

The Best Complex Finite Difference Equations Obtained:  
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Square: Interval , 1

Formula:, 1, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 3, Error:,  $2.4534138312579920088 \times 10^{-7}$ , New Error:,  $2.4374965778726909618 \times 10^{-10}$

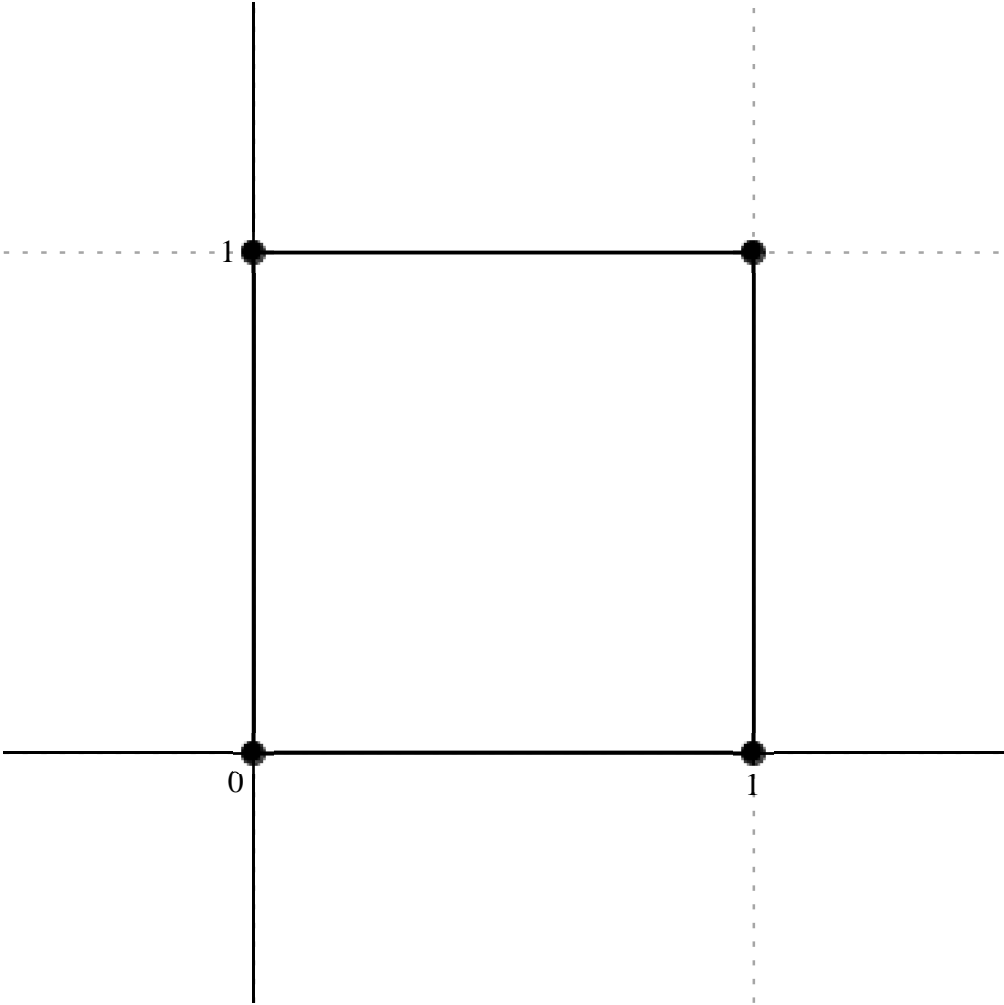
Error order:, 3, Error:,  $2.4374965778726909618 \times 10^{-10}$ , New Error:,  $2.4359076890095272158 \times 10^{-13}$

Error order:, 3, Error:,  $2.4359076890095272158 \times 10^{-13}$ , New Error:,  $2.4357488285114888247 \times 10^{-16}$

Error order:, 3, Error:,  $2.4357488285114888247 \times 10^{-16}$ , New Error:,  $2.4357329427455911228 \times 10^{-19}$

Error order:, 3, Error:,  $2.4357329427455911228 \times 10^{-19}$ , New Error:,  $2.4357313541718404373 \times 10^{-22}$

$$x_o + h, \begin{bmatrix} I & 1+I \\ 0 & 1 \end{bmatrix}$$
$$c =, \begin{bmatrix} 1 & \frac{1}{2} - \frac{I}{2} \\ -\frac{3}{2} + \frac{3I}{2} & -I \end{bmatrix}$$

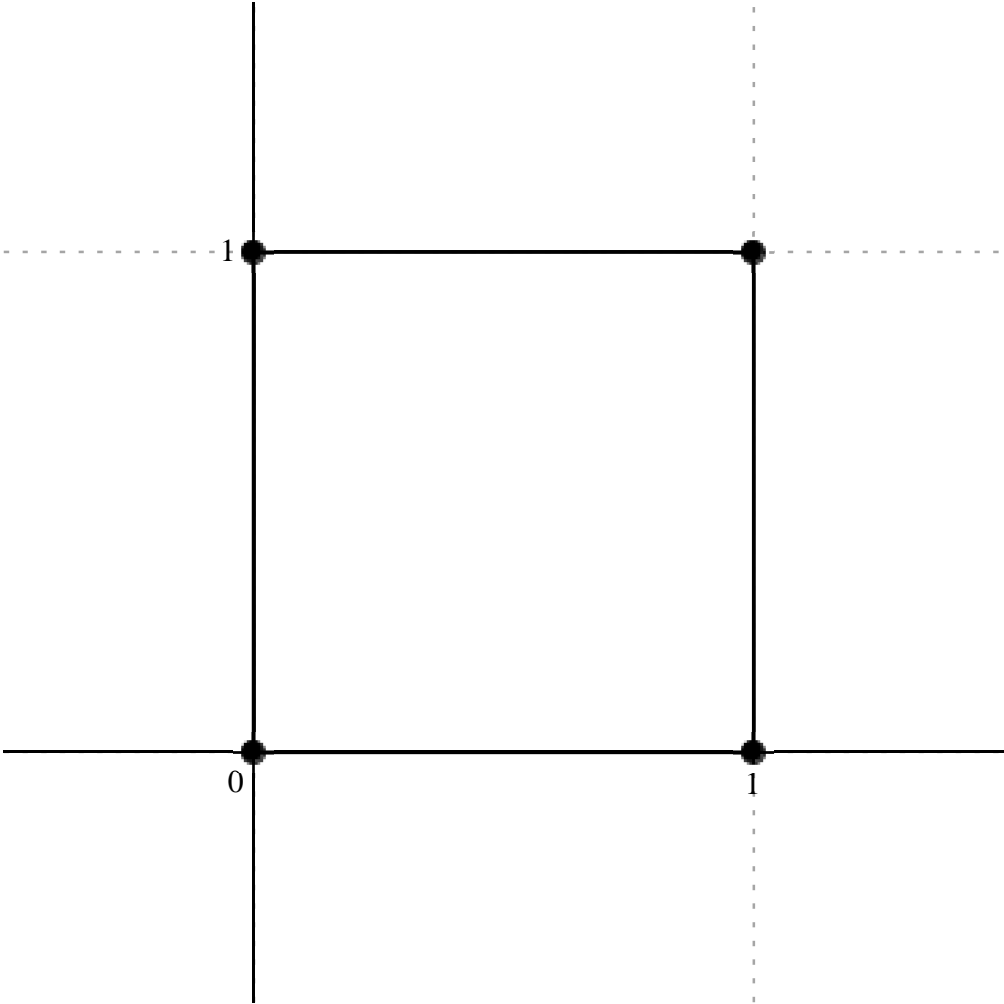


$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{2 u_{ol+1} + (1-I) u_{ol+1+1} + (-3+3I) u_{ol} - 2 I u_{ol+1}}{2 \Delta x_{ol}^3}, O(\Delta x_{ol}^3)$$

Formula:, 2, Var:, 1  
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 2, Error:, 0.00011027016243221806107, New Error:,  $1.0998466875172180258 \times 10^{-6}$   
Error order:, 2, Error:,  $1.0998466875172180258 \times 10^{-6}$ , New Error:,  $1.0995608922734057705 \times 10^{-8}$   
Error order:, 2, Error:,  $1.0995608922734057705 \times 10^{-8}$ , New Error:,  $1.0995323097580574002 \times 10^{-10}$   
Error order:, 2, Error:,  $1.0995323097580574002 \times 10^{-10}$ , New Error:,  $1.0995294514766375103 \times 10^{-12}$   
Error order:, 2, Error:,  $1.0995294514766375103 \times 10^{-12}$ , New Error:,  $1.0995291656481966954 \times 10^{-14}$

$$x_o \neq h, \begin{bmatrix} \text{I} & 1+\text{I} \\ 0 & 1 \end{bmatrix}$$
$$c =, \begin{bmatrix} -3+\text{I} & 2\text{I} \\ -4\text{I} & 3+\text{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{(-3+\text{I}) u_{ol+1} + 2\text{I} u_{ol+1+1} - 4\text{I} u_{ol} + (3+\text{I}) u_{ol+1}}{\Delta x_{ol}^2}, O(\Delta x_{ol}^2)$$

Formula:, 3, Var:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 3

Error order:, 1, Error:, 0.024265575449014548645, New Error:, 0.0024166953847624801079

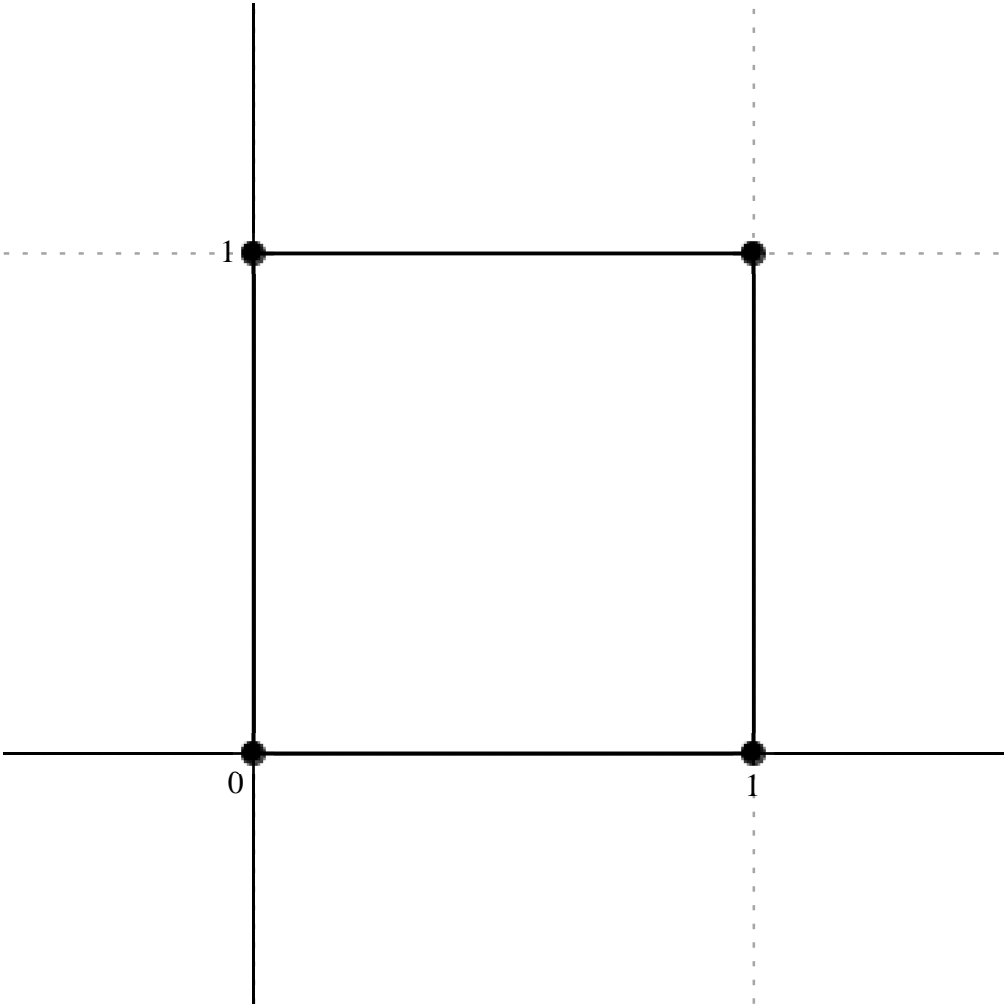
Error order:, 1, Error:, 0.0024166953847624801079, New Error:, 0.00024157105753949133008

Error order:, 1, Error:, 0.00024157105753949133008, New Error:, 0.000024156121085351173695

Error order:, 1, Error:, 0.000024156121085351173695, New Error:,  $2.4156022619899178077 \times 10^{-6}$

Error order:, 1, Error:,  $2.4156022619899178077 \times 10^{-6}$ , New Error:,  $2.4156012773368056623 \times 10^{-7}$

$$x_o+h., \begin{bmatrix} \textbf{I} & \textbf{1}+\textbf{I} \\ 0 & \textbf{1} \end{bmatrix}$$
$$c=, \begin{bmatrix} 3-3\textbf{I} & -3-3\textbf{I} \\ 3+3\textbf{I} & -3+3\textbf{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{(3-3\textbf{I}) \, u_{ol+1} - (3+3\textbf{I}) \, u_{ol+1+1} + (3+3\textbf{I}) \, u_{ol} + (-3+3\textbf{I}) \, u_{ol+1}}{\Delta x_{ol}^3}, \, O(\, \Delta x_{ol} \, )$$

Formula:, 4, Var:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 1

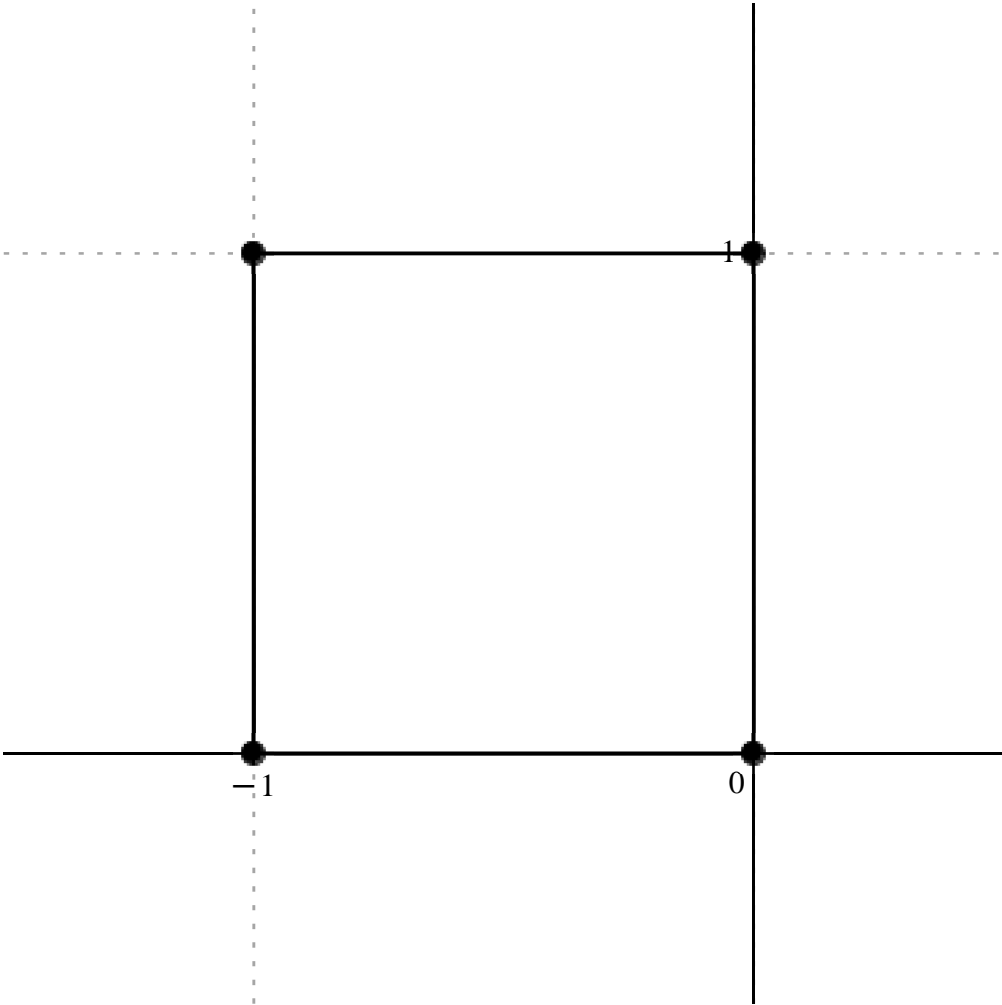
Error order:, 3, Error:,  $2.4320224598480233429 \times 10^{-7}$ , New Error:,  $2.4353631612050253366 \times 10^{-10}$

Error order:, 3, Error:,  $2.4353631612050253366 \times 10^{-10}$ , New Error:,  $2.4356944046830032129 \times 10^{-13}$

Error order:, 3, Error:,  $2.4356944046830032129 \times 10^{-13}$ , New Error:,  $2.4357275006523743589 \times 10^{-16}$

Error order:, 3, Error:,  $2.4357275006523743589 \times 10^{-16}$ , New Error:,  $2.4357308099654151910 \times 10^{-19}$   
Error order:, 3, Error:,  $2.4357308099654151910 \times 10^{-19}$ , New Error:,  $2.4357311408938801994 \times 10^{-22}$

$$x_o \neq h., \begin{bmatrix} -1 + \text{I} & \text{I} \\ -1 & 0 \end{bmatrix}$$
$$c =, \begin{bmatrix} -\frac{1}{2} - \frac{\text{I}}{2} & -1 \\ -\text{I} & \frac{3}{2} + \frac{3\text{I}}{2} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{-(1 + \text{I})\, u_{ol-1+1} - 2\, u_{ol+1} - 2\, \text{I}\, u_{ol-1} + (3 + 3\, \text{I})\, u_{ol}}{2\, \Delta x_{ol}},\, O(\, \Delta x_{ol}^{\, 3} \,)$$

Formula:, 5, Var:, 1

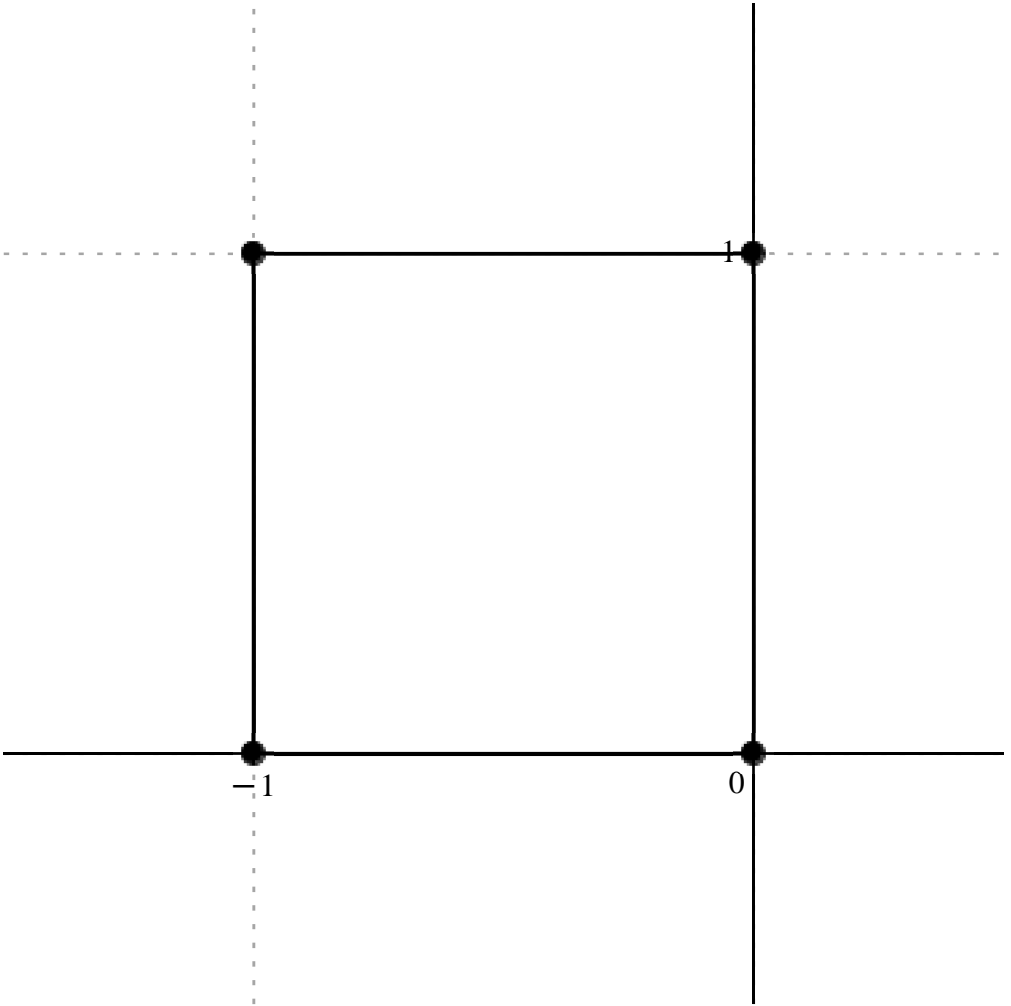
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 2, Error:, 0.00010946852795250663027, New Error:,  $1.0990444448231242720 \times 10^{-6}$   
Error order:, 2, Error:,  $1.0990444448231242720 \times 10^{-6}$ , New Error:,  $1.0994806619626333001 \times 10^{-8}$   
Error order:, 2, Error:,  $1.0994806619626333001 \times 10^{-8}$ , New Error:,  $1.0995242866666073028 \times 10^{-10}$   
Error order:, 2, Error:,  $1.0995242866666073028 \times 10^{-10}$ , New Error:,  $1.0995286491668888129 \times 10^{-12}$   
Error order:, 2, Error:,  $1.0995286491668888129 \times 10^{-12}$ , New Error:,  $1.0995290854172157889 \times 10^{-14}$



$$x_o \neq h. , \begin{bmatrix} -1 + \text{I} & \text{I} \\ -1 & 0 \end{bmatrix}$$

$$c =, \begin{bmatrix} -2 \text{ I} & -3 - \text{I} \\ 3 - \text{I} & 4 \text{ I} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d} x_{ol}^2} \, u(x_{ol}) = \frac{-2 \, \text{I} \, u_{ol-1+1} - (3 + \text{I}) \, u_{ol+1} + (3 - \text{I}) \, u_{ol-1} + 4 \, \text{I} \, u_{ol}}{\Delta x_{ol}^2}, \, O(\Delta x_{ol}^2 \, )$$

Formula: 6, Var.: 1

Variavel : x<sub>ol</sub>, Derivada de Ordem : 3

Error order.: 1, Error.: 0.024133063041748869997, New Error.: 0.0024153730980347758375

Error order.: 1, Error.: 0.0024153730980347758375, New Error.: 0.00024155783751560676077

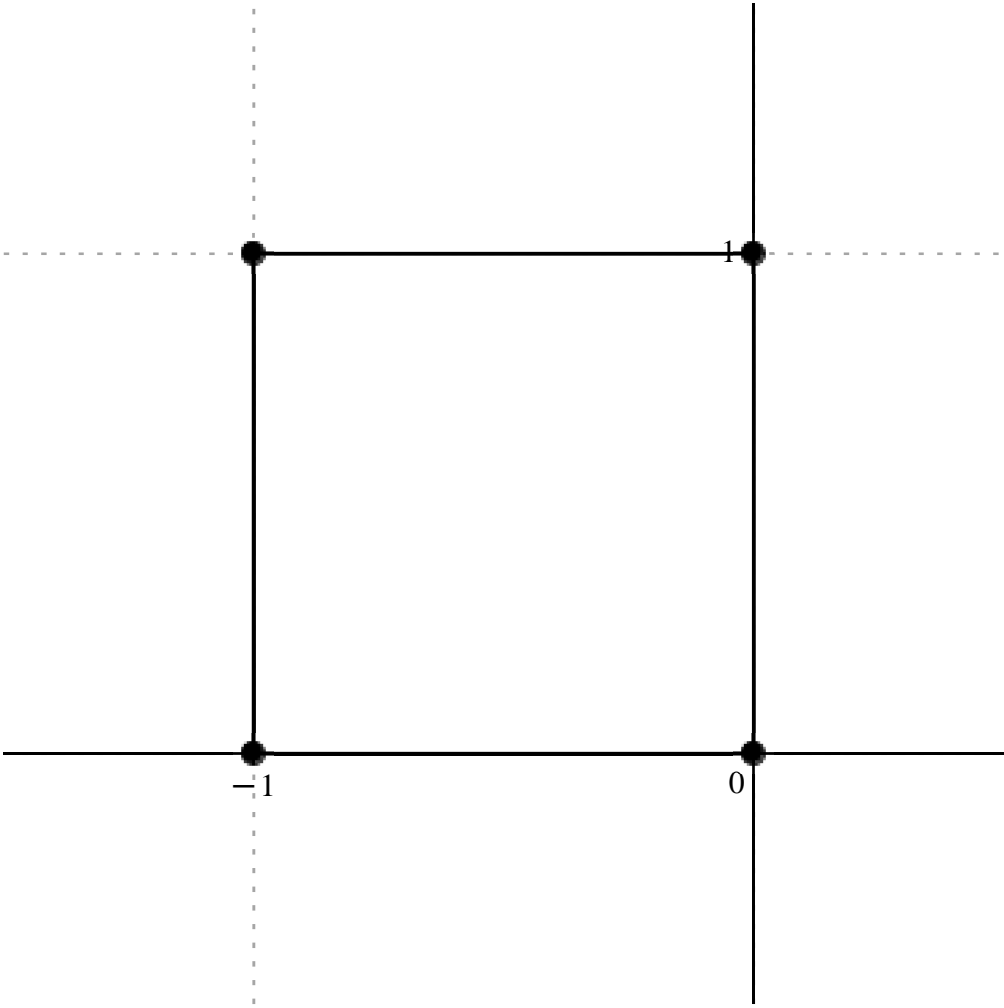
Error order.: 1, Error.: 0.00024155783751560676077, New Error.: 0.000024155988887956325226

Error order.: 1, Error.: 0.000024155988887956325226, New Error.: 2.4156009400188133807 × 10<sup>−6</sup>

Error order.: 1, Error.: 2.4156009400188133807 × 10<sup>−6</sup>, New Error.: 2.4156011451397236602 × 10<sup>−7</sup>

$$x_o \neq h. , \begin{bmatrix} -1 + \text{I} & \text{I} \\ -1 & 0 \end{bmatrix}$$

$$c =, \begin{bmatrix} 3 - 3 \text{ I} & -3 - 3 \text{ I} \\ 3 + 3 \text{ I} & -3 + 3 \text{ I} \end{bmatrix}$$



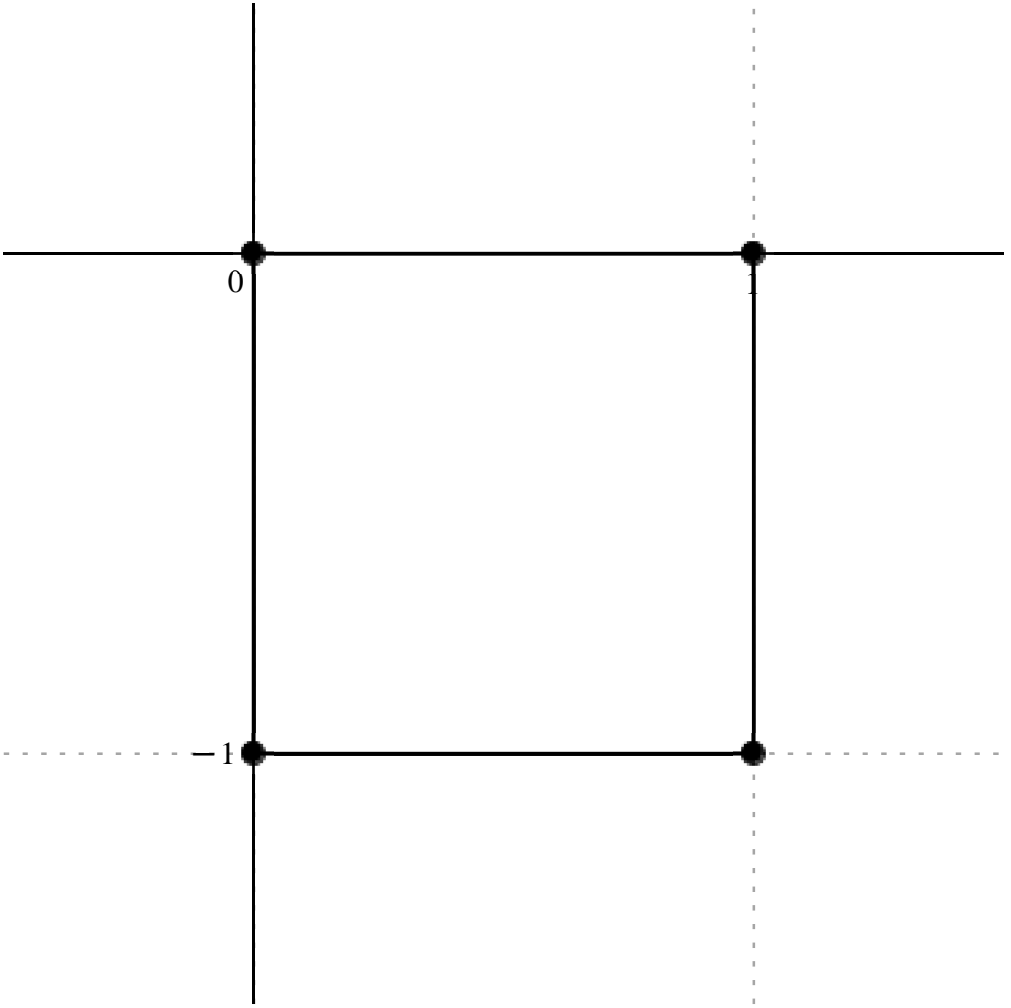
$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{(3-3 \, \mathrm{I}) \, u_{ol-1+1} - (3+3 \, \mathrm{I}) \, u_{ol+1} + (3+3 \, \mathrm{I}) \, u_{ol-1} + (-3+3 \, \mathrm{I}) \, u_{ol}}{\Delta x_{ol}^3}, \, O(\, \Delta x_{ol} \, )$$

Formula:, 7, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 3, Error:,  $2.4393761669946830826 \times 10^{-7}$ , New Error:,  $2.4360985568411916814 \times 10^{-10}$   
Error order:, 3, Error:,  $2.4360985568411916814 \times 10^{-10}$ , New Error:,  $2.4357679442715413339 \times 10^{-13}$   
Error order:, 3, Error:,  $2.4357679442715413339 \times 10^{-13}$ , New Error:,  $2.4357348546112530925 \times 10^{-16}$   
Error order:, 3, Error:,  $2.4357348546112530925 \times 10^{-16}$ , New Error:,  $2.4357315453613030893 \times 10^{-19}$   
Error order:, 3, Error:,  $2.4357315453613030893 \times 10^{-19}$ , New Error:,  $2.4357312144334689893 \times 10^{-22}$

$$x_o + h \cdot , \left[ \begin{array}{cc} 0 & 1 \\ -\mathrm{I} & 1-\mathrm{I} \end{array} \right]$$
  
$$c = , \left[ \begin{array}{cc} -\frac{3}{2} - \frac{3 \, \mathrm{I}}{2} & \mathrm{I} \\ 1 & \frac{1}{2} + \frac{\mathrm{I}}{2} \end{array} \right]$$

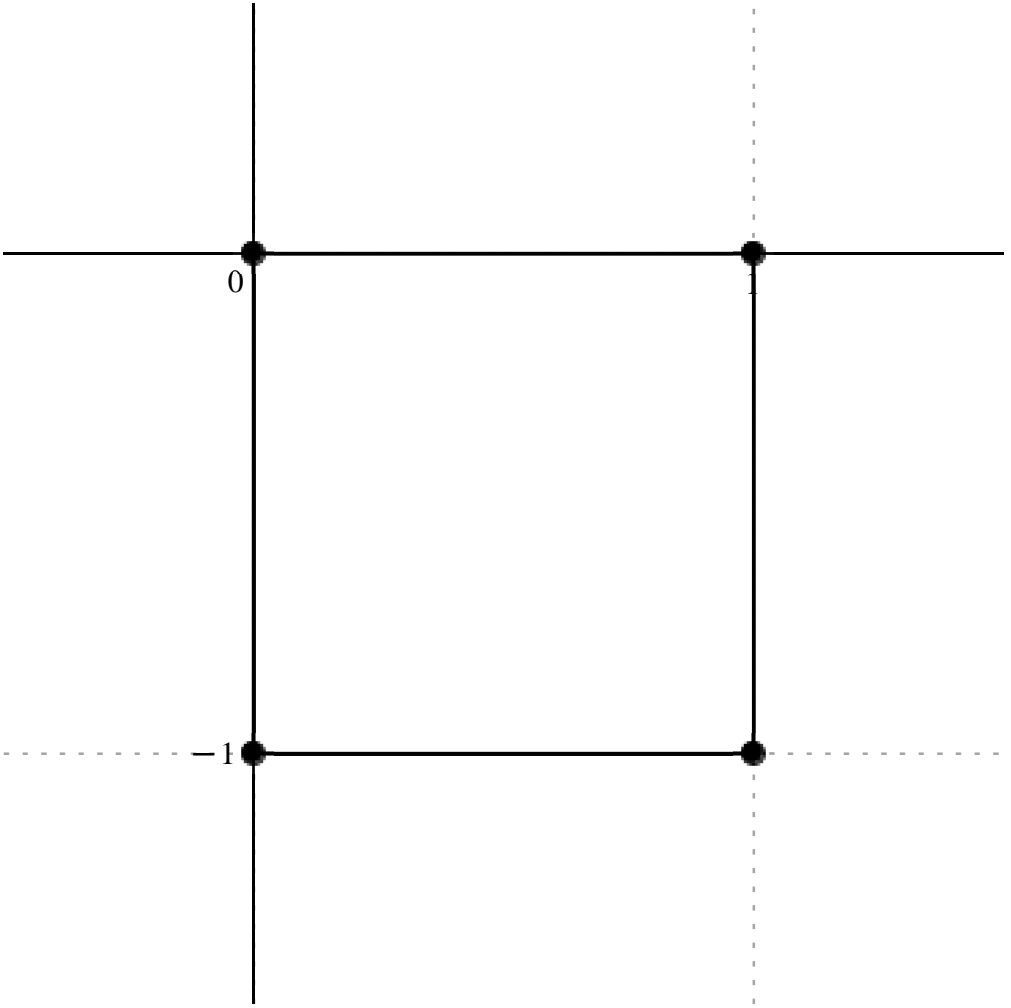


$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{-(3+3\,\mathrm{I})\,u_{ol}+2\,\mathrm{I}\,u_{ol+1}+2\,u_{ol-1}+(1+\mathrm{I})\,u_{ol+1-\mathrm{I}}}{2\,\Delta x_{ol}},\, O(\,\Delta x_{ol}^{\,3}\,)$$

Formula.: 8, Var.: 1  
Variavel .:  $x_{ol}$ , Derivada de Ordem .: 2  
Error order.: 2, Error.: 0.00011043796957384524451, New Error.:  $1.1000138900317306469 \times 10^{-6}$   
Error order.: 2, Error.:  $1.1000138900317306469 \times 10^{-6}$ , New Error.:  $1.0995776064870811917 \times 10^{-8}$   
Error order.: 2, Error.:  $1.0995776064870811917 \times 10^{-8}$ , New Error.:  $1.0995339811190556792 \times 10^{-10}$   
Error order.: 2, Error.:  $1.0995339811190556792 \times 10^{-10}$ , New Error.:  $1.0995296186121336541 \times 10^{-12}$   
Error order.: 2, Error.:  $1.0995296186121336541 \times 10^{-12}$ , New Error.:  $1.0995291823617402730 \times 10^{-14}$

$$x_o\,+h\,.,\left[\begin{array}{cc}0&1\\-\mathrm{I}&1-\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{cc}4\,\mathrm{I}&3-\mathrm{I}\\-3-\mathrm{I}&-2\,\mathrm{I}\end{array}\right]$$

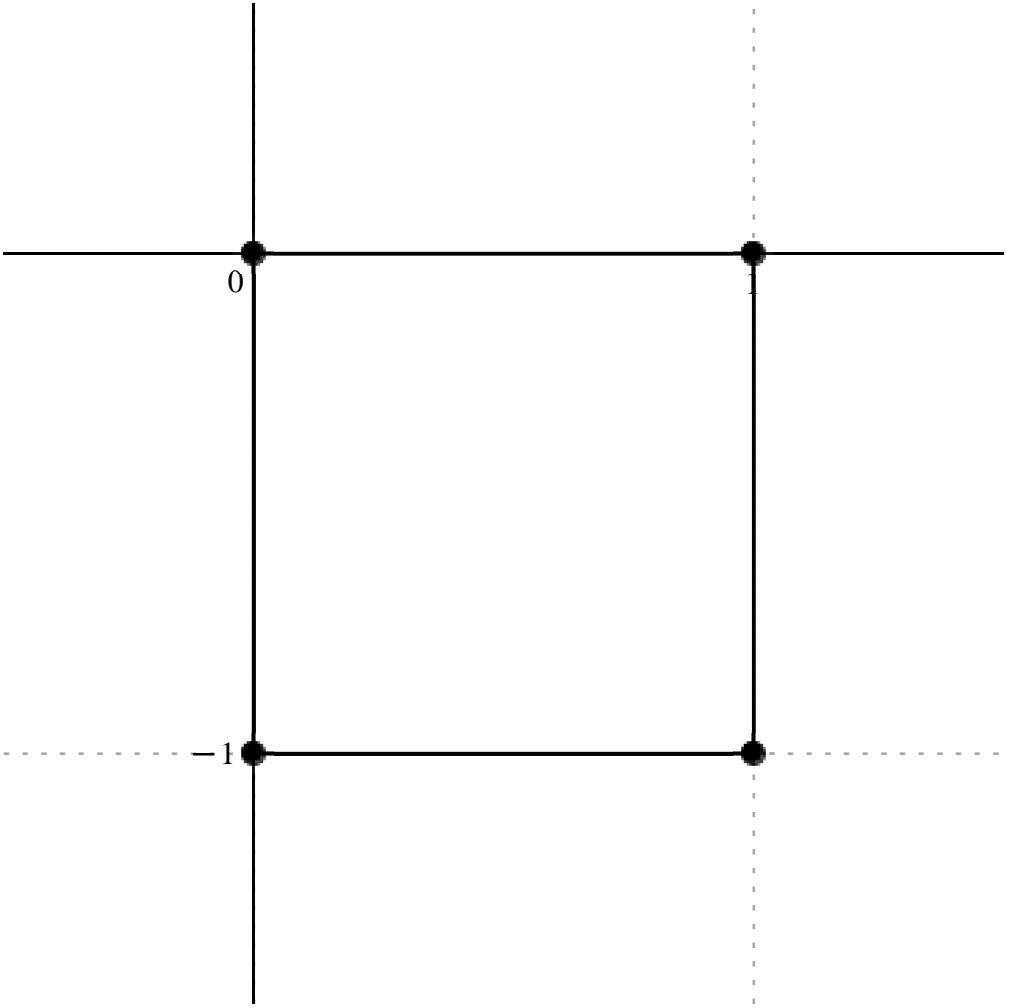


$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{4 \operatorname{I} u_{ol} + (3 - \operatorname{I}) u_{ol+1} - (3 + \operatorname{I}) u_{ol-1} - 2 \operatorname{I} u_{ol+1-1}}{\Delta x_{ol}^2}, \mathcal{O}(\Delta x_{ol}^2)$$

Formula.: 9, Var.: 1  
Variavel .:  $x_{ol}$ , Derivada de Ordem .: 3  
Error order.: 1, Error.: 0.024178644308061101700, New Error.: 0.0024158289218198903151  
Error order.: 1, Error.: 0.0024158289218198903151, New Error.: 0.00024156239575457010412  
Error order.: 1, Error.: 0.00024156239575457010412, New Error.: 0.000024156034470346069879  
Error order.: 1, Error.: 0.000024156034470346069879, New Error.:  $2.4156013958427108384 \times 10^{-6}$   
Error order.: 1, Error.:  $2.4156013958427108384 \times 10^{-6}$ , New Error.:  $2.4156011907221134060 \times 10^{-7}$

$$x_o + h \cdot , \left[ \begin{array}{cc} 0 & 1 \\ -\operatorname{I} & 1 - \operatorname{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cc} 3 - 3 \operatorname{I} & -3 - 3 \operatorname{I} \\ 3 + 3 \operatorname{I} & -3 + 3 \operatorname{I} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{(3-3 \, \mathrm{I}) \, u_{ol} - (3+3 \, \mathrm{I}) \, u_{ol+1} + (3+3 \, \mathrm{I}) \, u_{ol-1} + (-3+3 \, \mathrm{I}) \, u_{ol+1-1}}{\Delta x_{ol}^3}, \, O(\, \Delta x_{ol} \, )$$

Formula:, 10, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 3, Error:,  $2.4181122518049311949 \times 10^{-7}$ , New Error:,  $2.4339664147357282350 \times 10^{-10}$

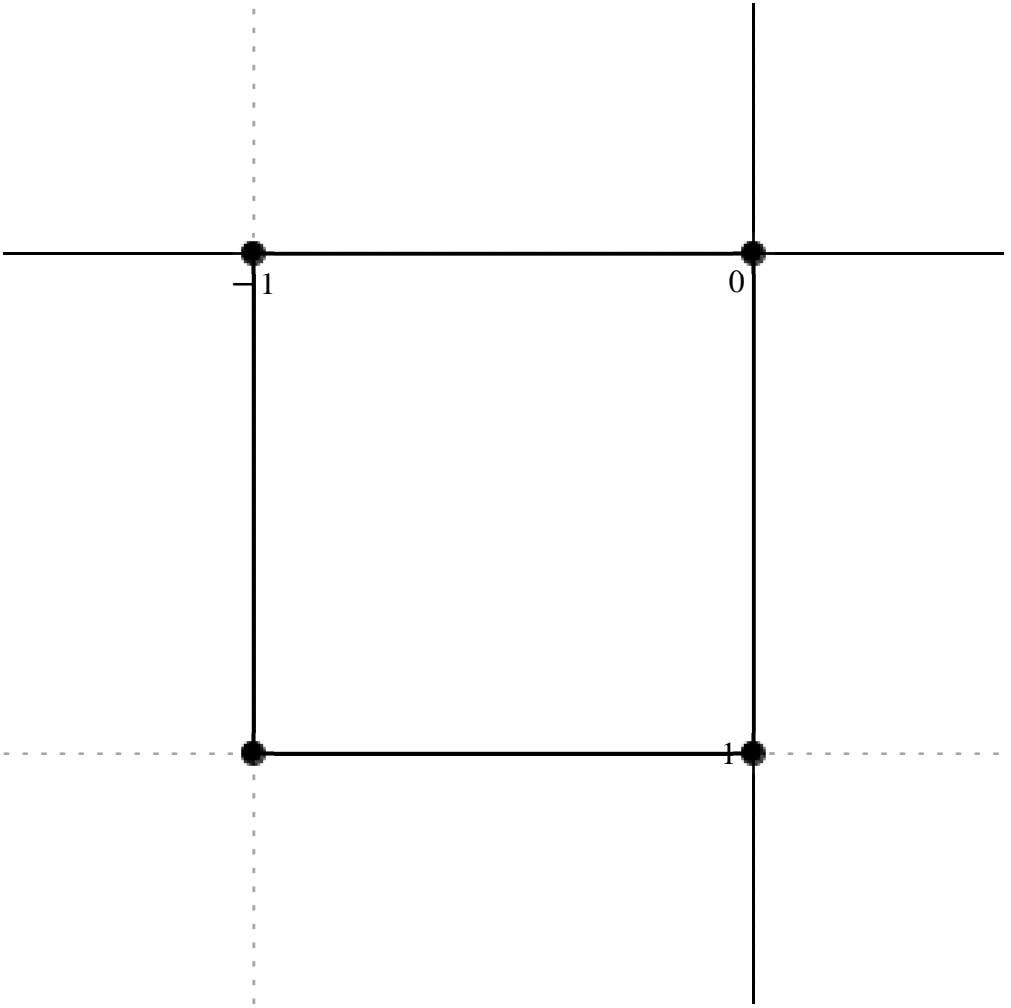
Error order:, 3, Error:,  $2.4339664147357282350 \times 10^{-10}$ , New Error:,  $2.4355546726906393528 \times 10^{-13}$

Error order:, 3, Error:,  $2.4355546726906393528 \times 10^{-13}$ , New Error:,  $2.4357135268795948468 \times 10^{-16}$

Error order:, 3, Error:,  $2.4357135268795948468 \times 10^{-16}$ , New Error:,  $2.4357294125824017198 \times 10^{-19}$

Error order:, 3, Error:,  $2.4357294125824017198 \times 10^{-19}$ , New Error:,  $2.4357310011555214970 \times 10^{-22}$

$$x_o + h \cdot , \left[ \begin{array}{cc} -1 & 0 \\ -1 - \mathrm{I} & -\mathrm{I} \end{array} \right]$$
  
$$c = , \left[ \begin{array}{cc} \mathrm{I} & \frac{3}{2} - \frac{3 \, \mathrm{I}}{2} \\ -\frac{1}{2} + \frac{\mathrm{I}}{2} & -1 \end{array} \right]$$

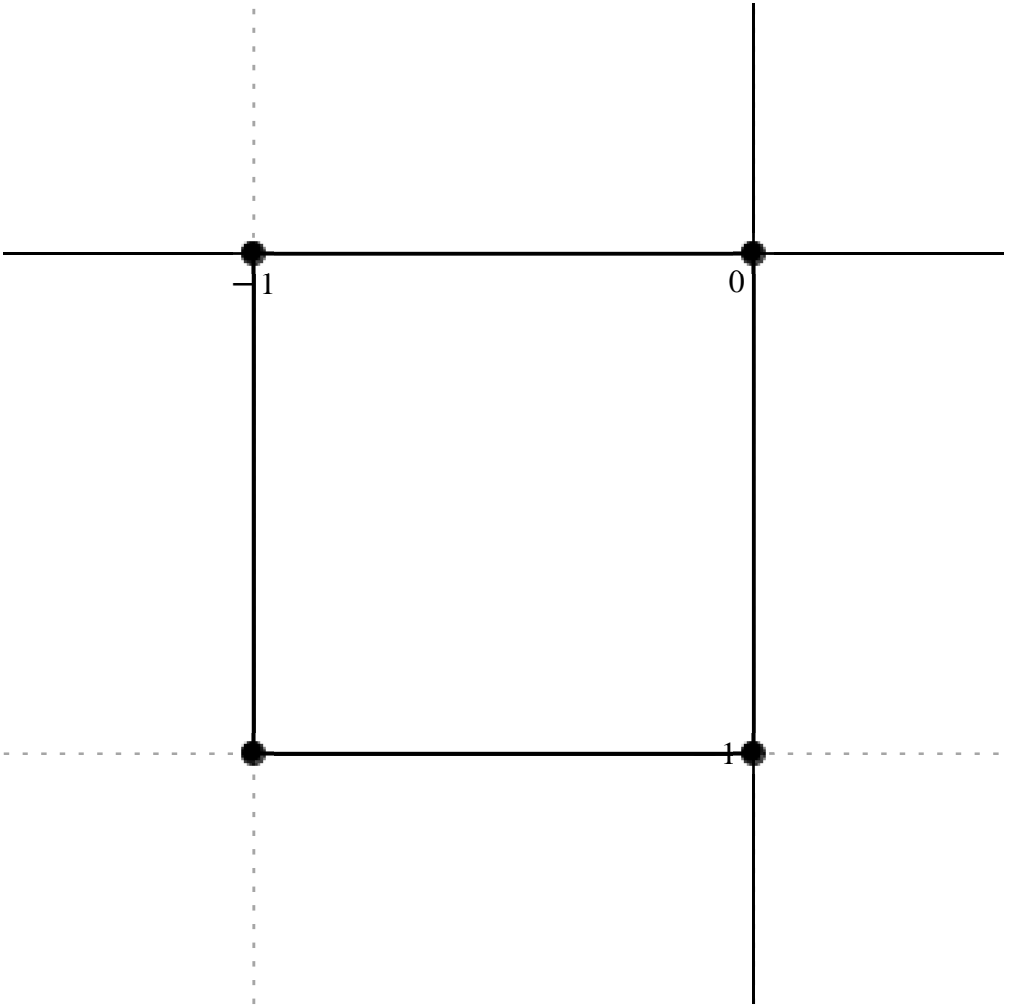


$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{2\,\mathrm{I}\, u_{ol-1} + (3-3\,\mathrm{I})\, u_{ol} + (-1+\mathrm{I})\, u_{ol-1-1} - 2\, u_{ol-1}}{2\, \Delta x_{ol}},\, O(\, \Delta x_{ol}^3 \,)$$

Formula:, 11, Var:, 1  
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 2, Error:, 0.00010963499357593036046, New Error:,  $1.0992115131858165467 \times 10^{-6}$   
Error order:, 2, Error:,  $1.0992115131858165467 \times 10^{-6}$ , New Error:,  $1.0994973748347905178 \times 10^{-8}$   
Error order:, 2, Error:,  $1.0994973748347905178 \times 10^{-8}$ , New Error:,  $1.0995259580141903998 \times 10^{-10}$   
Error order:, 2, Error:,  $1.0995259580141903998 \times 10^{-10}$ , New Error:,  $1.0995288163022508048 \times 10^{-12}$   
Error order:, 2, Error:,  $1.0995288163022508048 \times 10^{-12}$ , New Error:,  $1.0995291021307580249 \times 10^{-14}$

$$x_o \neq h \, , \, \left[ \begin{array}{cc} -1 & 0 \\ -1-\mathrm{I} & -\mathrm{I} \end{array} \right]$$
  
$$c =, \left[ \begin{array}{cc} 3+\mathrm{I} & -4\,\mathrm{I} \\ 2\,\mathrm{I} & -3+\mathrm{I} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{(3 + \mathrm{I}) u_{ol-1} - 4 \mathrm{I} u_{ol} + 2 \mathrm{I} u_{ol-1-1} + (-3 + \mathrm{I}) u_{ol-1}}{\Delta x_{ol}^2}, O(\Delta x_{ol}^2)$$

Formula:, 12, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 3

Error order:, 1, Error:, 0.024046763915110547572, New Error:, 0.0024145072671065011746

Error order:, 1, Error:, 0.0024145072671065011746, New Error:, 0.00024154917636269984994

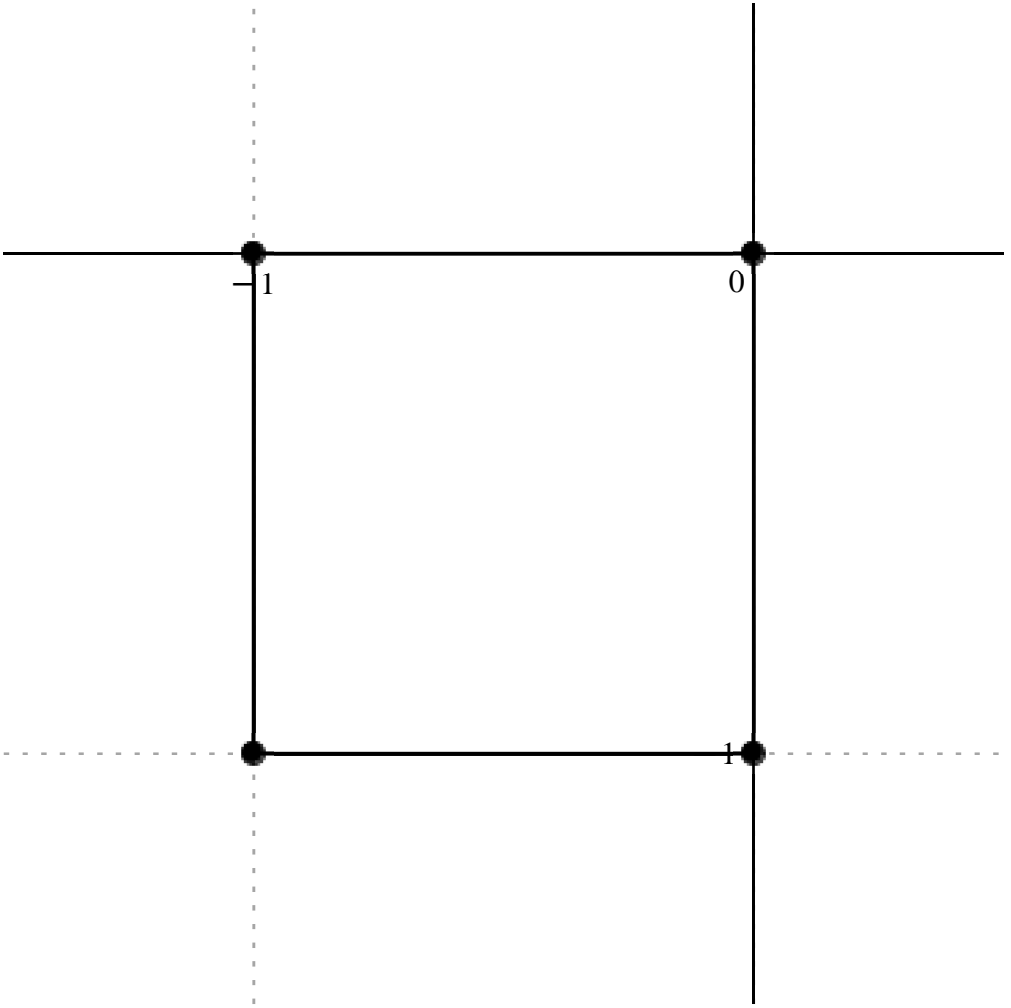
Error order:, 1, Error:, 0.00024154917636269984994, New Error:, 0.000024155902273583235725

Error order:, 1, Error:, 0.000024155902273583235725, New Error:, 2.4156000738722384257 \times 10^{-6}

Error order:, 1, Error:, 2.4156000738722384257 \times 10^{-6}, New Error:, 2.4156010585250377241 \times 10^{-7}

$$x_o + h, \begin{bmatrix} -1 & 0 \\ -1 - \mathrm{I} & -\mathrm{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} 3 - 3 \mathrm{I} & -3 - 3 \mathrm{I} \\ 3 + 3 \mathrm{I} & -3 + 3 \mathrm{I} \end{bmatrix}$$



$$\frac{d^3}{dx_{ol}^3} u(x_{ol}) = \frac{(3-3 I) u_{ol-1} - (3+3 I) u_{ol} + (3+3 I) u_{ol-1-1} + (-3+3 I) u_{ol-1}, O(\Delta x_{ol})}$$

Square: Interval, 2

Formula:, 13, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 8, Error:,  $1.6884348006347119661 \times 10^{-19}$ , New Error:,  $1.6767100195413197263 \times 10^{-27}$

Error order:, 8, Error:,  $1.6767100195413197263 \times 10^{-27}$ , New Error:,  $1.6755344274388987340 \times 10^{-35}$

Error order:, 8, Error:,  $1.6755344274388987340 \times 10^{-35}$ , New Error:,  $1.6754168376821737335 \times 10^{-43}$

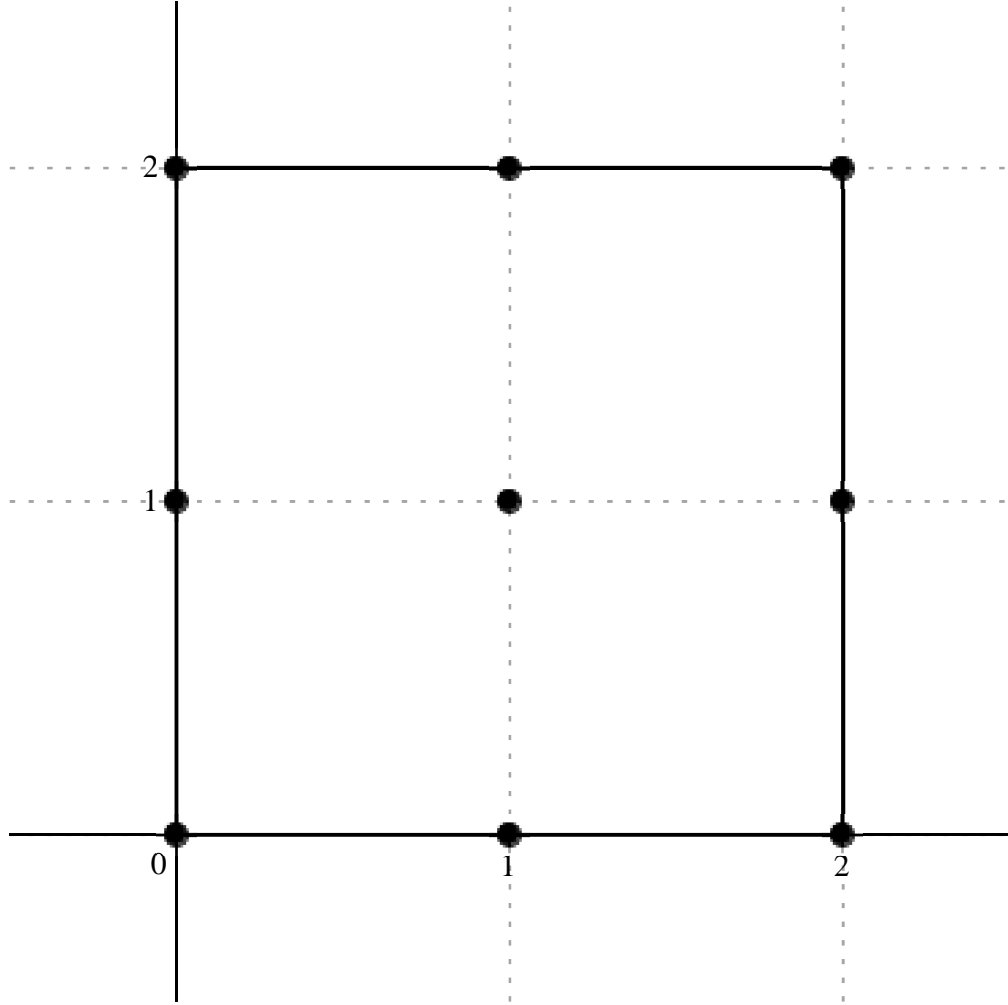
Error order:, 8, Error:,  $1.6754168376821737335 \times 10^{-43}$ , New Error:,  $1.6754050784016273748 \times 10^{-51}$

Error order:, 8, Error:,  $1.6754050784016273748 \times 10^{-51}$ , New Error:,  $1.6754039024705245911 \times 10^{-59}$

$$x_o + h, \begin{bmatrix} 2 I & 1+2 I & 2+2 I \\ I & 1+I & 2+I \\ 0 & 1 & 2 \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{1}{2} & -\frac{4}{5} + \frac{8 I}{5} & -\frac{1}{4} + \frac{I}{4} \\ 4 I & 10-10 I & -\frac{8}{5} + \frac{4 I}{5} \\ -\frac{57}{20} + \frac{57 I}{20} & -4 & -\frac{1}{2} \end{bmatrix}$$





$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{10\,\mathrm{I}u_{ol+2\,\mathrm{I}}+(-16+32\,\mathrm{I})\,u_{ol+1+2\,\mathrm{I}}+(-5+5\,\mathrm{I})\,u_{ol+2+2\,\mathrm{I}}+80\,\mathrm{I}u_{ol+1}+(200-200\,\mathrm{I})\,u_{ol+1+1}+(-32+16\,\mathrm{I})\,u_{ol+2+1}+(-57+57\,\mathrm{I})\,u_{ol}-80\,u_{ol+1}-10\,u_{ol+2}}{20\,\Delta x_{ol}}\,,\,O(\,\Delta x_{ol}^{\,8}\,)$$

Formula:, 14, Var:; 1

Variavel :; x<sub>ol</sub> , Derivada de Ordem :; 2

Error order:; 7, Error:; 1.0658533526119965903 × 10<sup>-16</sup>, New Error:; 1.0506954750210725917 × 10<sup>-23</sup>

Error order:; 7, Error:; 1.0506954750210725917 × 10<sup>-23</sup>, New Error:; 1.0491854678332341784 × 10<sup>-30</sup>

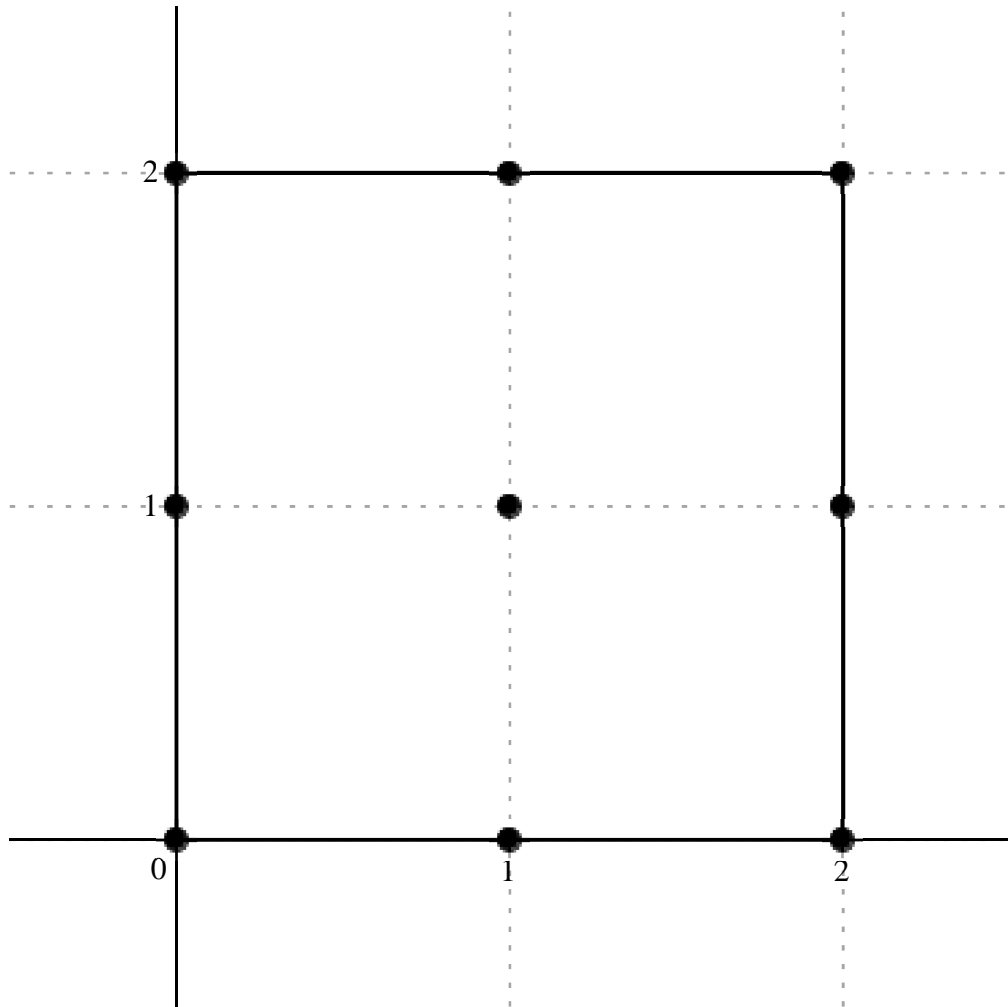
Error order:; 7, Error:; 1.0491854678332341784 × 10<sup>-30</sup>, New Error:; 1.0490345250222795772 × 10<sup>-37</sup>

Error order:; 7, Error:; 1.0490345250222795772 × 10<sup>-37</sup>, New Error:; 1.0490194313203630627 × 10<sup>-44</sup>

Error order:; 7, Error:; 1.0490194313203630627 × 10<sup>-44</sup>, New Error:; 1.0490179219559633012 × 10<sup>-51</sup>

$$x_o\neq h\,,\left[\begin{array}{ccc}2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}\\ 0&1&2\end{array}\right]$$

$$c=\,,\left[\begin{array}{ccc}-\frac{47}{20}-\frac{57\,\mathrm{I}}{20}&-\frac{18}{5}-\frac{62\,\mathrm{I}}{5}&-\frac{13\,\mathrm{I}}{5}\\ -\frac{74}{5}-\frac{114\,\mathrm{I}}{5}&94\,\mathrm{I}&\frac{18}{5}-\frac{62\,\mathrm{I}}{5}\\ -\frac{153\,\mathrm{I}}{10}&\frac{74}{5}-\frac{114\,\mathrm{I}}{5}&\frac{47}{20}-\frac{57\,\mathrm{I}}{20}\end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{-(47 + 57 \operatorname{I}) u_{ol+2\operatorname{I}} - (72 + 248 \operatorname{I}) u_{ol+1+2\operatorname{I}} - 52 \operatorname{I} u_{ol+2+2\operatorname{I}} - (296 + 456 \operatorname{I}) u_{ol+1} + 1880 \operatorname{I} u_{ol+1+1} + (72 - 248 \operatorname{I}) u_{ol+2+1} - 306 \operatorname{I} u_{ol} + (296 - 456 \operatorname{I}) u_{ol+1} + (47 - 57 \operatorname{I}) u_{ol+2}}{20 \Delta x_{ol}^2}, \mathcal{O}(\Delta x_{ol}^7)$$

Formula:, 15, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 6, Error:,  $6.4028470948468424226 \times 10^{-14}$ , New Error:,  $6.3602073161294969261 \times 10^{-20}$

Error order:, 6, Error:,  $6.3602073161294969261 \times 10^{-20}$ , New Error:,  $6.3559323949361063010 \times 10^{-26}$

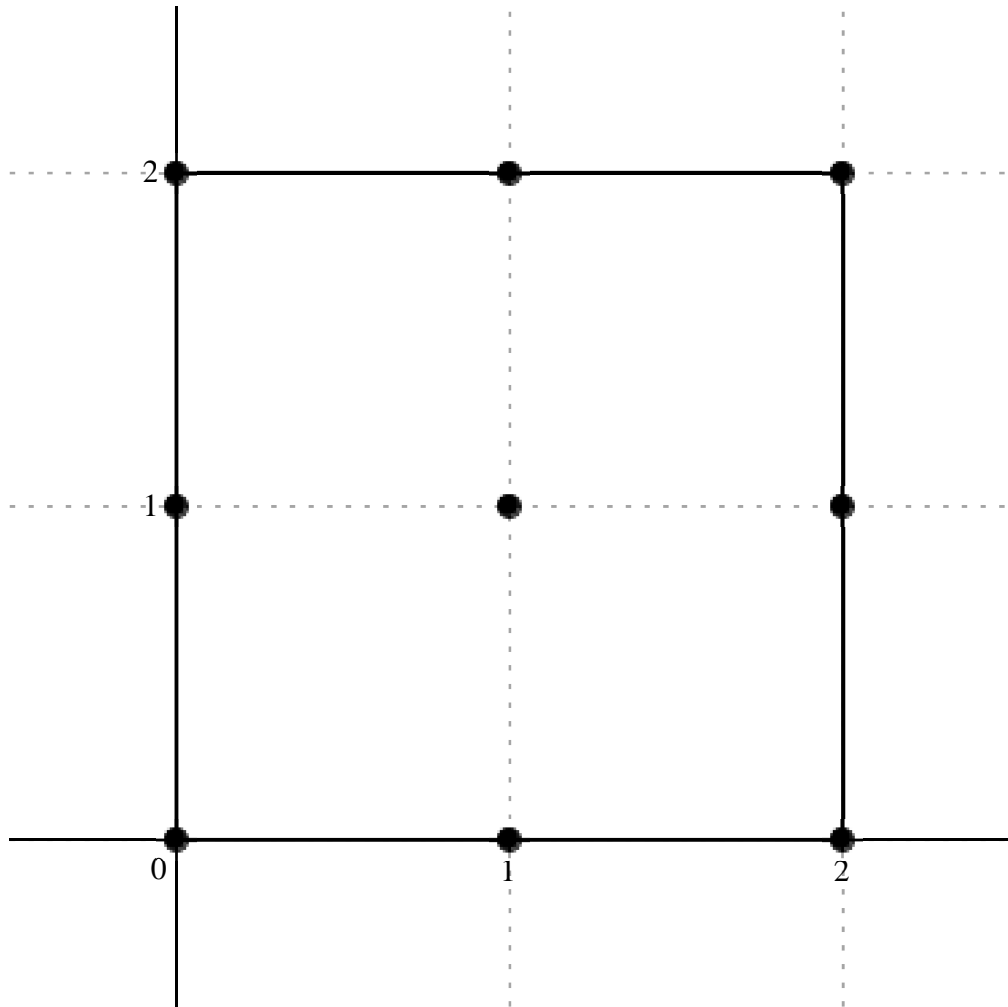
Error order:, 6, Error:,  $6.3559323949361063010 \times 10^{-26}$ , New Error:,  $6.3555047954138160403 \times 10^{-32}$

Error order:, 6, Error:,  $6.3555047954138160403 \times 10^{-32}$ , New Error:,  $6.3554620343895794794 \times 10^{-38}$

Error order:, 6, Error:,  $6.3554620343895794794 \times 10^{-38}$ , New Error:,  $6.3554577582764377691 \times 10^{-44}$

$$x_o \neq h, \begin{bmatrix} 2 \operatorname{I} & 1+2 \operatorname{I} & 2+2 \operatorname{I} \\ \operatorname{I} & 1+\operatorname{I} & 2+\operatorname{I} \\ 0 & 1 & 2 \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{747}{40} + \frac{141 \operatorname{I}}{40} & \frac{282}{5} + \frac{168 \operatorname{I}}{5} & \frac{381}{40} + \frac{381 \operatorname{I}}{40} \\ \frac{576}{5} + \frac{222 \operatorname{I}}{5} & -318 - 318 \operatorname{I} & \frac{168}{5} + \frac{282 \operatorname{I}}{5} \\ \frac{1467}{40} + \frac{1467 \operatorname{I}}{40} & \frac{222}{5} + \frac{576 \operatorname{I}}{5} & \frac{141}{40} + \frac{747 \operatorname{I}}{40} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{3 \left( (249 + 47 \, \mathrm{I}) u_{ol+2 \, \mathrm{I}} + (752 + 448 \, \mathrm{I}) u_{ol+1+2 \, \mathrm{I}} + (127 + 127 \, \mathrm{I}) u_{ol+2+2 \, \mathrm{I}} + (1536 + 592 \, \mathrm{I}) u_{ol+1} - (4240 + 4240 \, \mathrm{I}) u_{ol+1+1} + (448 + 752 \, \mathrm{I}) u_{ol+2+1} + (489 + 489 \, \mathrm{I}) u_{ol} + (592 + 1536 \, \mathrm{I}) u_{ol+1} + (47 + 249 \, \mathrm{I}) u_{ol+2} \right)}{40 \, \Delta x_{ol}^3}, \, O(\, \Delta x_{ol}^6 \,)$$

Formula:, 16, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 5, Error:,  $2.2652501030965187755 \times 10^{-11}$ , New Error:,  $2.2346594573384102687 \times 10^{-16}$

Error order:, 5, Error:,  $2.2346594573384102687 \times 10^{-16}$ , New Error:,  $2.2316116071432559261 \times 10^{-21}$

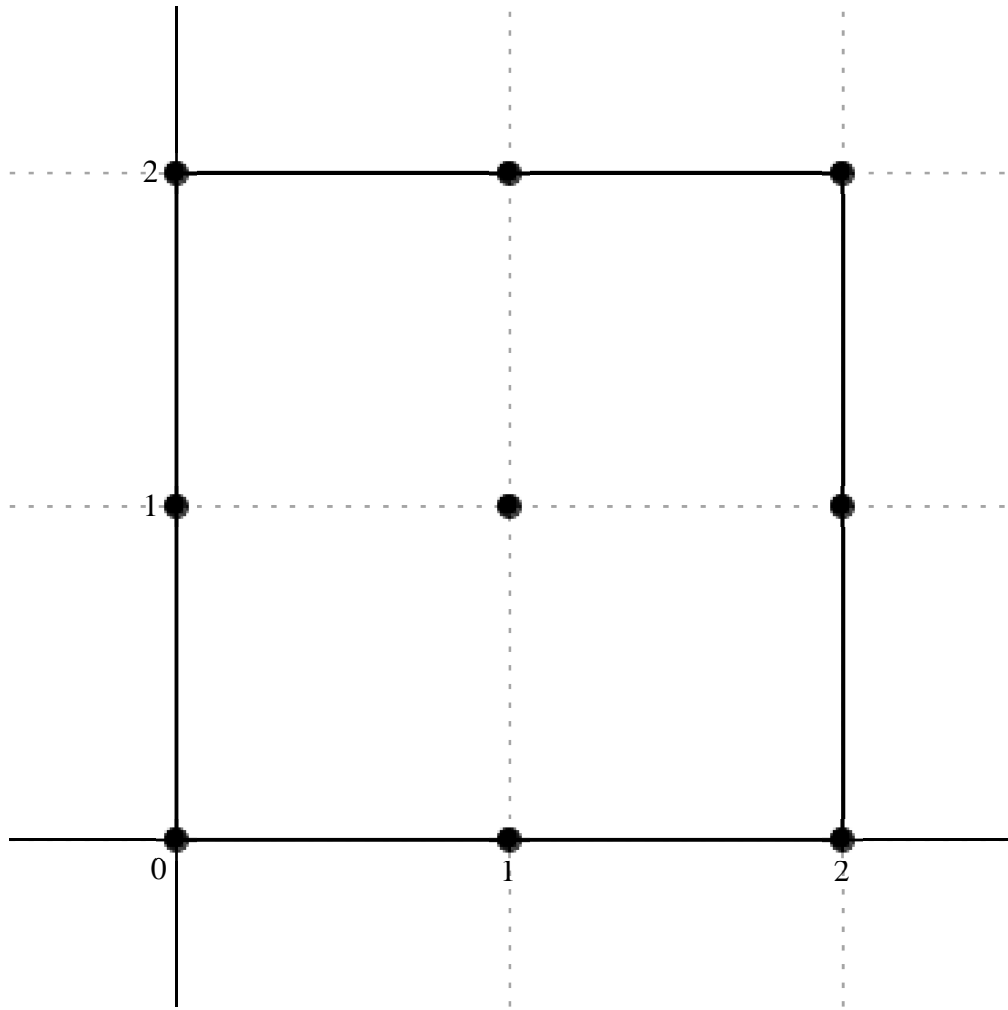
Error order:, 5, Error:,  $2.2316116071432559261 \times 10^{-21}$ , New Error:,  $2.2313069344595030949 \times 10^{-26}$

Error order:, 5, Error:,  $2.2313069344595030949 \times 10^{-26}$ , New Error:,  $2.2312764683146747093 \times 10^{-31}$

Error order:, 5, Error:,  $2.2312764683146747093 \times 10^{-31}$ , New Error:,  $2.2312734217114275287 \times 10^{-36}$

$$x_o + h, \begin{bmatrix} 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & 2 + 2 \, \mathrm{I} \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} \\ 0 & 1 & 2 \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{663}{10} + 36 \, \mathrm{I} & -\frac{1266}{5} + 54 \, \mathrm{I} & -\frac{543}{10} \\ -\frac{2046}{5} + 126 \, \mathrm{I} & 1662 & -\frac{1266}{5} - 54 \, \mathrm{I} \\ -\frac{1503}{10} & -\frac{2046}{5} - 126 \, \mathrm{I} & -\frac{663}{10} - 36 \, \mathrm{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{3 \left( (-221 + 120 \, \mathrm{I}) u_{ol+21} + (-844 + 180 \, \mathrm{I}) u_{ol+1+21} - 181 u_{ol+2+21} + (-1364 + 420 \, \mathrm{I}) u_{ol+1} + 5540 u_{ol+1+1} - (844 + 180 \, \mathrm{I}) u_{ol+2+1} - 501 u_{ol} - (1364 + 420 \, \mathrm{I}) u_{ol+1} - (221 + 120 \, \mathrm{I}) u_{ol+2} \right)}{10 \Delta x_{ol}^4}, \, O(\Delta x_{ol}^5)$$

Formula:, 17, Var:; 1

Variavel :; x\_{ol}, Derivada de Ordem :; 5

Error order:; 4, Error:; 8.6592354924375310535 × 10<sup>-9</sup>, New Error:; 8.6055675116004305169 × 10<sup>-13</sup>

Error order:; 4, Error:; 8.6055675116004305169 × 10<sup>-13</sup>, New Error:; 8.6001876509453839015 × 10<sup>-17</sup>

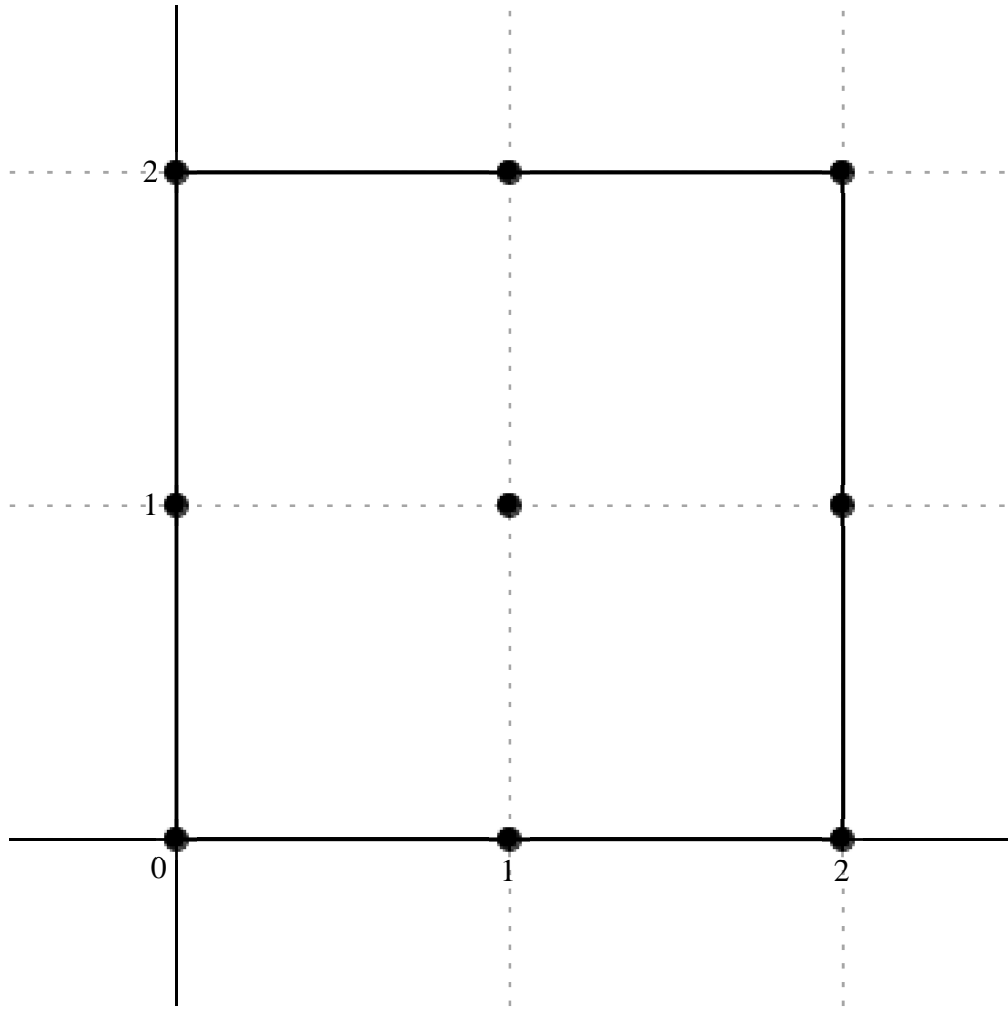
Error order:; 4, Error:; 8.6001876509453839015 × 10<sup>-17</sup>, New Error:; 8.5996495365861179682 × 10<sup>-21</sup>

Error order:; 4, Error:; 8.5996495365861179682 × 10<sup>-21</sup>, New Error:; 8.5995957238695764759 × 10<sup>-25</sup>

Error order:; 4, Error:; 8.5995957238695764759 × 10<sup>-25</sup>, New Error:; 8.5995903425851184995 × 10<sup>-29</sup>

$$x_o + h, \begin{bmatrix} 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & 2 + 2 \, \mathrm{I} \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} \\ 0 & 1 & 2 \end{bmatrix}$$

$$c =, \begin{bmatrix} 90 - 210 \, \mathrm{I} & 456 - 642 \, \mathrm{I} & 120 - 120 \, \mathrm{I} \\ 630 - 960 \, \mathrm{I} & -3360 + 3360 \, \mathrm{I} & 642 - 456 \, \mathrm{I} \\ 252 - 252 \, \mathrm{I} & 960 - 630 \, \mathrm{I} & 210 - 90 \, \mathrm{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} u(x_{ol}) = \frac{(90 - 210 \operatorname{I}) u_{ol+21} + (456 - 642 \operatorname{I}) u_{ol+1+21} + (120 - 120 \operatorname{I}) u_{ol+2+21} + (630 - 960 \operatorname{I}) u_{ol+1} + (-3360 + 3360 \operatorname{I}) u_{ol+1+1} + (642 - 456 \operatorname{I}) u_{ol+2+1} + (252 - 252 \operatorname{I}) u_{ol} + (960 - 630 \operatorname{I}) u_{ol+1} + (210 - 90 \operatorname{I}) u_{ol+2}, O(\Delta x_{ol}^4)}$$

Formula:, 18, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order:, 3, Error:,  $1.9265369324565645839 \times 10^{-6}$ , New Error:,  $1.9031789807930790971 \times 10^{-9}$

Error order:, 3, Error:,  $1.9031789807930790971 \times 10^{-9}$ , New Error:,  $1.9008511550742531460 \times 10^{-12}$

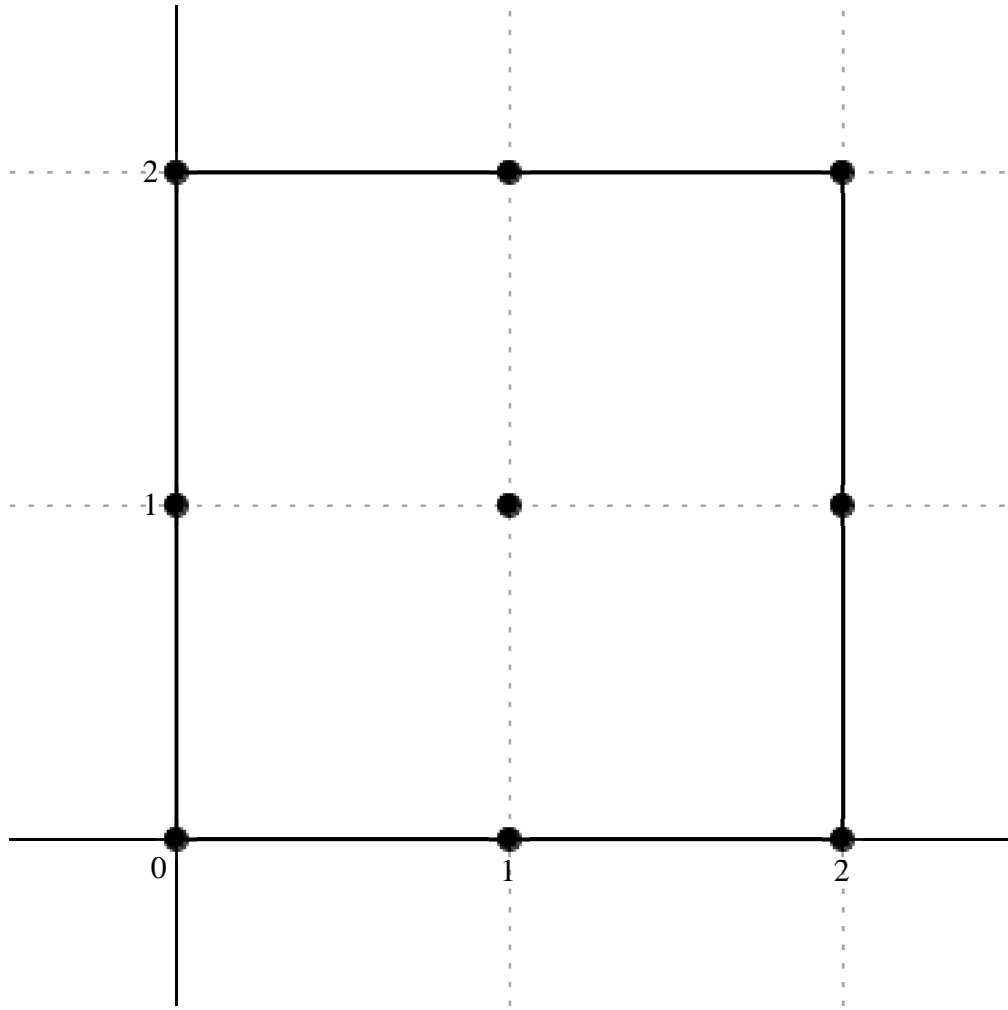
Error order:, 3, Error:,  $1.9008511550742531460 \times 10^{-12}$ , New Error:,  $1.9006184523263663325 \times 10^{-15}$

Error order:, 3, Error:,  $1.9006184523263663325 \times 10^{-15}$ , New Error:,  $1.9005951828499453840 \times 10^{-18}$

Error order:, 3, Error:,  $1.9005951828499453840 \times 10^{-18}$ , New Error:,  $1.9005928559102870941 \times 10^{-21}$

$$x_o + h, \begin{bmatrix} 2 \operatorname{I} & 1 + 2 \operatorname{I} & 2 + 2 \operatorname{I} \\ \operatorname{I} & 1 + \operatorname{I} & 2 + \operatorname{I} \\ 0 & 1 & 2 \end{bmatrix}$$

$$c =, \begin{bmatrix} 126 + 486 \operatorname{I} & 216 + 1764 \operatorname{I} & 396 \operatorname{I} \\ 288 + 2268 \operatorname{I} & -10080 \operatorname{I} & -216 + 1764 \operatorname{I} \\ 648 \operatorname{I} & -288 + 2268 \operatorname{I} & -126 + 486 \operatorname{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} u(x_{ol}) = \frac{(126 + 486 \, \mathrm{I}) u_{ol+2 \, \mathrm{I}} + (216 + 1764 \, \mathrm{I}) u_{ol+1+2 \, \mathrm{I}} + 396 \, \mathrm{I} u_{ol+2+2 \, \mathrm{I}} + (288 + 2268 \, \mathrm{I}) u_{ol+1} - 10080 \, \mathrm{I} u_{ol+1+1} + (-216 + 1764 \, \mathrm{I}) u_{ol+2+1} + 648 \, \mathrm{I} u_{ol} + (-288 + 2268 \, \mathrm{I}) u_{ol+1} + (-126 + 486 \, \mathrm{I}) u_{ol+2}}{\Delta x_{ol}^6}, \, O(\Delta x_{ol}^3)$$

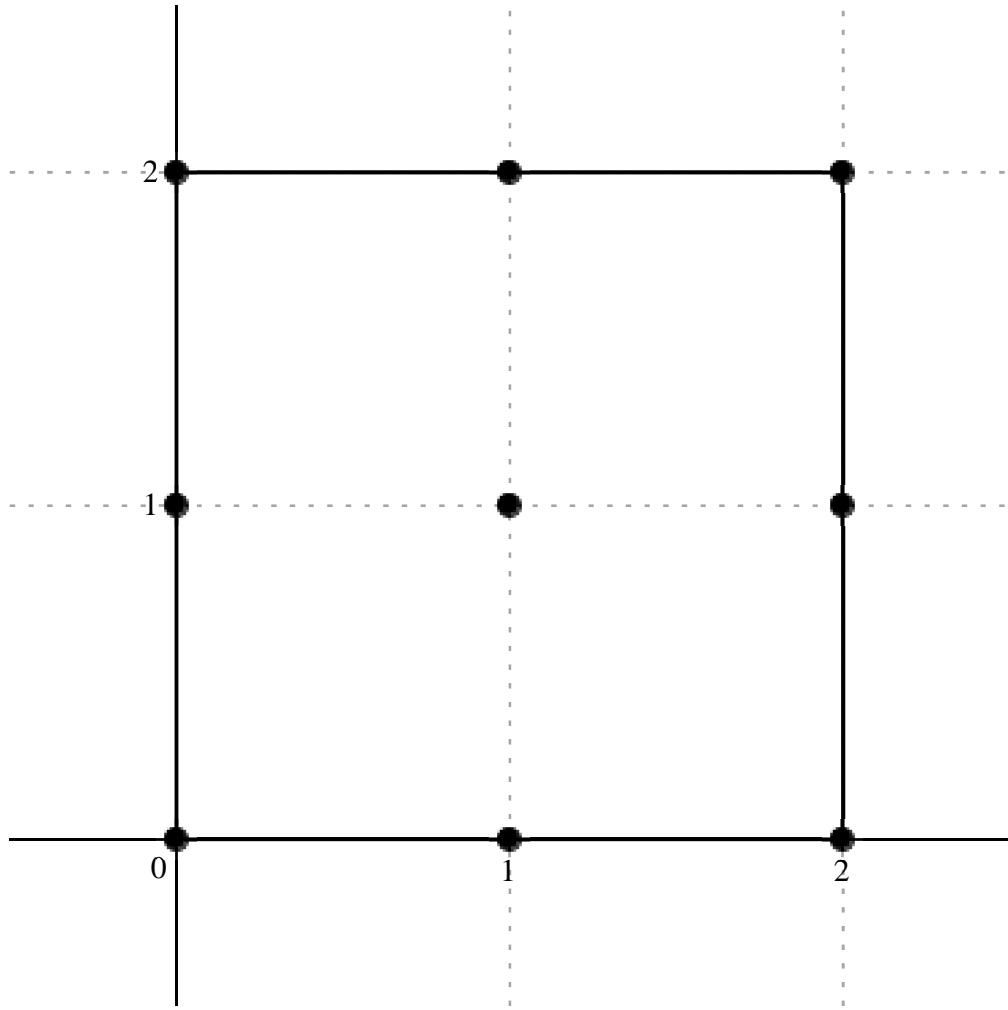
Formula:, 19, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order:, 2, Error:, 0.00043145206865798057786, New Error:,  $4.2922714508880134640 \times 10^{-6}$   
 Error order:, 2, Error:,  $4.2922714508880134640 \times 10^{-6}$ , New Error:,  $4.2900416716468345929 \times 10^{-8}$   
 Error order:, 2, Error:,  $4.2900416716468345929 \times 10^{-8}$ , New Error:,  $4.2898186459752674386 \times 10^{-10}$   
 Error order:, 2, Error:,  $4.2898186459752674386 \times 10^{-10}$ , New Error:,  $4.2897963429314424451 \times 10^{-12}$   
 Error order:, 2, Error:,  $4.2897963429314424451 \times 10^{-12}$ , New Error:,  $4.2897941126222940688 \times 10^{-14}$

$$x_o \neq h, \left[ \begin{array}{ccc} 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ 0 & 1 & 2 \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} -567-441 \, \mathrm{I} & -2016-1764 \, \mathrm{I} & -441-441 \, \mathrm{I} \\ -2268-2016 \, \mathrm{I} & 10080+10080 \, \mathrm{I} & -1764-2016 \, \mathrm{I} \\ -567-567 \, \mathrm{I} & -2016-2268 \, \mathrm{I} & -441-567 \, \mathrm{I} \end{array} \right]$$

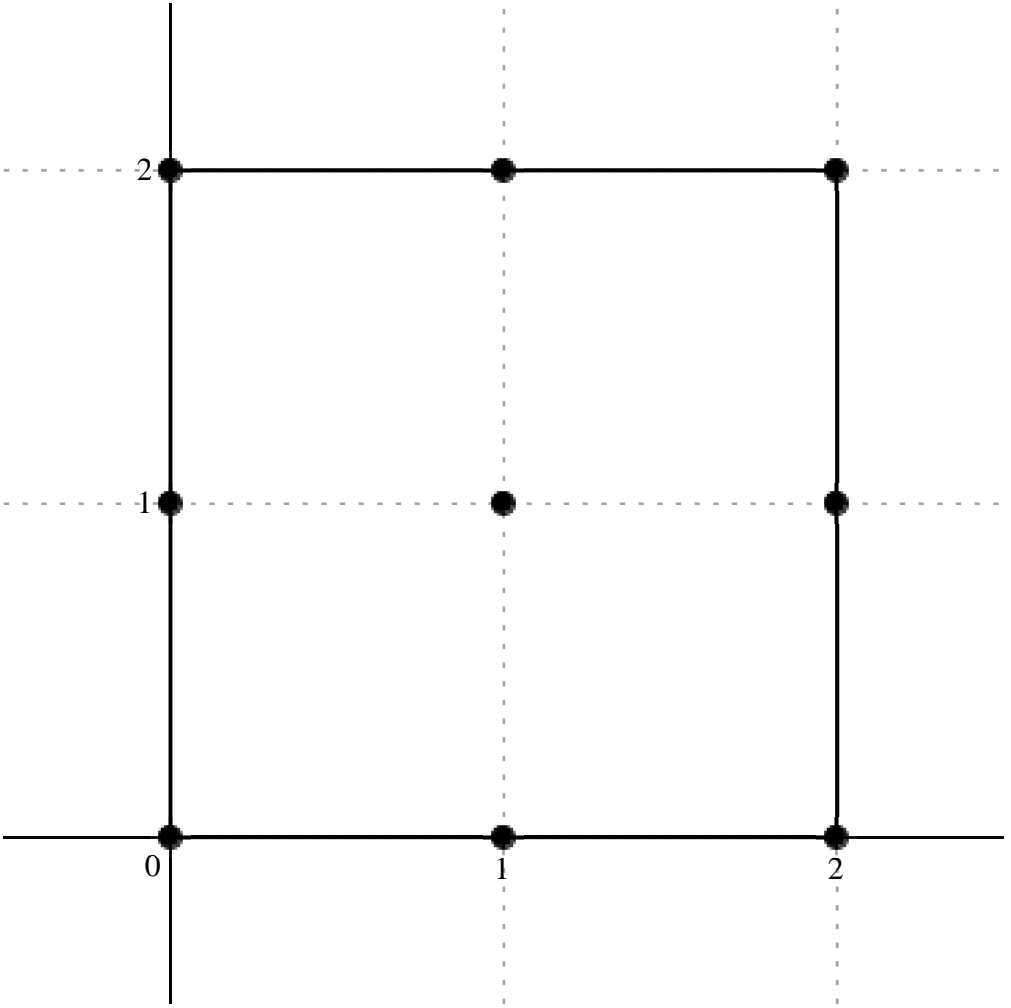


$$\frac{d^7}{dx_{ol}^7} u(x_{ol}) = \frac{-(567 + 441 I) u_{ol+2I} - (2016 + 1764 I) u_{ol+1+2I} - (441 + 441 I) u_{ol+2+2I} - (2268 + 2016 I) u_{ol+1} + (10080 + 10080 I) u_{ol+1+I} - (1764 + 2016 I) u_{ol+2+I} - (567 + 567 I) u_{ol} - (2016 + 2268 I) u_{ol+I} - (441 + 567 I) u_{ol+2}, O(\Delta x_{ol}^2)}$$

Formula:, 20, Var:, 1  
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 1, Error:, 0.047550206769339351703, New Error:, 0.0047164827356347569450  
Error order:, 1, Error:, 0.0047164827356347569450, New Error:, 0.00047126399087990323347  
Error order:, 1, Error:, 0.00047126399087990323347, New Error:, 0.000047122557359489252745  
Error order:, 1, Error:, 0.000047122557359489252745, New Error:,  $4.7122173197624077175 \times 10^{-6}$   
Error order:, 1, Error:,  $4.7122173197624077175 \times 10^{-6}$ , New Error:,  $4.7122134781547410516 \times 10^{-7}$

$$x_o \neq h, \begin{bmatrix} 2I & 1+2I & 2+2I \\ I & 1+I & 2+I \\ 0 & 1 & 2 \end{bmatrix}$$
  
$$c =, \begin{bmatrix} 504 & 2016 & 504 \\ 2016 & -10080 & 2016 \\ 504 & 2016 & 504 \end{bmatrix}$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} u(x_{ol}) = \frac{504 \left( u_{ol+2l} + 4 u_{ol+1+2l} + u_{ol+2+2l} + 4 u_{ol+1} - 20 u_{ol+1+1} + 4 u_{ol+2+1} + u_{ol} + 4 u_{ol+1} + u_{ol+2} \right)}{\Delta x_{ol}^8}, \mathcal{O}(\Delta x_{ol})$$

Formula:, 21, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 8, Error:,  $1.6554963635152935421 \times 10^{-19}$ , New Error:,  $1.6734099093425511331 \times 10^{-27}$

Error order:, 8, Error:,  $1.6734099093425511331 \times 10^{-27}$ , New Error:,  $1.6752043547328592701 \times 10^{-35}$

Error order:, 8, Error:,  $1.6752043547328592701 \times 10^{-35}$ , New Error:,  $1.6753838297956868555 \times 10^{-43}$

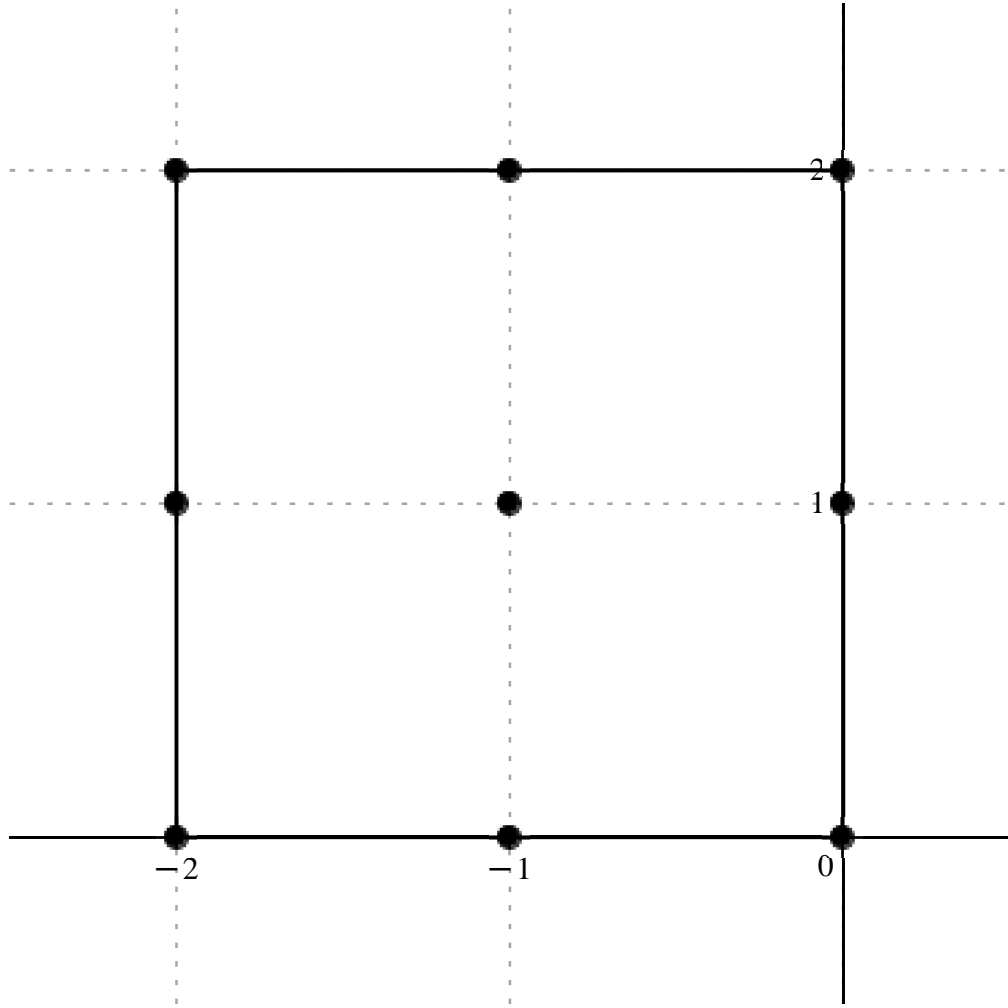
Error order:, 8, Error:,  $1.6753838297956868555 \times 10^{-43}$ , New Error:,  $1.6754017776068208364 \times 10^{-51}$

Error order:, 8, Error:,  $1.6754017776068208364 \times 10^{-51}$ , New Error:,  $1.6754035723909823597 \times 10^{-59}$

$$x_o + h. , \begin{bmatrix} -2+2\text{I} & -1+2\text{I} & 2\text{I} \\ -2+\text{I} & -1+\text{I} & \text{I} \\ -2 & -1 & 0 \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{1}{4} + \frac{\text{I}}{4} & \frac{4}{5} + \frac{8\text{I}}{5} & \frac{\text{I}}{2} \\ \frac{8}{5} + \frac{4\text{I}}{5} & -10-10\text{I} & 4\text{I} \\ \frac{1}{2} & 4 & \frac{57}{20} + \frac{57\text{I}}{20} \end{bmatrix}$$





$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\; u(x_{ol}) = \frac{(5+5\,\mathrm{I})\,u_{ol-2+2\,\mathrm{I}}+(16+32\,\mathrm{I})\,u_{ol-1+2\,\mathrm{I}}+10\,\mathrm{I}\,u_{ol+2\,\mathrm{I}}+(32+16\,\mathrm{I})\,u_{ol-2+1}-(200+200\,\mathrm{I})\,u_{ol-1+1}+80\,\mathrm{I}\,u_{ol+1}+10\,u_{ol-2}+80\,u_{ol-1}+(57+57\,\mathrm{I})\,u_{ol}}{20\,\Delta x_{ol}^8},\; O(\Delta x_{ol}^8)$$

Formula:, 22, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 2

Error order:, 7, Error:, 1.0454596527012789839 × 10<sup>−16</sup>, New Error:, 1.0486677410098959402 × 10<sup>−23</sup>

Error order:, 7, Error:, 1.0486677410098959402 × 10<sup>−23</sup>, New Error:, 1.0489828113753903321 × 10<sup>−30</sup>

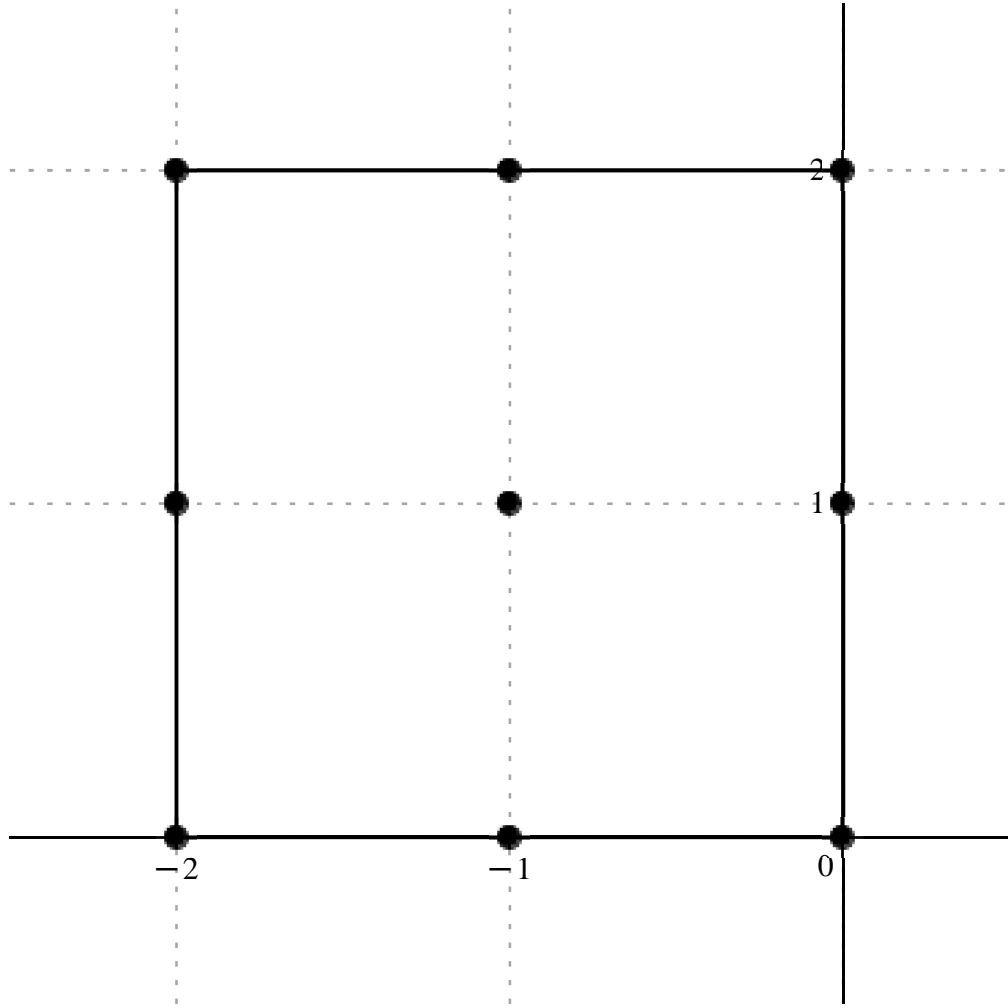
Error order:, 7, Error:, 1.0489828113753903321 × 10<sup>−30</sup>, New Error:, 1.0490142605465113991 × 10<sup>−37</sup>

Error order:, 7, Error:, 1.0490142605465113991 × 10<sup>−37</sup>, New Error:, 1.0490174048844869904 × 10<sup>−44</sup>

Error order:, 7, Error:, 1.0490174048844869904 × 10<sup>−44</sup>, New Error:, 1.0490177193124927020 × 10<sup>−51</sup>

$$x_o\; +h\; .\; ,\; \left[\begin{array}{ccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \end{array}\right]$$

$$c=,\left[\begin{array}{ccc} \frac{13\,\mathrm{I}}{5} & -\frac{18}{5}+\frac{62\,\mathrm{I}}{5} & -\frac{47}{20}+\frac{57\,\mathrm{I}}{20} \\ \frac{18}{5}+\frac{62\,\mathrm{I}}{5} & -94\,\mathrm{I} & -\frac{74}{5}+\frac{114\,\mathrm{I}}{5} \\ \frac{47}{20}+\frac{57\,\mathrm{I}}{20} & \frac{74}{5}+\frac{114\,\mathrm{I}}{5} & \frac{153\,\mathrm{I}}{10} \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{52 \operatorname{I} u_{ol-2+2\operatorname{I}} + (-72+248 \operatorname{I}) u_{ol-1+2\operatorname{I}} + (-47+57 \operatorname{I}) u_{ol+2\operatorname{I}} + (72+248 \operatorname{I}) u_{ol-2+\operatorname{I}} -1880 \operatorname{I} u_{ol-1+\operatorname{I}} + (-296+456 \operatorname{I}) u_{ol+\operatorname{I}} + (47+57 \operatorname{I}) u_{ol-2} + (296+456 \operatorname{I}) u_{ol-1} + 306 \operatorname{I} u_{ol}}{20 \Delta x_{ol}^2}, \mathcal{O}(\Delta x_{ol}^7)$$

Formula:, 23, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 6, Error:,  $6.2830625059766801465 \times 10^{-14}$ , New Error:,  $6.3482068329920590956 \times 10^{-20}$

Error order:, 6, Error:,  $6.3482068329920590956 \times 10^{-20}$ , New Error:,  $6.3547321297284860430 \times 10^{-26}$

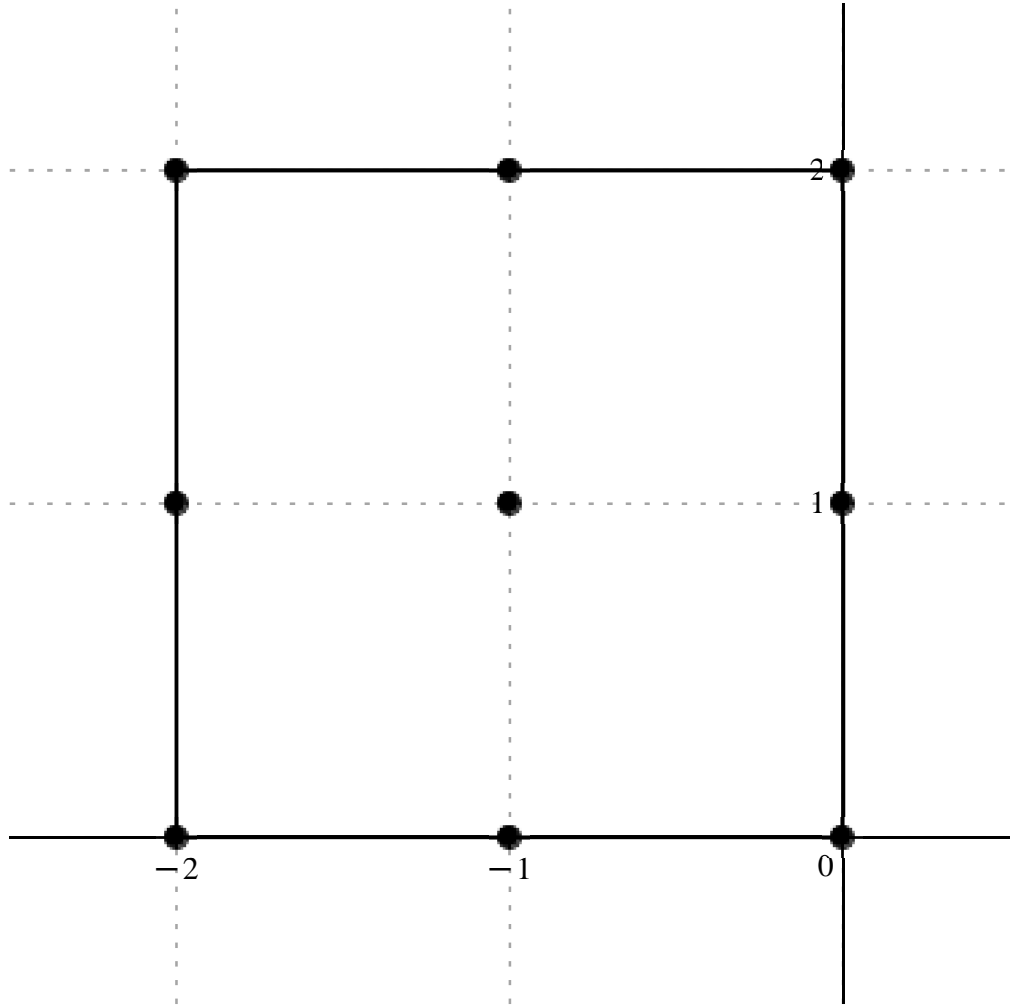
Error order:, 6, Error:,  $6.3547321297284860430 \times 10^{-26}$ , New Error:,  $6.3553847667274638406 \times 10^{-32}$

Error order:, 6, Error:,  $6.3553847667274638406 \times 10^{-32}$ , New Error:,  $6.3554500314992917063 \times 10^{-38}$

Error order:, 6, Error:,  $6.3554500314992917063 \times 10^{-38}$ , New Error:,  $6.3554565579871924696 \times 10^{-44}$

$$x_o+h., \begin{bmatrix} -2+2 \operatorname{I} & -1+2 \operatorname{I} & 2 \operatorname{I} \\ -2+\operatorname{I} & -1+\operatorname{I} & \operatorname{I} \\ -2 & -1 & 0 \end{bmatrix}$$

$$c=, \begin{bmatrix} -\frac{381}{40}+\frac{381 \operatorname{I}}{40} & -\frac{282}{5}+\frac{168 \operatorname{I}}{5} & -\frac{747}{40}+\frac{141 \operatorname{I}}{40} \\ -\frac{168}{5}+\frac{282 \operatorname{I}}{5} & 318-318 \operatorname{I} & -\frac{576}{5}+\frac{222 \operatorname{I}}{5} \\ -\frac{141}{40}+\frac{747 \operatorname{I}}{40} & -\frac{222}{5}+\frac{576 \operatorname{I}}{5} & -\frac{1467}{40}+\frac{1467 \operatorname{I}}{40} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \; u(x_{ol}) = \frac{3 \left( (-127 + 127 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (-752 + 448 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (-249 + 47 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (-448 + 752 \, \mathrm{I}) \, u_{ol-2+1} + (4240 - 4240 \, \mathrm{I}) \, u_{ol-1+1} + (-1536 + 592 \, \mathrm{I}) \, u_{ol+1} + (-47 + 249 \, \mathrm{I}) \, u_{ol-2} + (-592 + 1536 \, \mathrm{I}) \, u_{ol-1} + (-489 + 489 \, \mathrm{I}) \, u_{ol} \right)}{40 \, \Delta x_{ol}^3}, \; O(\Delta x_{ol}^6)$$

Formula:, 24, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 4

Error order:, 5, Error:, 2.2240962032546106623 × 10<sup>−11</sup>, New Error:, 2.2305666437816557137 × 10<sup>−16</sup>

Error order:, 5, Error:, 2.2305666437816557137 × 10<sup>−16</sup>, New Error:, 2.2312025526490813760 × 10<sup>−21</sup>

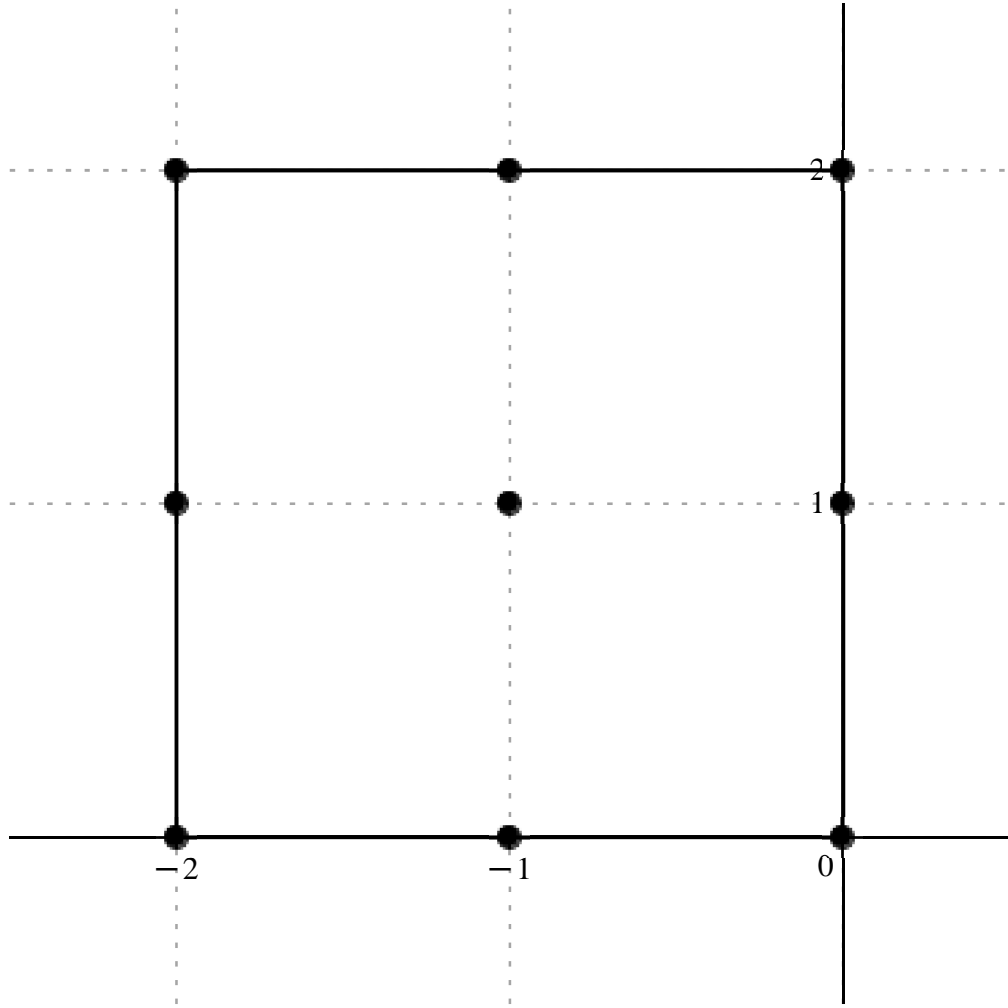
Error order:, 5, Error:, 2.2312025526490813760 × 10<sup>−21</sup>, New Error:, 2.2312660312797978637 × 10<sup>−26</sup>

Error order:, 5, Error:, 2.2312660312797978637 × 10<sup>−26</sup>, New Error:, 2.2312723780194024056 × 10<sup>−31</sup>

Error order:, 5, Error:, 2.2312723780194024056 × 10<sup>−31</sup>, New Error:, 2.2312730126821272816 × 10<sup>−36</sup>

$$x_o+h.~,~\begin{bmatrix} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \end{bmatrix}$$

$$c=,\begin{bmatrix} -\frac{543}{10} & -\frac{1266}{5}-54\,\mathrm{I} & -\frac{663}{10}-36\,\mathrm{I} \\ -\frac{1266}{5}+54\,\mathrm{I} & 1662 & -\frac{2046}{5}-126\,\mathrm{I} \\ -\frac{663}{10}+36\,\mathrm{I} & -\frac{2046}{5}+126\,\mathrm{I} & -\frac{1503}{10} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{3 \left( -181 u_{ol-2+2I} - (844 + 180 I) u_{ol-1+2I} - (221 + 120 I) u_{ol+2I} + (-844 + 180 I) u_{ol-2+1} + 5540 u_{ol-1+1} - (1364 + 420 I) u_{ol+1} + (-221 + 120 I) u_{ol-2} + (-1364 + 420 I) u_{ol-1} - 501 u_{ol} \right)}{10 \Delta x_{ol}^4}, O(\Delta x_{ol}^5)$$

Formula:, 25, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 4, Error:,  $8.5084765293407966697 \times 10^{-9}$ , New Error:,  $8.5904653220801065979 \times 10^{-13}$

Error order:, 4, Error:,  $8.5904653220801065979 \times 10^{-13}$ , New Error:,  $8.5986771729079770319 \times 10^{-17}$

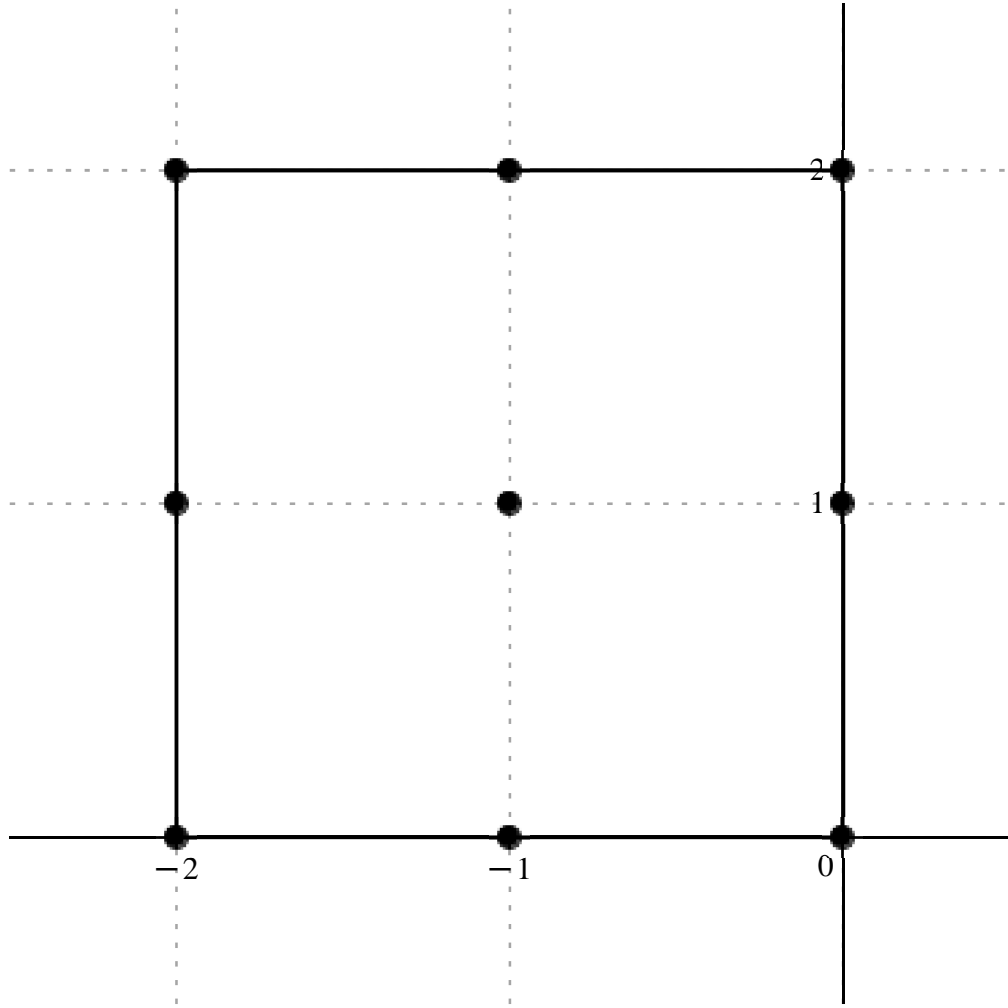
Error order:, 4, Error:,  $8.5986771729079770319 \times 10^{-17}$ , New Error:,  $8.5994984861953702283 \times 10^{-21}$

Error order:, 4, Error:,  $8.5994984861953702283 \times 10^{-21}$ , New Error:,  $8.5995806188046354781 \times 10^{-25}$

Error order:, 4, Error:,  $8.5995806188046354781 \times 10^{-25}$ , New Error:,  $8.5995888320783657413 \times 10^{-29}$

$$x_o + h. , \begin{bmatrix} -2 + 2 I & -1 + 2 I & 2 I \\ -2 + I & -1 + I & I \\ -2 & -1 & 0 \end{bmatrix}$$

$$c = , \begin{bmatrix} -120 - 120 I & -456 - 642 I & -90 - 210 I \\ -642 - 456 I & 3360 + 3360 I & -630 - 960 I \\ -210 - 90 I & -960 - 630 I & -252 - 252 I \end{bmatrix}$$



$$\frac{d^5}{dx_{ol}^5} u(x_{ol}) = \frac{-(120 + 120 I) u_{ol-2+2I} - (456 + 642 I) u_{ol-1+2I} - (90 + 210 I) u_{ol+2I} - (642 + 456 I) u_{ol-2+1} + (3360 + 3360 I) u_{ol-1+1} - (630 + 960 I) u_{ol+1} - (210 + 90 I) u_{ol-2} - (960 + 630 I) u_{ol-1} - (252 + 252 I) u_{ol}}{\Delta x_{ol}^5}, O(\Delta x_{ol}^4)$$

Formula:, 26, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order:, 3, Error:,  $1.8951176471462109844 \times 10^{-6}$ , New Error:,  $1.9000530988820685260 \times 10^{-9}$

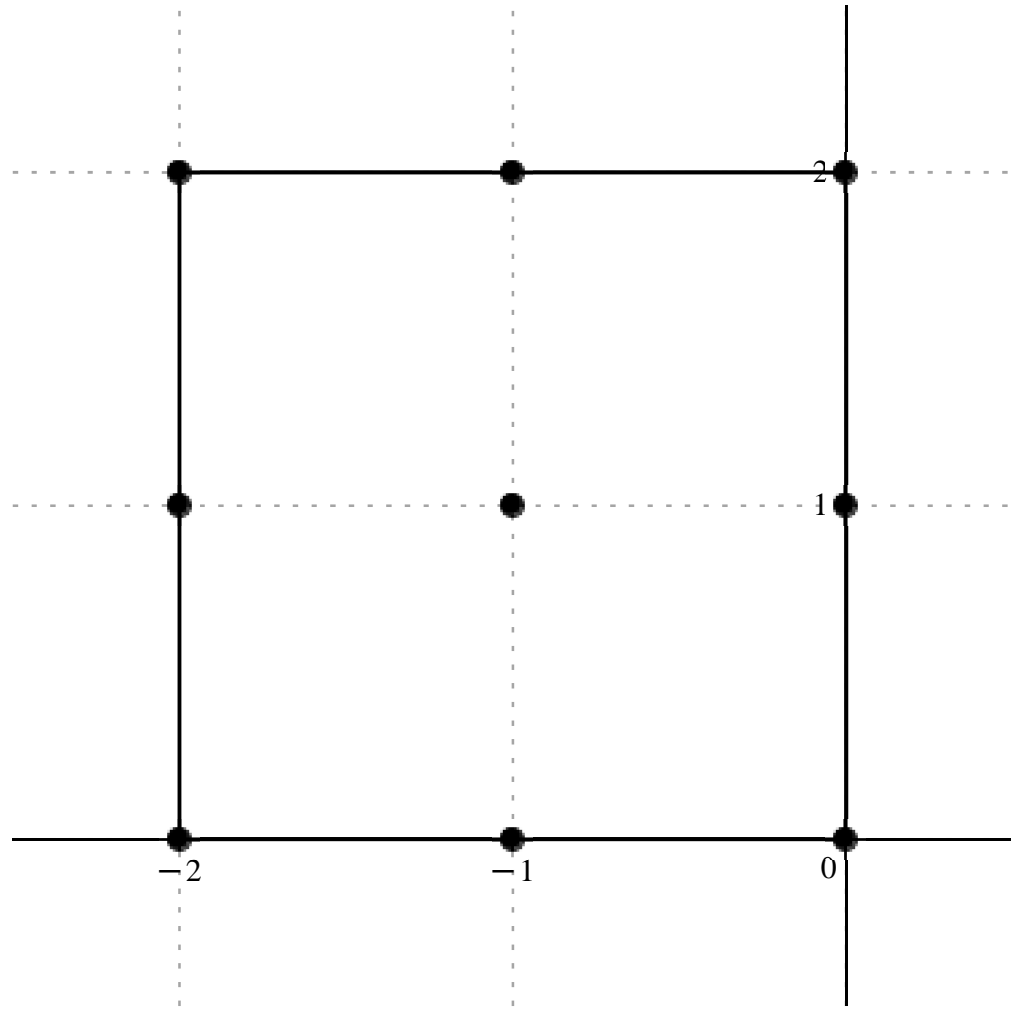
Error order:, 3, Error:,  $1.9000530988820685260 \times 10^{-9}$ , New Error:,  $1.9005387280901202364 \times 10^{-12}$

Error order:, 3, Error:,  $1.9005387280901202364 \times 10^{-12}$ , New Error:,  $1.9005872112407634835 \times 10^{-15}$

Error order:, 3, Error:,  $1.9005872112407634835 \times 10^{-15}$ , New Error:,  $1.9005920587575139443 \times 10^{-18}$

Error order:, 3, Error:,  $1.9005920587575139443 \times 10^{-18}$ , New Error:,  $1.9005925435012052393 \times 10^{-21}$

$$x_o + h, \begin{bmatrix} -2+2I & -1+2I & 2I \\ -2+I & -1+I & I \\ -2 & -1 & 0 \end{bmatrix}$$
$$c =, \begin{bmatrix} -396I & 216-1764I & 126-486I \\ -216-1764I & 10080I & 288-2268I \\ -126-486I & -288-2268I & -648I \end{bmatrix}$$



$$\frac{d^6}{dx_{ol}^6} u(x_{ol}) = \frac{-396 I u_{ol-2+2I} + (216 - 1764 I) u_{ol-1+2I} + (126 - 486 I) u_{ol+2I} - (216 + 1764 I) u_{ol-2+1} + 10080 I u_{ol-1+1} + (288 - 2268 I) u_{ol+1} - (126 + 486 I) u_{ol-2} - (288 + 2268 I) u_{ol-1} - 648 I u_{ol}}{\Delta x_{ol}^6}, O(\Delta x_{ol}^3)$$

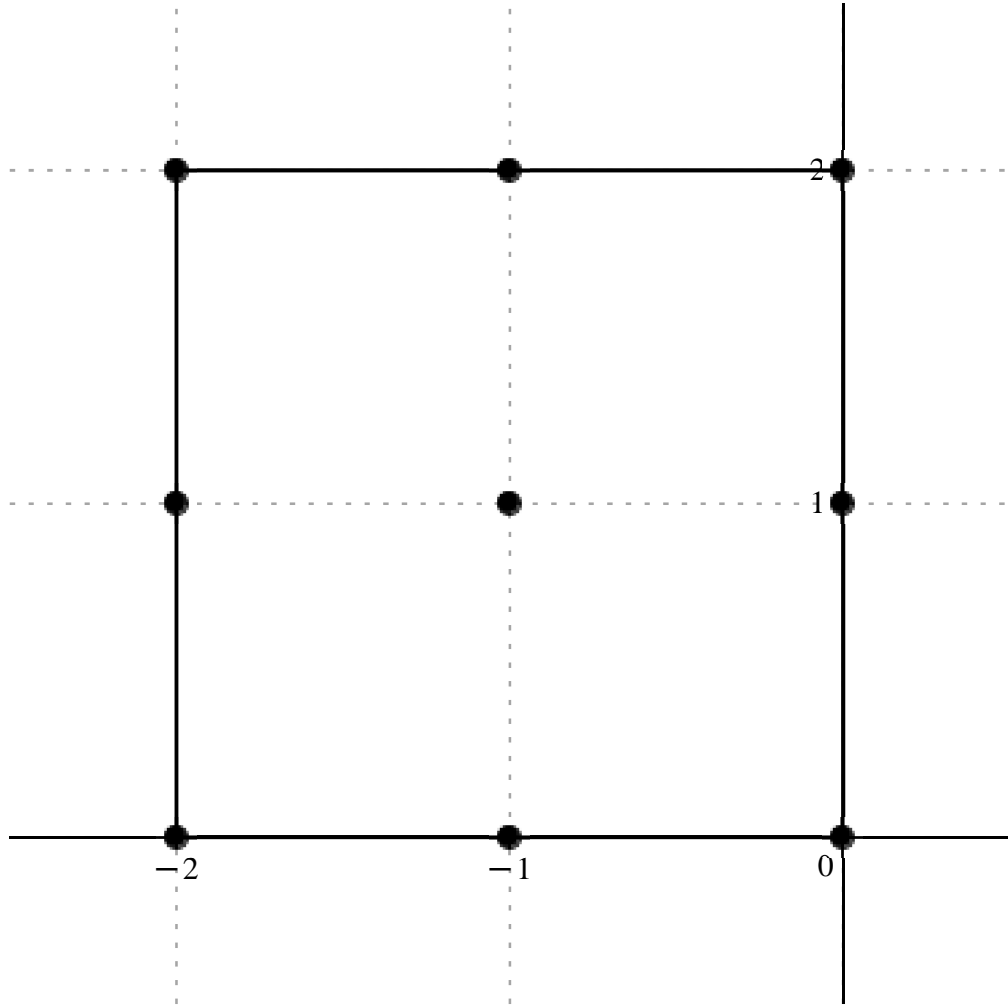
Formula:, 27, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order:, 2, Error:, 0.00042520252043980291524, New Error:,  $4.2860121264580988875 \times 10^{-6}$   
 Error order:, 2, Error:,  $4.2860121264580988875 \times 10^{-6}$ , New Error:,  $4.2894156427769539609 \times 10^{-8}$   
 Error order:, 2, Error:,  $4.2894156427769539609 \times 10^{-8}$ , New Error:,  $4.2897560421253456990 \times 10^{-10}$   
 Error order:, 2, Error:,  $4.2897560421253456990 \times 10^{-10}$ , New Error:,  $4.2897900825368222696 \times 10^{-12}$   
 Error order:, 2, Error:,  $4.2897900825368222696 \times 10^{-12}$ , New Error:,  $4.2897934865827357726 \times 10^{-14}$

$$x_o + h. , \begin{bmatrix} -2 + 2 I & -1 + 2 I & 2 I \\ -2 + I & -1 + I & I \\ -2 & -1 & 0 \end{bmatrix}$$

$$c = , \begin{bmatrix} 441 - 441 I & 2016 - 1764 I & 567 - 441 I \\ 1764 - 2016 I & -10080 + 10080 I & 2268 - 2016 I \\ 441 - 567 I & 2016 - 2268 I & 567 - 567 I \end{bmatrix}$$



$$\frac{d^7}{dx_{ol}^7} u(x_{ol}) = \frac{(441 - 441 I) u_{ol-2+2I} + (2016 - 1764 I) u_{ol-1+2I} + (567 - 441 I) u_{ol+2I} + (1764 - 2016 I) u_{ol-2+1} + (-10080 + 10080 I) u_{ol-1+1} + (2268 - 2016 I) u_{ol+1} + (441 - 567 I) u_{ol-2} + (2016 - 2268 I) u_{ol-1} + (567 - 567 I) u_{ol}}{\Delta x_{ol}^7}, O(\Delta x_{ol}^2)$$

Formula:, 28, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 1, Error:, 0.047031986677561122713, New Error:, 0.0047113226247474075644

Error order:, 1, Error:, 0.0047113226247474075644, New Error:, 0.00047121241195295535513

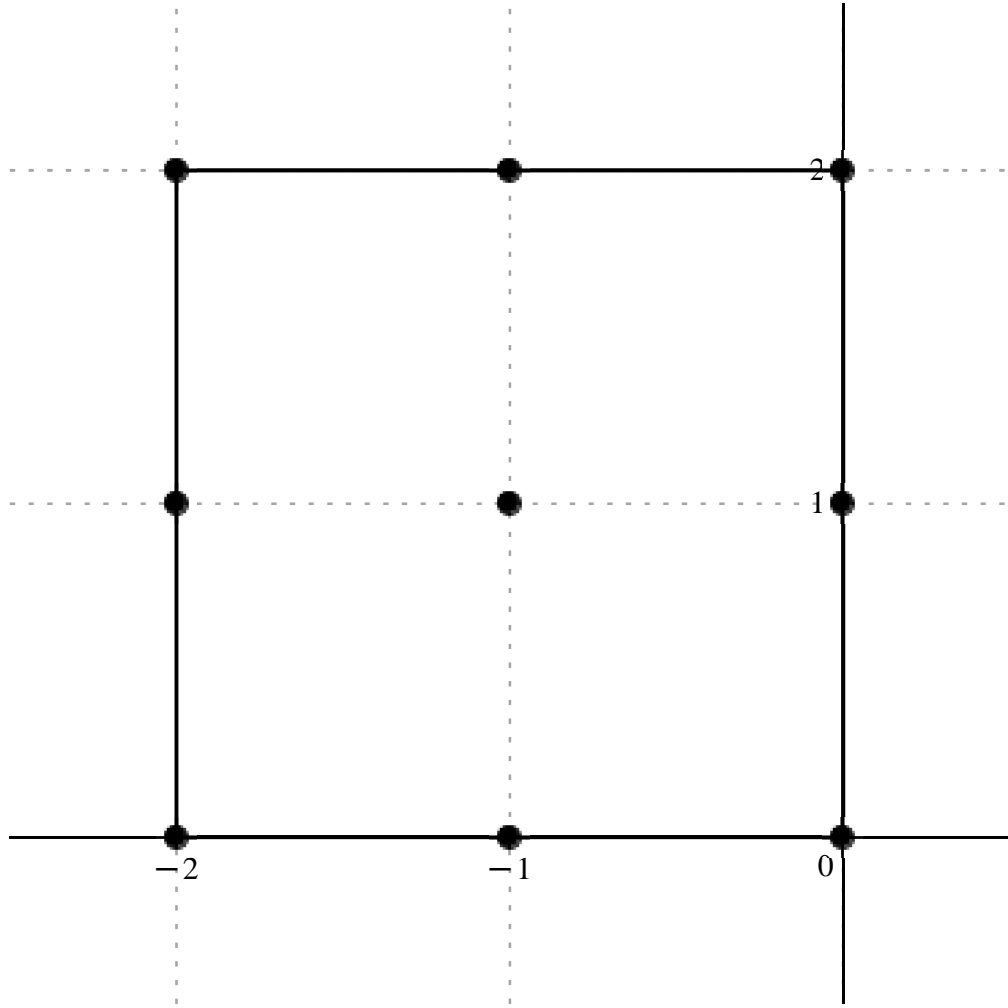
Error order:, 1, Error:, 0.00047121241195295535513, New Error:, 0.000047122041592410889012

Error order:, 1, Error:, 0.000047122041592410889012, New Error:,  $4.7122121621138161142 \times 10^{-6}$

Error order:, 1, Error:,  $4.7122121621138161142 \times 10^{-6}$ , New Error:,  $4.7122129623901038125 \times 10^{-7}$

$$x_o + h, \begin{bmatrix} -2+2I & -1+2I & 2I \\ -2+I & -1+I & I \\ -2 & -1 & 0 \end{bmatrix}$$

$$c =, \begin{bmatrix} 504 & 2016 & 504 \\ 2016 & -10080 & 2016 \\ 504 & 2016 & 504 \end{bmatrix}$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} u(x_{ol}) = \frac{504 \left( u_{ol-2+2l} + 4 u_{ol-1+2l} + u_{ol+2l} + 4 u_{ol-2+l} - 20 u_{ol-1+l} + 4 u_{ol+l} + u_{ol-2} + 4 u_{ol-1} + u_{ol} \right)}{\Delta x_{ol}^8}, \quad O(\Delta x_{ol})$$

Formula: 29, Var: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 1

Error order: 8, Error:  $1.6953795939045873732 \times 10^{-19}$ , New Error:  $1.6773983184733930623 \times 10^{-27}$

Error order: 8, Error:  $1.6773983184733930623 \times 10^{-27}$ , New Error:  $1.6756031957320340162 \times 10^{-35}$

Error order: 8, Error:  $1.6756031957320340162 \times 10^{-35}$ , New Error:  $1.6754237138956904206 \times 10^{-43}$

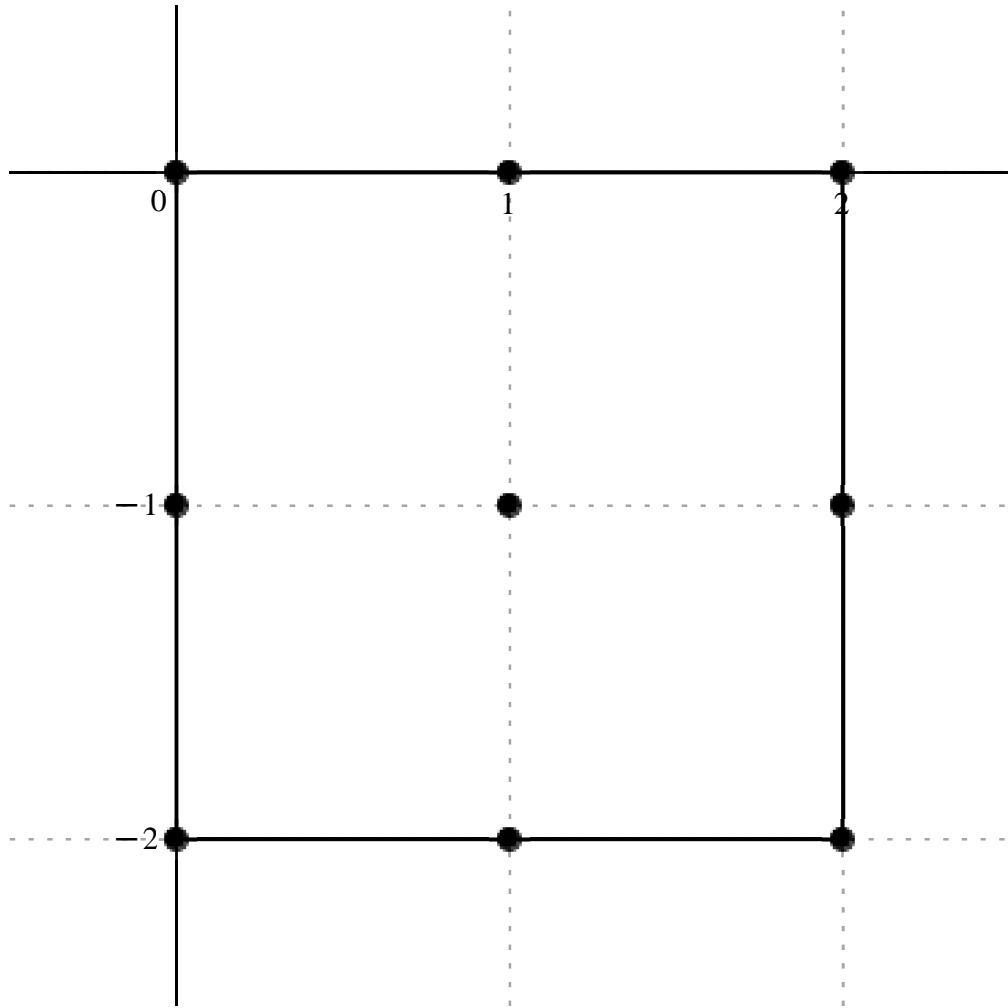
Error order: 8, Error:  $1.6754237138956904206 \times 10^{-43}$ , New Error:  $1.6754057660168212790 \times 10^{-51}$

Error order: 8, Error:  $1.6754057660168212790 \times 10^{-51}$ , New Error:  $1.6754039712319824041 \times 10^{-59}$

$$x_o + h, \begin{bmatrix} 0 & 1 & 2 \\ -1 & 1-1 & 2-1 \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{57}{20} - \frac{57 \text{ I}}{20} & -4 & -\frac{1}{2} \\ -4 \text{ I} & 10 + 10 \text{ I} & -\frac{8}{5} - \frac{4 \text{ I}}{5} \\ -\frac{1}{2} & -\frac{4}{5} - \frac{8 \text{ I}}{5} & -\frac{1}{4} - \frac{1}{4} \end{bmatrix}$$





$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{-(57+57\,\mathrm{I})\,u_{ol}-80\,u_{ol+1}-10\,u_{ol+2}-80\,\mathrm{I}\,u_{ol-1}+(200+200\,\mathrm{I})\,u_{ol+1-1}-(32+16\,\mathrm{I})\,u_{ol+2-1}-10\,\mathrm{I}\,u_{ol-2\mathrm{I}}-(16+32\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}-(5+5\,\mathrm{I})\,u_{ol+2-2\mathrm{I}}}{20\,\Delta x_{ol}},\,O(\,\Delta x_{ol}^8\,)$$

Formula:, 30, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 2

Error order:, 7, Error:, 1.0524458435160624771 × 10<sup>−16</sup>, New Error:, 1.0493664673974816646 × 10<sup>−23</sup>

Error order:, 7, Error:, 1.0493664673974816646 × 10<sup>−23</sup>, New Error:, 1.0490526841214547854 × 10<sup>−30</sup>

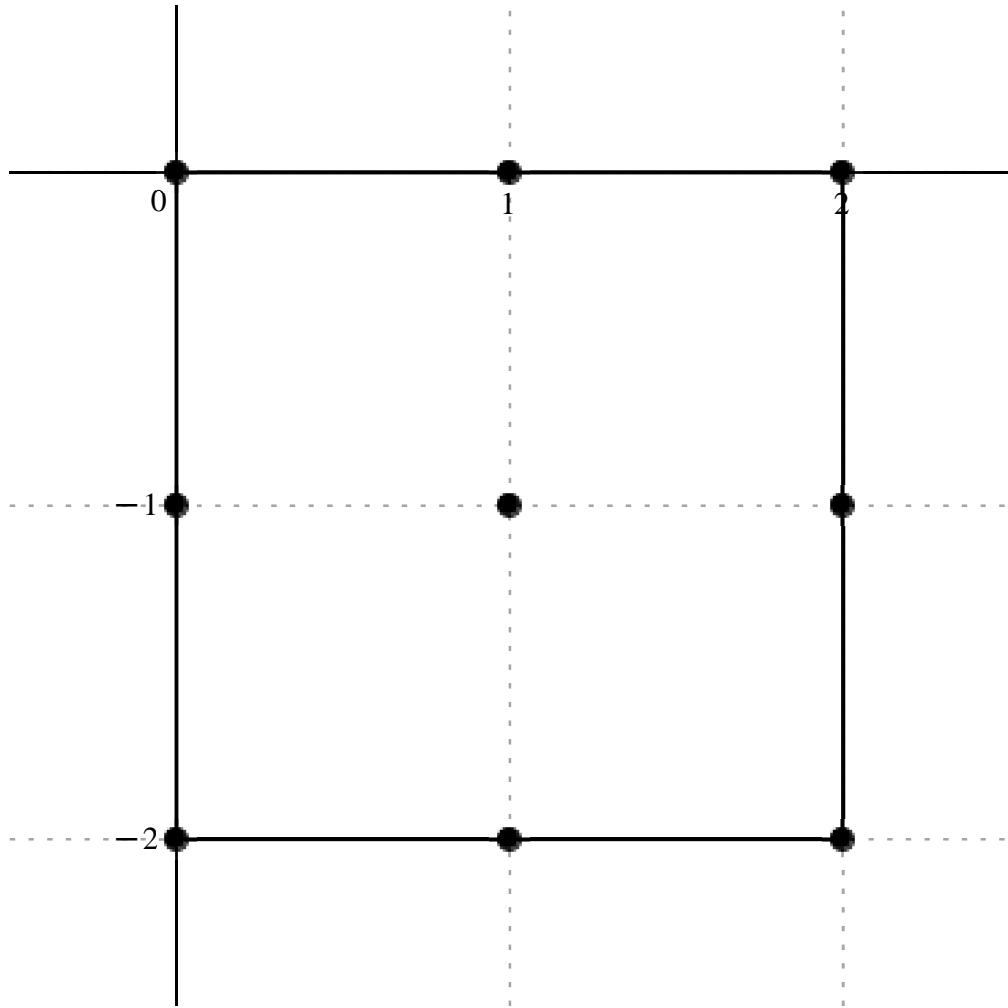
Error order:, 7, Error:, 1.0490526841214547854 × 10<sup>−30</sup>, New Error:, 1.0490212478212251503 × 10<sup>−37</sup>

Error order:, 7, Error:, 1.0490212478212251503 × 10<sup>−37</sup>, New Error:, 1.0490181036119584729 × 10<sup>−44</sup>

Error order:, 7, Error:, 1.0490181036119584729 × 10<sup>−44</sup>, New Error:, 1.0490177891852398504 × 10<sup>−51</sup>

$$x_o\neq h.,\left[\begin{array}{ccc}0&1&2\\-1&1-1&2-1\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{ccc}\frac{153\,\mathrm{I}}{10}&\frac{74}{5}+\frac{114\,\mathrm{I}}{5}&\frac{47}{20}+\frac{57\,\mathrm{I}}{20}\\-\frac{74}{5}+\frac{114\,\mathrm{I}}{5}&-94\,\mathrm{I}&\frac{18}{5}+\frac{62\,\mathrm{I}}{5}\\-\frac{47}{20}+\frac{57\,\mathrm{I}}{20}&-\frac{18}{5}+\frac{62\,\mathrm{I}}{5}&\frac{13\,\mathrm{I}}{5}\end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{306 \, \mathrm{I} u_{ol} + (296 + 456 \, \mathrm{I}) \, u_{ol+1} + (47 + 57 \, \mathrm{I}) \, u_{ol+2} + (-296 + 456 \, \mathrm{I}) \, u_{ol-1} - 1880 \, \mathrm{I} u_{ol+1-1} + (72 + 248 \, \mathrm{I}) \, u_{ol+2-1} + (-47 + 57 \, \mathrm{I}) \, u_{ol-21} + (-72 + 248 \, \mathrm{I}) \, u_{ol+1-21} + 52 \, \mathrm{I} u_{ol+2-21}}{20 \, \Delta x_{ol}^2}, \, O( \, \Delta x_{ol}^7 \, )$$

Formula:, 31, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 3

Error order:, 6, Error:, 6.4280926215263520579 × 10<sup>−14</sup>, New Error:, 6.3627101391092499329 × 10<sup>−20</sup>

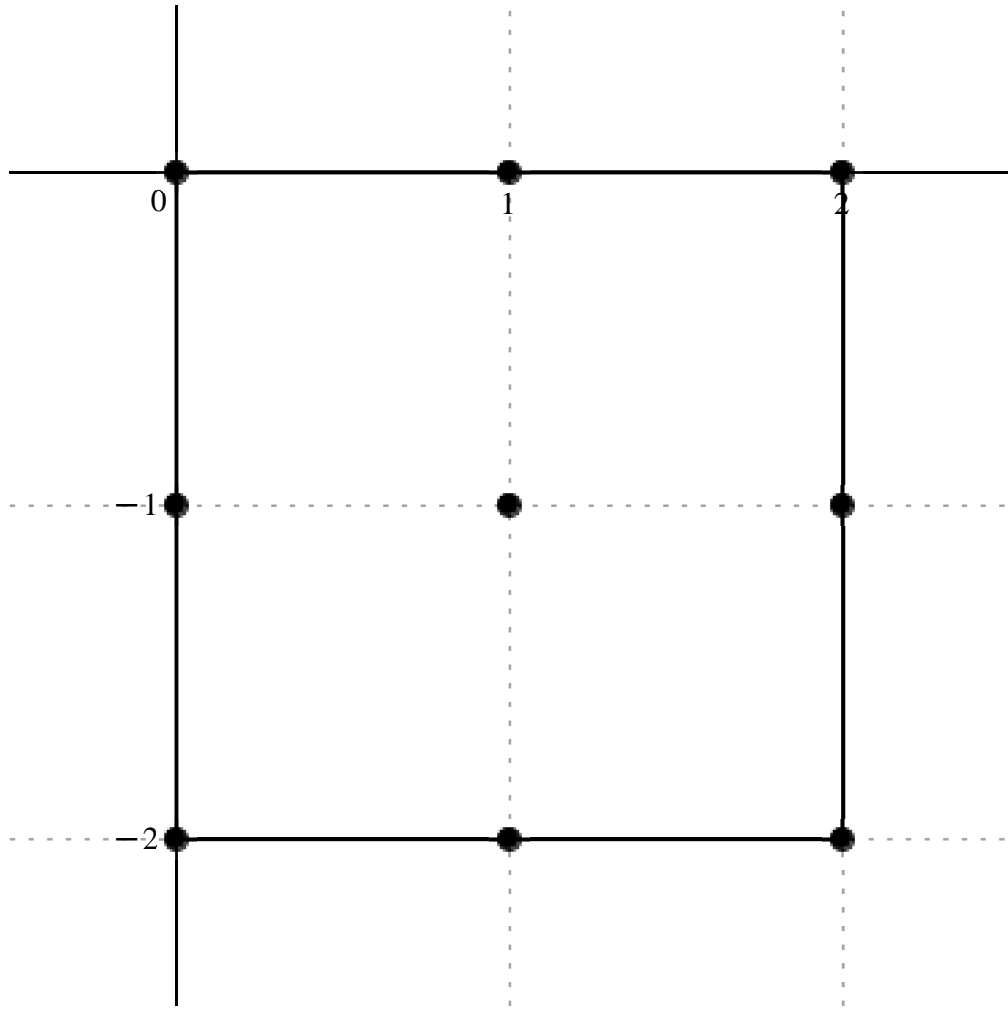
Error order:, 6, Error:, 6.3627101391092499329 × 10<sup>−20</sup>, New Error:, 6.3561824606347628855 × 10<sup>−26</sup>

Error order:, 6, Error:, 6.3561824606347628855 × 10<sup>−26</sup>, New Error:, 6.3555297998183860826 × 10<sup>−32</sup>

Error order:, 6, Error:, 6.3555297998183860826 × 10<sup>−32</sup>, New Error:, 6.3554645348083842250 × 10<sup>−38</sup>

Error order:, 6, Error:, 6.3554645348083842250 × 10<sup>−38</sup>, New Error:, 6.3554580083181017218 × 10<sup>−44</sup>

$$c =, \left[ \begin{array}{ccc} x_o+h., & \begin{bmatrix} 0 & 1 & 2 \\ -1 & 1-1 & 2-1 \\ -2 \, 1 & 1-2 \, 1 & 2-2 \, 1 \end{bmatrix} \\ \begin{bmatrix} \frac{1467}{40} - \frac{1467 \, \mathrm{I}}{40} & \frac{222}{5} - \frac{576 \, \mathrm{I}}{5} & \frac{141}{40} - \frac{747 \, \mathrm{I}}{40} \\ \frac{576}{5} - \frac{222 \, \mathrm{I}}{5} & -318 + 318 \, \mathrm{I} & \frac{168}{5} - \frac{282 \, \mathrm{I}}{5} \\ \frac{747}{40} - \frac{141 \, \mathrm{I}}{40} & \frac{282}{5} - \frac{168 \, \mathrm{I}}{5} & \frac{381}{40} - \frac{381 \, \mathrm{I}}{40} \end{bmatrix} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{3 \left( (489 - 489 \, \mathrm{I}) \, u_{ol} + (592 - 1536 \, \mathrm{I}) \, u_{ol+1} + (47 - 249 \, \mathrm{I}) \, u_{ol+2} + (1536 - 592 \, \mathrm{I}) \, u_{ol-1} + (-4240 + 4240 \, \mathrm{I}) \, u_{ol+1-1} + (448 - 752 \, \mathrm{I}) \, u_{ol+2-1} + (249 - 47 \, \mathrm{I}) \, u_{ol-21} + (752 - 448 \, \mathrm{I}) \, u_{ol+1-21} + (127 - 127 \, \mathrm{I}) \, u_{ol+2-21} \right)}{40 \, \Delta x_{ol}^3}, \, O( \, \Delta x_{ol}^6 \, )$$

Formula:, 32, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 4

Error order:, 5, Error:, 2.2381977533418875098 × 10<sup>-11</sup>, New Error:, 2.2319770005799772183 × 10<sup>-16</sup>

Error order:, 5, Error:, 2.2319770005799772183 × 10<sup>-16</sup>, New Error:, 2.2313435885307027127 × 10<sup>-21</sup>

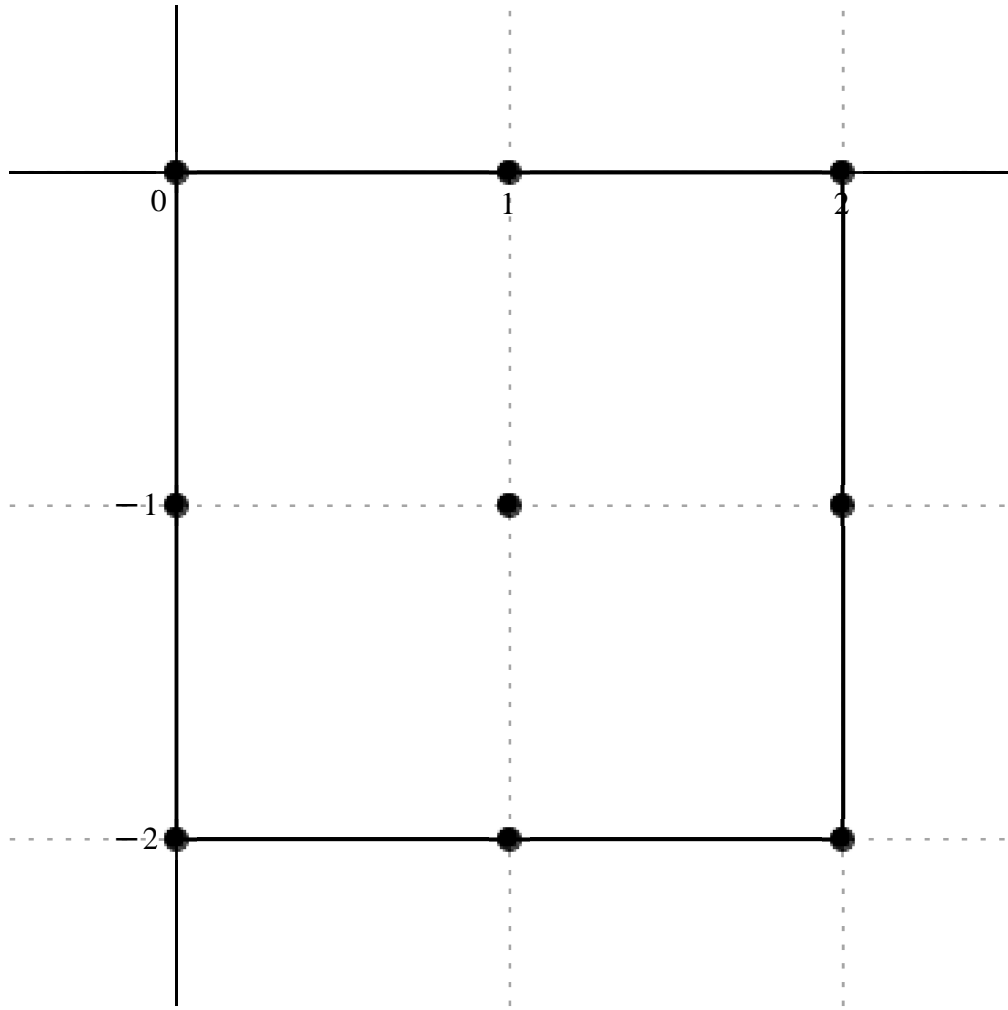
Error order:, 5, Error:, 2.2313435885307027127 × 10<sup>-21</sup>, New Error:, 2.2312801348681617865 × 10<sup>-26</sup>

Error order:, 5, Error:, 2.2312801348681617865 × 10<sup>-26</sup>, New Error:, 2.2312737883782389997 × 10<sup>-31</sup>

Error order:, 5, Error:, 2.2312737883782389997 × 10<sup>-31</sup>, New Error:, 2.2312731537180109412 × 10<sup>-36</sup>

$$x_o \neq h. , \left[ \begin{array}{ccc} 0 & 1 & 2 \\ -1 & 1 - \mathrm{I} & 2 - \mathrm{I} \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & 2 - 2 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccc} -\frac{1503}{10} & -\frac{2046}{5} + 126 \, \mathrm{I} & -\frac{663}{10} + 36 \, \mathrm{I} \\ -\frac{2046}{5} - 126 \, \mathrm{I} & 1662 & -\frac{1266}{5} + 54 \, \mathrm{I} \\ -\frac{663}{10} - 36 \, \mathrm{I} & -\frac{1266}{5} - 54 \, \mathrm{I} & -\frac{543}{10} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{3 \left( -501 \, u_{ol} + \left( -1364 + 420 \, \mathrm{I} \right) u_{ol+1} + \left( -221 + 120 \, \mathrm{I} \right) u_{ol+2} - \left( 1364 + 420 \, \mathrm{I} \right) u_{ol-1} + 5540 \, u_{ol+1-1} + \left( -844 + 180 \, \mathrm{I} \right) u_{ol+2-1} - \left( 221 + 120 \, \mathrm{I} \right) u_{ol-21} - \left( 844 + 180 \, \mathrm{I} \right) u_{ol+1-21} - 181 \, u_{ol+2-21} \right)}{10 \, \Delta x_{ol}^4}, \, O( \, \Delta x_{ol}^5 \, )$$

Formula:, 33, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 5

Error order:, 4, Error:, 8.6909903370021280033 × 10<sup>−9</sup>, New Error:, 8.6087170412241607822 × 10<sup>−13</sup>

Error order:, 4, Error:, 8.6087170412241607822 × 10<sup>−13</sup>, New Error:, 8.6005023451607555086 × 10<sup>−17</sup>

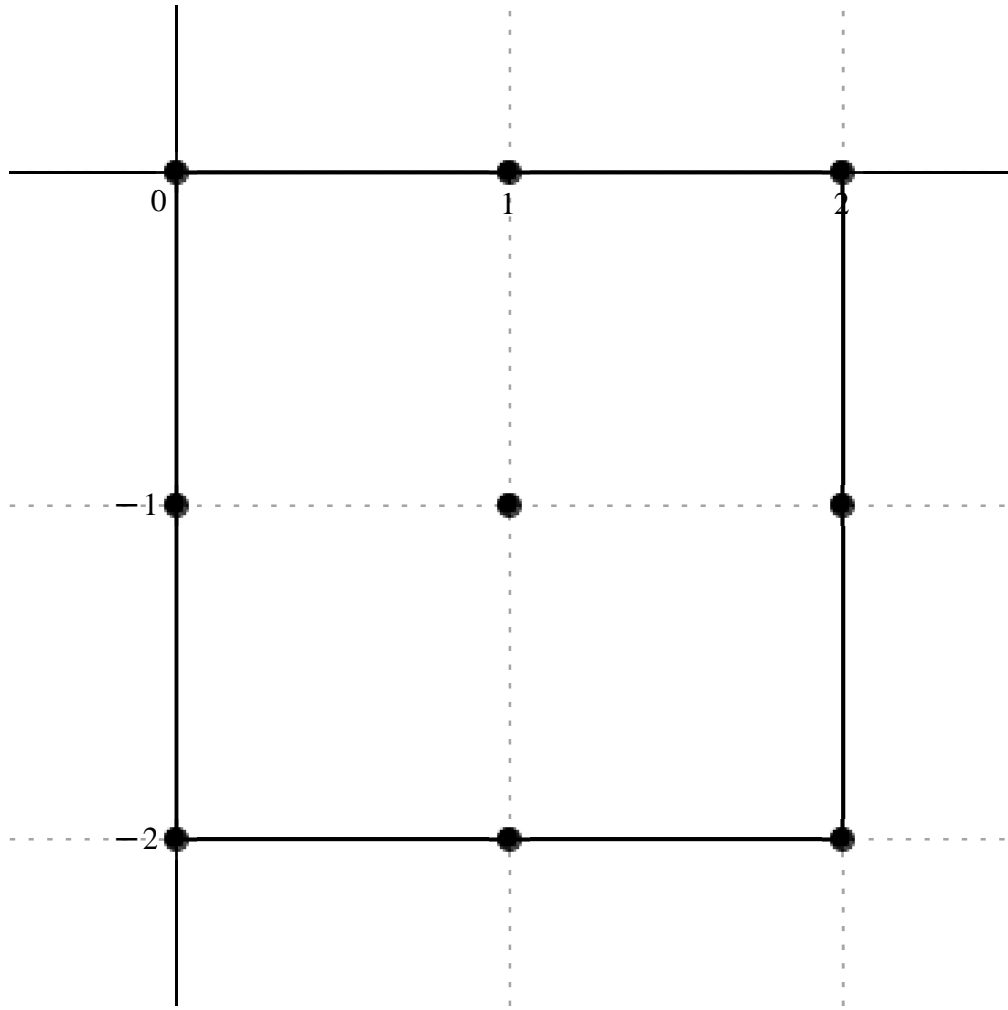
Error order:, 4, Error:, 8.6005023451607555086 × 10<sup>−17</sup>, New Error:, 8.5996810034209864490 × 10<sup>−21</sup>

Error order:, 4, Error:, 8.5996810034209864490 × 10<sup>−21</sup>, New Error:, 8.5995988705271974385 × 10<sup>−25</sup>

Error order:, 4, Error:, 8.5995988705271974385 × 10<sup>−25</sup>, New Error:, 8.5995906572506219377 × 10<sup>−29</sup>

$$x_o \neq h. , \left[ \begin{array}{ccc} 0 & 1 & 2 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccc} 252 + 252 \, \mathrm{I} & 960 + 630 \, \mathrm{I} & 210 + 90 \, \mathrm{I} \\ 630 + 960 \, \mathrm{I} & -3360 - 3360 \, \mathrm{I} & 642 + 456 \, \mathrm{I} \\ 90 + 210 \, \mathrm{I} & 456 + 642 \, \mathrm{I} & 120 + 120 \, \mathrm{I} \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} u(x_{ol}) = \frac{(252 + 252 \operatorname{I}) u_{ol} + (960 + 630 \operatorname{I}) u_{ol+1} + (210 + 90 \operatorname{I}) u_{ol+2} + (630 + 960 \operatorname{I}) u_{ol-1} - (3360 + 3360 \operatorname{I}) u_{ol+1-1} + (642 + 456 \operatorname{I}) u_{ol+2-1} + (90 + 210 \operatorname{I}) u_{ol-21} + (456 + 642 \operatorname{I}) u_{ol+1-21} + (120 + 120 \operatorname{I}) u_{ol+2-21}}{\Delta x_{ol}^5}, \quad O(\Delta x_{ol}^4)$$

Formula:, 34, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order:, 3, Error:,  $1.905888333629447471 \times 10^{-6}$ , New Error:,  $1.9011303037375381852 \times 10^{-9}$

Error order:, 3, Error:,  $1.9011303037375381852 \times 10^{-9}$ , New Error:,  $1.9006464487119007409 \times 10^{-12}$

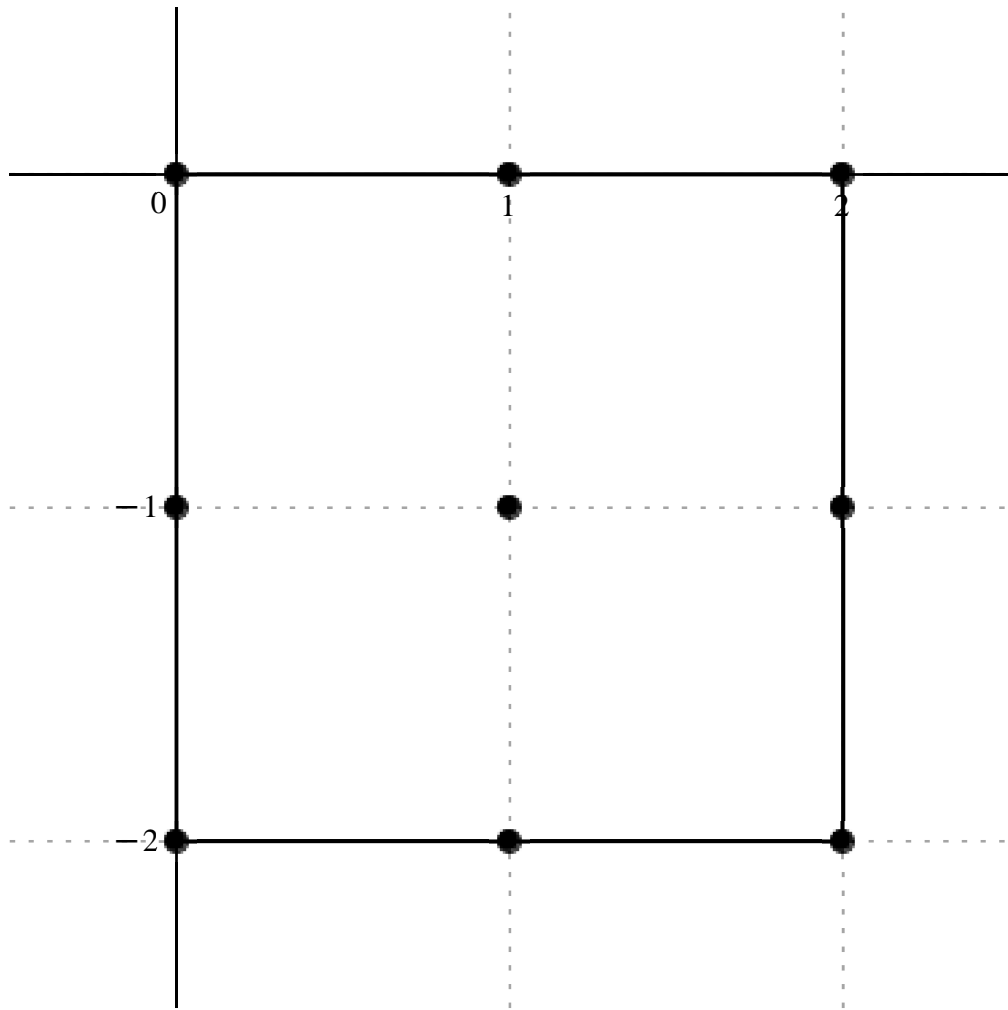
Error order:, 3, Error:,  $1.9006464487119007409 \times 10^{-12}$ , New Error:,  $1.9005979833030777674 \times 10^{-15}$

Error order:, 3, Error:,  $1.9005979833030777674 \times 10^{-15}$ , New Error:,  $1.9005931359637455089 \times 10^{-18}$

Error order:, 3, Error:,  $1.9005931359637455089 \times 10^{-18}$ , New Error:,  $1.9005926512218283959 \times 10^{-21}$

$$x_o + h, \begin{bmatrix} 0 & 1 & 2 \\ -1 & 1 - \operatorname{I} & 2 - \operatorname{I} \\ -2 \operatorname{I} & 1 - 2 \operatorname{I} & 2 - 2 \operatorname{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -648 \operatorname{I} & -288 - 2268 \operatorname{I} & -126 - 486 \operatorname{I} \\ 288 - 2268 \operatorname{I} & 10080 \operatorname{I} & -216 - 1764 \operatorname{I} \\ 126 - 486 \operatorname{I} & 216 - 1764 \operatorname{I} & -396 \operatorname{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} u(x_{ol}) = \frac{-648 \operatorname{I} u_{ol} - (288 + 2268 \operatorname{I}) u_{ol+1} - (126 + 486 \operatorname{I}) u_{ol+2} + (288 - 2268 \operatorname{I}) u_{ol-1} + 10080 \operatorname{I} u_{ol+1-1} - (216 + 1764 \operatorname{I}) u_{ol+2-1} + (126 - 486 \operatorname{I}) u_{ol-2\operatorname{I}} + (216 - 1764 \operatorname{I}) u_{ol+1-2\operatorname{I}} - 396 \operatorname{I} u_{ol+2-2\operatorname{I}}}{\Delta x_{ol}^6}, O(\Delta x_{ol}^3)$$

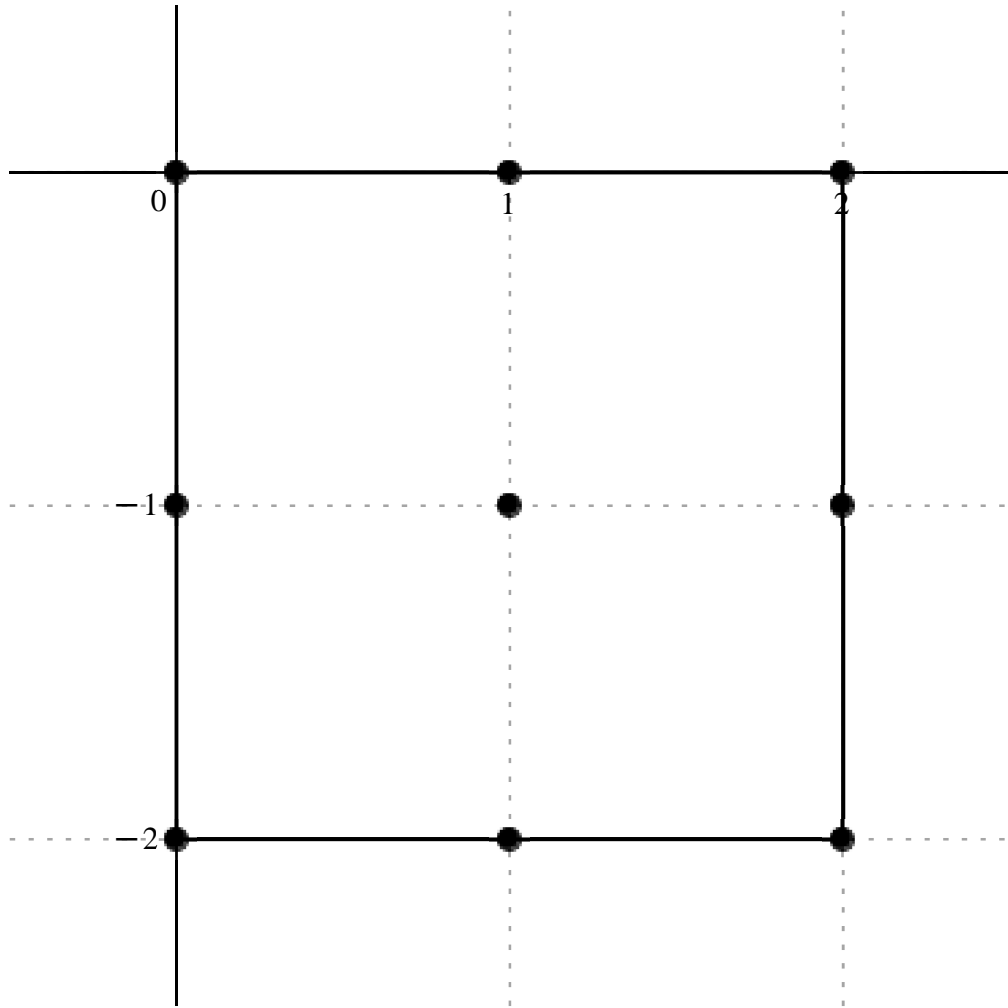
Formula:, 35, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order:, 2, Error:, 0.00043276694945125158915, New Error:,  $4.2935766729229071828 \times 10^{-6}$   
 Error order:, 2, Error:,  $4.2935766729229071828 \times 10^{-6}$ , New Error:,  $4.2901720975408865944 \times 10^{-8}$   
 Error order:, 2, Error:,  $4.2901720975408865944 \times 10^{-8}$ , New Error:,  $4.2898316876018564142 \times 10^{-10}$   
 Error order:, 2, Error:,  $4.2898316876018564142 \times 10^{-10}$ , New Error:,  $4.2897976470844734585 \times 10^{-12}$   
 Error order:, 2, Error:,  $4.2897976470844734585 \times 10^{-12}$ , New Error:,  $4.2897942430375008916 \times 10^{-14}$

$$x_o \neq h, \begin{bmatrix} 0 & 1 & 2 \\ -\operatorname{I} & 1-\operatorname{I} & 2-\operatorname{I} \\ -2 \operatorname{I} & 1-2 \operatorname{I} & 2-2 \operatorname{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -567 + 567 \operatorname{I} & -2016 + 2268 \operatorname{I} & -441 + 567 \operatorname{I} \\ -2268 + 2016 \operatorname{I} & 10080 - 10080 \operatorname{I} & -1764 + 2016 \operatorname{I} \\ -567 + 441 \operatorname{I} & -2016 + 1764 \operatorname{I} & -441 + 441 \operatorname{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{(-567 + 567 \, \mathrm{I}) \, u_{ol} + (-2016 + 2268 \, \mathrm{I}) \, u_{ol+1} + (-441 + 567 \, \mathrm{I}) \, u_{ol+2} + (-2268 + 2016 \, \mathrm{I}) \, u_{ol-1} + (10080 - 10080 \, \mathrm{I}) \, u_{ol+1-1} + (-1764 + 2016 \, \mathrm{I}) \, u_{ol+2-1} + (-567 + 441 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (-2016 + 1764 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (-441 + 441 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}}}{\Delta x_{ol}^7}, \, O(\, \Delta x_{ol}^2 \,)$$

Formula:, 36, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 8

Error order:, 1, Error:, 0.047209808510303173446, New Error:, 0.0047131010120783744075

Error order:, 1, Error:, 0.0047131010120783744075, New Error:, 0.00047123019584316534949

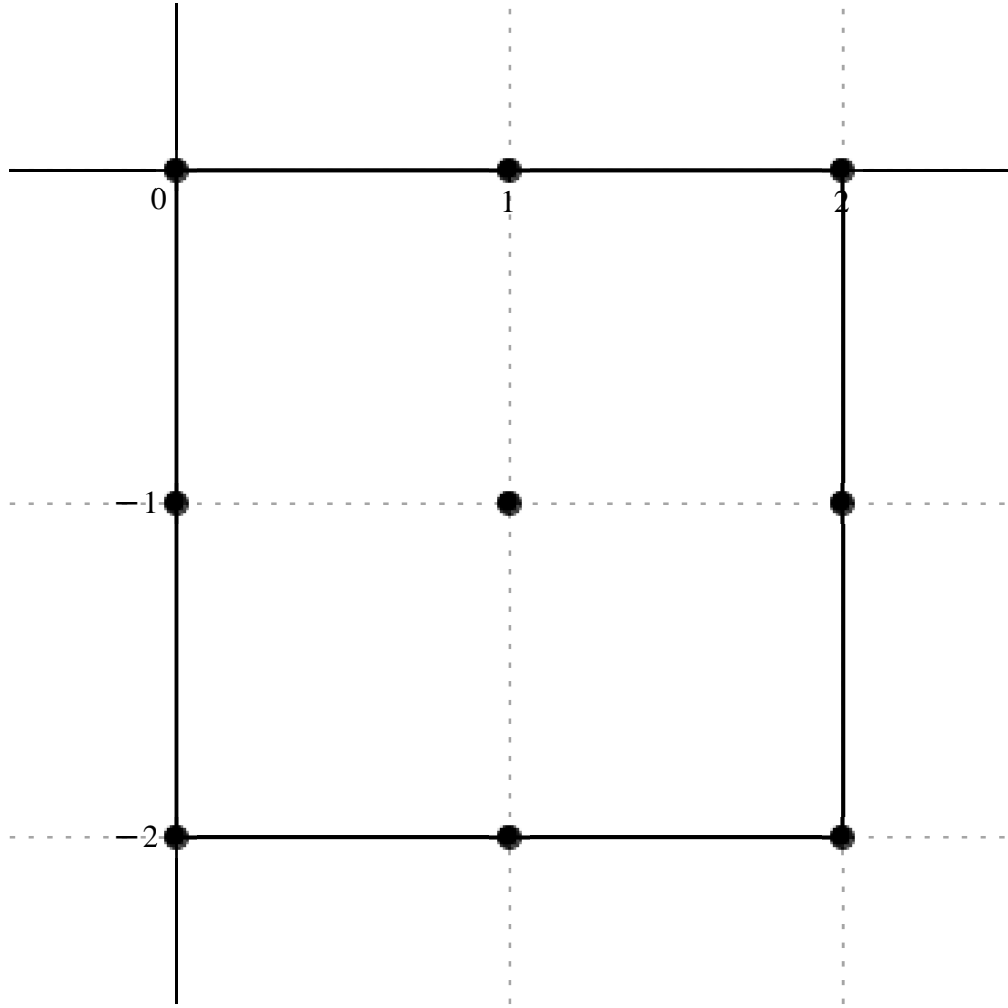
Error order:, 1, Error:, 0.00047123019584316534949, New Error:, 0.000047122219431314678988

Error order:, 1, Error:, 0.000047122219431314678988, New Error:, 4.7122139405028541830 × 10<sup>−6</sup>

Error order:, 1, Error:, 4.7122139405028541830 × 10<sup>−6</sup>, New Error:, 4.7122131402290076196 × 10<sup>−7</sup>

$$x_o \neq h., \left[ \begin{array}{ccc} 0 & 1 & 2 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} 504 & 2016 & 504 \\ 2016 & -10080 & 2016 \\ 504 & 2016 & 504 \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{504 \left( u_{ol} + 4 \, u_{ol+1} + u_{ol+2} + 4 \, u_{ol-1} - 20 \, u_{ol+1-1} + 4 \, u_{ol+2-1} + u_{ol-2l} + 4 \, u_{ol+1-2l} + u_{ol+2-2l} \right)}{\Delta x_{ol}^8}, \, O( \, \Delta x_{ol} \, )$$

Formula:, 37, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 1

Error order:, 8, Error:, 1.6623043180767852328 × 10<sup>−19</sup>, New Error:, 1.6740968398875404683 × 10<sup>−27</sup>

Error order:, 8, Error:, 1.6740968398875404683 × 10<sup>−27</sup>, New Error:, 1.6752731093421237123 × 10<sup>−35</sup>

Error order:, 8, Error:, 1.6752731093421237123 × 10<sup>−35</sup>, New Error:, 1.6753907058723648342 × 10<sup>−43</sup>

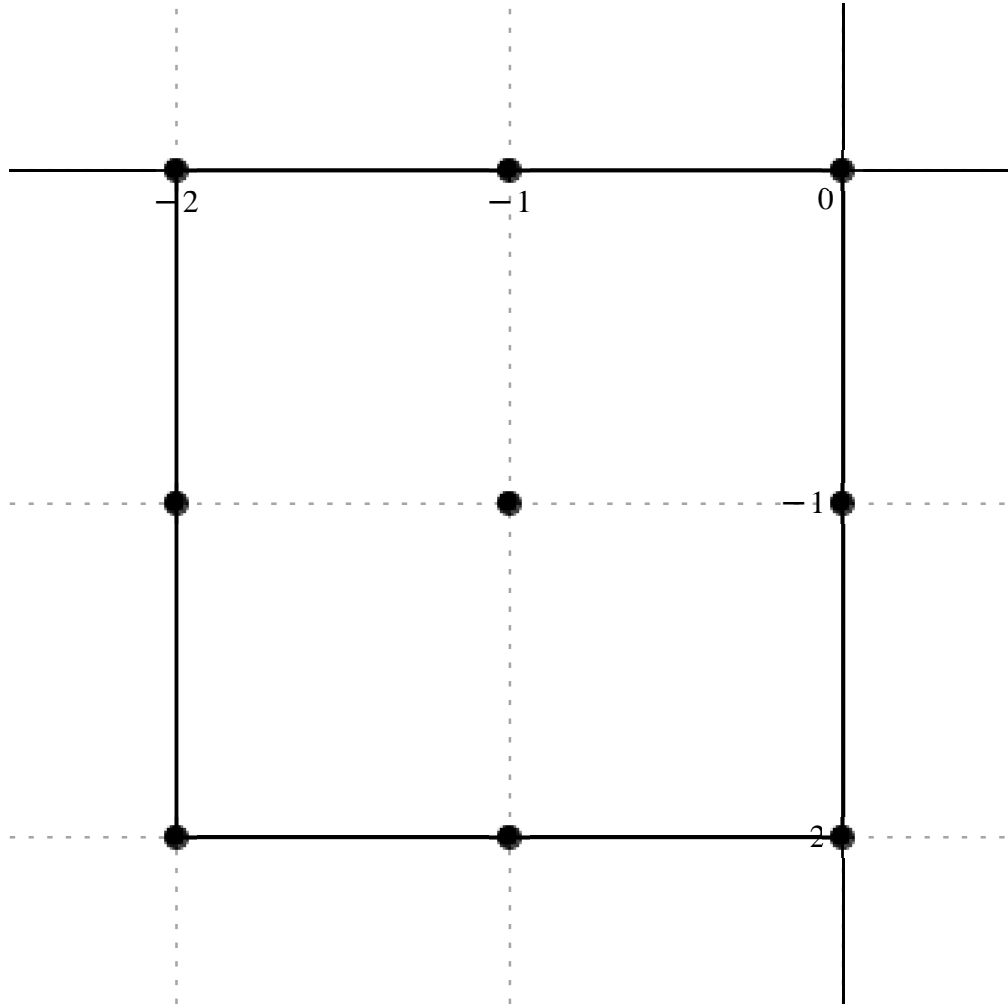
Error order:, 8, Error:, 1.6753907058723648342 × 10<sup>−43</sup>, New Error:, 1.6754024652206463535 × 10<sup>−51</sup>

Error order:, 8, Error:, 1.6754024652206463535 × 10<sup>−51</sup>, New Error:, 1.6754036411524264888 × 10<sup>−59</sup>

$$x_o \neq h \, , \, \left[ \begin{array}{ccc} -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \end{array} \right]$$

$$c =, \, \left[ \begin{array}{ccc} \frac{1}{2} & 4 & \frac{57}{20} - \frac{57 \, \mathrm{I}}{20} \\ \frac{8}{5} - \frac{4 \, \mathrm{I}}{5} & -10 + 10 \, \mathrm{I} & -4 \, \mathrm{I} \\ \frac{1}{4} - \frac{\mathrm{I}}{4} & \frac{4}{5} - \frac{8 \, \mathrm{I}}{5} & -\frac{\mathrm{I}}{2} \end{array} \right]$$





$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol})=\frac{10\, u_{ol-2}+80\, u_{ol-1}+(57-57\,\mathrm{I})\, u_{ol}+(32-16\,\mathrm{I})\, u_{ol-2-1}+(-200+200\,\mathrm{I})\, u_{ol-1-1}-80\,\mathrm{I}\, u_{ol-1}+(5-5\,\mathrm{I})\, u_{ol-2-2\,\mathrm{I}}+(16-32\,\mathrm{I})\, u_{ol-1-2\,\mathrm{I}}-10\,\mathrm{I}\, u_{ol-2\,\mathrm{I}}}{20\, \Delta x_{ol}^8},\, O(\, \Delta x_{ol}^8\, )$$

Formula:, 38, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 7, Error:,  $1.0323121616133769848 \times 10^{-16}$ , New Error:,  $1.0473413335663856326 \times 10^{-23}$

Error order:, 7, Error:,  $1.0473413335663856326 \times 10^{-23}$ , New Error:,  $1.0488500536654117452 \times 10^{-30}$

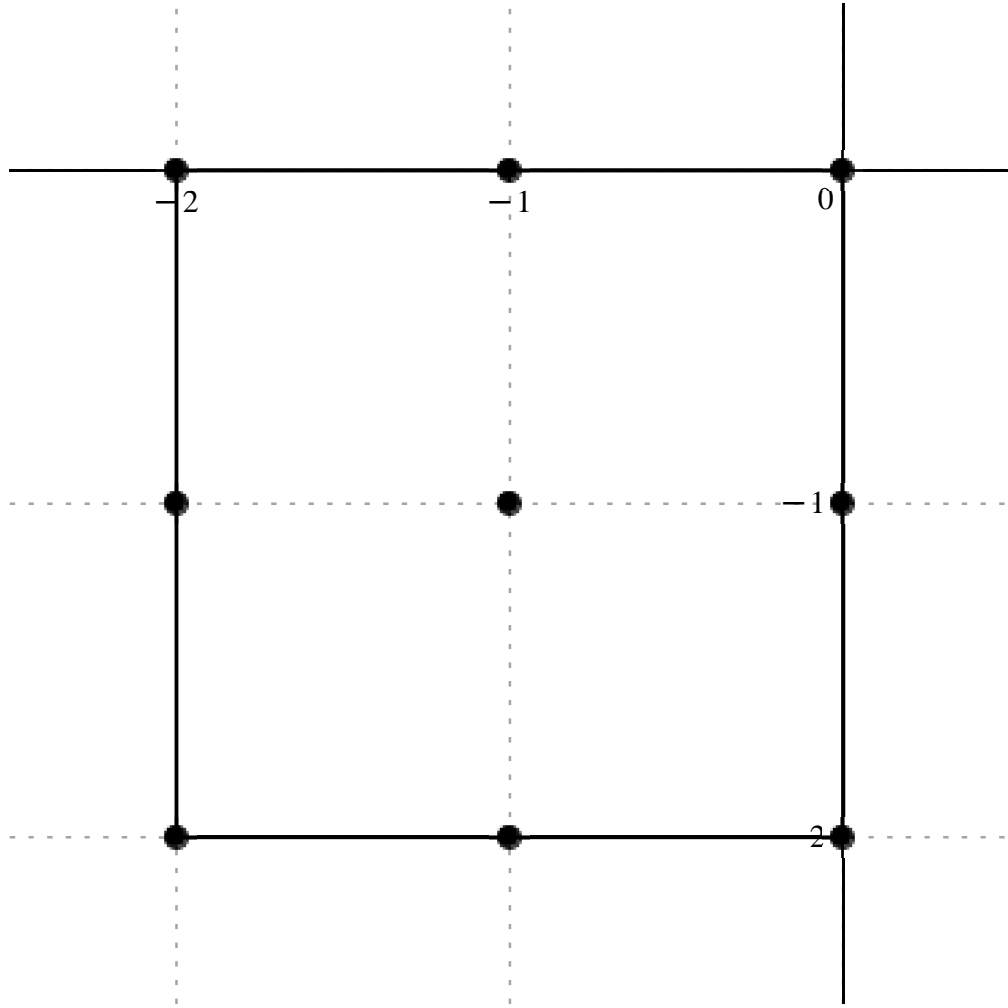
Error order:, 7, Error:,  $1.0488500536654117452 \times 10^{-30}$ , New Error:,  $1.0490009836054749802 \times 10^{-37}$

Error order:, 7, Error:,  $1.0490009836054749802 \times 10^{-37}$ , New Error:,  $1.0490160771786825807 \times 10^{-44}$

Error order:, 7, Error:,  $1.0490160771786825807 \times 10^{-44}$ , New Error:,  $1.0490175865417952530 \times 10^{-51}$

$$x_o\, +h\, .\, ,\, \left[\begin{array}{ccc} -2 & -1 & 0 \\ -2-1 & -1-1 & -1 \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \end{array}\right]$$

$$c=,\, \left[\begin{array}{ccc} \frac{47}{20}-\frac{57\,\mathrm{I}}{20} & \frac{74}{5}-\frac{114\,\mathrm{I}}{5} & -\frac{153\,\mathrm{I}}{10} \\ \frac{18}{5}-\frac{62\,\mathrm{I}}{5} & 94\,\mathrm{I} & -\frac{74}{5}-\frac{114\,\mathrm{I}}{5} \\ -\frac{13\,\mathrm{I}}{5} & -\frac{18}{5}-\frac{62\,\mathrm{I}}{5} & -\frac{47}{20}-\frac{57\,\mathrm{I}}{20} \end{array}\right]$$



$$\frac{d^2}{dx_{ol}^2} u(x_{ol}) = \frac{(47 - 57 I) u_{ol-2} + (296 - 456 I) u_{ol-1} - 306 I u_{ol} + (72 - 248 I) u_{ol+2-1} + 1880 I u_{ol+1-1} - (296 + 456 I) u_{ol+1} - 52 I u_{ol+2-21} - (72 + 248 I) u_{ol+1-21} - (47 + 57 I) u_{ol+21}}{20 \Delta x_{ol}^2}, O(\Delta x_{ol}^7)$$

Formula:, 39, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 6, Error:,  $6.3078268730766232908 \times 10^{-14}$ , New Error:,  $6.3507048443760159080 \times 10^{-20}$

Error order:, 6, Error:,  $6.3507048443760159080 \times 10^{-20}$ , New Error:,  $6.3549821473111846655 \times 10^{-26}$

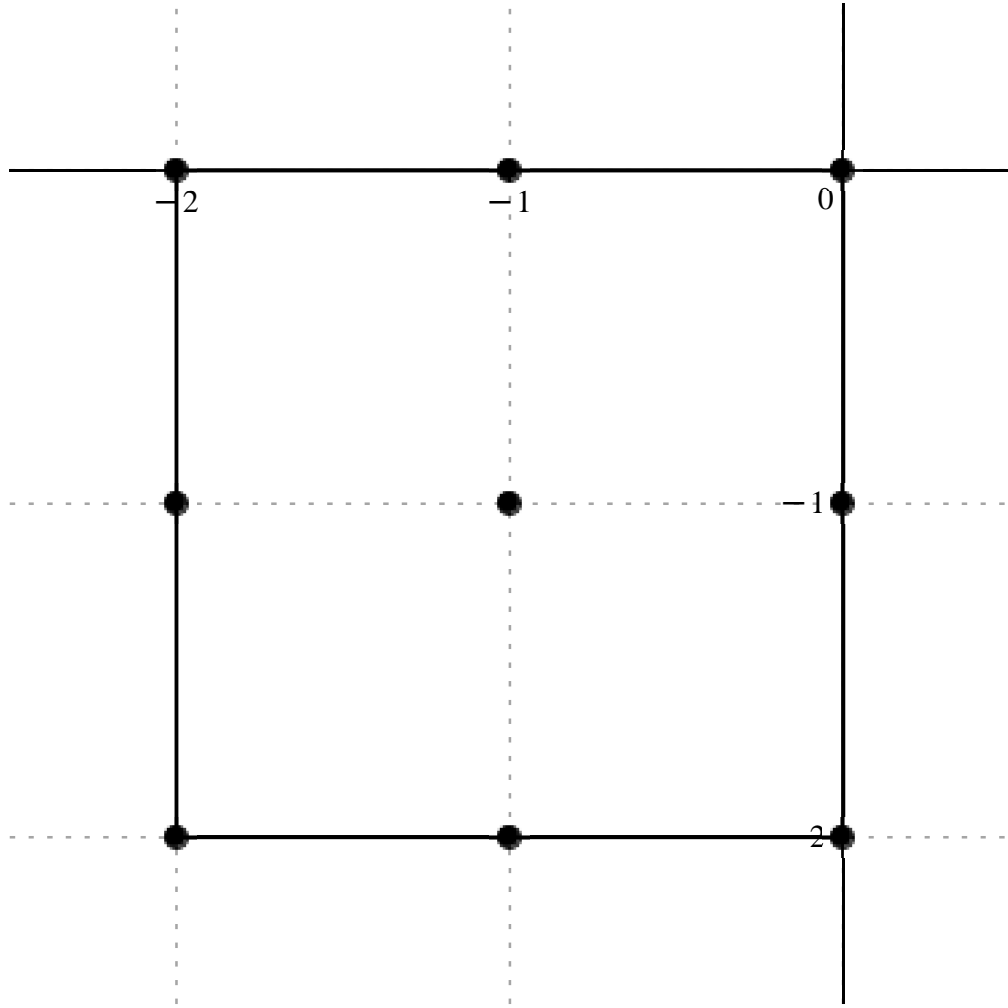
Error order:, 6, Error:,  $6.3549821473111846655 \times 10^{-26}$ , New Error:,  $6.3554097706508743033 \times 10^{-32}$

Error order:, 6, Error:,  $6.3554097706508743033 \times 10^{-32}$ , New Error:,  $6.3554525319132848561 \times 10^{-38}$

Error order:, 6, Error:,  $6.3554525319132848561 \times 10^{-38}$ , New Error:,  $6.3554568080288083063 \times 10^{-44}$

$$x_o + h \cdot, \begin{bmatrix} -2 & -1 & 0 \\ -2 - I & -1 - I & -I \\ -2 - 2 I & -1 - 2 I & -2 I \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{141}{40} - \frac{747 I}{40} & -\frac{222}{5} - \frac{576 I}{5} & -\frac{1467}{40} - \frac{1467 I}{40} \\ -\frac{168}{5} - \frac{282 I}{5} & 318 + 318 I & -\frac{576}{5} - \frac{222 I}{5} \\ -\frac{381}{40} - \frac{381 I}{40} & -\frac{282}{5} - \frac{168 I}{5} & -\frac{747}{40} - \frac{141 I}{40} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{3 \left( -(47 + 249 \, \mathrm{I}) \, u_{ol-2} - (592 + 1536 \, \mathrm{I}) \, u_{ol-1} - (489 + 489 \, \mathrm{I}) \, u_{ol} - (448 + 752 \, \mathrm{I}) \, u_{ol-2-1} + (4240 + 4240 \, \mathrm{I}) \, u_{ol-1-1} - (1536 + 592 \, \mathrm{I}) \, u_{ol-1} - (127 + 127 \, \mathrm{I}) \, u_{ol-2-21} - (752 + 448 \, \mathrm{I}) \, u_{ol-1-21} - (249 + 47 \, \mathrm{I}) \, u_{ol-21} \right)}{40 \, \Delta x_{ol}^3}, \, O( \, \Delta x_{ol}^6 \, )$$

Formula:, 40, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 5, Error:,  $2.1975482610858138082 \times 10^{-11}$ , New Error:,  $2.2278892310990815360 \times 10^{-16}$

Error order:, 5, Error:,  $2.2278892310990815360 \times 10^{-16}$ , New Error:,  $2.2309345844772867513 \times 10^{-21}$

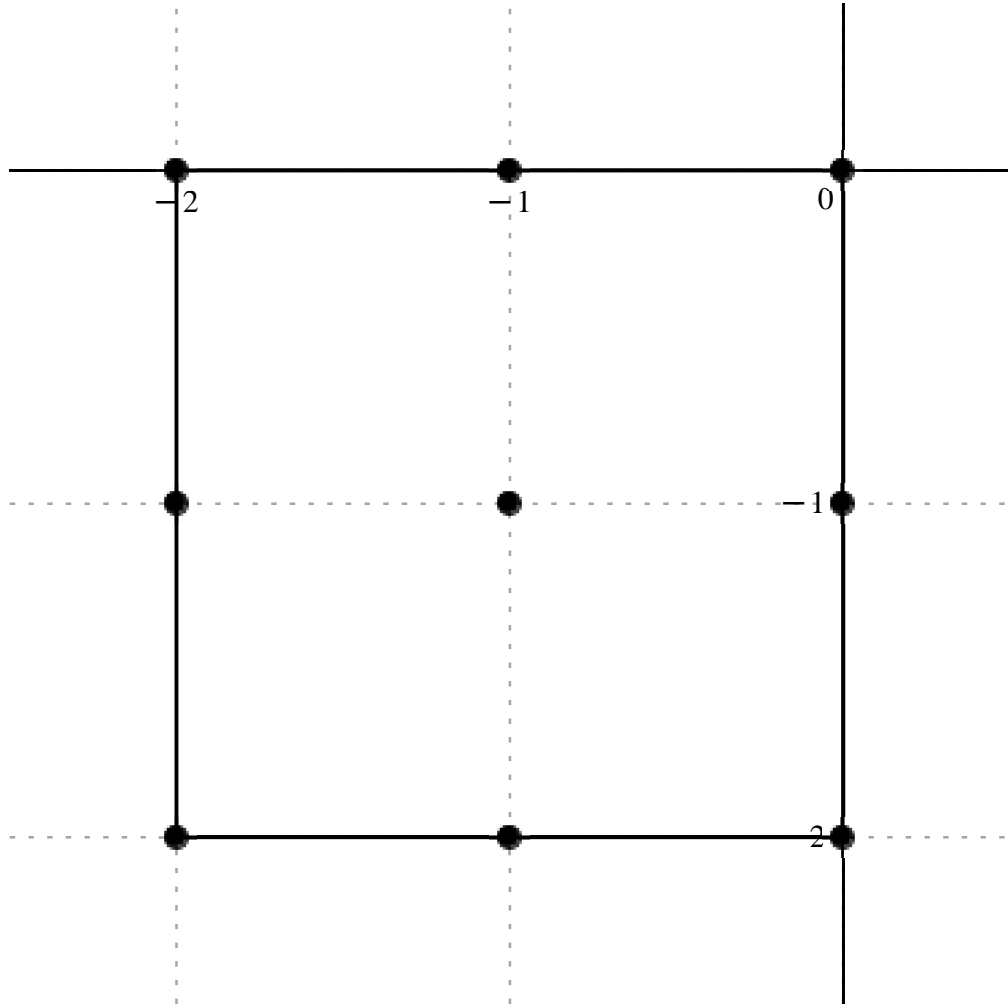
Error order:, 5, Error:,  $2.2309345844772867513 \times 10^{-21}$ , New Error:,  $2.2312392321928641412 \times 10^{-26}$

Error order:, 5, Error:,  $2.2312392321928641412 \times 10^{-26}$ , New Error:,  $2.2312696980880107718 \times 10^{-31}$

Error order:, 5, Error:,  $2.2312696980880107718 \times 10^{-31}$ , New Error:,  $2.2312727446887611349 \times 10^{-36}$

$$x_o + h \cdot , \left[ \begin{array}{ccc} -2 & -1 & 0 \\ -2-1 & -1-1 & -1 \\ -2-2 \, \mathrm{I} & -1-2 \, \mathrm{I} & -2 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccc} -\frac{663}{10} - 36 \, \mathrm{I} & -\frac{2046}{5} - 126 \, \mathrm{I} & -\frac{1503}{10} \\ -\frac{1266}{5} - 54 \, \mathrm{I} & 1662 & -\frac{2046}{5} + 126 \, \mathrm{I} \\ -\frac{543}{10} & -\frac{1266}{5} + 54 \, \mathrm{I} & -\frac{663}{10} + 36 \, \mathrm{I} \end{array} \right]$$



$$\frac{d^4}{dx_{ol}^4} u(x_{ol}) = \frac{3 \left( -(221 + 120 I) u_{ol-2} - (1364 + 420 I) u_{ol-1} - 501 u_{ol} - (844 + 180 I) u_{ol-2+1} + 5540 u_{ol-1+1} + (-1364 + 420 I) u_{ol+1} - 181 u_{ol-2-21} + (-844 + 180 I) u_{ol+1-21} + (-221 + 120 I) u_{ol-21} \right)}{10 \Delta x_{ol}^4}, O(\Delta x_{ol}^5)$$

Formula:, 41, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 4, Error:,  $8.5396565784292803026 \times 10^{-9}$ , New Error:,  $8.5936091037490751633 \times 10^{-13}$

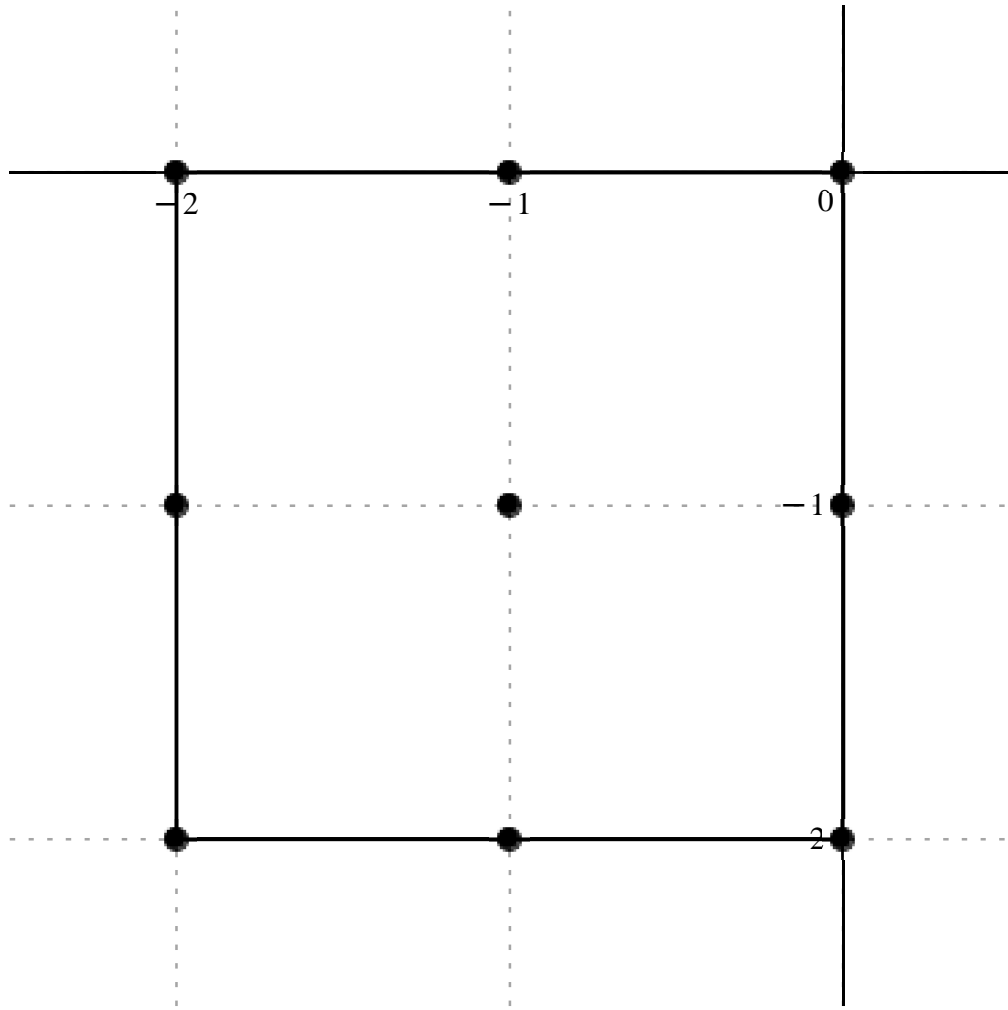
Error order:, 4, Error:,  $8.5936091037490751633 \times 10^{-13}$ , New Error:,  $8.5989918096438010220 \times 10^{-17}$

Error order:, 4, Error:,  $8.5989918096438010220 \times 10^{-17}$ , New Error:,  $8.5995299524554432329 \times 10^{-21}$

Error order:, 4, Error:,  $8.5995299524554432329 \times 10^{-21}$ , New Error:,  $8.5995837654565084859 \times 10^{-25}$

Error order:, 4, Error:,  $8.5995837654565084859 \times 10^{-25}$ , New Error:,  $8.5995891467438117000 \times 10^{-29}$

$$x_o + h \cdot, \begin{bmatrix} -2 & -1 & 0 \\ -2 - I & -1 - I & -I \\ -2 - 2 I & -1 - 2 I & -2 I \end{bmatrix}$$
  
$$c =, \begin{bmatrix} -210 + 90 I & -960 + 630 I & -252 + 252 I \\ -642 + 456 I & 3360 - 3360 I & -630 + 960 I \\ -120 + 120 I & -456 + 642 I & -90 + 210 I \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{(-210 + 90 \, \mathrm{I}) \, u_{ol-2} + (-960 + 630 \, \mathrm{I}) \, u_{ol-1} + (-252 + 252 \, \mathrm{I}) \, u_{ol} + (-642 + 456 \, \mathrm{I}) \, u_{ol-2-1} + (3360 - 3360 \, \mathrm{I}) \, u_{ol-1-1} + (-630 + 960 \, \mathrm{I}) \, u_{ol-1} + (-120 + 120 \, \mathrm{I}) \, u_{ol-2-21} + (-456 + 642 \, \mathrm{I}) \, u_{ol-1-21} + (-90 + 210 \, \mathrm{I}) \, u_{ol-21}}{\Delta x_{ol}^5}, \, O( \, \Delta x_{ol}^4 \, )$$

Formula:, 42, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 6

Error order:, 3, Error:, 1.8748274686633571556 × 10−6, New Error:, 1.8980080060326356018 × 10−9

Error order:, 3, Error:, 1.8980080060326356018 × 10−9, New Error:, 1.9003340575698289112 × 10−12

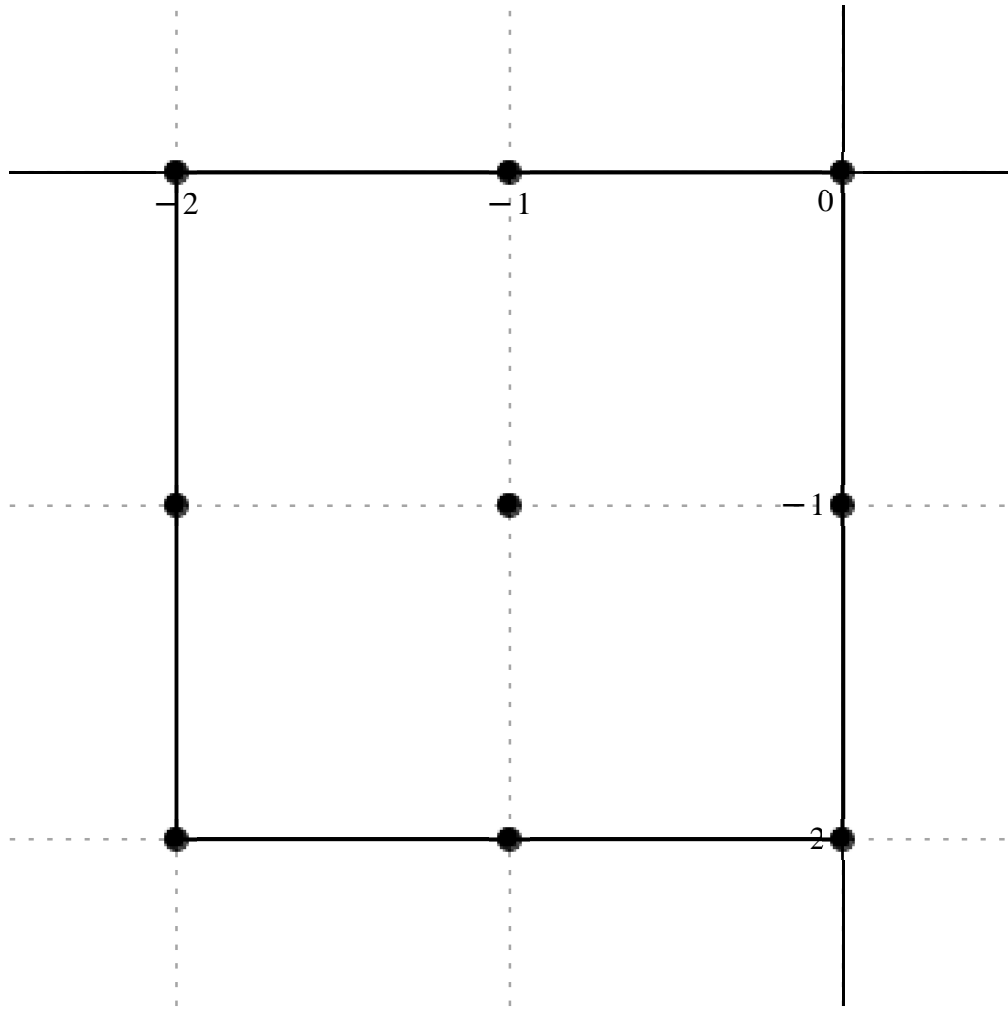
Error order:, 3, Error:, 1.9003340575698289112 × 10−12, New Error:, 1.9005667425758955292 × 10−15

Error order:, 3, Error:, 1.9005667425758955292 × 10−15, New Error:, 1.9005900118748982753 × 10−18

Error order:, 3, Error:, 1.9005900118748982753 × 10−18, New Error:, 1.9005923388127823832 × 10−21

$$x_o \, + h \, . \, , \, \left[ \begin{array}{ccc} -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \end{array} \right]$$

$$c = , \, \left[ \begin{array}{ccc} -126 + 486 \, \mathrm{I} & -288 + 2268 \, \mathrm{I} & 648 \, \mathrm{I} \\ -216 + 1764 \, \mathrm{I} & -10080 \, \mathrm{I} & 288 + 2268 \, \mathrm{I} \\ 396 \, \mathrm{I} & 216 + 1764 \, \mathrm{I} & 126 + 486 \, \mathrm{I} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} u(x_{ol}) = \frac{(-126 + 486 \mathrm{I}) u_{ol-2} + (-288 + 2268 \mathrm{I}) u_{ol-1} + 648 \mathrm{I} u_{ol} + (-216 + 1764 \mathrm{I}) u_{ol-2-1} - 10080 \mathrm{I} u_{ol-1-1} + (288 + 2268 \mathrm{I}) u_{ol-1} + 396 \mathrm{I} u_{ol-2-2\mathrm{I}} + (216 + 1764 \mathrm{I}) u_{ol-1-2\mathrm{I}} + (126 + 486 \mathrm{I}) u_{ol-2\mathrm{I}}}{\Delta x_{ol}^6}, O(\Delta x_{ol}^3)$$

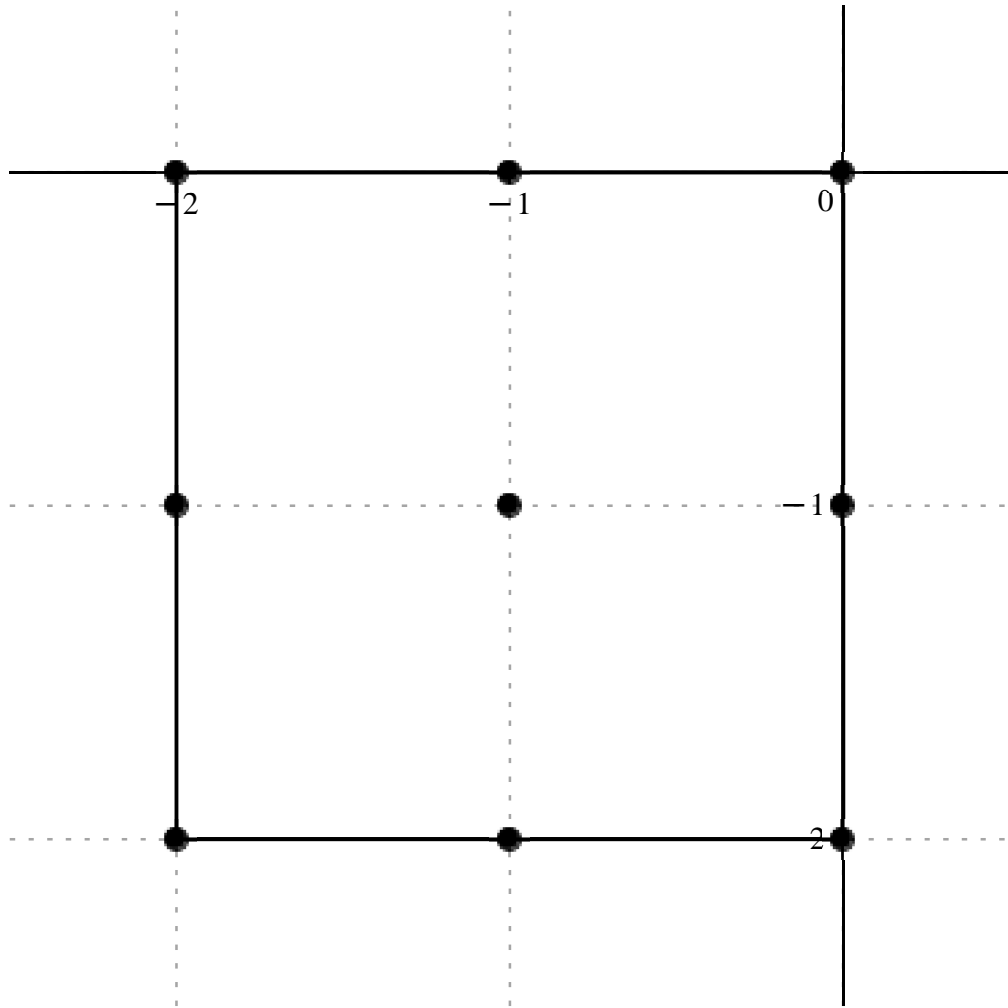
Formula:, 43, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order:, 2, Error:, 0.00042649600600376113412, New Error:,  $4.2873152089700611499 \times 10^{-6}$   
Error order:, 2, Error:,  $4.2873152089700611499 \times 10^{-6}$ , New Error:,  $4.2895460472757766479 \times 10^{-8}$   
Error order:, 2, Error:,  $4.2895460472757766479 \times 10^{-8}$ , New Error:,  $4.2897690835379823814 \times 10^{-10}$   
Error order:, 2, Error:,  $4.2897690835379823814 \times 10^{-10}$ , New Error:,  $4.2897913866877137601 \times 10^{-12}$   
Error order:, 2, Error:,  $4.2897913866877137601 \times 10^{-12}$ , New Error:,  $4.2897936169979212002 \times 10^{-14}$

$$x_o + h \cdot \begin{bmatrix} -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -2 - 2 \mathrm{I} & -1 - 2 \mathrm{I} & -2 \mathrm{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} 441 + 567 \mathrm{I} & 2016 + 2268 \mathrm{I} & 567 + 567 \mathrm{I} \\ 1764 + 2016 \mathrm{I} & -10080 - 10080 \mathrm{I} & 2268 + 2016 \mathrm{I} \\ 441 + 441 \mathrm{I} & 2016 + 1764 \mathrm{I} & 567 + 441 \mathrm{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u(x_{ol})=\frac{(441+567\,\mathrm{I})\,u_{ol-2}+(2016+2268\,\mathrm{I})\,u_{ol-1}+(567+567\,\mathrm{I})\,u_{ol}+(1764+2016\,\mathrm{I})\,u_{ol-2-\mathrm{I}}-(10080+10080\,\mathrm{I})\,u_{ol-1-\mathrm{I}}+(2268+2016\,\mathrm{I})\,u_{ol-1}+(441+441\,\mathrm{I})\,u_{ol-2-2\mathrm{I}}+(2016+1764\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}+(567+441\,\mathrm{I})\,u_{ol-2\mathrm{I}}}{\Delta x_{ol}^7},\,O(\,\Delta x_{ol}^2\,)$$

Formula:, 44, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 1, Error:, 0.046696520004324277901, New Error:, 0.0047079458327768247152

Error order:, 1, Error:, 0.0047079458327768247152, New Error:, 0.00047117862184780327084

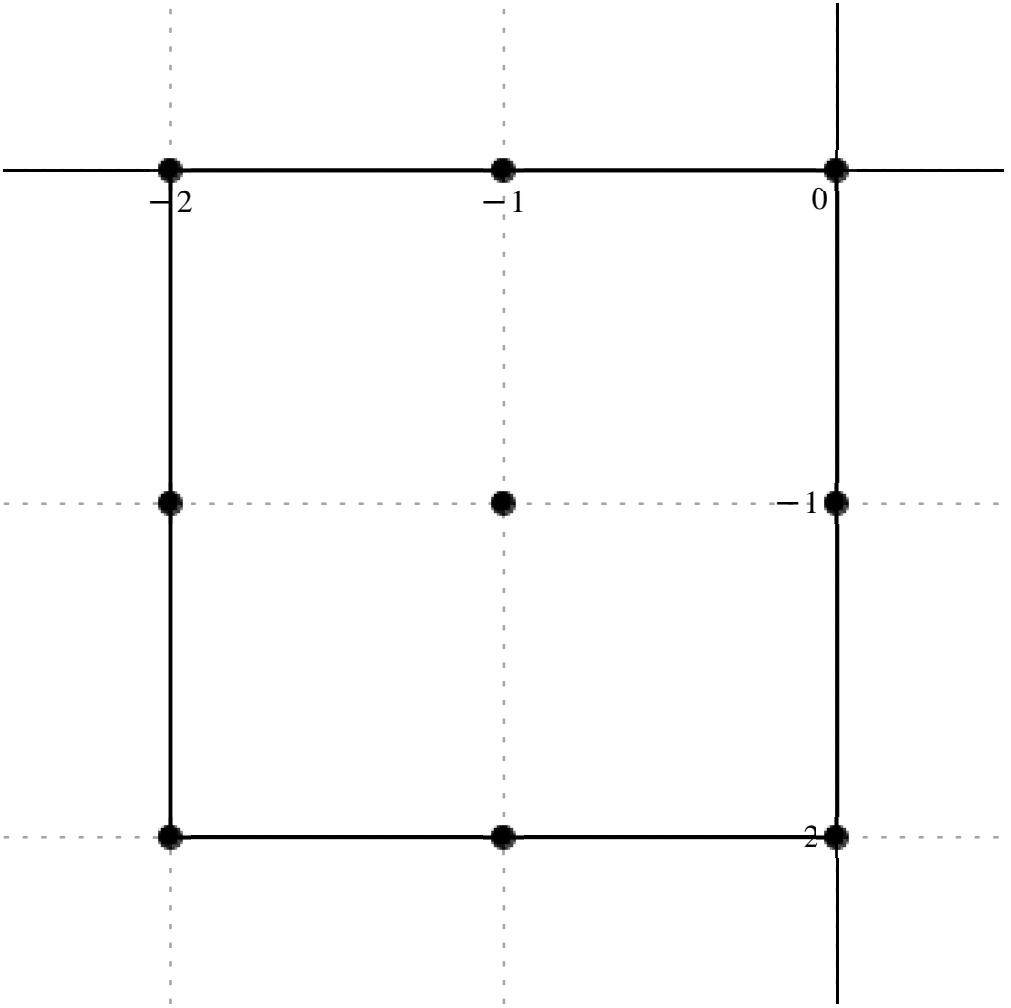
Error order:, 1, Error:, 0.00047117862184780327084, New Error:, 0.000047121703669167901055

Error order:, 1, Error:, 0.000047121703669167901055, New Error:,  $4.7122087828591941654 \times 10^{-6}$

Error order:, 1, Error:,  $4.7122087828591941654 \times 10^{-6}$ , New Error:,  $4.7122126244644196964 \times 10^{-7}$

$$x_o+h\cdot,\left[\begin{array}{ccc} -2 & -1 & 0 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \end{array}\right]$$

$$c=\left[\begin{array}{ccc} 504 & 2016 & 504 \\ 2016 & -10080 & 2016 \\ 504 & 2016 & 504 \end{array}\right]$$



$$\frac{d^8}{dx_{ol}^8} u(x_{ol}) = \frac{504 \left( u_{ol-2} + 4 u_{ol-1} + u_{ol} + 4 u_{ol-2-1} - 20 u_{ol-1-1} + 4 u_{ol-1} + u_{ol-2-21} + 4 u_{ol-1-21} + u_{ol-21} \right)}{\Delta x_{ol}^8}, O(\Delta x_{ol})$$

Formula:, 45, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 5, Error:,  $1.6175075033753258608 \times 10^{-12}$ , New Error:,  $1.6106970873746907313 \times 10^{-17}$

Error order:, 5, Error:,  $1.6106970873746907313 \times 10^{-17}$ , New Error:,  $1.6100172740779412306 \times 10^{-22}$

Error order:, 5, Error:,  $1.6100172740779412306 \times 10^{-22}$ , New Error:,  $1.6099493050238566026 \times 10^{-27}$

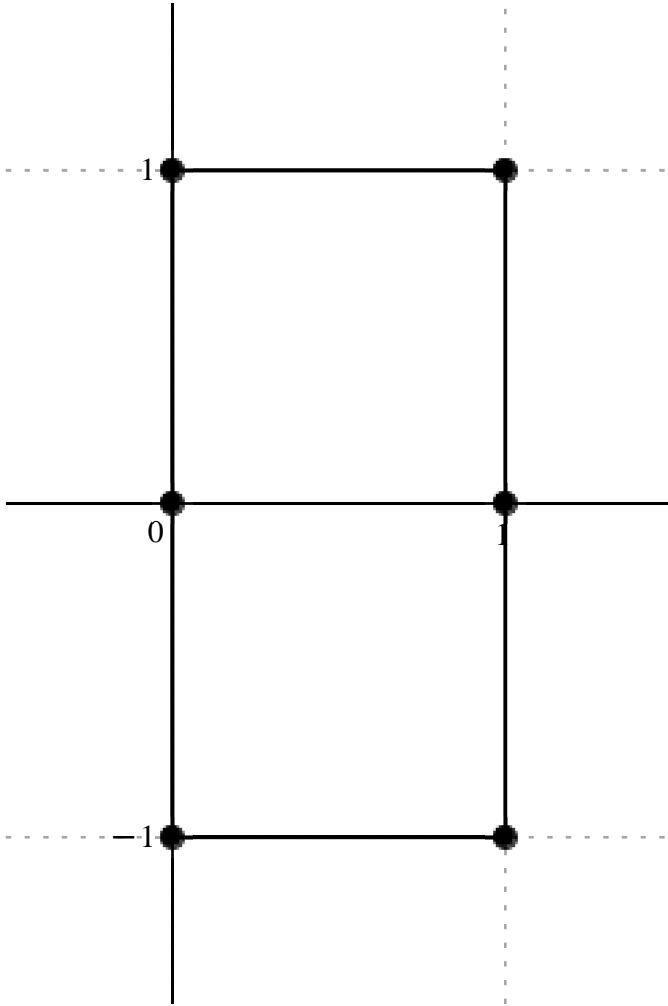
Error order:, 5, Error:,  $1.6099493050238566026 \times 10^{-27}$ , New Error:,  $1.6099425082411965879 \times 10^{-32}$

Error order:, 5, Error:,  $1.6099425082411965879 \times 10^{-32}$ , New Error:,  $1.6099418285641580635 \times 10^{-37}$

$$x_o + h, \begin{bmatrix} I & 1+I \\ 0 & 1 \\ -I & 1-I \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{3}{10} + \frac{I}{10} & \frac{1}{5} + \frac{I}{10} \\ -2 & 1 \\ \frac{3}{10} - \frac{I}{10} & \frac{1}{5} - \frac{I}{10} \end{bmatrix}$$





$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\; u(x_{ol})=\frac{(3+\mathrm{I})\; u_{ol+1}+(2+\mathrm{I})\; u_{ol+1+1}-20\; u_{ol}+10\; u_{ol+1}+(3-\mathrm{I})\; u_{ol-1}+(2-\mathrm{I})\; u_{ol+1-1}}{10\; \Delta x_{ol}},\; O(\; \Delta x_{ol}^5\; )$$

Formula:, 46, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 2

Error order:, 4, Error:, 5.8772497015208587211 × 10<sup>−10</sup>, New Error:, 5.8566224349522495379 × 10<sup>−14</sup>

Error order:, 4, Error:, 5.8566224349522495379 × 10<sup>−14</sup>, New Error:, 5.8545624980073434086 × 10<sup>−18</sup>

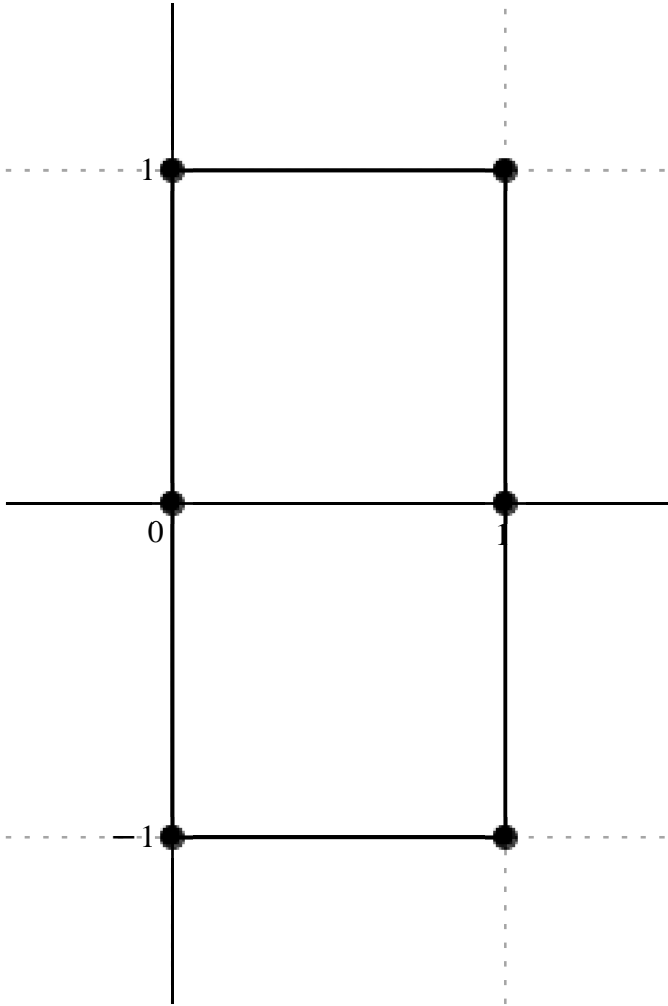
Error order:, 4, Error:, 5.8545624980073434086 × 10<sup>−18</sup>, New Error:, 5.8543565322100384112 × 10<sup>−22</sup>

Error order:, 4, Error:, 5.8543565322100384112 × 10<sup>−22</sup>, New Error:, 5.8543359359092797743 × 10<sup>−26</sup>

Error order:, 4, Error:, 5.8543359359092797743 × 10<sup>−26</sup>, New Error:, 5.8543338762819936292 × 10<sup>−30</sup>

$$x_o\; +h\; ,\; \left[\begin{array}{cc} \mathrm{I} & 1+\mathrm{I} \\ 0 & 1 \\ -\mathrm{I} & 1-\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{cc} -1-\mathrm{I} & -\frac{1}{2}-\frac{\mathrm{I}}{2} \\ 5 & -2 \\ -1+\mathrm{I} & -\frac{1}{2}+\frac{\mathrm{I}}{2} \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{-(2+2\,\mathrm{I})\,u_{ol+1}-(1+\mathrm{I})\,u_{ol+1+1}+10\,u_{ol}-4\,u_{ol+1}+(-2+2\,\mathrm{I})\,u_{ol-1}+(-1+\mathrm{I})\,u_{ol+1-1}}{2\,\Delta x_{ol}^2},\,O(\,\Delta x_{ol}^4\,)$$

Formula:, 47, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 3, Error:,  $2.0026695239459022051 \times 10^{-7}$ , New Error:,  $1.9964821893416412273 \times 10^{-10}$

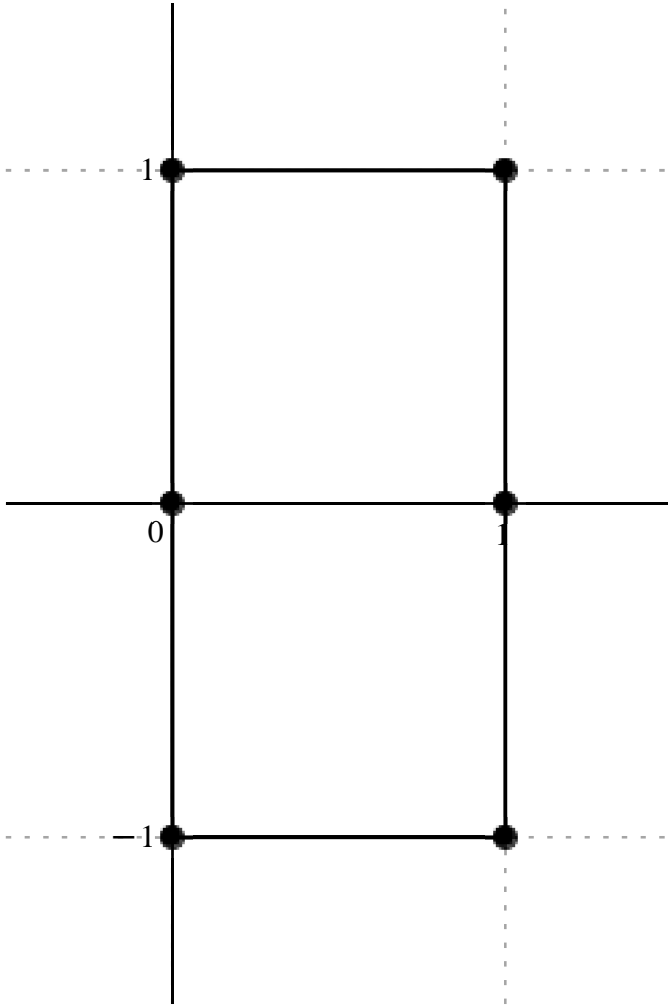
Error order:, 3, Error:,  $1.9964821893416412273 \times 10^{-10}$ , New Error:,  $1.9958642167118619057 \times 10^{-13}$

Error order:, 3, Error:,  $1.9958642167118619057 \times 10^{-13}$ , New Error:,  $1.9958024270572073346 \times 10^{-16}$

Error order:, 3, Error:,  $1.9958024270572073346 \times 10^{-16}$ , New Error:,  $1.9957962481678251128 \times 10^{-19}$

Error order:, 3, Error:,  $1.9957962481678251128 \times 10^{-19}$ , New Error:,  $1.9957956302796477229 \times 10^{-22}$

$$x_o+h\, , \begin{bmatrix} \mathrm{I} & 1+\mathrm{I} \\ 0 & 1 \\ -\mathrm{I} & 1-\mathrm{I} \end{bmatrix}$$
  
$$c= , \begin{bmatrix} \frac{3}{2}+\frac{9\,\mathrm{I}}{2} & \frac{3}{2}+\frac{3\,\mathrm{I}}{2} \\ -15 & 9 \\ \frac{3}{2}-\frac{9\,\mathrm{I}}{2} & \frac{3}{2}-\frac{3\,\mathrm{I}}{2} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{3 \left( (1+3 I) u_{ol+1} + (1+I) u_{ol+1+1} - 10 u_{ol} + 6 u_{ol+1} + (1-3 I) u_{ol-1} + (1-I) u_{ol+1-1} \right)}{2 \Delta x_{ol}^3}, O(\Delta x_{ol}^3)$$

Formula:, 48, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 2, Error:, 0.000072801619660029674776, New Error:,  $7.2597082467777657021 \times 10^{-7}$

Error order:, 2, Error:,  $7.2597082467777657021 \times 10^{-7}$ , New Error:,  $7.2576653648458322480 \times 10^{-9}$

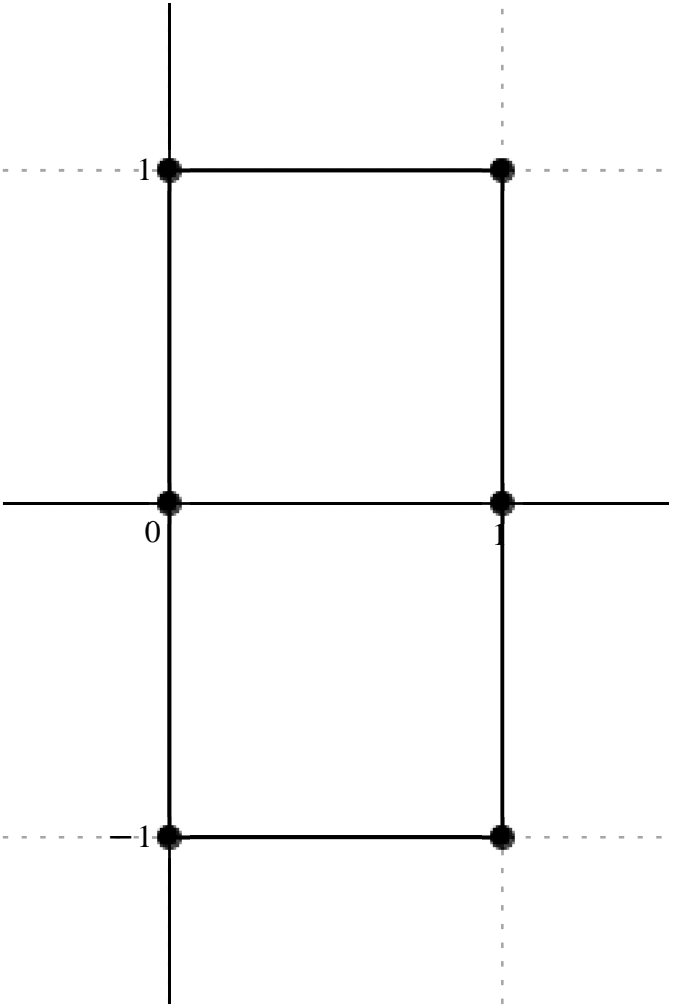
Error order:, 2, Error:,  $7.2576653648458322480 \times 10^{-9}$ , New Error:,  $7.2574611015526062041 \times 10^{-11}$

Error order:, 2, Error:,  $7.2574611015526062041 \times 10^{-11}$ , New Error:,  $7.2574406754722832788 \times 10^{-13}$

Error order:, 2, Error:,  $7.2574406754722832788 \times 10^{-13}$ , New Error:,  $7.2574386328667409831 \times 10^{-15}$

$$x_o + h, \begin{bmatrix} I & 1+I \\ 0 & 1 \\ -I & 1-I \end{bmatrix}$$

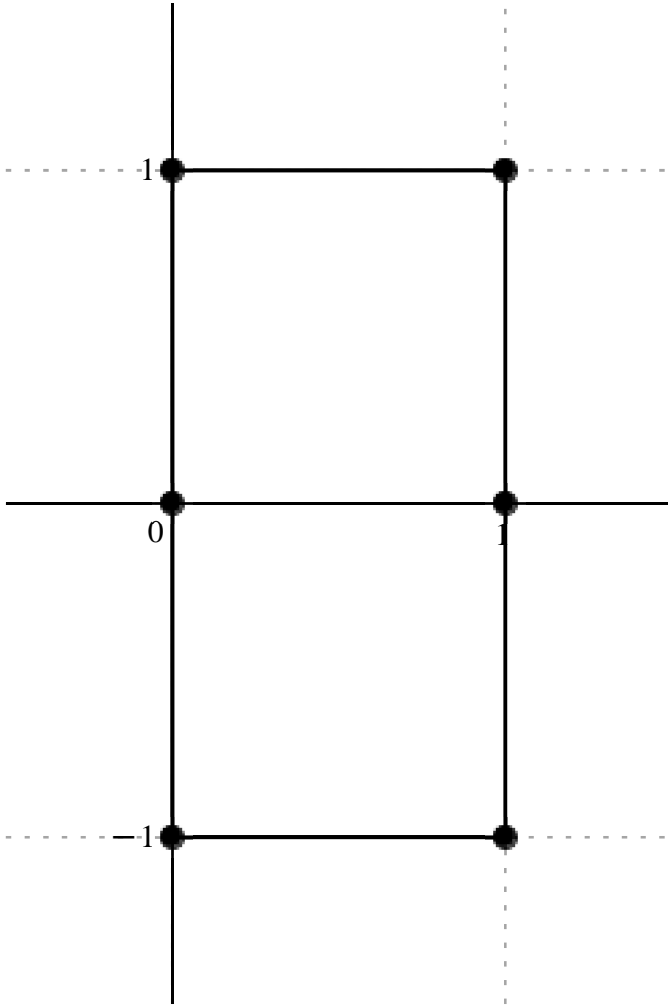
$$c =, \begin{bmatrix} -12 I & -6-6 I \\ 36 & -24 \\ 12 I & -6+6 I \end{bmatrix}$$



$$\frac{d^4}{dx_{ol}^4} u(x_{ol}) = \frac{-12 I u_{ol+1} - (6+6 I) u_{ol+1+1} + 36 u_{ol} - 24 u_{ol+1} + 12 I u_{ol-1} + (-6+6 I) u_{ol+1-1}}{\Delta x_{ol}^4}, O(\Delta x_{ol}^2)$$

Formula:, 49, Var:, 1  
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5  
Error order:, 1, Error:, 0.019834306763854467449, New Error:, 0.0019797140591817975096  
Error order:, 1, Error:, 0.0019797140591817975096, New Error:, 0.00019793426484652825775  
Error order:, 1, Error:, 0.00019793426484652825775, New Error:, 0.000019793055099082699040  
Error order:, 1, Error:, 0.000019793055099082699040, New Error:,  $1.9793017960777196101 \times 10^{-6}$   
Error order:, 1, Error:,  $1.9793017960777196101 \times 10^{-6}$ , New Error:,  $1.9793014246949160950 \times 10^{-7}$

$$x_o + h, \begin{bmatrix} I & 1+I \\ 0 & 1 \\ -I & 1-I \end{bmatrix}$$
  
$$c =, \begin{bmatrix} -6+18 I & 6+18 I \\ -60 & 60 \\ -6-18 I & 6-18 I \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{(-6 + 18 \, \mathrm{I}) \, u_{ol+1} + (6 + 18 \, \mathrm{I}) \, u_{ol+1+1} - 60 \, u_{ol} + 60 \, u_{ol+1} - (6 + 18 \, \mathrm{I}) \, u_{ol-1} + (6 - 18 \, \mathrm{I}) \, u_{ol+1-1}}{\Delta x_{ol}^5}, \, O(\, \Delta x_{ol} \,)$$

Formula:, 50, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 1

Error order:, 5, Error:, 1.6024035554627438045 × 10<sup>−12</sup>, New Error:, 1.6091866942420740496 × 10<sup>−17</sup>

Error order:, 5, Error:, 1.6091866942420740496 × 10<sup>−17</sup>, New Error:, 1.6098662347663382121 × 10<sup>−22</sup>

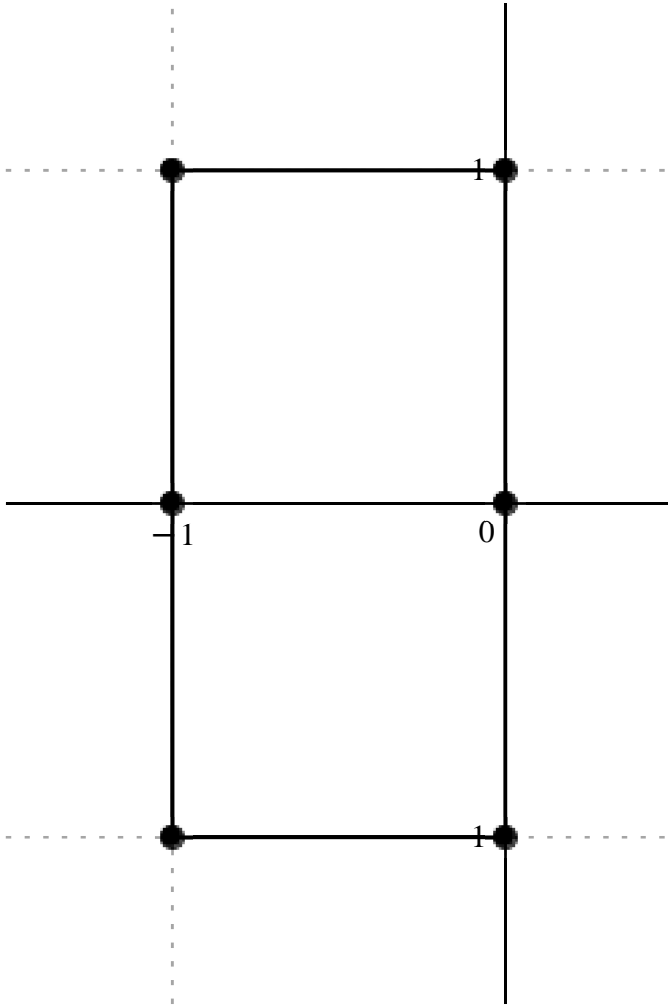
Error order:, 5, Error:, 1.6098662347663382121 × 10<sup>−22</sup>, New Error:, 1.6099342010926979594 × 10<sup>−27</sup>

Error order:, 5, Error:, 1.6099342010926979594 × 10<sup>−27</sup>, New Error:, 1.6099409978480807253 × 10<sup>−32</sup>

Error order:, 5, Error:, 1.6099409978480807253 × 10<sup>−32</sup>, New Error:, 1.6099416775248464772 × 10<sup>−37</sup>

$$x_o \neq h \, , \, \left[ \begin{array}{cc} -1 + \mathrm{I} & \mathrm{I} \\ -1 & 0 \\ -1 - \mathrm{I} & -\mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cc} -\frac{1}{5} + \frac{\mathrm{I}}{10} & -\frac{3}{10} + \frac{\mathrm{I}}{10} \\ -1 & 2 \\ -\frac{1}{5} - \frac{\mathrm{I}}{10} & -\frac{3}{10} - \frac{\mathrm{I}}{10} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}} u(x_{ol}) = \frac{(-2 + \mathrm{I}) u_{ol-1+1} + (-3 + \mathrm{I}) u_{ol+1} - 10 u_{ol-1} + 20 u_{ol} - (2 + \mathrm{I}) u_{ol-1-1} - (3 + \mathrm{I}) u_{ol-1}}{10 \Delta x_{ol}}, \quad O(\Delta x_{ol}^5)$$

Formula:, 51, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 4, Error:,  $5.8314802131616334537 \times 10^{-10}$ , New Error:,  $5.8520454861163021320 \times 10^{-14}$

Error order:, 4, Error:,  $5.8520454861163021320 \times 10^{-14}$ , New Error:,  $5.8541048031237486678 \times 10^{-18}$

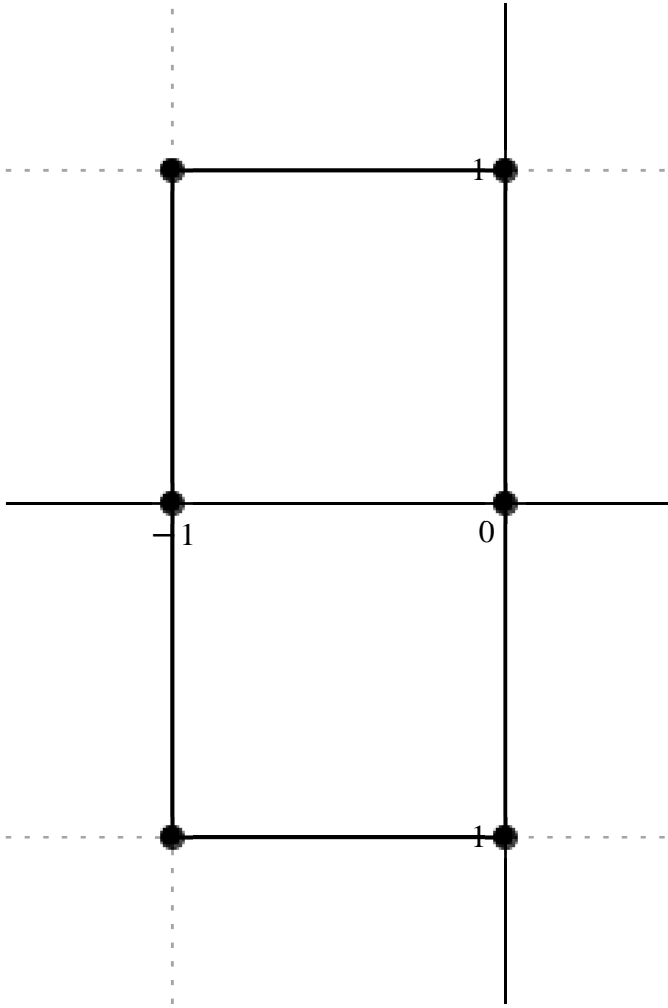
Error order:, 4, Error:,  $5.8541048031237486678 \times 10^{-18}$ , New Error:,  $5.8543107627216789372 \times 10^{-22}$

Error order:, 4, Error:,  $5.8543107627216789372 \times 10^{-22}$ , New Error:,  $5.8543313589604438268 \times 10^{-26}$

Error order:, 4, Error:,  $5.8543313589604438268 \times 10^{-26}$ , New Error:,  $5.8543334185871100344 \times 10^{-30}$

$$x_o + h, \begin{bmatrix} -1 + \mathrm{I} & \mathrm{I} \\ -1 & 0 \\ -1 - \mathrm{I} & -\mathrm{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{1}{2} + \frac{\mathrm{I}}{2} & -1 + \mathrm{I} \\ -2 & 5 \\ -\frac{1}{2} - \frac{\mathrm{I}}{2} & -1 - \mathrm{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{(-1 + \mathrm{I}) \, u_{ol-1+1} + (-2 + 2 \, \mathrm{I}) \, u_{ol+1} - 4 \, u_{ol-1} + 10 \, u_{ol} - (1 + \mathrm{I}) \, u_{ol-1-1} - (2 + 2 \, \mathrm{I}) \, u_{ol-1}}{2 \, \Delta x_{ol}^2}, \, O(\, \Delta x_{ol}^4 \, )$$

Formula:, 52, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 3, Error:,  $1.9889386774381255770 \times 10^{-7}$ , New Error:,  $1.9951091046908570055 \times 10^{-10}$

Error order:, 3, Error:,  $1.9951091046908570055 \times 10^{-10}$ , New Error:,  $1.9957269082467834834 \times 10^{-13}$

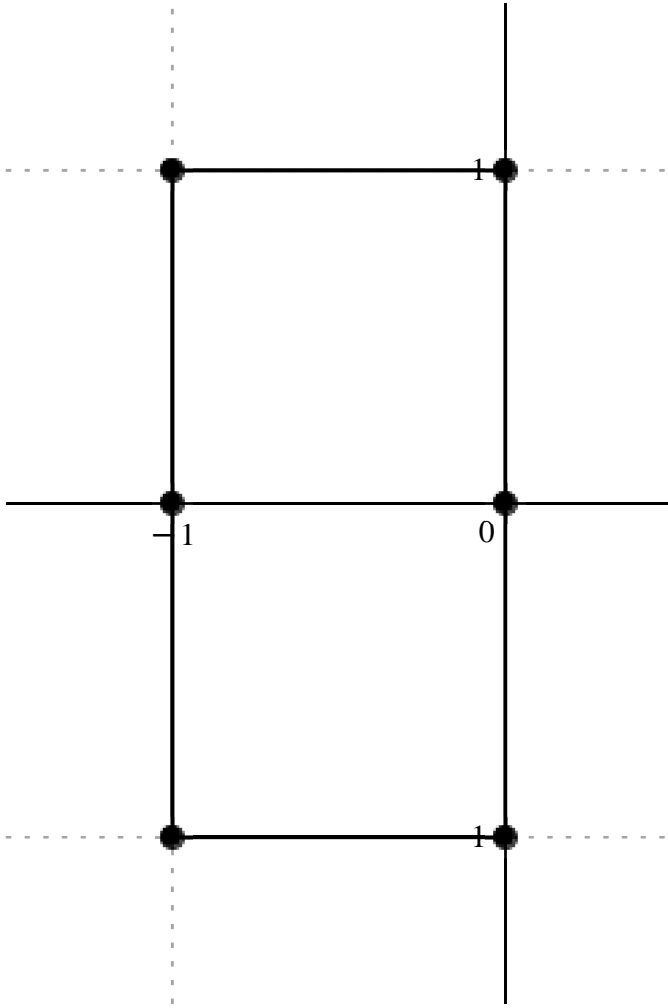
Error order:, 3, Error:,  $1.9957269082467834834 \times 10^{-13}$ , New Error:,  $1.9957886962106994924 \times 10^{-16}$

Error order:, 3, Error:,  $1.9957886962106994924 \times 10^{-16}$ , New Error:,  $1.9957948750831743285 \times 10^{-19}$

Error order:, 3, Error:,  $1.9957948750831743285 \times 10^{-19}$ , New Error:,  $1.9957954929711826445 \times 10^{-22}$

$$x_o \neq h \, , \, \begin{bmatrix} -1 + \mathrm{I} & \mathrm{I} \\ -1 & 0 \\ -1 - \mathrm{I} & -\mathrm{I} \end{bmatrix}$$

$$c =, \, \begin{bmatrix} -\frac{3}{2} + \frac{3 \, \mathrm{I}}{2} & -\frac{3}{2} + \frac{9 \, \mathrm{I}}{2} \\ -9 & 15 \\ -\frac{3}{2} - \frac{3 \, \mathrm{I}}{2} & -\frac{3}{2} - \frac{9 \, \mathrm{I}}{2} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{3 \left( (-1 + \mathrm{I}) u_{ol-1+1} + (-1 + 3 \mathrm{I}) u_{ol+1} - 6 u_{ol-1} + 10 u_{ol} - (1 + \mathrm{I}) u_{ol-1-1} - (1 + 3 \mathrm{I}) u_{ol-1} \right)}{2 \Delta x_{ol}^3}, \quad O(\Delta x_{ol}^3)$$

Formula:, 53, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 2, Error:, 0.000072347707378781159727, New Error:,  $7.2551691239652558781 \times 10^{-7}$

Error order:, 2, Error:,  $7.2551691239652558781 \times 10^{-7}$ , New Error:,  $7.2572114525645812653 \times 10^{-9}$

Error order:, 2, Error:,  $7.2572114525645812653 \times 10^{-9}$ , New Error:,  $7.2574157103244811058 \times 10^{-11}$

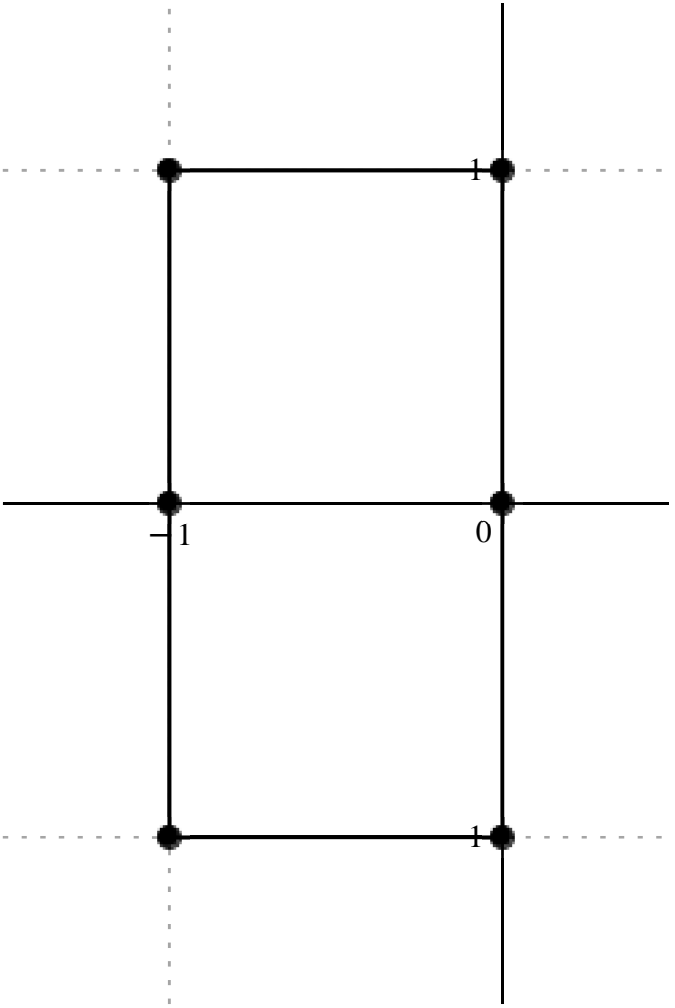
Error order:, 2, Error:,  $7.2574157103244811058 \times 10^{-11}$ , New Error:,  $7.2574361363494707690 \times 10^{-13}$

Error order:, 2, Error:,  $7.2574361363494707690 \times 10^{-13}$ , New Error:,  $7.2574381789544597321 \times 10^{-15}$

$$x_o + h, \begin{bmatrix} -1 + \mathrm{I} & \mathrm{I} \\ -1 & 0 \\ -1 - \mathrm{I} & -\mathrm{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -6 + 6 \mathrm{I} & 12 \mathrm{I} \\ -24 & 36 \\ -6 - 6 \mathrm{I} & -12 \mathrm{I} \end{bmatrix}$$





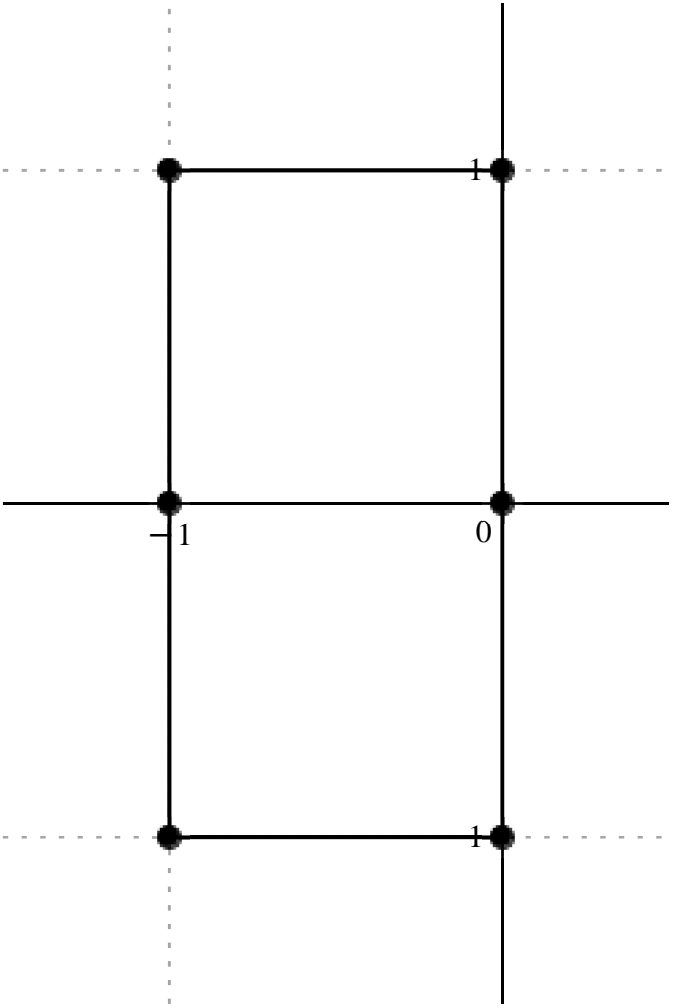
$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{(-6 + 6 \mathrm{I}) u_{ol-1+1} + 12 \mathrm{I} u_{ol+1} - 24 u_{ol-1} + 36 u_{ol} - (6 + 6 \mathrm{I}) u_{ol-1-1} - 12 \mathrm{I} u_{ol-1}}{\Delta x_{ol}^4}, O(\Delta x_{ol}^2)$$

Formula:, 54, Var:, 1  
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 1, Error:, 0.019751777361162017997, New Error:, 0.0019788887641352764515  
Error order:, 1, Error:, 0.0019788887641352764515, New Error:, 0.00019792601189596108796  
Error order:, 1, Error:, 0.00019792601189596108796, New Error:, 0.000019792972569577017146  
Error order:, 1, Error:, 0.000019792972569577017146, New Error:,  $1.9793009707826627901 \times 10^{-6}$   
Error order:, 1, Error:,  $1.9793009707826627901 \times 10^{-6}$ , New Error:,  $1.9793013421654104130 \times 10^{-7}$

$$x_o + h, \begin{bmatrix} -1 + \mathrm{I} & \mathrm{I} \\ -1 & 0 \\ -1 - \mathrm{I} & -\mathrm{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -6 + 18 \mathrm{I} & 6 + 18 \mathrm{I} \\ -60 & 60 \\ -6 - 18 \mathrm{I} & 6 - 18 \mathrm{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} u(x_{ol}) = \frac{(-6 + 18 \mathrm{I}) u_{ol-1+1} + (6 + 18 \mathrm{I}) u_{ol+1} - 60 u_{ol-1} + 60 u_{ol} - (6 + 18 \mathrm{I}) u_{ol-1-1} + (6 - 18 \mathrm{I}) u_{ol-1}}{\Delta x_{ol}^5}, O(\Delta x_{ol})$$

Formula:, 55, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 5, Error:,  $1.6083547694069438429 \times 10^{-12}$ , New Error:,  $1.6097842943843009955 \times 10^{-17}$

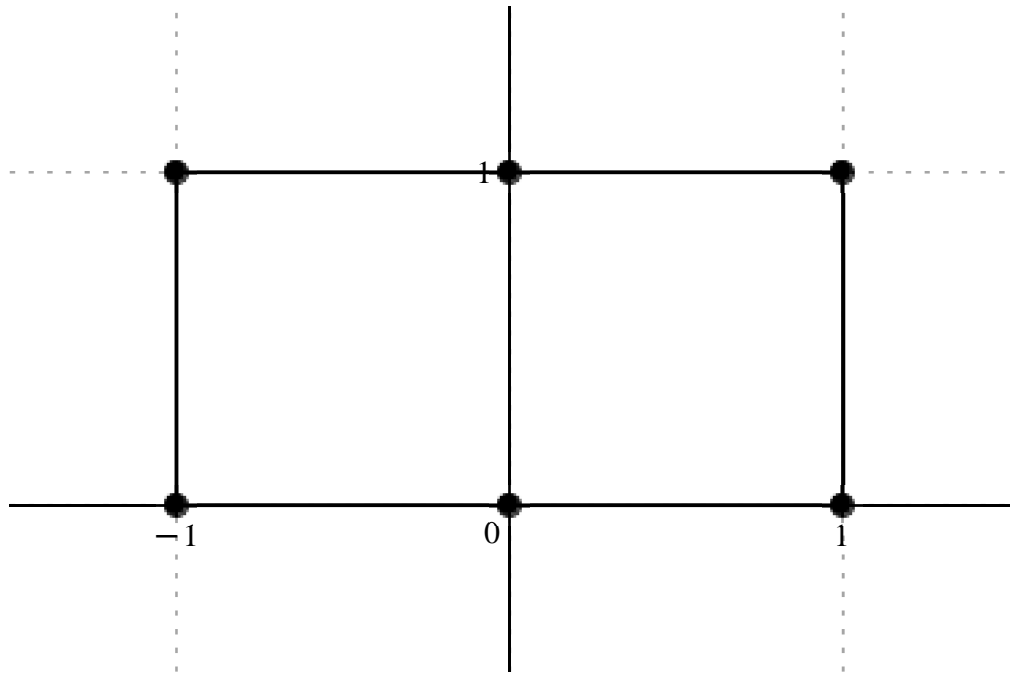
Error order:, 5, Error:,  $1.6097842943843009955 \times 10^{-17}$ , New Error:,  $1.6099260195770577358 \times 10^{-22}$

Error order:, 5, Error:,  $1.6099260195770577358 \times 10^{-22}$ , New Error:,  $1.6099401798217438989 \times 10^{-27}$

Error order:, 5, Error:,  $1.6099401798217438989 \times 10^{-27}$ , New Error:,  $1.6099415957234650681 \times 10^{-32}$

Error order:, 5, Error:,  $1.6099415957234650681 \times 10^{-32}$ , New Error:,  $1.6099417373124097090 \times 10^{-37}$

$$x_o + h \cdot, \begin{bmatrix} -1 + \mathrm{I} & \mathrm{I} & 1 + \mathrm{I} \\ -1 & 0 & 1 \end{bmatrix}$$
  
$$c =, \begin{bmatrix} \frac{1}{10} - \frac{\mathrm{I}}{5} & -\mathrm{I} & -\frac{1}{10} - \frac{\mathrm{I}}{5} \\ \frac{1}{10} - \frac{3 \mathrm{I}}{10} & 2 \mathrm{I} & -\frac{1}{10} - \frac{3 \mathrm{I}}{10} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{(1-2\,\mathrm{I})\,u_{ol-1+1}-10\,\mathrm{I}u_{ol+1}-(1+2\,\mathrm{I})\,u_{ol+1+1}+(1-3\,\mathrm{I})\,u_{ol-1}+20\,\mathrm{I}u_{ol}-(1+3\,\mathrm{I})\,u_{ol+1}}{10\,\Delta x_{ol}^5},\,O(\,\Delta x_{ol}^5\,)$$

Formula:, 56, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 4, Error:,  $5.8495350374532774786 \times 10^{-10}$ , New Error:,  $5.8538566043406848027 \times 10^{-14}$

Error order:, 4, Error:,  $5.8538566043406848027 \times 10^{-14}$ , New Error:,  $5.8542859713041390193 \times 10^{-18}$

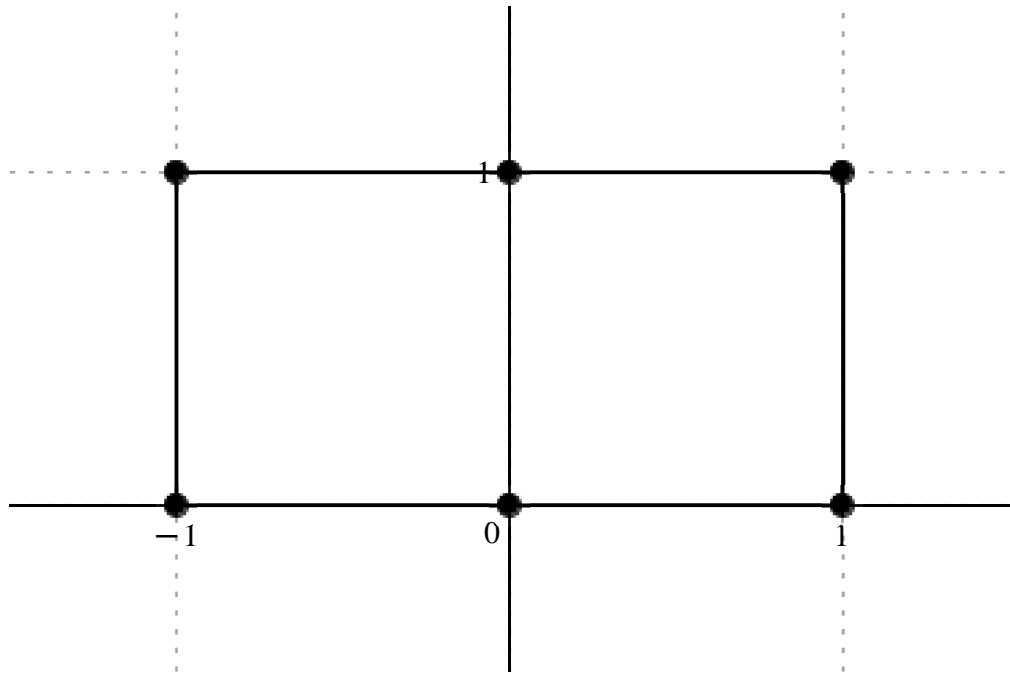
Error order:, 4, Error:,  $5.8542859713041390193 \times 10^{-18}$ , New Error:,  $5.8543288801032974932 \times 10^{-22}$

Error order:, 4, Error:,  $5.8543288801032974932 \times 10^{-22}$ , New Error:,  $5.8543331707042414777 \times 10^{-26}$

Error order:, 4, Error:,  $5.8543331707042414777 \times 10^{-26}$ , New Error:,  $5.8543335997615461575 \times 10^{-30}$

$$x_o+h.\,,\left[\begin{array}{cccc} -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & \\ -1 & 0 & 1 & \end{array}\right]$$

$$c=\,,\left[\begin{array}{cccc} \frac{1}{2}+\frac{\mathrm{I}}{2} & 2 & \frac{1}{2}-\frac{\mathrm{I}}{2} & \\ 1+\mathrm{I} & -5 & 1-\mathrm{I} & \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{(1 + \mathbf{I}) u_{ol-1+1} + 4 u_{ol+1} + (1 - \mathbf{I}) u_{ol+1+1} + (2 + 2 \mathbf{I}) u_{ol-1} - 10 u_{ol} + (2 - 2 \mathbf{I}) u_{ol+1}}{2 \Delta x_{ol}^2}, \quad O(\Delta x_{ol}^4)$$

Formula:, 57, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 3, Error:,  $1.9943568325423521909 \times 10^{-7}$ , New Error:,  $1.9956524572363391050 \times 10^{-10}$

Error order:, 3, Error:,  $1.9956524572363391050 \times 10^{-10}$ , New Error:,  $1.9957812588716822619 \times 10^{-13}$

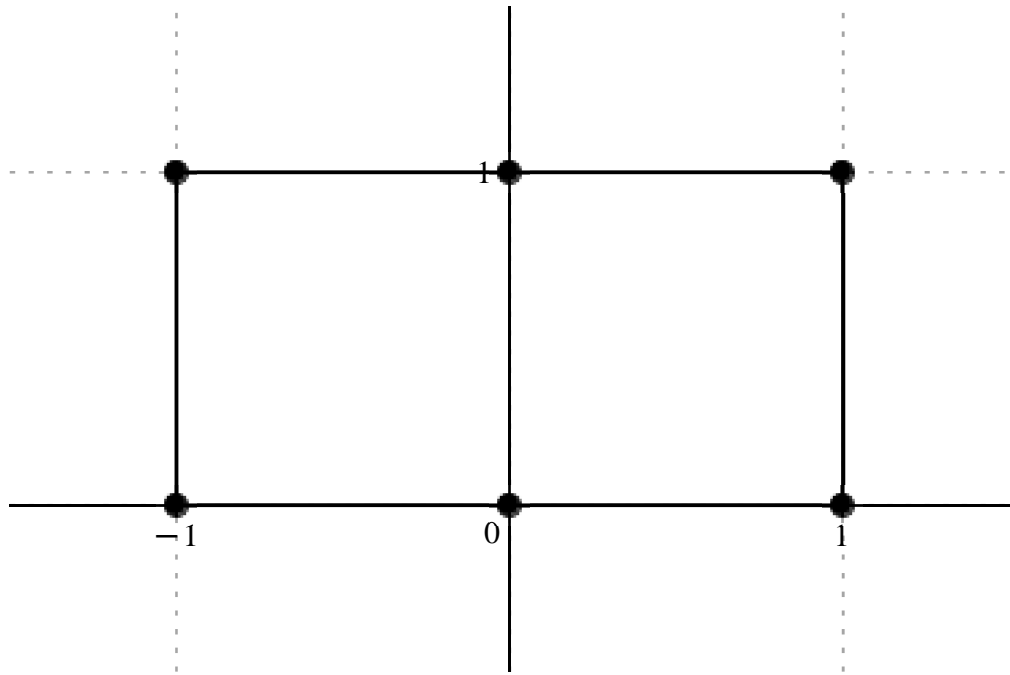
Error order:, 3, Error:,  $1.9957812588716822619 \times 10^{-13}$ , New Error:,  $1.9957941314268928759 \times 10^{-16}$

Error order:, 3, Error:,  $1.9957941314268928759 \times 10^{-16}$ , New Error:,  $1.9957954186063307020 \times 10^{-19}$

Error order:, 3, Error:,  $1.9957954186063307020 \times 10^{-19}$ , New Error:,  $1.9957955473235136522 \times 10^{-22}$

$$x_o + h \cdot, \begin{bmatrix} -1 + \mathbf{I} & \mathbf{I} & 1 + \mathbf{I} \\ -1 & 0 & 1 \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{3}{2} + \frac{3\mathbf{I}}{2} & 9\mathbf{I} & \frac{3}{2} + \frac{3\mathbf{I}}{2} \\ -\frac{9}{2} + \frac{3\mathbf{I}}{2} & -15\mathbf{I} & \frac{9}{2} + \frac{3\mathbf{I}}{2} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{3 \left( (-1 + \mathrm{I}) u_{ol-1+1} + 6 \mathrm{I} u_{ol+1} + (1 + \mathrm{I}) u_{ol+1+1} + (-3 + \mathrm{I}) u_{ol-1} - 10 \mathrm{I} u_{ol} + (3 + \mathrm{I}) u_{ol+1} \right)}{2 \Delta x_{ol}^3}, O(\Delta x_{ol}^3)$$

Formula:, 58, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 2, Error:, 0.000072526825589885160519, New Error:,  $7.2569653363728553139 \times 10^{-7}$

Error order:, 2, Error:,  $7.2569653363728553139 \times 10^{-7}$ , New Error:,  $7.2573911241083067058 \times 10^{-9}$

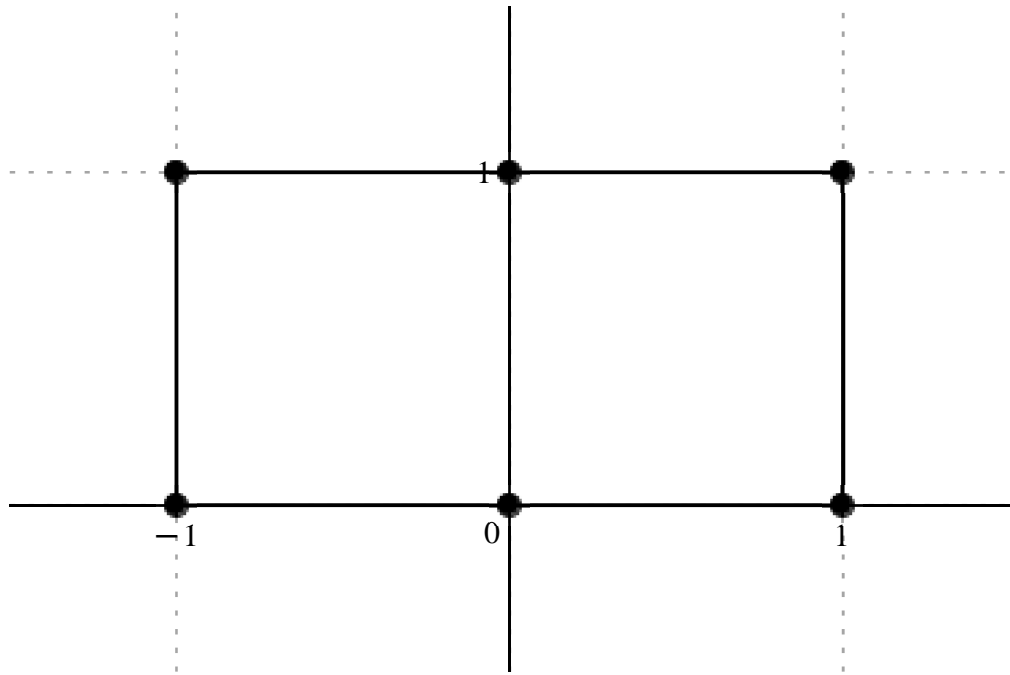
Error order:, 2, Error:,  $7.2573911241083067058 \times 10^{-9}$ , New Error:,  $7.2574336779818833048 \times 10^{-11}$

Error order:, 2, Error:,  $7.2574336779818833048 \times 10^{-11}$ , New Error:,  $7.2574379331202412854 \times 10^{-13}$

Error order:, 2, Error:,  $7.2574379331202412854 \times 10^{-13}$ , New Error:,  $7.2574383586315870867 \times 10^{-15}$

$$x_o + h., \begin{bmatrix} -1 + \mathrm{I} & \mathrm{I} & 1 + \mathrm{I} \\ -1 & 0 & 1 \end{bmatrix}$$

$$c =, \begin{bmatrix} -6 - 6 \mathrm{I} & -24 & -6 + 6 \mathrm{I} \\ -12 \mathrm{I} & 36 & 12 \mathrm{I} \end{bmatrix}$$

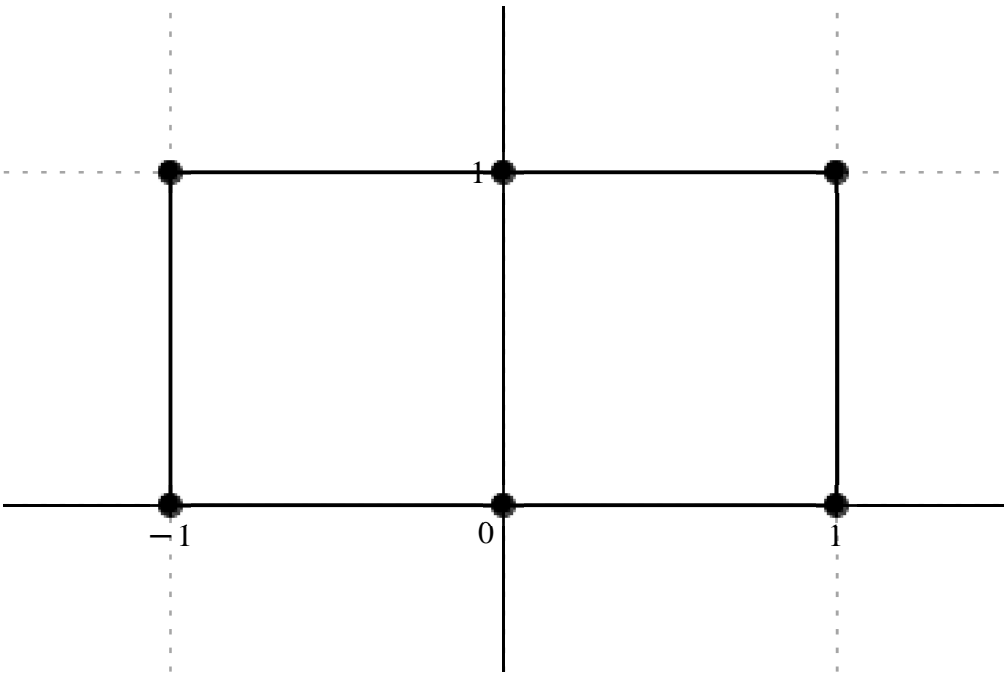


$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{-(6+6 \, \mathrm{I}) \, u_{ol-1+1} - 24 \, u_{ol+1} + (-6+6 \, \mathrm{I}) \, u_{ol+1+1} - 12 \, \mathrm{I} \, u_{ol-1} + 36 \, u_{ol} + 12 \, \mathrm{I} \, u_{ol+1}}{\Delta x_{ol}^4}, \, O(\, \Delta x_{ol}^2 \, )$$

Formula.: 59, Var.: 1  
Variavel :  $x_{ol}$ , Derivada de Ordem :. 5  
Error order.: 1, Error.: 0.019784389411814810508, New Error.: 0.0019792153933685643812  
Error order.: 1, Error.: 0.0019792153933685643812, New Error.: 0.00019792927869646632942  
Error order.: 1, Error.: 0.00019792927869646632942, New Error.: 0.000019793005238090186483  
Error order.: 1, Error.: 0.000019793005238090186483, New Error.:  $1.9793012974683025949 \times 10^{-6}$   
Error order.: 1, Error.:  $1.9793012974683025949 \times 10^{-6}$ , New Error.:  $1.9793013748339794746 \times 10^{-7}$

$$x_o + h. , \left[ \begin{array}{cccc} -1 + \mathrm{I} & \mathrm{I} & 1 + \mathrm{I} & \\ -1 & 0 & 1 & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} 18 - 6 \, \mathrm{I} & -60 \, \mathrm{I} & -18 - 6 \, \mathrm{I} & \\ 18 + 6 \, \mathrm{I} & 60 \, \mathrm{I} & -18 + 6 \, \mathrm{I} & \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5}u(x_{ol})=\frac{(18-6\,\mathrm{I})\,u_{ol-1+1}-60\,\mathrm{I}u_{ol+1}-(18+6\,\mathrm{I})\,u_{ol+1+1}+(18+6\,\mathrm{I})\,u_{ol-1}+60\,\mathrm{I}u_{ol}+(-18+6\,\mathrm{I})\,u_{ol+1}}{\Delta x_{ol}^5},\,O(\,\Delta x_{ol}\,)$$

Formula:, 60, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 1

Error order:, 5, Error:, 1.6115011838779768045 × 10<sup>-12</sup>, New Error:, 1.6100989361769322931 × 10<sup>-17</sup>

Error order:, 5, Error:, 1.6100989361769322931 × 10<sup>-17</sup>, New Error:, 1.6099574837566663919 × 10<sup>-22</sup>

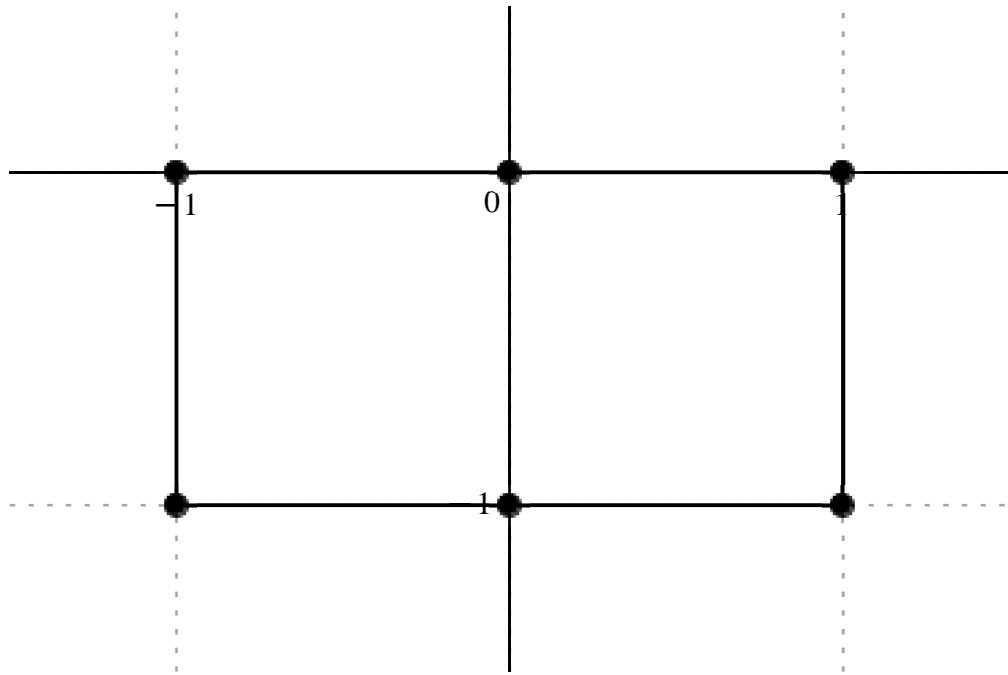
Error order:, 5, Error:, 1.6099574837566663919 × 10<sup>-22</sup>, New Error:, 1.6099433262397051100 × 10<sup>-27</sup>

Error order:, 5, Error:, 1.6099433262397051100 × 10<sup>-27</sup>, New Error:, 1.6099419103652611896 × 10<sup>-32</sup>

Error order:, 5, Error:, 1.6099419103652611896 × 10<sup>-32</sup>, New Error:, 1.6099417687765893212 × 10<sup>-37</sup>

$$x_o+h.\,,\left[\begin{array}{ccc} -1 & 0 & 1 \\ -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} \end{array}\right]$$

$$c=\,,\left[\begin{array}{ccc} \frac{1}{10}+\frac{3\,\mathrm{I}}{10} & -2\,\mathrm{I} & -\frac{1}{10}+\frac{3\,\mathrm{I}}{10} \\ \frac{1}{10}+\frac{\mathrm{I}}{5} & \mathrm{I} & -\frac{1}{10}+\frac{\mathrm{I}}{5} \end{array}\right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\;u(x_{ol})=\frac{(1+3\,\mathrm{I})\,u_{ol-1}-20\,\mathrm{I}u_{ol}+(-1+3\,\mathrm{I})\,u_{ol+1}+(1+2\,\mathrm{I})\,u_{ol-1-1}+10\,\mathrm{I}u_{ol-1}+(-1+2\,\mathrm{I})\,u_{ol+1-1}}{10\,\Delta x_{ol}^5},\;O(\,\Delta x_{ol}^5\,)$$

Formula:, 61, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 4, Error:, 5.8590696373356942011 × 10−10, New Error:, 5.8548100643289316577 × 10−14

Error order:, 4, Error:, 5.8548100643289316577 × 10−14, New Error:, 5.8543813173029637049 × 10−18

Error order:, 4, Error:, 5.8543813173029637049 × 10−18, New Error:, 5.8543384147031799617 × 10−22

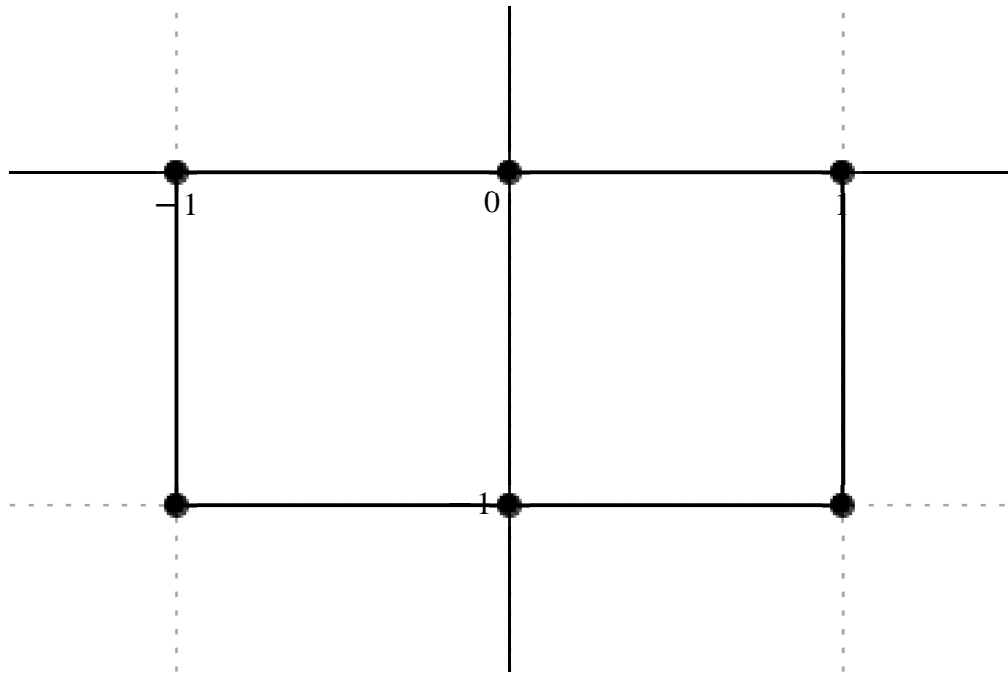
Error order:, 4, Error:, 5.8543384147031799617 × 10−22, New Error:, 5.8543341241642297245 × 10−26

Error order:, 4, Error:, 5.8543341241642297245 × 10−26, New Error:, 5.8543336951075449822 × 10−30

$$x_o+h.\,,\left[\begin{array}{rrr} -1 & 0 & 1 \\ -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} \end{array}\right]$$

$$^c=,\left[\begin{array}{rrr} 1-\mathrm{I} & -5 & 1+\mathrm{I} \\ \frac{1}{2}-\frac{\mathrm{I}}{2} & 2 & \frac{1}{2}+\frac{\mathrm{I}}{2} \end{array}\right]$$





$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{(2-2\mathrm{I}) u_{ol-1} - 10 u_{ol} + (2+2\mathrm{I}) u_{ol+1} + (1-\mathrm{I}) u_{ol-1-1} + 4 u_{ol-1} + (1+\mathrm{I}) u_{ol+1-1}}{2 \Delta x_{ol}^2}, \quad O(\Delta x_{ol}^4)$$

Formula:, 62, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 3, Error:,  $1.9972172125070790925 \times 10^{-7}$ , New Error:,  $1.9959384952328131616 \times 10^{-10}$

Error order:, 3, Error:,  $1.9959384952328131616 \times 10^{-10}$ , New Error:,  $1.9958098626713296676 \times 10^{-13}$

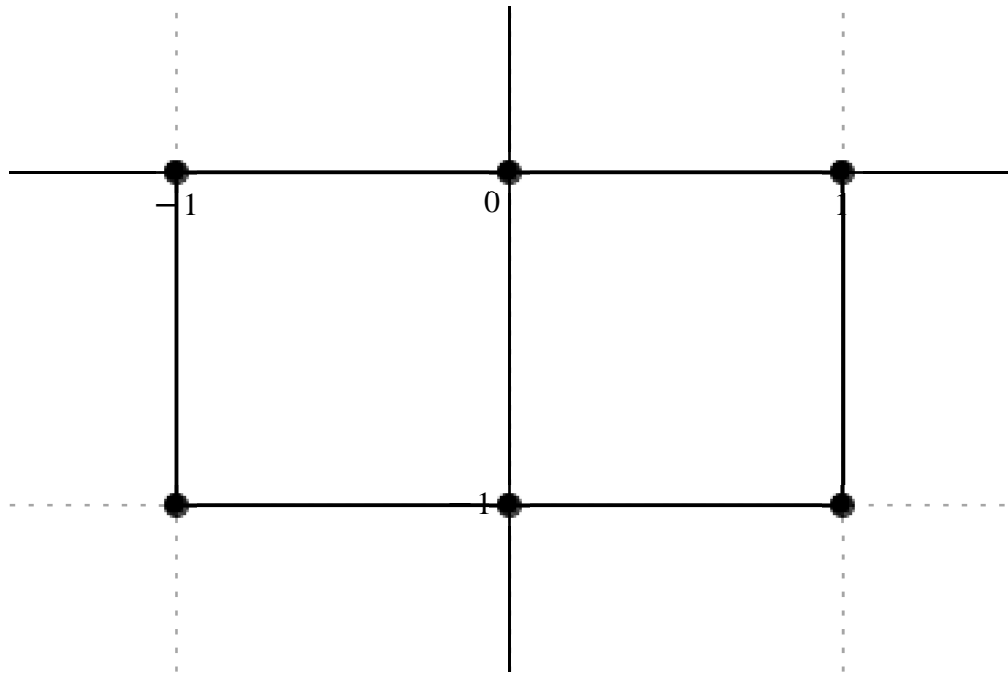
Error order:, 3, Error:,  $1.9958098626713296676 \times 10^{-13}$ , New Error:,  $1.9957969918068576165 \times 10^{-16}$

Error order:, 3, Error:,  $1.9957969918068576165 \times 10^{-16}$ , New Error:,  $1.9957957046443271760 \times 10^{-19}$

Error order:, 3, Error:,  $1.9957957046443271760 \times 10^{-19}$ , New Error:,  $1.9957955759273132996 \times 10^{-22}$

$$x_o + h \cdot, \begin{bmatrix} -1 & 0 & 1 \\ -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{9}{2} - \frac{3\mathrm{I}}{2} & 15\mathrm{I} & \frac{9}{2} - \frac{3\mathrm{I}}{2} \\ -\frac{3}{2} - \frac{3\mathrm{I}}{2} & -9\mathrm{I} & \frac{3}{2} - \frac{3\mathrm{I}}{2} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{3 \left( -(3 + \mathrm{I}) \, u_{ol-1} + 10 \, \mathrm{I} u_{ol} + (3 - \mathrm{I}) \, u_{ol+1} - (1 + \mathrm{I}) \, u_{ol-1-\mathrm{I}} - 6 \, \mathrm{I} u_{ol-\mathrm{I}} + (1 - \mathrm{I}) \, u_{ol+1-\mathrm{I}} \right)}{2 \, \Delta x_{ol}^3}, \, O(\Delta x_{ol}^3)$$

Formula:, 63, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 2, Error:, 0.000072621383605247970991, New Error:,  $7.2579109165264885586 \times 10^{-7}$

Error order:, 2, Error:,  $7.2579109165264885586 \times 10^{-7}$ , New Error:,  $7.2574856821236700304 \times 10^{-9}$

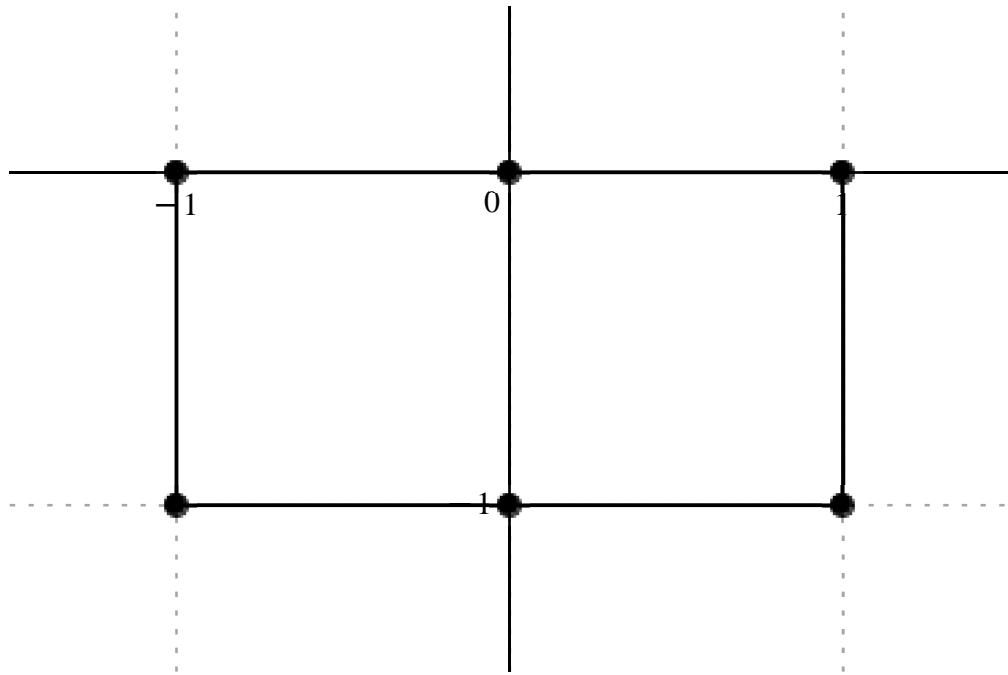
Error order:, 2, Error:,  $7.2574856821236700304 \times 10^{-9}$ , New Error:,  $7.2574431337834196373 \times 10^{-11}$

Error order:, 2, Error:,  $7.2574431337834196373 \times 10^{-11}$ , New Error:,  $7.2574388787003949187 \times 10^{-13}$

Error order:, 2, Error:,  $7.2574388787003949187 \times 10^{-13}$ , New Error:,  $7.2574384531896024500 \times 10^{-15}$

$$x_o + h. , \left[ \begin{array}{ccc} -1 & 0 & 1 \\ -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} 12 \, \mathrm{I} & 36 & -12 \, \mathrm{I} \\ -6 + 6 \, \mathrm{I} & -24 & -6 - 6 \, \mathrm{I} \end{array} \right]$$

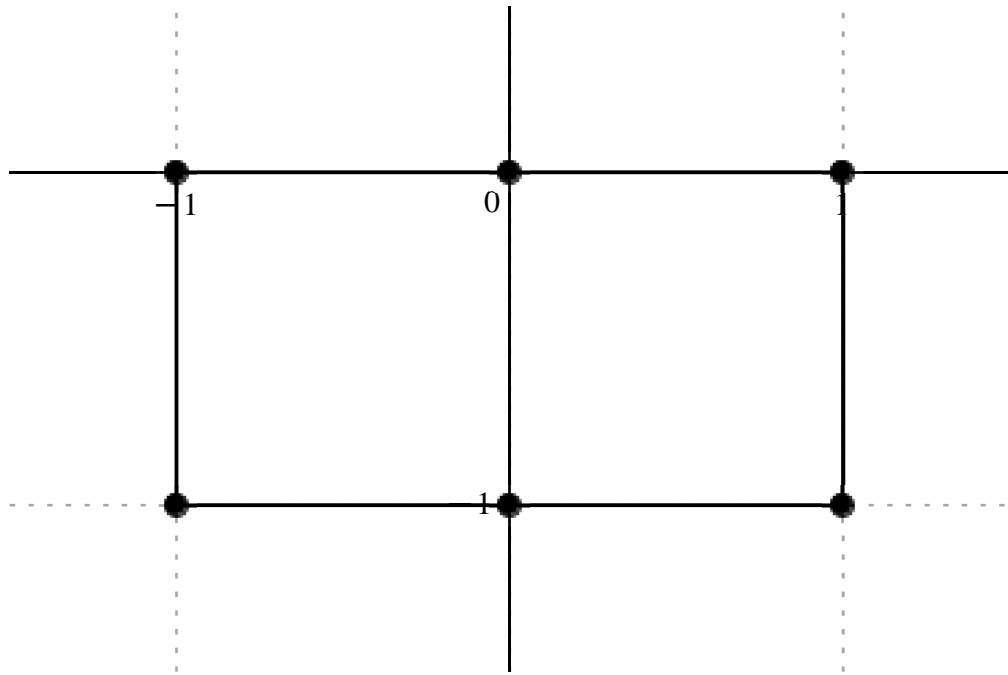


$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{12 \, \mathrm{I} \, u_{ol-1} + 36 \, u_{ol} - 12 \, \mathrm{I} \, u_{ol+1} + (-6 + 6 \, \mathrm{I}) \, u_{ol-1-1} - 24 \, u_{ol-1} - (6 + 6 \, \mathrm{I}) \, u_{ol+1-1}}{\Delta x_{ol}^4}, \, O(\Delta x_{ol}^2)$$

Formula:, 64, Var:, 1  
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5  
Error order:, 1, Error:, 0.019801581799698876595, New Error:, 0.0019793873170350067812  
Error order:, 1, Error:, 0.0019793873170350067812, New Error:, 0.00019793099793310951350  
Error order:, 1, Error:, 0.00019793099793310951350, New Error:, 0.000019793022430456616200  
Error order:, 1, Error:, 0.000019793022430456616200, New Error:,  $1.9793014693919668918 \times 10^{-6}$   
Error order:, 1, Error:,  $1.9793014693919668918 \times 10^{-6}$ , New Error:,  $1.9793013920263459043 \times 10^{-7}$

$$x_o + h., \begin{bmatrix} -1 & 0 & 1 \\ -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} 18 - 6 \, \mathrm{I} & -60 \, \mathrm{I} & -18 - 6 \, \mathrm{I} \\ 18 + 6 \, \mathrm{I} & 60 \, \mathrm{I} & -18 + 6 \, \mathrm{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{(18-6 \, \mathrm{I}) \, u_{ol-1} -60 \, \mathrm{I} u_{ol} - (18+6 \, \mathrm{I}) \, u_{ol+1} + (18+6 \, \mathrm{I}) \, u_{ol-1-1} +60 \, \mathrm{I} u_{ol-1} + (-18+6 \, \mathrm{I}) \, u_{ol+1-1}}{\Delta x_{ol}^5}, \, O( \, \Delta x_{ol} \, )$$

Formula:, 65, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 8, Error:, 8.3770188590363763899 × 10<sup>−21</sup>, New Error:, 8.3770188590573927029 × 10<sup>−29</sup>

Error order:, 8, Error:, 8.3770188590573927029 × 10<sup>−29</sup>, New Error:, 8.3770188590573948045 × 10<sup>−37</sup>

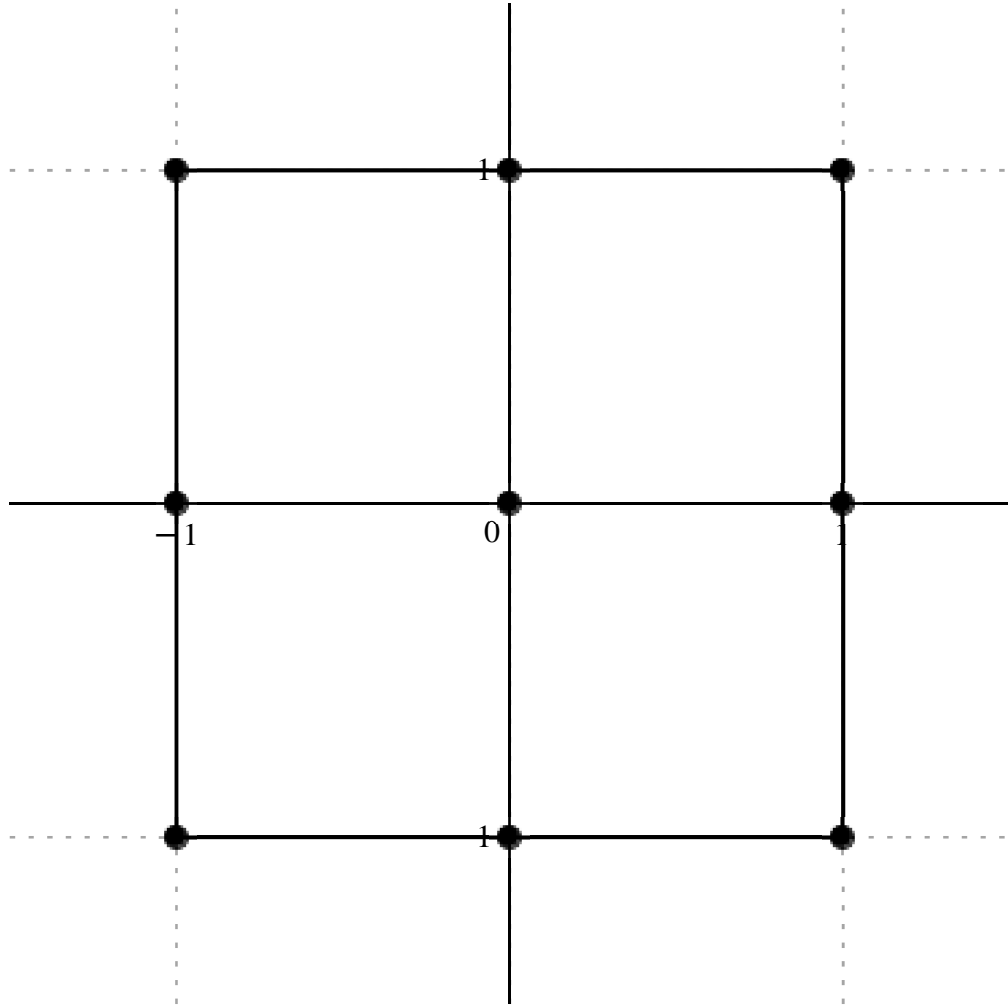
Error order:, 8, Error:, 8.3770188590573948045 × 10<sup>−37</sup>, New Error:, 8.3770188590573948047 × 10<sup>−45</sup>

Error order:, 8, Error:, 8.3770188590573948047 × 10<sup>−45</sup>, New Error:, 8.3770188590573948047 × 10<sup>−53</sup>

Error order:, 8, Error:, 8.3770188590573948047 × 10<sup>−53</sup>, New Error:, 8.3770188590573948047 × 10<sup>−61</sup>

$$x_o \neq h \, . \, , \left[ \begin{array}{cccc} -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & \\ -1 & 0 & 1 & \\ -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccc} -\frac{1}{40}-\frac{\mathrm{I}}{40} & -\frac{\mathrm{I}}{5} & \frac{1}{40}-\frac{\mathrm{I}}{40} & \\ -\frac{1}{5} & 0 & \frac{1}{5} & \\ -\frac{1}{40}+\frac{\mathrm{I}}{40} & \frac{\mathrm{I}}{5} & \frac{1}{40}+\frac{\mathrm{I}}{40} & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{-(1+I)\, u_{ol-1+1} - 8\, I\, u_{ol+1} + (1-I)\, u_{ol+1+1} - 8\, u_{ol-1} + 8\, u_{ol+1} + (-1+I)\, u_{ol-1-1} + 8\, I\, u_{ol-1} + (1+I)\, u_{ol+1-1}}{40\, \Delta x_{ol}^8}, \, O(\, \Delta x_{ol}^8 \,)$$

Formula:, 66, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 8, Error:,  $1.6670684296601754530 \times 10^{-21}$ , New Error:,  $1.6670684296631628464 \times 10^{-29}$

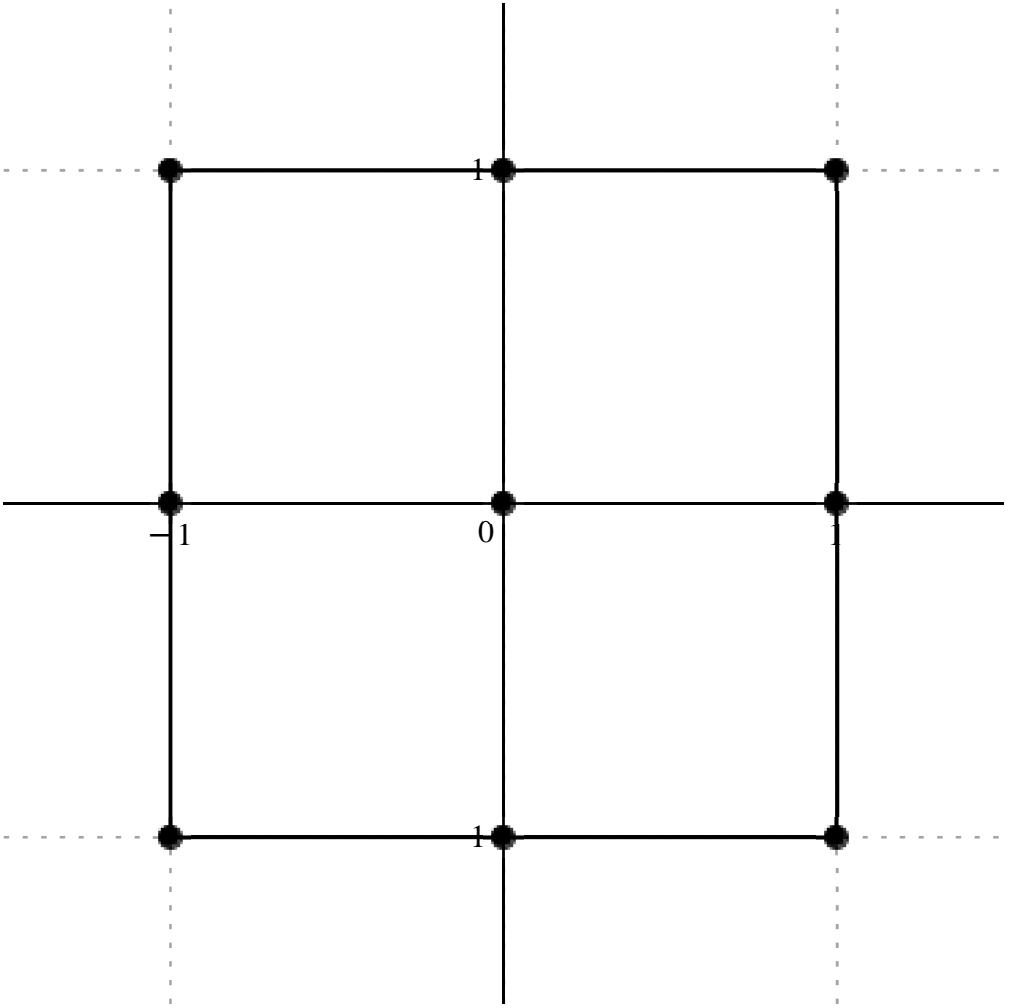
Error order:, 8, Error:,  $1.6670684296631628464 \times 10^{-29}$ , New Error:,  $1.6670684296631631452 \times 10^{-37}$

Error order:, 8, Error:,  $1.6670684296631631452 \times 10^{-37}$ , New Error:,  $1.6670684296631631452 \times 10^{-45}$

Error order:, 8, Error:,  $1.6670684296631631452 \times 10^{-45}$ , New Error:,  $1.6670684296631631452 \times 10^{-53}$

Error order:, 8, Error:,  $1.6670684296631631452 \times 10^{-53}$ , New Error:,  $1.6670684296631631452 \times 10^{-61}$

$$x_o \neq h. , \left[ \begin{array}{cccc} -1+I & I & 1+I & \\ -1 & 0 & 1 & \\ -1-I & -I & 1-I & \end{array} \right]$$
$$c = , \left[ \begin{array}{ccc} \frac{I}{20} & -\frac{2}{5} & -\frac{I}{20} \\ \frac{2}{5} & 0 & \frac{2}{5} \\ -\frac{I}{20} & -\frac{2}{5} & \frac{I}{20} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \; u(x_{ol}) = \frac{\mathrm{I} u_{ol-1+1} - 8 u_{ol+1} - \mathrm{I} u_{ol+1+1} + 8 u_{ol-1} + 8 u_{ol+1} - \mathrm{I} u_{ol-1-1} - 8 u_{ol-1} + \mathrm{I} u_{ol+1-1}}{20 \; \Delta x_{ol}^2}, \; O( \; \Delta x_{ol}^8 \; )$$

Formula:, 67, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 3

Error order:, 8, Error:, 4.5239306096634251585 × 10−22, New Error:, 4.5239306096693702201 × 10−30

Error order:, 8, Error:, 4.5239306096693702201 × 10−30, New Error:, 4.5239306096693708146 × 10−38

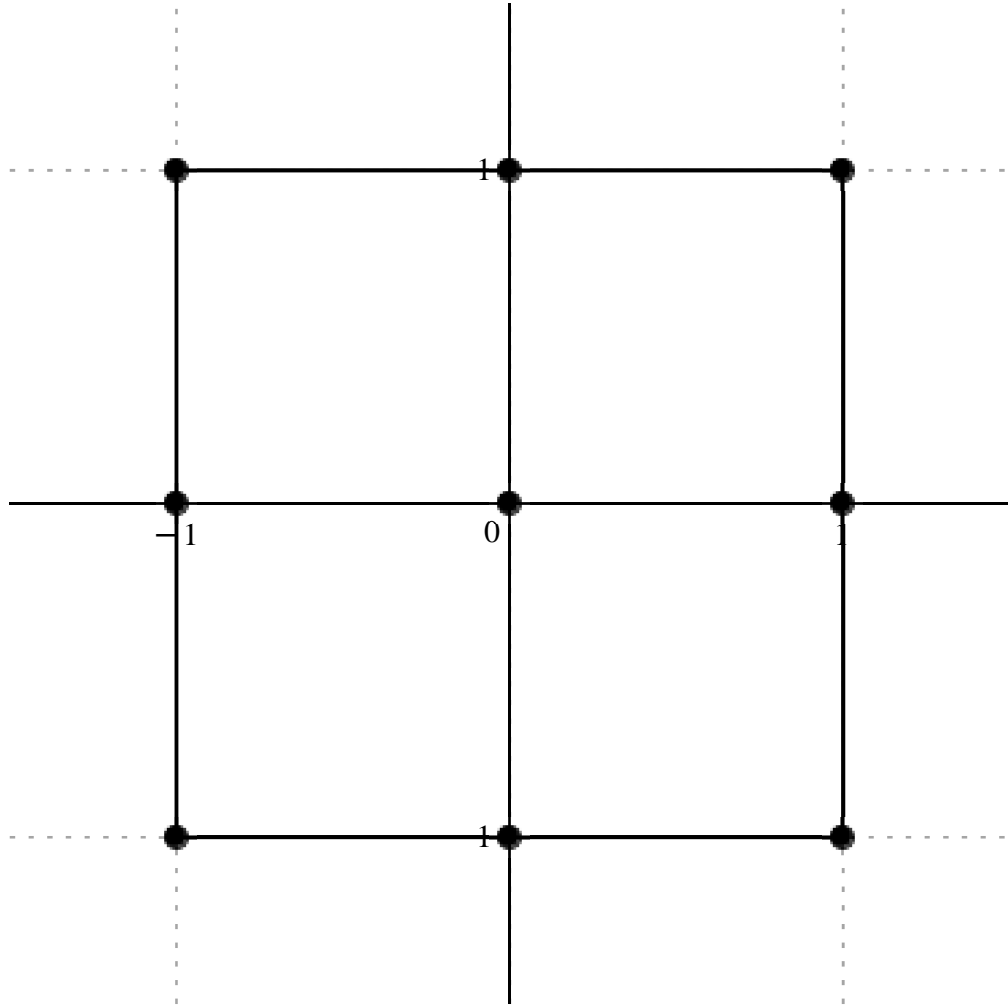
Error order:, 8, Error:, 4.5239306096693708146 × 10−38, New Error:, 4.5239306096693708147 × 10−46

Error order:, 8, Error:, 4.5239306096693708147 × 10−46, New Error:, 4.5239306096693708147 × 10−54

Error order:, 8, Error:, 4.5239306096693708147 × 10−54, New Error:, 4.5239306096693708147 × 10−62

$$x_o \; + h \; . \; , \; \left[ \begin{array}{cccc} -1 + \mathrm{I} & \mathrm{I} & 1 + \mathrm{I} & \\ & -1 & 0 & 1 \\ & & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} \end{array} \right]$$

$$c = , \; \left[ \begin{array}{cccc} \frac{3}{40} - \frac{3 \; \mathrm{I}}{40} & \frac{6 \; \mathrm{I}}{5} & -\frac{3}{40} - \frac{3 \; \mathrm{I}}{40} & \\ & -\frac{6}{5} & 0 & \frac{6}{5} \\ \frac{3}{40} + \frac{3 \; \mathrm{I}}{40} & -\frac{6 \; \mathrm{I}}{5} & -\frac{3}{40} + \frac{3 \; \mathrm{I}}{40} & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3}u(x_{ol})=\frac{(3-3\,\mathrm{I})\,u_{ol-1+1}+48\,\mathrm{I}u_{ol+1}-(3+3\,\mathrm{I})\,u_{ol+1+1}-48\,u_{ol-1}+48\,u_{ol+1}+(3+3\,\mathrm{I})\,u_{ol-1-1}-48\,\mathrm{I}u_{ol-1}+(-3+3\,\mathrm{I})\,u_{ol+1-1}}{40\,\Delta x_{ol}^3},\,O(\,\Delta x_{ol}^8\,)$$

Formula.: 68, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 4

Error order.: 8, Error.:  $1.5004744974012973707\times10^{-22}$ , New Error.:  $1.5004744974027762417\times10^{-30}$

Error order.: 8, Error.:  $1.5004744974027762417\times10^{-30}$ , New Error.:  $1.5004744974027763896\times10^{-38}$

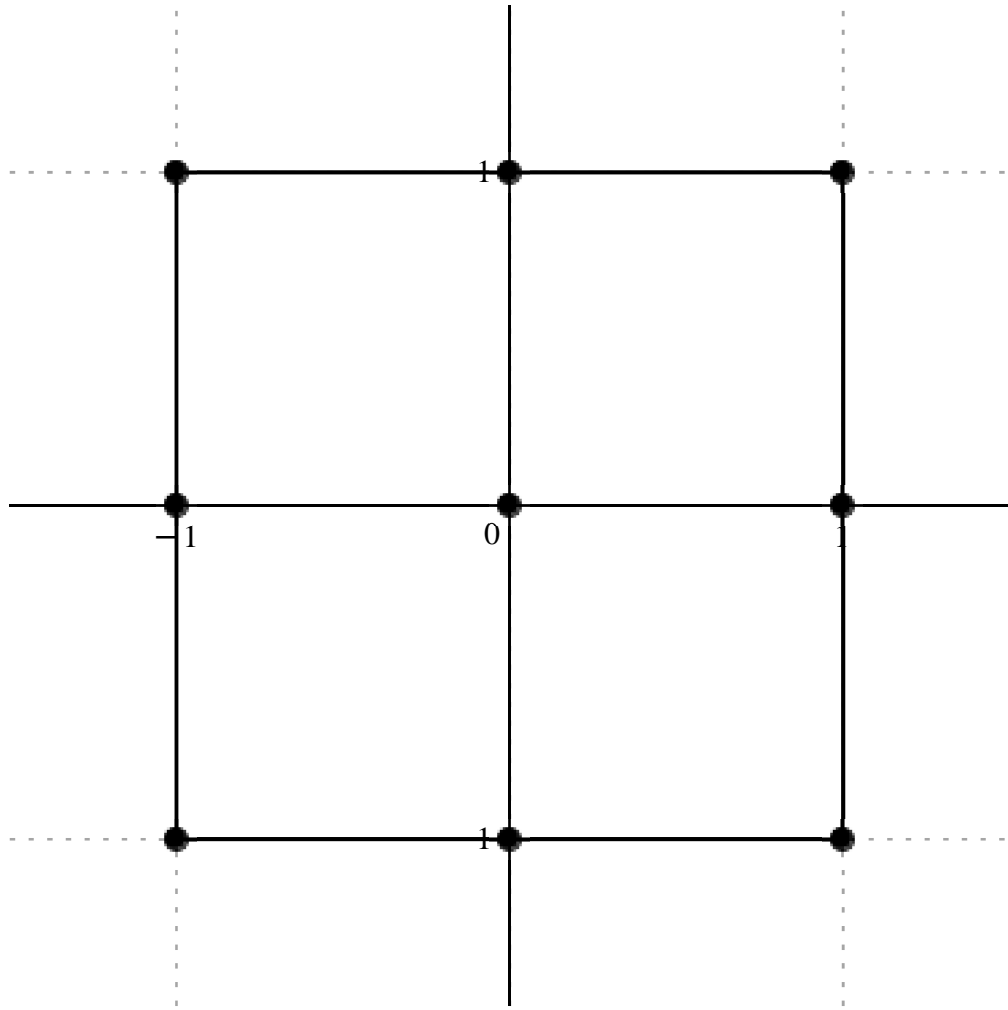
Error order.: 8, Error.:  $1.5004744974027763896\times10^{-38}$ , New Error.:  $1.5004744974027763896\times10^{-46}$

Error order.: 8, Error.:  $1.5004744974027763896\times10^{-46}$ , New Error.:  $1.5004744974027763896\times10^{-54}$

Error order.: 8, Error.:  $1.5004744974027763896\times10^{-54}$ , New Error.:  $1.5004744974027763896\times10^{-62}$

$$x_o+h.\, , \left[\begin{array}{cccc} -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & \\ -1 & 0 & 1 & \\ -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & \end{array}\right]$$

$$c=,\left[\begin{array}{ccc} -\frac{3}{10} & \frac{24}{5} & -\frac{3}{10} \\ \frac{24}{5} & -18 & \frac{24}{5} \\ -\frac{3}{10} & \frac{24}{5} & -\frac{3}{10} \end{array}\right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{3 \left( -u_{ol-1+1} + 16 \, u_{ol+1} - u_{ol+1+1} + 16 \, u_{ol-1} - 60 \, u_{ol} + 16 \, u_{ol+1} - u_{ol-1-1} + 16 \, u_{ol-1} - u_{ol+1-1} \right)}{10 \, \Delta x_{ol}^4}, \, O( \, \Delta x_{ol}^8 \, )$$

Formula:, 69, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 5

Error order:, 4, Error:, 5.1494549369061753876 × 10<sup>−11</sup>, New Error:, 5.1494549369248361395 × 10<sup>−15</sup>

Error order:, 4, Error:, 5.1494549369248361395 × 10<sup>−15</sup>, New Error:, 5.1494549369248380056 × 10<sup>−19</sup>

Error order:, 4, Error:, 5.1494549369248380056 × 10<sup>−19</sup>, New Error:, 5.1494549369248380058 × 10<sup>−23</sup>

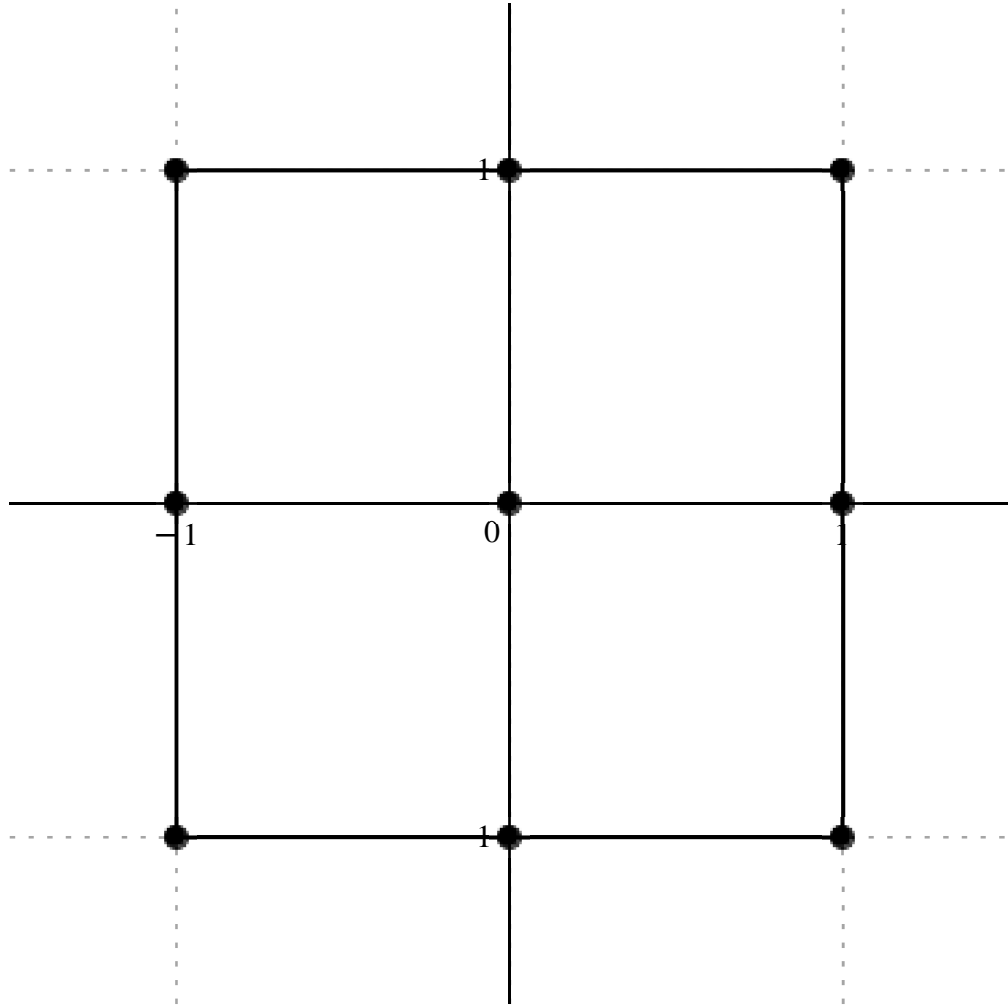
Error order:, 4, Error:, 5.1494549369248380058 × 10<sup>−23</sup>, New Error:, 5.1494549369248380058 × 10<sup>−27</sup>

Error order:, 4, Error:, 5.1494549369248380058 × 10<sup>−27</sup>, New Error:, 5.1494549369248380058 × 10<sup>−31</sup>

$$x_o \neq h. , \left[ \begin{array}{cccc} -1 + \mathrm{I} & \mathrm{I} & 1 + \mathrm{I} & \\ -1 & 0 & 1 & \\ -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccc} 3 + 3 \, \mathrm{I} & -6 \, \mathrm{I} & -3 + 3 \, \mathrm{I} & \\ -6 & 0 & 6 & \\ 3 - 3 \, \mathrm{I} & 6 \, \mathrm{I} & -3 - 3 \, \mathrm{I} & \end{array} \right]$$





$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{(3+3 \, \mathrm{I}) \, u_{ol-1+1} - 6 \, \mathrm{I} u_{ol+1} + (-3+3 \, \mathrm{I}) \, u_{ol+1+1} - 6 \, u_{ol-1} + 6 \, u_{ol+1} + (3-3 \, \mathrm{I}) \, u_{ol-1-1} + 6 \, \mathrm{I} u_{ol-1} - (3+3 \, \mathrm{I}) \, u_{ol+1-1}}{\Delta x_{ol}^5}, \, O(\, \Delta x_{ol}^4 \, )$$

Formula:, 70, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 6

Error order:, 4, Error:, 3.0743014548725418294 × 10<sup>−11</sup>, New Error:, 3.0743014548804995061 × 10<sup>−15</sup>

Error order:, 4, Error:, 3.0743014548804995061 × 10<sup>−15</sup>, New Error:, 3.0743014548805003019 × 10<sup>−19</sup>

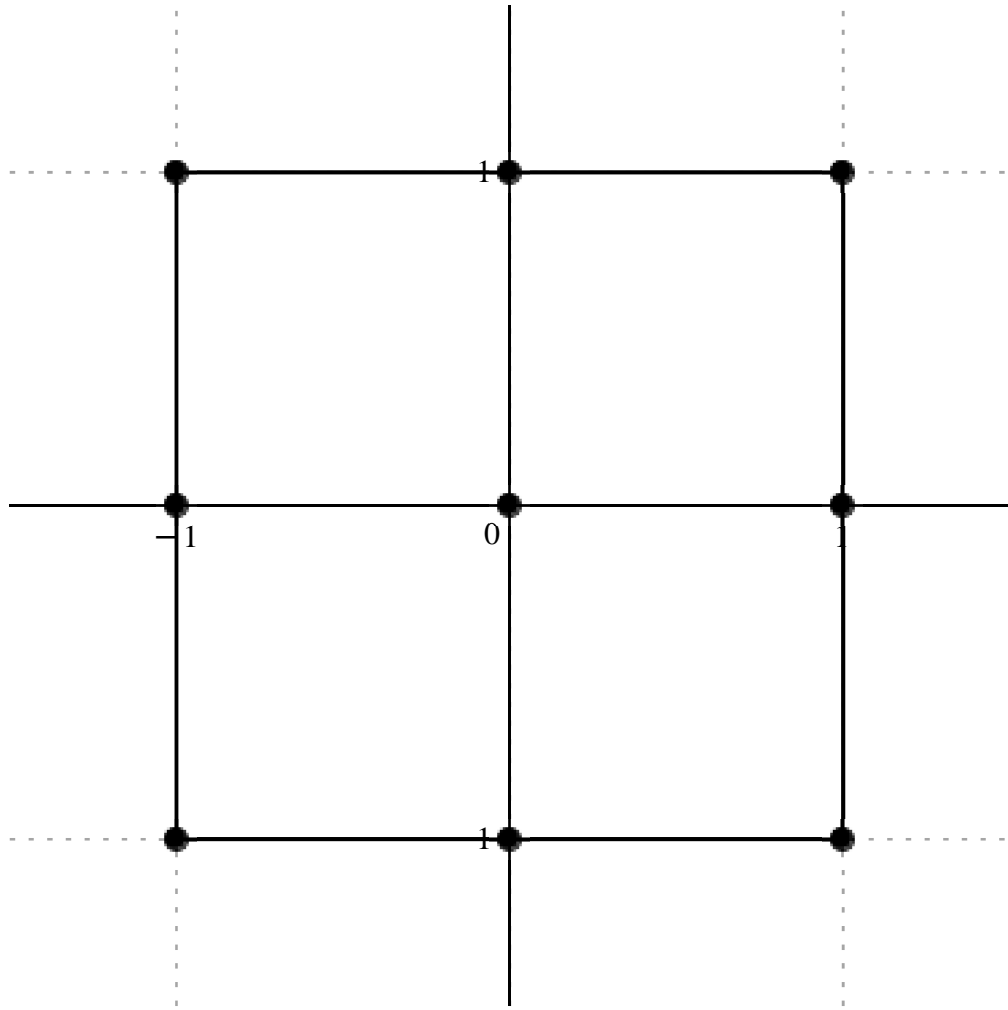
Error order:, 4, Error:, 3.0743014548805003019 × 10<sup>−19</sup>, New Error:, 3.0743014548805003019 × 10<sup>−23</sup>

Error order:, 4, Error:, 3.0743014548805003019 × 10<sup>−23</sup>, New Error:, 3.0743014548805003019 × 10<sup>−27</sup>

Error order:, 4, Error:, 3.0743014548805003019 × 10<sup>−27</sup>, New Error:, 3.0743014548805003019 × 10<sup>−31</sup>

$$x_o \neq h. , \left[ \begin{array}{cccc} -1 + \mathrm{I} & \mathrm{I} & 1 + \mathrm{I} & \\ & -1 & 0 & 1 \\ & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{cccc} -18 \, \mathrm{I} & -36 & 18 \, \mathrm{I} & \\ 36 & 0 & 36 & \\ 18 \, \mathrm{I} & -36 & -18 \, \mathrm{I} & \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{18 \left( -\mathrm{I} u_{ol-1+1} - 2 u_{ol+1} + \mathrm{I} u_{ol+1+1} + 2 u_{ol-1} + 2 u_{ol+1} + \mathrm{I} u_{ol-1-1} - 2 u_{ol-1} - \mathrm{I} u_{ol+1-1} \right)}{\Delta x_{ol}^6}, \, O(\Delta x_{ol}^4)$$

Formula:, 71, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order:, 4, Error:,  $1.9466404508478198662 \times 10^{-11}$ , New Error:,  $1.9466404508515149732 \times 10^{-15}$

Error order:, 4, Error:,  $1.9466404508515149732 \times 10^{-15}$ , New Error:,  $1.9466404508515153427 \times 10^{-19}$

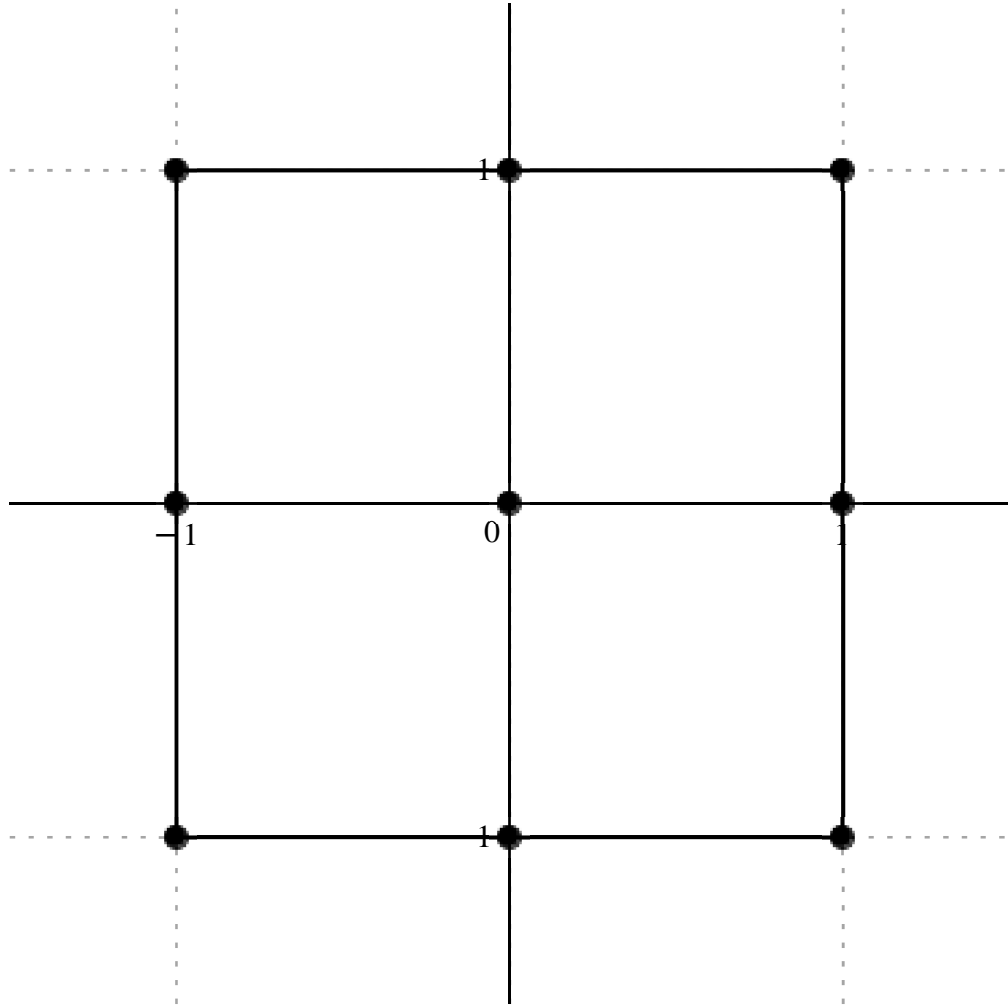
Error order:, 4, Error:,  $1.9466404508515153427 \times 10^{-19}$ , New Error:,  $1.9466404508515153427 \times 10^{-23}$

Error order:, 4, Error:,  $1.9466404508515153427 \times 10^{-23}$ , New Error:,  $1.9466404508515153427 \times 10^{-27}$

Error order:, 4, Error:,  $1.9466404508515153427 \times 10^{-27}$ , New Error:,  $1.9466404508515153427 \times 10^{-31}$

$$x_o + h \cdot \begin{bmatrix} -1 + \mathrm{I} & \mathrm{I} & 1 + \mathrm{I} \\ -1 & 0 & 1 \\ -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -63 + 63 \, \mathrm{I} & 252 \, \mathrm{I} & 63 + 63 \, \mathrm{I} \\ -252 & 0 & 252 \\ -63 - 63 \, \mathrm{I} & -252 \, \mathrm{I} & 63 - 63 \, \mathrm{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u(x_{ol})=\frac{63\left((-1+\mathrm{I})u_{ol-1+1}+4\mathrm{I}u_{ol+1}+(1+\mathrm{I})u_{ol+1+1}-4u_{ol-1}+4u_{ol+1}-(1+\mathrm{I})u_{ol-1-1}-4\mathrm{I}u_{ol-1}+(1-\mathrm{I})u_{ol+1-1}\right)}{\Delta x_{ol}^7},\mathcal{O}(\Delta x_{ol}^4)$$

Formula:, 72, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 4, Error:,  $1.2913037816575414497\times10^{-11}$ , New Error:,  $1.2913037816593798113\times10^{-15}$

Error order:, 4, Error:,  $1.2913037816593798113\times10^{-15}$ , New Error:,  $1.2913037816593799951\times10^{-19}$

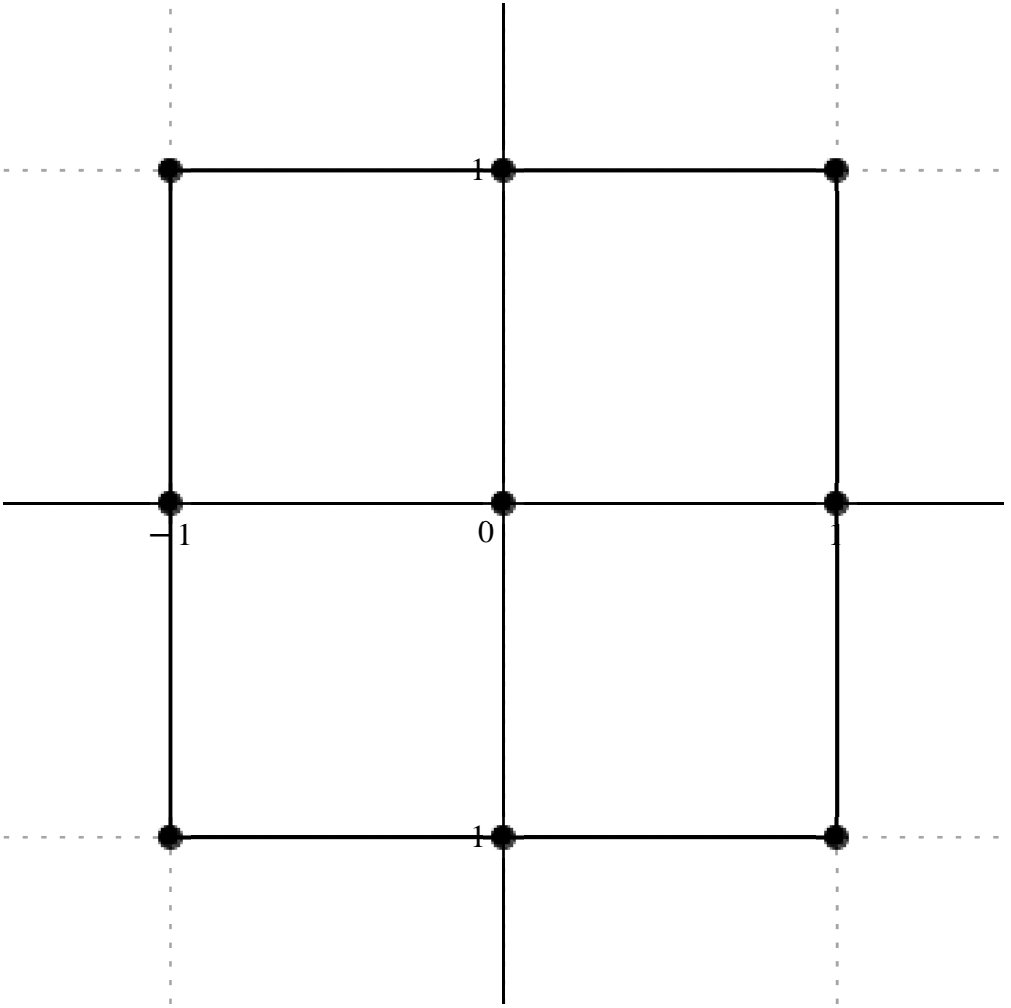
Error order:, 4, Error:,  $1.2913037816593799951\times10^{-19}$ , New Error:,  $1.2913037816593799952\times10^{-23}$

Error order:, 4, Error:,  $1.2913037816593799952\times10^{-23}$ , New Error:,  $1.2913037816593799952\times10^{-27}$

Error order:, 4, Error:,  $1.2913037816593799952\times10^{-27}$ , New Error:,  $1.2913037816593799952\times10^{-31}$

$$x_o+h.,\left[\begin{array}{cccc} -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & \\ -1 & 0 & 1 & \\ -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & \end{array}\right]$$

$$c=,\left[\begin{array}{ccccc} 504 & 2016 & 504 & & \\ 2016 & -10080 & 2016 & & \\ 504 & 2016 & 504 & & \end{array}\right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{504 \left( u_{ol-1+1} + 4 \, u_{ol+1} + u_{ol+1+1} + 4 \, u_{ol-1} - 20 \, u_{ol} + 4 \, u_{ol+1} + u_{ol-1-1} + 4 \, u_{ol-1} + u_{ol+1-1} \right)}{\Delta x_{ol}^8}, \, O( \, \Delta x_{ol}^4 \, )$$

*Square: Interval, 3*

*Formula:, 73, Var:, 1*

*Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 1*

*Error order:, 15, Error:, 2.3788762516376854594 × 10<sup>−37</sup>, New Error:, 2.3251320034965593788 × 10<sup>−52</sup>*

*Error order:, 15, Error:, 2.3251320034965593788 × 10<sup>−52</sup>, New Error:, 2.3197899172380326761 × 10<sup>−67</sup>*

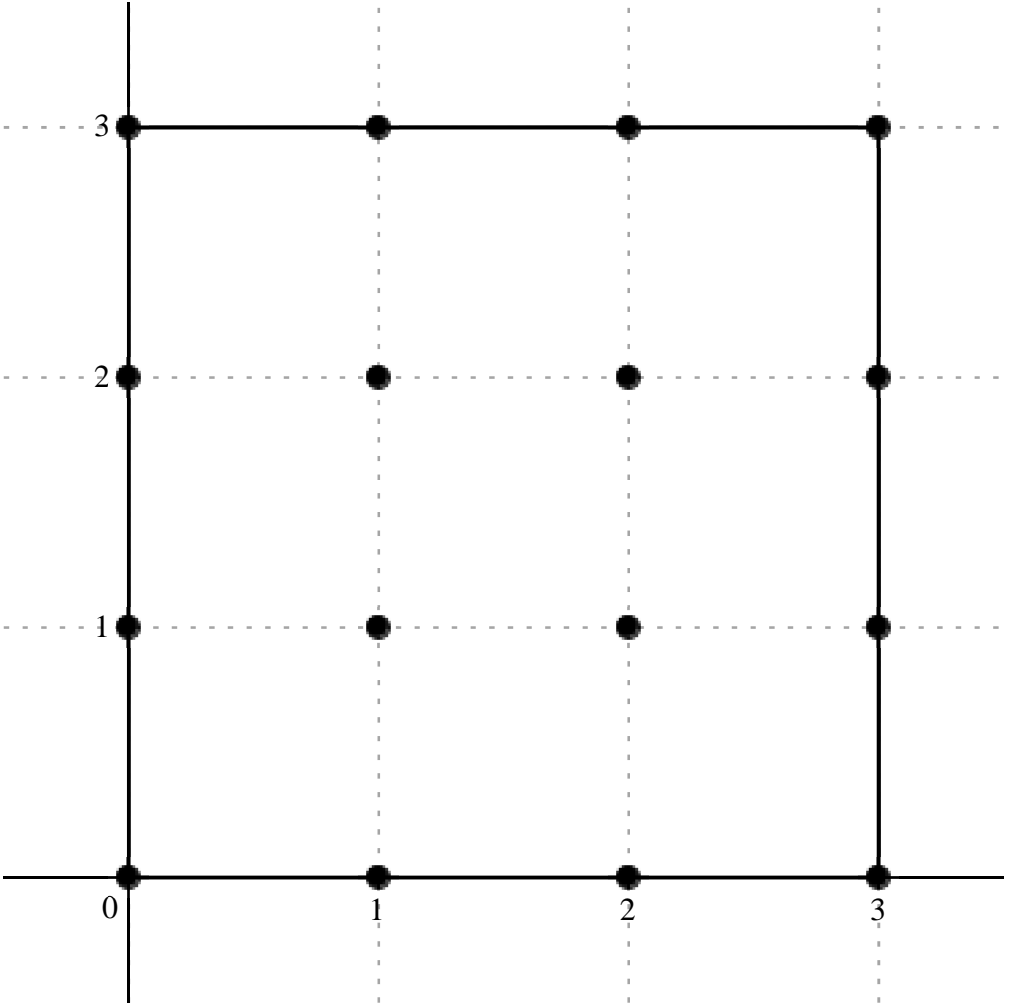
*Error order:, 15, Error:, 2.3197899172380326761 × 10<sup>−67</sup>, New Error:, 2.3192560329042839192 × 10<sup>−82</sup>*

*Error order:, 15, Error:, 2.3192560329042839192 × 10<sup>−82</sup>, New Error:, 2.3192026477147165148 × 10<sup>−97</sup>*

*Error order:, 15, Error:, 2.3192026477147165148 × 10<sup>−97</sup>, New Error:, 2.3191973092281987335 × 10<sup>−112</sup>*

$$x_o \, + h \, , \left[ \begin{array}{cccc} 3 \, \mathbf{I} & 1 + 3 \, \mathbf{I} & 2 + 3 \, \mathbf{I} & 3 + 3 \, \mathbf{I} \\ 2 \, \mathbf{I} & 1 + 2 \, \mathbf{I} & 2 + 2 \, \mathbf{I} & 3 + 2 \, \mathbf{I} \\ \mathbf{I} & 1 + \mathbf{I} & 2 + \mathbf{I} & 3 + \mathbf{I} \\ 0 & 1 & 2 & 3 \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccc} \frac{1}{3} & -\frac{9}{10} + \frac{9 \text{ I}}{2} & -\frac{198}{65} - \frac{171 \text{ I}}{65} & \frac{1}{6} - \frac{\text{I}}{6} \\ \frac{9}{10} - \frac{36 \text{ I}}{5} & -\frac{702}{5} - \frac{351 \text{ I}}{5} & -\frac{351}{4} + \frac{351 \text{ I}}{4} & \frac{171}{65} + \frac{198 \text{ I}}{65} \\ -\frac{72}{5} + \frac{9 \text{ I}}{5} & \frac{351}{2} - \frac{351 \text{ I}}{2} & \frac{351}{5} + \frac{702 \text{ I}}{5} & -\frac{9}{2} + \frac{9 \text{ I}}{10} \\ -\frac{215}{52} + \frac{215 \text{ I}}{52} & -\frac{9}{5} + \frac{72 \text{ I}}{5} & \frac{36}{5} - \frac{9 \text{ I}}{10} & -\frac{\text{I}}{3} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{1}{780\,\Delta x_{ol}} \big( 260\, u_{ol+3\text{I}} + (-702+3510\,\text{I})\, u_{ol+1+3\text{I}} - (2376+2052\,\text{I})\, u_{ol+2+3\text{I}} + (130-130\,\text{I})\, u_{ol+3+3\text{I}} + (702-5616\,\text{I})\, u_{ol+2\text{I}} - (109512+54756\,\text{I})\, u_{ol+1+2\text{I}} + (-68445+68445\,\text{I})\, u_{ol+2+2\text{I}} + (2052+2376\,\text{I})\, u_{ol+3+2\text{I}} + (-11232+1404\,\text{I})\, u_{ol+1\text{I}} + (136890-136890\,\text{I})\, u_{ol+1+1\text{I}} + (54756+109512\,\text{I})\, u_{ol+2+1\text{I}} + (-3510+702\,\text{I})\, u_{ol+3+1\text{I}} + (-3225+3225\,\text{I})\, u_{ol} + (-1404+11232\,\text{I})\, u_{ol+1\text{I}} + (5616-702\,\text{I})\, u_{ol+2\text{I}} -260\,\text{I}\, u_{ol+3\text{I}} \big),\, O(\,\Delta x_{ol}^{15}\,)$$

Formula: 74, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 2

Error order: 14, Error: 2.9207279374374395191 × 10<sup>−34</sup>, New Error: 2.8892618152051974964 × 10<sup>−48</sup>

Error order: 14, Error: 2.8892618152051974964 × 10<sup>−48</sup>, New Error: 2.8861020657861798303 × 10<sup>−62</sup>

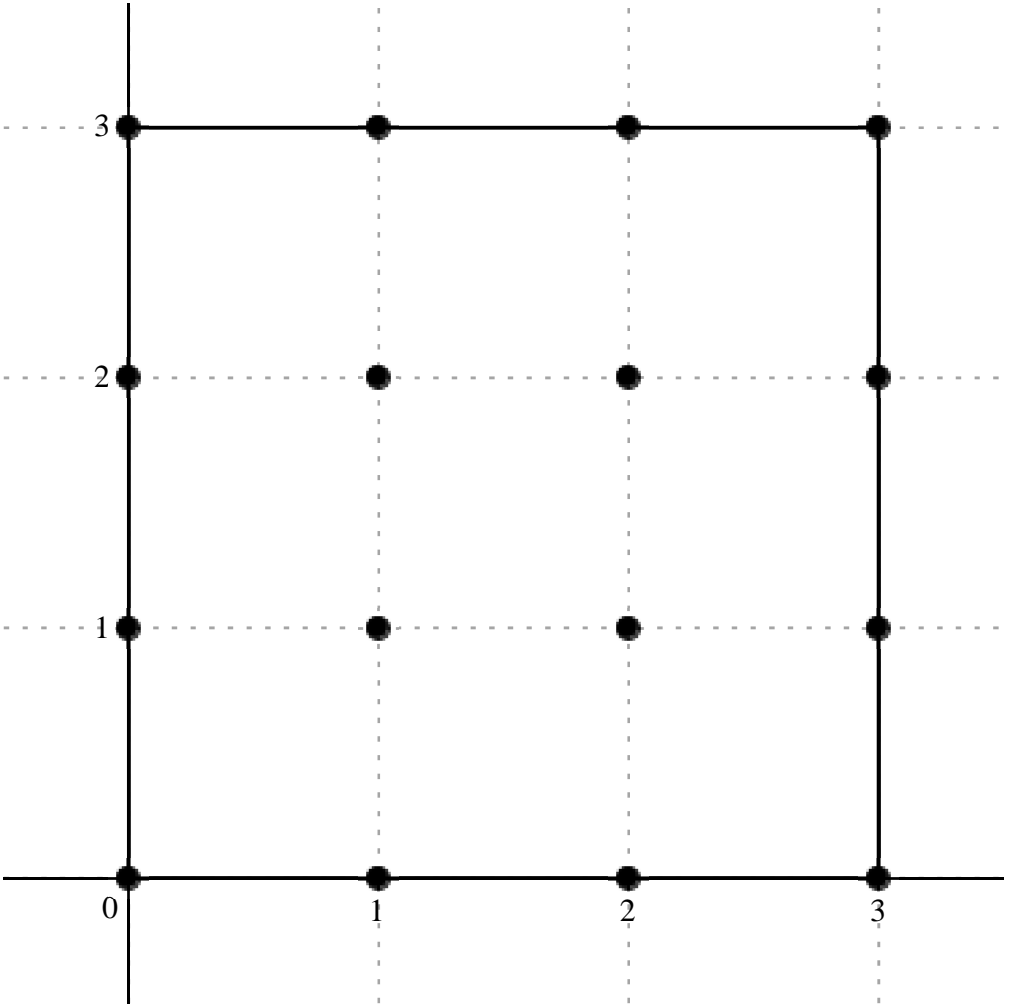
Error order: 14, Error: 2.8861020657861798303 × 10<sup>−62</sup>, New Error: 2.8857859633032761857 × 10<sup>−76</sup>

Error order: 14, Error: 2.8857859633032761857 × 10<sup>−76</sup>, New Error: 2.8857543517833822273 × 10<sup>−90</sup>

Error order: 14, Error: 2.8857543517833822273 × 10<sup>−90</sup>, New Error: 2.8857511906186805995 × 10<sup>−104</sup>

$$x_o+h., \begin{bmatrix} 3\text{ I} & 1+3\text{ I} & 2+3\text{ I} & 3+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$

$$c=, \begin{bmatrix} -\frac{215}{78}+\frac{593\text{ I}}{234} & -\frac{8856}{325}-\frac{28089\text{ I}}{650} & \frac{5823}{130}-\frac{369\text{ I}}{130} & \frac{619\text{ I}}{234} \\ \frac{11673}{260}+\frac{17181\text{ I}}{260} & \frac{81459}{50}-\frac{24813\text{ I}}{50} & -\frac{2727\text{ I}}{2} & -\frac{5823}{130}-\frac{369\text{ I}}{130} \\ \frac{14013}{130}-\frac{13671\text{ I}}{130} & \frac{5103\text{ I}}{2} & -\frac{81459}{50}-\frac{24813\text{ I}}{50} & \frac{8856}{325}-\frac{28089\text{ I}}{650} \\ -\frac{96313\text{ I}}{2925} & -\frac{14013}{130}-\frac{13671\text{ I}}{130} & -\frac{11673}{260}+\frac{17181\text{ I}}{260} & \frac{215}{78}+\frac{593\text{ I}}{234} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \; u(x_{ol})\!=\! \frac{1}{11700\,\Delta x_{ol}^2} \big( (-32250\!+\!29650\,\mathrm{I})\,u_{ol+3\mathrm{I}} - (318816\!+\!505602\,\mathrm{I})\,u_{ol+1+3\mathrm{I}} \!+\! (524070\!-\!33210\,\mathrm{I})\,u_{ol+2+3\mathrm{I}} \!+\! 30950\,\mathrm{I}u_{ol+3+3\mathrm{I}} \!+\! (525285\!+\!773145\,\mathrm{I})\,u_{ol+2\mathrm{I}} \!+\! (19061406\!-\!5806242\,\mathrm{I})\,u_{ol+1+2\mathrm{I}} \!-\! 15952950\,\mathrm{I}u_{ol+2+2\mathrm{I}} \!-\! (524070\!+\!33210\,\mathrm{I})\,u_{ol+3+2\mathrm{I}} \!+\! (1261170\!-\!1230390\,\mathrm{I})\,u_{ol+1\mathrm{I}} \!+\! 29852550\,\mathrm{I}u_{ol+1+1\mathrm{I}} \!-\! (19061406\!+\!5806242\,\mathrm{I})\,u_{ol+2+1\mathrm{I}} \!+\! (318816\!-\!505602\,\mathrm{I})\,u_{ol+3+1\mathrm{I}} \!-\! 385252\,\mathrm{I}u_{ol} \!-\! (1261170\!+\!1230390\,\mathrm{I})\,u_{ol+1\mathrm{I}} \!+\! (-525285\!+\!773145\,\mathrm{I})\,u_{ol+2\mathrm{I}} \!+\! (32250\!+\!29650\,\mathrm{I})\,u_{ol+3\mathrm{I}} \big), \; O(\;\Delta x_{ol}^{14}\;)$$

Formula.: 75, Var.: 1

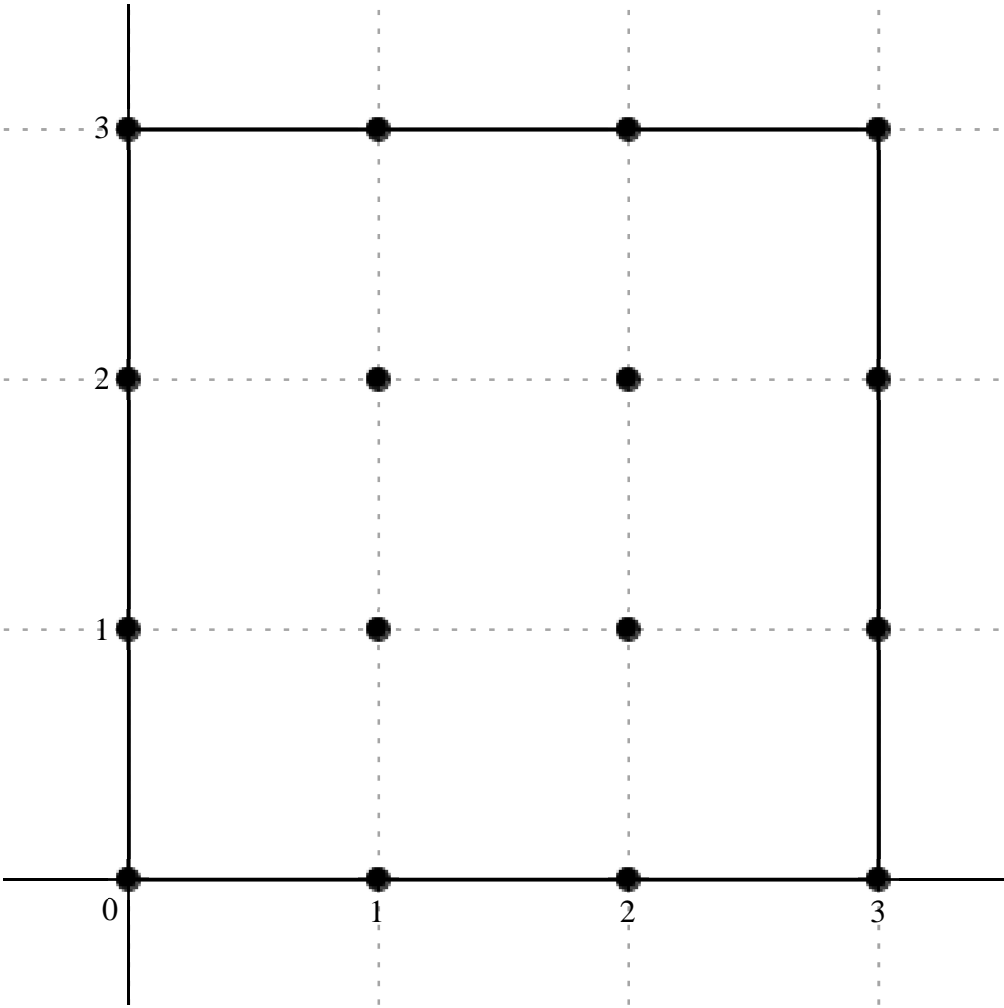
Variavel .:  $x_{ol}$ , Derivada de Ordem .: 3

Error order.: 13, Error.:  $1.9415659594509849928 \times 10^{-31}$ , New Error.:  $1.8981517592271802946 \times 10^{-44}$

Error order.: 13, Error.:  $1.8981517592271802946 \times 10^{-44}$ , New Error.:  $1.8938362231944248498 \times 10^{-57}$

*Error order:*, 13,    *Error:*,  $1.8938362231944248498 \times 10^{-57}$ ,    *New Error:*,  $1.8934049291505515369 \times 10^{-70}$   
*Error order:*, 13,    *Error:*,  $1.8934049291505515369 \times 10^{-70}$ ,    *New Error:*,  $1.8933618023424618832 \times 10^{-83}$   
*Error order:*, 13,    *Error:*,  $1.8933618023424618832 \times 10^{-83}$ ,    *New Error:*,  $1.8933574896876165966 \times 10^{-96}$

$$\begin{aligned}
& x_o + h., \quad \begin{bmatrix} 3 \, \mathbf{I} & 1 + 3 \, \mathbf{I} & 2 + 3 \, \mathbf{I} & 3 + 3 \, \mathbf{I} \\ 2 \, \mathbf{I} & 1 + 2 \, \mathbf{I} & 2 + 2 \, \mathbf{I} & 3 + 2 \, \mathbf{I} \\ \mathbf{I} & 1 + \mathbf{I} & 2 + \mathbf{I} & 3 + \mathbf{I} \\ 0 & 1 & 2 & 3 \end{bmatrix} \\
c =, & \quad \begin{bmatrix} \frac{593}{234} - \frac{13577 \, \mathbf{I}}{450} & \frac{2583453}{6500} + \frac{653019 \, \mathbf{I}}{6500} & -\frac{783789}{3250} + \frac{872907 \, \mathbf{I}}{3250} & -\frac{13627}{900} - \frac{13627 \, \mathbf{I}}{900} \\ -\frac{7957473}{13000} - \frac{2031231 \, \mathbf{I}}{13000} & -\frac{327627}{50} + \frac{116163 \, \mathbf{I}}{10} & \frac{1529109}{200} + \frac{1529109 \, \mathbf{I}}{200} & \frac{872907}{3250} - \frac{783789 \, \mathbf{I}}{3250} \\ -\frac{34419}{250} + \frac{274773 \, \mathbf{I}}{250} & -\frac{1350909}{100} - \frac{1350909 \, \mathbf{I}}{100} & \frac{116163}{10} - \frac{327627 \, \mathbf{I}}{50} & \frac{653019}{6500} + \frac{2583453 \, \mathbf{I}}{6500} \\ \frac{2905559}{23400} + \frac{2905559 \, \mathbf{I}}{23400} & \frac{274773}{250} - \frac{34419 \, \mathbf{I}}{250} & -\frac{2031231}{13000} - \frac{7957473 \, \mathbf{I}}{13000} & -\frac{13577}{450} + \frac{593 \, \mathbf{I}}{234} \end{bmatrix}
\end{aligned}$$



$$\begin{aligned}
\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = & \frac{1}{117000 \, \Delta x_{ol}^3} \big( (296500 - 3530020 \, \mathbf{I}) \, u_{ol+3\mathbf{I}} + (46502154 + 11754342 \, \mathbf{I}) \, u_{ol+1+3\mathbf{I}} + (-28216404 + 31424652 \, \mathbf{I}) \, u_{ol+2+3\mathbf{I}} - (1771510 + 1771510 \, \mathbf{I}) \, u_{ol+3+3\mathbf{I}} \\
& - (71617257 + 18281079 \, \mathbf{I}) \, u_{ol+2\mathbf{I}} + (-766647180 + 1359107100 \, \mathbf{I}) \, u_{ol+1+2\mathbf{I}} + (894528765 + 894528765 \, \mathbf{I}) \, u_{ol+2+2\mathbf{I}} + (31424652 - 28216404 \, \mathbf{I}) \, u_{ol+3+2\mathbf{I}} \\
& + (-16108092 + 128593764 \, \mathbf{I}) \, u_{ol+1} - (1580563530 + 1580563530 \, \mathbf{I}) \, u_{ol+1+1} + (1359107100 - 766647180 \, \mathbf{I}) \, u_{ol+2+1} + (11754342 + 46502154 \, \mathbf{I}) \, u_{ol+3+1} + (14527795 + 14527795 \, \mathbf{I}) \, u_{ol} + (128593764 - 16108092 \, \mathbf{I}) \, u_{ol+1} - (18281079 + 71617257 \, \mathbf{I}) \, u_{ol+2} + (-3530020 + 296500 \, \mathbf{I}) \, u_{ol+3} \big), \, O(\, \Delta x_{ol}^{13} \,)
\end{aligned}$$

Formula:, 76, Var:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 4

Error order:, 12, Error:,  $1.4496206875178726789 \times 10^{-28}$ , New Error:,  $1.4341815520275751291 \times 10^{-40}$

Error order:, 12, Error:,  $1.4341815520275751291 \times 10^{-40}$ , New Error:,  $1.4326312599531597127 \times 10^{-52}$

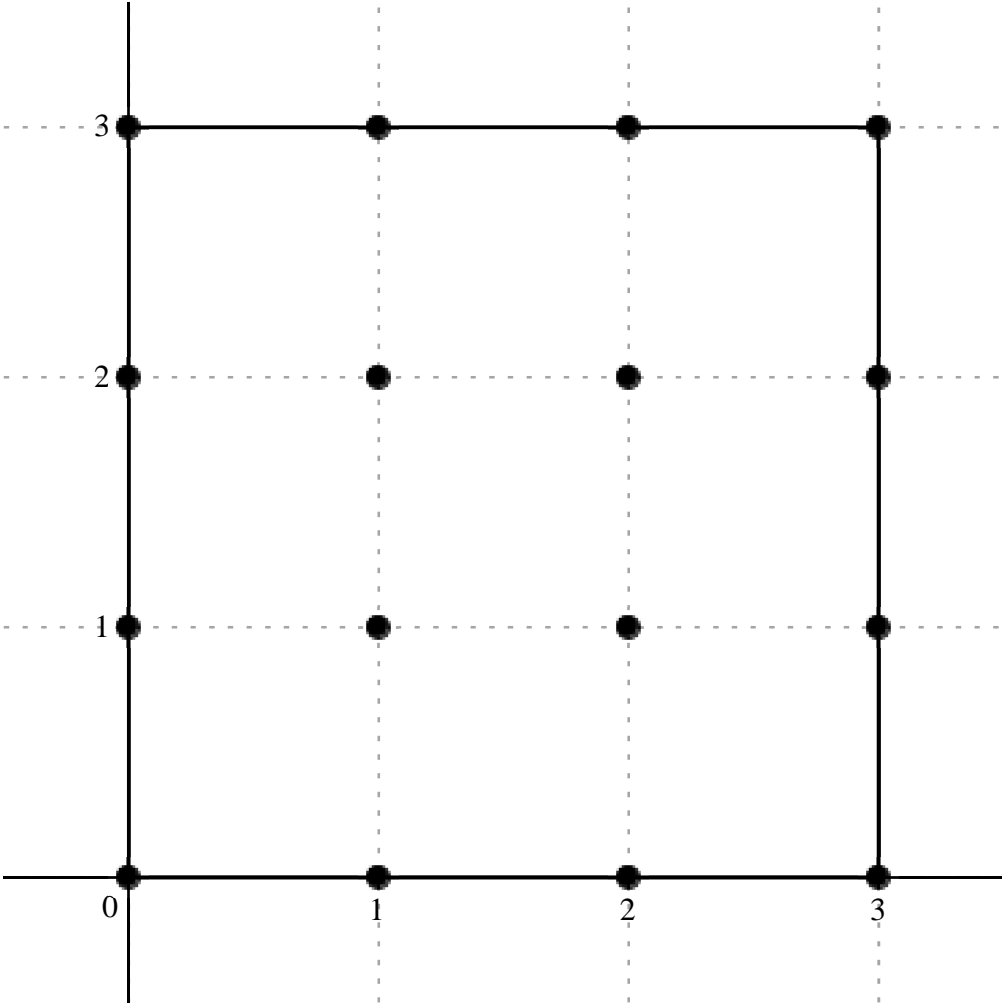
Error order:, 12, Error:,  $1.4326312599531597127 \times 10^{-52}$ , New Error:,  $1.4324761688043876727 \times 10^{-64}$

Error order:, 12, Error:,  $1.4324761688043876727 \times 10^{-64}$ , New Error:,  $1.4324606590719293723 \times 10^{-76}$

Error order:, 12, Error:,  $1.4324606590719293723 \times 10^{-76}$ , New Error:,  $1.4324591080925095623 \times 10^{-88}$

$$x_o + h, \begin{bmatrix} 3\text{ I} & 1+3\text{ I} & 2+3\text{ I} & 3+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{16293}{130} + \frac{8109\text{ I}}{50} & -\frac{312327}{130} + \frac{87833\text{ I}}{65} & -\frac{69417}{650} - \frac{1580603\text{ I}}{650} & \frac{94491}{650} \\ \frac{241188}{65} - \frac{619072\text{ I}}{325} & -\frac{1076133}{50} - \frac{4241151\text{ I}}{50} & -\frac{1796892}{25} & -\frac{69417}{650} + \frac{1580603\text{ I}}{650} \\ -\frac{2372367}{650} - \frac{148393\text{ I}}{26} & \frac{6014859}{50} & -\frac{1076133}{50} + \frac{4241151\text{ I}}{50} & -\frac{312327}{130} - \frac{87833\text{ I}}{65} \\ -\frac{56886}{65} & -\frac{2372367}{650} + \frac{148393\text{ I}}{26} & \frac{241188}{65} + \frac{619072\text{ I}}{325} & \frac{16293}{130} - \frac{8109\text{ I}}{50} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{1}{650 \Delta x_{ol}^4} \big( (81465 + 105417\text{ I}) u_{ol+3\text{ I}} + (-1561635 + 878330\text{ I}) u_{ol+1+3\text{ I}} - (69417 + 1580603\text{ I}) u_{ol+2+3\text{ I}} + 94491 u_{ol+3+3\text{ I}} + (2411880 - 1238144\text{ I}) u_{ol+2\text{ I}} - (13989729 + 55134963\text{ I}) u_{ol+1+2\text{ I}} - 46719192 u_{ol+2+2\text{ I}} + (-69417 + 1580603\text{ I}) u_{ol+3+2\text{ I}} - (2372367 + 3709825\text{ I}) u_{ol+1\text{ I}} + 78193167 u_{ol+1+1\text{ I}} + (-13989729 + 55134963\text{ I}) u_{ol+2+1\text{ I}} - (1561635 + 878330\text{ I}) u_{ol+3+1\text{ I}} - 568860 u_{ol\text{ I}} + (-2372367 + 3709825\text{ I}) u_{ol+1\text{ I}} + (2411880 + 1238144\text{ I}) u_{ol+2\text{ I}} + (81465 - 105417\text{ I}) u_{ol+3\text{ I}} \big), O(\Delta x_{ol}^{12})$$



Formula.: 77, Var.: 1

Variavel .:  $x_{ol}$  , Derivada de Ordem .: 5

Error order.: 11, Error.:  $7.1056548730663514329 \times 10^{-26}$ , New Error.:  $6.9488460244156172565 \times 10^{-37}$

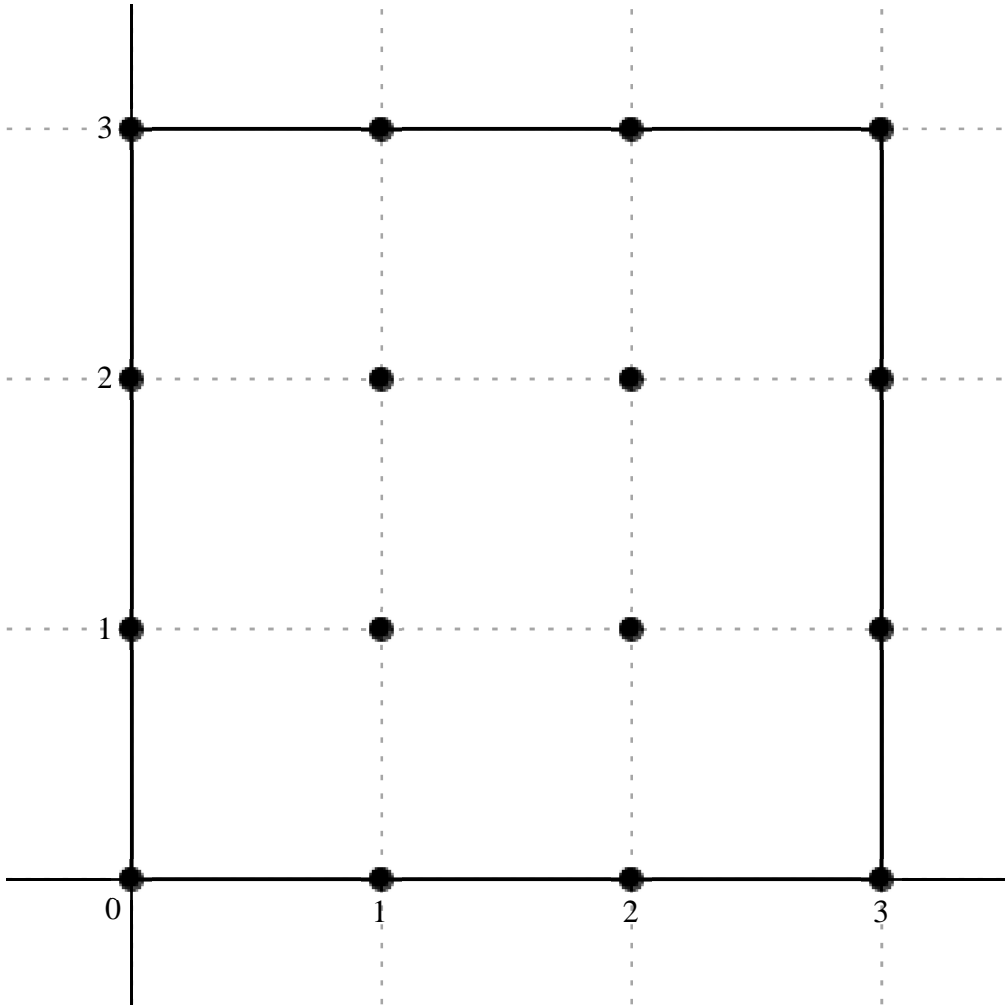
Error order.: 11, Error.:  $6.9488460244156172565 \times 10^{-37}$ , New Error.:  $6.9332575662732250345 \times 10^{-48}$

Error order.: 11, Error.:  $6.9332575662732250345 \times 10^{-48}$ , New Error.:  $6.9316996472690797856 \times 10^{-59}$

Error order.: 11, Error.:  $6.9316996472690797856 \times 10^{-59}$ , New Error.:  $6.9315438646392535309 \times 10^{-70}$

Error order.: 11, Error.:  $6.9315438646392535309 \times 10^{-70}$ , New Error.:  $6.9315282864689792699 \times 10^{-81}$

$$x_o + h., \begin{bmatrix} 3 \text{ I} & 1+3 \text{ I} & 2+3 \text{ I} & 3+3 \text{ I} \\ 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} & 3+2 \text{ I} \\ 1 & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$
$$c =, \begin{bmatrix} -\frac{154481}{130} - \frac{5431 \text{ I}}{26} & \frac{1238619}{260} - \frac{4007093 \text{ I}}{260} & \frac{1357401}{130} + \frac{1269389 \text{ I}}{130} & -\frac{158123}{260} + \frac{158123 \text{ I}}{260} \\ -\frac{565523}{65} + \frac{1444926 \text{ I}}{65} & \frac{4232001}{10} + \frac{2654067 \text{ I}}{10} & \frac{2941359}{10} - \frac{2941359 \text{ I}}{10} & -\frac{1269389}{130} - \frac{1357401 \text{ I}}{130} \\ \frac{4481759}{130} + \frac{1348419 \text{ I}}{130} & -\frac{9344361}{20} + \frac{9344361 \text{ I}}{20} & -\frac{2654067}{10} - \frac{4232001 \text{ I}}{10} & \frac{4007093}{260} - \frac{1238619 \text{ I}}{260} \\ \frac{74123}{26} - \frac{74123 \text{ I}}{26} & -\frac{1348419}{130} - \frac{4481759 \text{ I}}{130} & -\frac{1444926}{65} + \frac{565523 \text{ I}}{65} & \frac{5431}{26} + \frac{154481 \text{ I}}{130} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{260 \, \Delta x_{ol}^5} \left( -(308962 + 54310 \, \text{I}) \, u_{ol+31} + (1238619 - 4007093 \, \text{I}) \, u_{ol+1+31} + (2714802 + 2538778 \, \text{I}) \, u_{ol+2+31} + (-158123 + 158123 \, \text{I}) \, u_{ol+3+31} + (-2262092 + 5779704 \, \text{I}) \, u_{ol+21} + (110032026 + 69005742 \, \text{I}) \, u_{ol+1+21} + (76475334 - 76475334 \, \text{I}) \, u_{ol+2+21} - (2538778 + 2714802 \, \text{I}) \, u_{ol+3+21} + (8963518 + 2696838 \, \text{I}) \, u_{ol+1} \right)$$

$$+ \left( -121476693 + 121476693 \, \text{I} \right) u_{oI+1+1} - \left( 69005742 + 110032026 \, \text{I} \right) u_{oI+2+1} + \left( 4007093 - 1238619 \, \text{I} \right) u_{oI+3+1} + \left( 741230 - 741230 \, \text{I} \right) u_{oI} - \left( 2696838 + 8963518 \, \text{I} \right) u_{oI+1} + \left( -5779704 + 2262092 \, \text{I} \right) u_{oI+2} + \left( 54310 + 308962 \, \text{I} \right) u_{oI+3} \Big), \, O( \, \Delta x_o^{11} \, )$$

Formula.: 78, Var.: 1

Variavel :,  $x_o$ , Derivada de Ordem :, 6

Error order.: 10, Error.:  $4.1252076542915671052 \times 10^{-23}$ , New Error.:  $4.0819497305963846287 \times 10^{-33}$

Error order.: 10, Error.:  $4.0819497305963846287 \times 10^{-33}$ , New Error.:  $4.0776063125512943647 \times 10^{-43}$

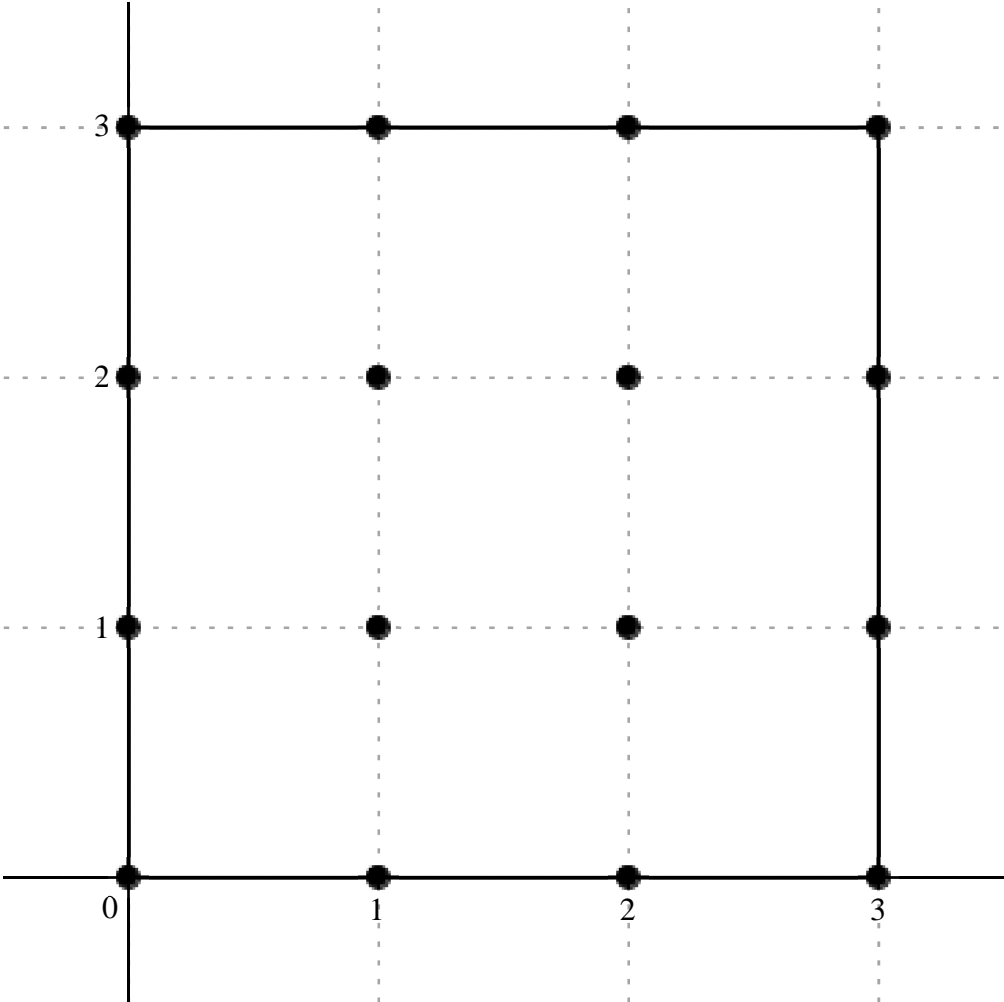
Error order.: 10, Error.:  $4.0776063125512943647 \times 10^{-43}$ , New Error.:  $4.0771717995283111572 \times 10^{-53}$

Error order.: 10, Error.:  $4.0771717995283111572 \times 10^{-53}$ , New Error.:  $4.0771283465188346852 \times 10^{-63}$

Error order.: 10, Error.:  $4.0771283465188346852 \times 10^{-63}$ , New Error.:  $4.0771240012008202599 \times 10^{-73}$

$$x_o+h., \left[ \begin{array}{cccc} 3 \, \text{I} & 1+3 \, \text{I} & 2+3 \, \text{I} & 3+3 \, \text{I} \\ 2 \, \text{I} & 1+2 \, \text{I} & 2+2 \, \text{I} & 3+2 \, \text{I} \\ 1 & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 \end{array} \right]$$

$$c=, \left[ \begin{array}{cccc} 5284-\frac{216134 \, \text{I}}{65} & \frac{2385243}{65}+\frac{9691041 \, \text{I}}{130} & -\frac{4806558}{65}+\frac{107976 \, \text{I}}{65} & -\frac{583107 \, \text{I}}{130} \\ -\frac{5339691}{130}-\frac{14618751 \, \text{I}}{130} & -\frac{12287808}{5}+\frac{2518002 \, \text{I}}{5} & \frac{10597869 \, \text{I}}{5} & \frac{4806558}{65}+\frac{107976 \, \text{I}}{65} \\ -\frac{1992798}{13}+\frac{4566612 \, \text{I}}{65} & -\frac{32006547 \, \text{I}}{10} & \frac{12287808}{5}+\frac{2518002 \, \text{I}}{5} & -\frac{2385243}{65}+\frac{9691041 \, \text{I}}{130} \\ \frac{1104562 \, \text{I}}{65} & \frac{1992798}{13}+\frac{4566612 \, \text{I}}{65} & \frac{5339691}{130}-\frac{14618751 \, \text{I}}{130} & -5284-\frac{216134 \, \text{I}}{65} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u\big(x_{ol}\big) = \frac{1}{130 \, \mathcal{A}x_{ol}^6} \big( (686920 - 432268 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (4770486 + 9691041 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (-9613116 + 215952 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} - 583107 \, \mathrm{I} u_{ol+3+3\mathrm{I}} - (5339691 + 14618751 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (-319483008 + 65468052 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + 275544594 \, \mathrm{I} u_{ol+2+2\mathrm{I}} + (9613116 + 215952 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (-19927980 + 9133224 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} - 416085111 \, \mathrm{I} u_{ol+1+1\mathrm{I}} + (319483008 + 65468052 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} + (-4770486 + 9691041 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} + 2209124 \, \mathrm{I} u_{ol} + (19927980 + 9133224 \, \mathrm{I}) \, u_{ol+1} + (5339691 - 14618751 \, \mathrm{I}) \, u_{ol+2} - (686920 + 432268 \, \mathrm{I}) \, u_{ol+3} \big), \, O(\, \mathcal{A}x_{ol}^{10} \, )$$

Formula:, 79, Var:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 7

Error order:, 9, Error:, 1.5956257473961019198 × 10−20, New Error:, 1.5610605977868741681 × 10−29

Error order:, 9, Error:, 1.5610605977868741681 × 10−29, New Error:, 1.5576241393148493442 × 10−38

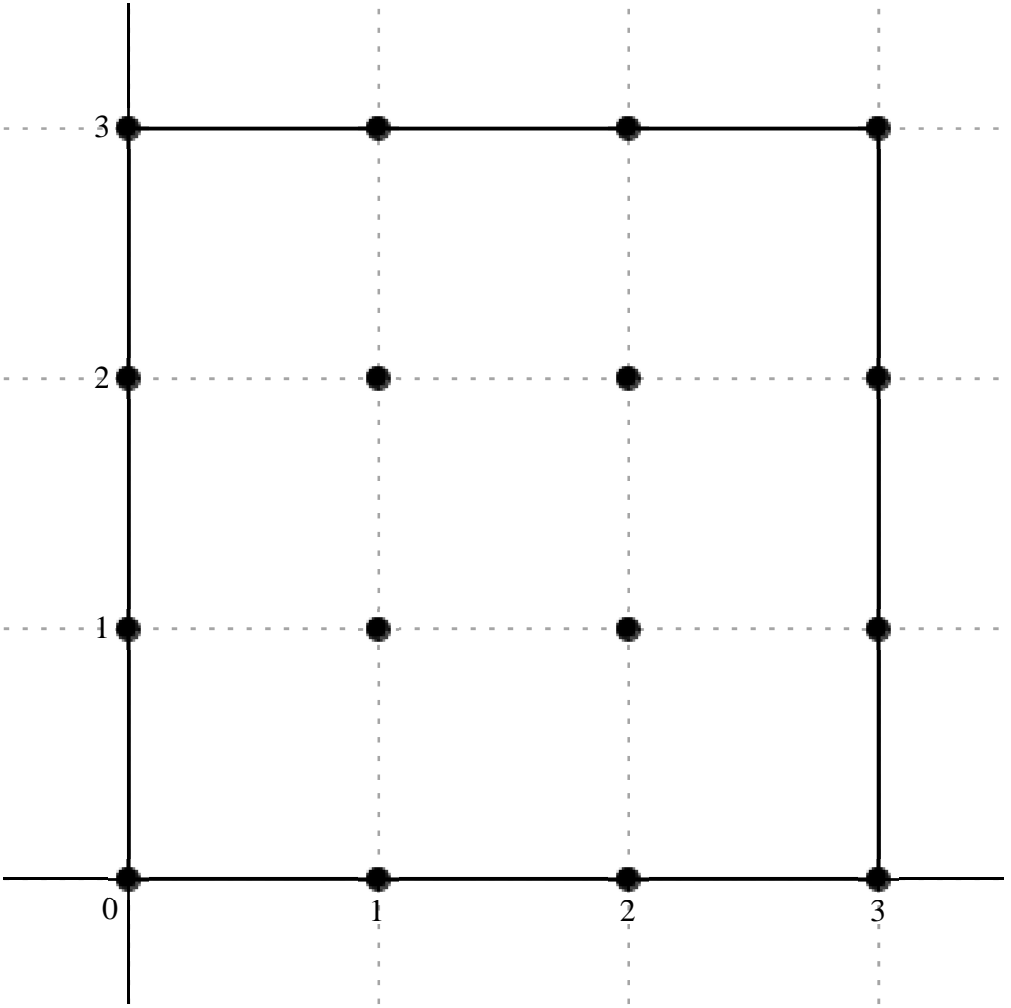
Error order:, 9, Error:, 1.5576241393148493442 × 10−38, New Error:, 1.5572806945767967904 × 10−47

Error order:, 9, Error:, 1.5572806945767967904 × 10−47, New Error:, 1.5572463521146155421 × 10−56

Error order:, 9, Error:, 1.5572463521146155421 × 10−56, New Error:, 1.5572429178885141887 × 10−65

$$x_o \rightarrow x_o+h \text{ , } \left[ \begin{array}{cccc} 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & 2+3 \, \mathrm{I} & 3+3 \, \mathrm{I} \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & 3+2 \, \mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{1512938}{195} + \frac{5327714 \, \mathrm{I}}{195} & -\frac{458968797}{1300} - \frac{171517731 \, \mathrm{I}}{1300} & \frac{76695318}{325} - \frac{78359694 \, \mathrm{I}}{325} & \frac{11382119}{780} + \frac{11382119 \, \mathrm{I}}{780} \\ \frac{601742211}{1300} + \frac{326063997 \, \mathrm{I}}{1300} & \frac{31599918}{5} - \frac{45573822 \, \mathrm{I}}{5} & -\frac{26915427}{4} - \frac{26915427 \, \mathrm{I}}{4} & -\frac{78359694}{325} + \frac{76695318 \, \mathrm{I}}{325} \\ \frac{90244014}{325} - \frac{207959598 \, \mathrm{I}}{325} & \frac{193478607}{20} + \frac{193478607 \, \mathrm{I}}{20} & -\frac{45573822}{5} + \frac{31599918 \, \mathrm{I}}{5} & -\frac{171517731}{1300} - \frac{458968797 \, \mathrm{I}}{1300} \\ -\frac{35749511}{780} - \frac{35749511 \, \mathrm{I}}{780} & -\frac{207959598}{325} + \frac{90244014 \, \mathrm{I}}{325} & \frac{326063997}{1300} + \frac{601742211 \, \mathrm{I}}{1300} & \frac{5327714}{195} - \frac{1512938 \, \mathrm{I}}{195} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u(x_{ol})=\frac{1}{3900\,\Delta x_{ol}^7}\Big(7\,\big((\,-4322680+15222040\,\mathrm{I}\,)u_{ol+3\mathrm{I}}-(196700913+73507599\,\mathrm{I}\,)u_{ol+1+3\mathrm{I}}+(131477688-134330904\,\mathrm{I}\,)u_{ol+2+3\mathrm{I}}+(8130085+8130085\,\mathrm{I}\,)u_{ol+3+3\mathrm{I}}+(257889519+139741713\,\mathrm{I}\,)u_{ol+2\mathrm{I}}+(3521133720-5078225880\,\mathrm{I}\,)u_{ol+1+2\mathrm{I}}-(3748934475+3748934475\,\mathrm{I}\,)u_{ol+2+2\mathrm{I}}+(\,-134330904$$

$$+131477688\,\mathrm{I}\,)u_{ol+3+2\mathrm{I}}+(154704024-356502168\,\mathrm{I}\,)u_{ol+1\mathrm{I}}+(5389761195+5389761195\,\mathrm{I}\,)u_{ol+1+1\mathrm{I}}+(\,-5078225880+3521133720\,\mathrm{I}\,)u_{ol+2+1\mathrm{I}}-(73507599+196700913\,\mathrm{I}\,)u_{ol+3+1\mathrm{I}}-(25535365+25535365\,\mathrm{I}\,)u_{ol}+(\,-356502168+154704024\,\mathrm{I}\,)u_{ol+1\mathrm{I}}+(139741713+257889519\,\mathrm{I}\,)u_{ol+2\mathrm{I}}+(15222040-4322680\,\mathrm{I}\,)u_{ol+3\mathrm{I}}\big)\Big),$$

$$O(\,\Delta x_{ol}^9\,)$$

Formula: , 80, Var: , 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order: , 8, Error: ,  $7.3060036461349947503\times 10^{-18}$ , New Error: ,  $7.2311132879476444266\times 10^{-26}$

Error order: , 8, Error: ,  $7.2311132879476444266\times 10^{-26}$ , New Error: ,  $7.2235943278682593168\times 10^{-34}$

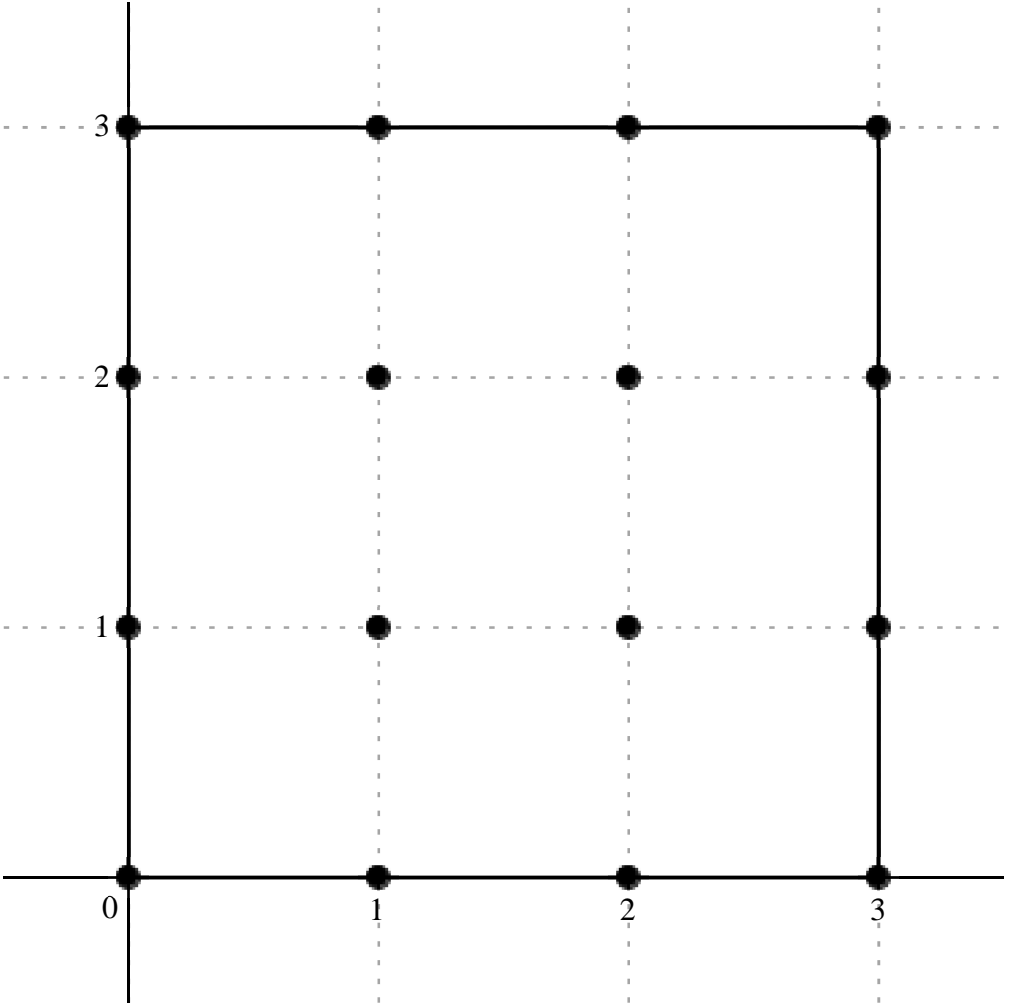
Error order: , 8, Error: ,  $7.2235943278682593168\times 10^{-34}$ , New Error: ,  $7.2228421410406978266\times 10^{-42}$

Error order: , 8, Error: ,  $7.2228421410406978266\times 10^{-42}$ , New Error: ,  $7.2227669194581161521\times 10^{-50}$

Error order: , 8, Error: ,  $7.2227669194581161521\times 10^{-50}$ , New Error: ,  $7.2227593972708680949\times 10^{-58}$

$$x_o+h\cdot,\left[\begin{array}{cccc}3\,\mathrm{I} & 1+3\,\mathrm{I} & 2+3\,\mathrm{I} & 3+3\,\mathrm{I} \\2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & 3+2\,\mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\0 & 1 & 2 & 3\end{array}\right]$$

$$c =, \left[ \begin{array}{cccc} -\frac{641718}{13} - \frac{507654 \text{ I}}{5} & \frac{17951472}{13} - \frac{7516656 \text{ I}}{13} & -\frac{154098}{65} + \frac{87691338 \text{ I}}{65} & -\frac{5414976}{65} \\ -\frac{25566912}{13} + \frac{29799504 \text{ I}}{65} & \frac{33421878}{5} + \frac{212056866 \text{ I}}{5} & \frac{187168464}{5} & -\frac{154098}{65} - \frac{87691338 \text{ I}}{65} \\ \frac{53359362}{65} + \frac{31181094 \text{ I}}{13} & -\frac{256533984}{5} & \frac{33421878}{5} - \frac{212056866 \text{ I}}{5} & \frac{17951472}{13} + \frac{7516656 \text{ I}}{13} \\ \frac{2871792}{13} & \frac{53359362}{65} - \frac{31181094 \text{ I}}{13} & -\frac{25566912}{13} - \frac{29799504 \text{ I}}{65} & -\frac{641718}{13} + \frac{507654 \text{ I}}{5} \end{array} \right]$$



$$\frac{\text{d}^8}{\text{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{65 \, \Delta x_{ol}^8} \Big( 126 \, \big( -(25465 + 52377 \, \text{I}) \, u_{ol+3\text{I}} + (712360 - 298280 \, \text{I}) \, u_{ol+1+3\text{I}} + (-1223 + 695963 \, \text{I}) \, u_{ol+2+3\text{I}} - 42976 \, u_{ol+3+3\text{I}} + (-1014560 + 236504 \, \text{I}) \, u_{ol+2\text{I}} + (3448289 + 21878883 \, \text{I}) \, u_{ol+1+2\text{I}} + 19311032 \, u_{ol+2+2\text{I}} - (1223 + 695963 \, \text{I}) \, u_{ol+3+2\text{I}} + (423487 + 1237345 \, \text{I}) \, u_{ol+1\text{I}} - 26467792 \, u_{ol+1+1\text{I}} + (3448289 - 21878883 \, \text{I}) \, u_{ol+2+1\text{I}} + (712360 + 298280 \, \text{I}) \, u_{ol+3+1\text{I}} + 113960 \, u_{ol\text{I}} + (423487 - 1237345 \, \text{I}) \, u_{ol+1\text{I}} - (1014560 + 236504 \, \text{I}) \, u_{ol+2\text{I}} + (-25465 + 52377 \, \text{I}) \, u_{ol+3\text{I}} \big) \Big), \, O( \, \Delta x_{ol}^8 \, )$$

Formula:, 81, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 9

Error order:, 7, Error:;, 2.2025449419084289501 × 10−15, New Error:;, 2.1561628453155014360 × 10−22

Error order:, 7, Error:;, 2.1561628453155014360 × 10−22, New Error:;, 2.1515509400708977013 × 10−29

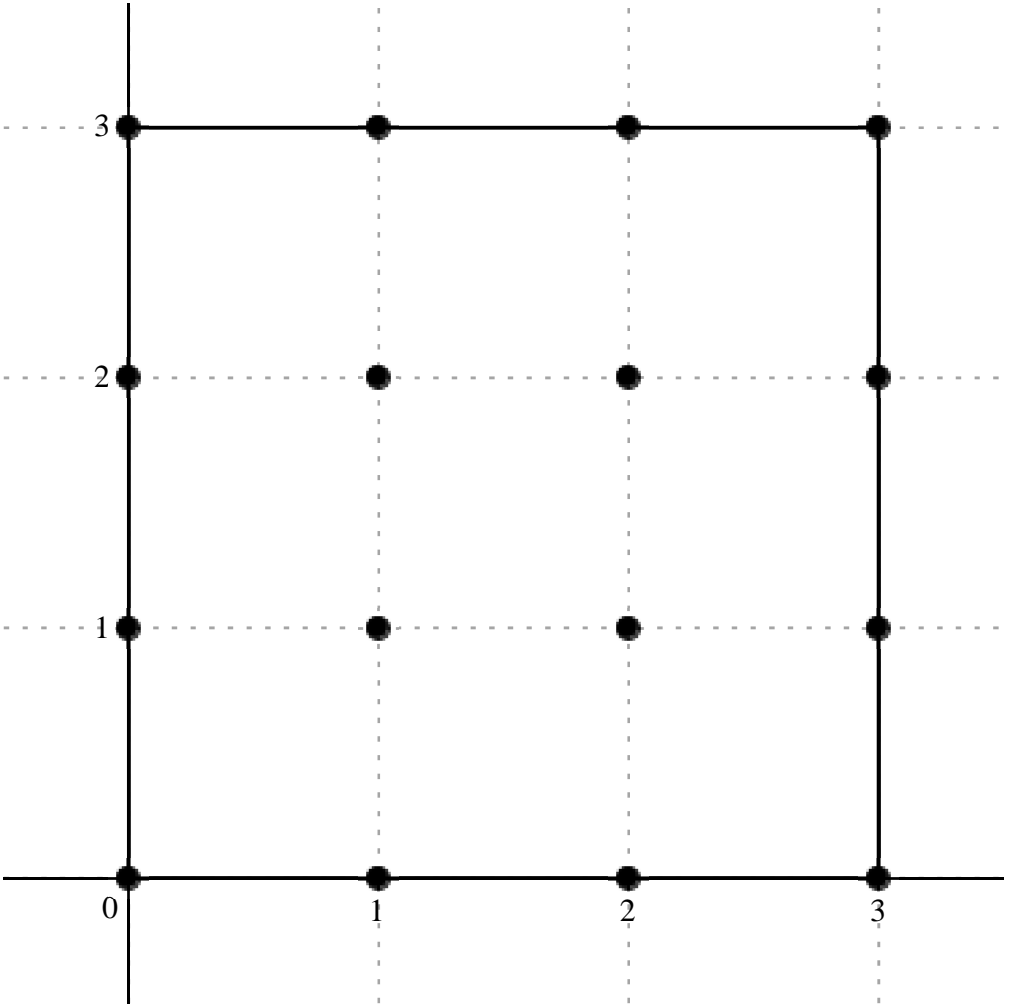
Error order:, 7, Error:;, 2.1515509400708977013 × 10−29, New Error:;, 2.1510900132907186526 × 10−36

Error order:, 7, Error:;, 2.1510900132907186526 × 10−36, New Error:;, 2.1510439232508288080 × 10−43

Error order:, 7, Error:;, 2.1510439232508288080 × 10−43, New Error:;, 2.1510393142732217879 × 10−50

$$x_o+h., \begin{bmatrix} 3\text{ I} & 1+3\text{ I} & 2+3\text{ I} & 3+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$

$$c=, \begin{bmatrix} \frac{23278374}{65}+\frac{1925154\text{ I}}{13} & -\frac{137000808}{65}+\frac{305368056\text{ I}}{65} & -\frac{211741614}{65}-\frac{218237166\text{ I}}{65} & \frac{13415976}{65}-\frac{13415976\text{ I}}{65} \\ \frac{250405344}{65}-\frac{355205088\text{ I}}{65} & -\frac{572126814}{5}-\frac{436461858\text{ I}}{5} & -\frac{451177776}{5}+\frac{451177776\text{ I}}{5} & \frac{218237166}{65}+\frac{211741614\text{ I}}{65} \\ -\frac{457771986}{65}-\frac{247619106\text{ I}}{65} & \frac{590210712}{5}-\frac{590210712\text{ I}}{5} & \frac{436461858}{5}+\frac{572126814\text{ I}}{5} & -\frac{305368056}{65}+\frac{137000808\text{ I}}{65} \\ -\frac{6087312}{13}+\frac{6087312\text{ I}}{13} & \frac{247619106}{65}+\frac{457771986\text{ I}}{65} & \frac{355205088}{65}-\frac{250405344\text{ I}}{65} & -\frac{1925154}{13}-\frac{23278374\text{ I}}{65} \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \; u(x_{ol}) = \frac{1}{65 \; \Delta x_{ol}^9} \Big( 378 \big( (61583 + 25465 \; \mathrm{I}) \; u_{ol+3\mathrm{I}} + (-362436 + 807852 \; \mathrm{I}) \; u_{ol+1+3\mathrm{I}} - (560163 + 577347 \; \mathrm{I}) \; u_{ol+2+3\mathrm{I}} + (35492 - 35492 \; \mathrm{I}) \; u_{ol+3+3\mathrm{I}} + (662448 - 939696 \; \mathrm{I}) \; u_{ol+2\mathrm{I}} - (19676319 + 15010593 \; \mathrm{I}) \; u_{ol+1+2\mathrm{I}} + (-15516696 + 15516696 \; \mathrm{I}) \; u_{ol+2+2\mathrm{I}} + (577347 + 560163 \; \mathrm{I}) \; u_{ol+3+2\mathrm{I}} - (1211037 + 655077 \; \mathrm{I}) \; u_{ol+1\mathrm{I}} + (20298252$$

$$- 20298252 \; \mathrm{I}) \; u_{ol+1+\mathrm{I}} + (15010593 + 19676319 \; \mathrm{I}) \; u_{ol+2+\mathrm{I}} + (-807852 + 362436 \; \mathrm{I}) \; u_{ol+3+\mathrm{I}} + (-80520 + 80520 \; \mathrm{I}) \; u_{ol} + (655077 + 1211037 \; \mathrm{I}) \; u_{ol+1} + (939696 - 662448 \; \mathrm{I}) \; u_{ol+2} - (25465 + 61583 \; \mathrm{I}) \; u_{ol+3} \big) \big), \; O( \; \Delta x_{ol}^7 \; )$$

Formula.: 82, Var.: 1

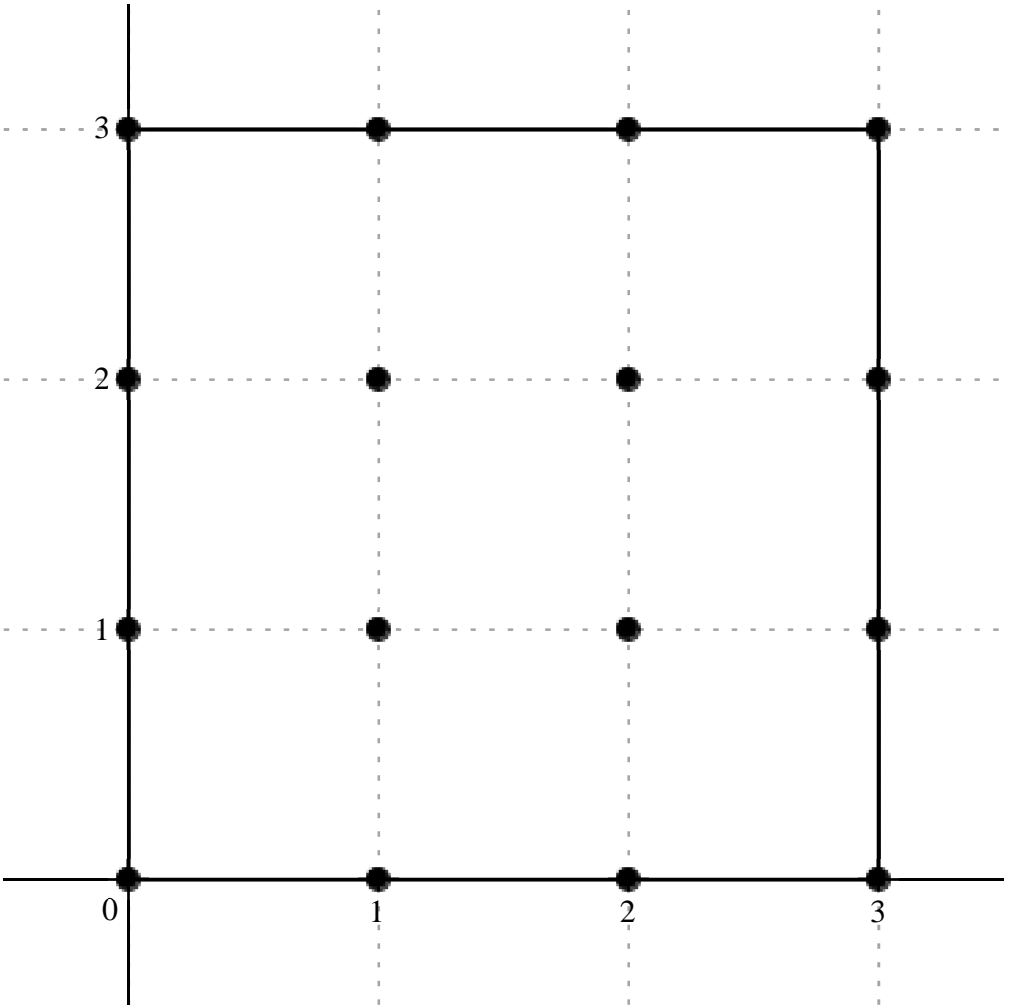
Variavel .:  $x_{ol}$ , Derivada de Ordem .: 10

Error order.: 6, Error.: 7.7078254517120638848 × 10<sup>−13</sup>, New Error.: 7.6316470924814058616 × 10<sup>−19</sup>

Error order.: 6, Error.: 7.6316470924814058616 × 10<sup>−19</sup>, New Error.: 7.6239997061345689025 × 10<sup>−25</sup>

*Error order:*, 6,    *Error:*,  $7.6239997061345689025 \times 10^{-25}$ ,    *New Error:*,  $7.6232346801289937926 \times 10^{-31}$   
*Error order:*, 6,    *Error:*,  $7.6232346801289937926 \times 10^{-31}$ ,    *New Error:*,  $7.6231581746628111671 \times 10^{-37}$   
*Error order:*, 6,    *Error:*,  $7.6231581746628111671 \times 10^{-37}$ ,    *New Error:*,  $7.6231505240875447322 \times 10^{-43}$

$$c =, \left[ \begin{array}{cccc} x_o+h., & \begin{bmatrix} 3\text{ I} & 1+3\text{ I} & 2+3\text{ I} & 3+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix} \\ \begin{array}{cccc} -1067220+\frac{4772124\text{ I}}{13} & -\frac{63322560}{13}-\frac{185440752\text{ I}}{13} & \frac{179695908}{13}+\frac{5291244\text{ I}}{13} & \frac{11347056\text{ I}}{13} \\ \frac{28295568}{13}+\frac{242666928\text{ I}}{13} & 408124332-45598140\text{ I} & -370609344\text{ I} & -\frac{179695908}{13}+\frac{5291244\text{ I}}{13} \\ \frac{271763100}{13}-\frac{70600572\text{ I}}{13} & 463152816\text{ I} & -408124332-45598140\text{ I} & \frac{63322560}{13}-\frac{185440752\text{ I}}{13} \\ -\frac{22238496\text{ I}}{13} & -\frac{271763100}{13}-\frac{70600572\text{ I}}{13} & -\frac{28295568}{13}+\frac{242666928\text{ I}}{13} & 1067220+\frac{4772124\text{ I}}{13} \end{array} \end{array} \right]$$



$$\begin{aligned}
\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\; u(x_{ol}) = & \frac{1}{13\,\Delta x_{ol}^{10}} \Big( 252\, \big( (-55055+18937\,\mathrm{I})\, u_{_{ol+31}} - (251280+735876\,\mathrm{I})\, u_{_{ol+1+31}} + (713079+20997\,\mathrm{I})\, u_{_{ol+2+31}} + 45028\,\mathrm{I} u_{_{ol+3+31}} \\
& + (112284+962964\,\mathrm{I})\, u_{_{ol+21}} + (21054033-2352285\,\mathrm{I})\, u_{_{ol+1+21}} - 19118736\,\mathrm{I} u_{_{ol+2+21}} + (-713079+20997\,\mathrm{I})\, u_{_{ol+3+21}} \\
& + (1078425-280161\,\mathrm{I})\, u_{_{ol+1}} + 23892804\,\mathrm{I} u_{_{ol+1+1}} - (21054033+2352285\,\mathrm{I})\, u_{_{ol+2+1}} + (251280-735876\,\mathrm{I})\, u_{_{ol+3+1}} \\
& - 88248\,\mathrm{I} u_{_{ol}} - (1078425+280161\,\mathrm{I})\, u_{_{ol+1}} + (-112284+962964\,\mathrm{I})\, u_{_{ol+2}} + (55055+18937\,\mathrm{I})\, u_{_{ol+3}} \big) \Big), \; O(\,\Delta x_{ol}^6\,)
\end{aligned}$$

Formula.: 83, Var.: 1

Variavel .:,  $x_{ol}$ , Derivada de Ordem .: 11

Error order.: 5, Error.:  $1.7208772907213754370 \times 10^{-10}$ , New Error.:  $1.6863549539288712258 \times 10^{-15}$

Error order.: 5, Error.:  $1.6863549539288712258 \times 10^{-15}$ , New Error.:  $1.6829215946022234064 \times 10^{-20}$

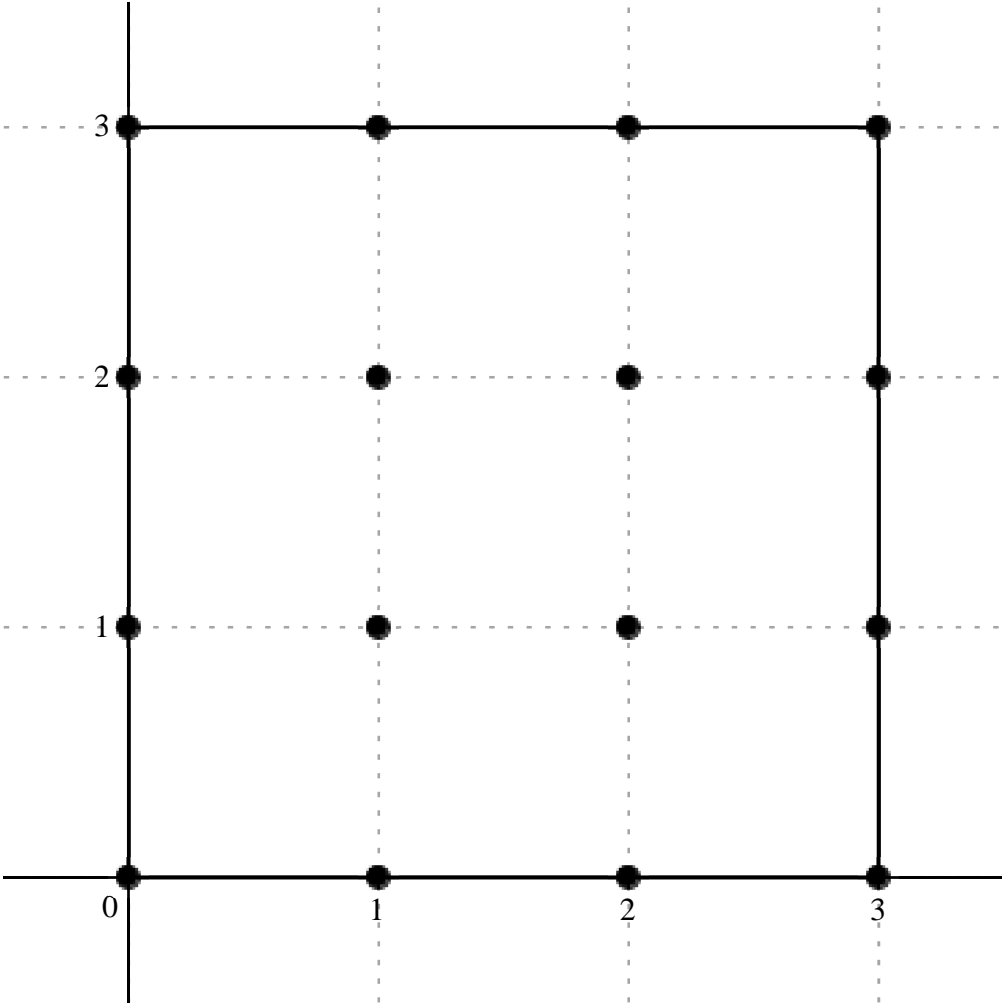
Error order.: 5, Error.:  $1.6829215946022234064 \times 10^{-20}$ , New Error.:  $1.6825784479009677006 \times 10^{-25}$

Error order.: 5, Error.:  $1.6825784479009677006 \times 10^{-25}$ , New Error.:  $1.6825441351236339593 \times 10^{-30}$

Error order.: 5, Error.:  $1.6825441351236339593 \times 10^{-30}$ , New Error.:  $1.6825407038648289802 \times 10^{-35}$

$$x_o + h., \begin{bmatrix} 3 \text{ I} & 1+3 \text{ I} & 2+3 \text{ I} & 3+3 \text{ I} \\ 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} & 3+2 \text{ I} \\ 1 & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{17497788}{13} - \frac{30670332 \text{ I}}{13} & \frac{2095981272}{65} + \frac{1125703656 \text{ I}}{65} & -\frac{1630077372}{65} + \frac{1489819716 \text{ I}}{65} & -\frac{19967640}{13} - \frac{19967640 \text{ I}}{13} \\ -\frac{2133103896}{65} - \frac{1878933672 \text{ I}}{65} & -623724948 + 745870356 \text{ I} & 632032632 + 632032632 \text{ I} & \frac{1489819716}{65} - \frac{1630077372 \text{ I}}{65} \\ -\frac{1681420356}{65} + \frac{2665918332 \text{ I}}{65} & -755076168 - 755076168 \text{ I} & 745870356 - 623724948 \text{ I} & \frac{1125703656}{65} + \frac{2095981272 \text{ I}}{65} \\ \frac{34038312}{13} + \frac{34038312 \text{ I}}{13} & \frac{2665918332}{65} - \frac{1681420356 \text{ I}}{65} & -\frac{1878933672}{65} - \frac{2133103896 \text{ I}}{65} & -\frac{30670332}{13} + \frac{17497788 \text{ I}}{13} \end{bmatrix}$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d}x_{ol}^{11}}\, u(x_{ol}) = \frac{1}{65 \, \Delta x_{ol}^{11}} \left( 924 \left( (94685 - 165965 \text{ I}) \, u_{ol+3 \text{ I}} + (2268378 + 1218294 \text{ I}) \, u_{ol+1+3 \text{ I}} + (-1764153 + 1612359 \text{ I}) \, u_{ol+2+3 \text{ I}} - (108050 + 108050 \text{ I}) \, u_{ol+3+3 \text{ I}} - (2308554 + 2033478 \text{ I}) \, u_{ol+2 \text{ I}} + (-43876755 + 52469235 \text{ I}) \, u_{ol+1+2 \text{ I}} + (44461170 + 44461170 \text{ I}) \, u_{ol+2+2 \text{ I}} + (1612359 - 1764153 \text{ I}) \, u_{ol+3+2 \text{ I}} + (-1819719 \right.$$

$$\left. + 2885193 \text{ I}) \, u_{ol+ \text{ I}} - (53116830 + 53116830 \text{ I}) \, u_{ol+1+ \text{ I}} + (52469235 - 43876755 \text{ I}) \, u_{ol+2+ \text{ I}} + (1218294 + 2268378 \text{ I}) \, u_{ol+3+ \text{ I}} + (184190 + 184190 \text{ I}) \, u_{ol} + (2885193 - 1819719 \text{ I}) \, u_{ol+1} - (2033478 + 2308554 \text{ I}) \, u_{ol+2} + (-165965 + 94685 \text{ I}) \, u_{ol+3} \right) \Big), \, O( \, \Delta x_{ol}^5 \, )$$



Formula:, 84, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

Error order:, 4, Error:;  $4.2712034980030104382 \times 10^{-8}$ , New Error:;  $4.2317900562671336490 \times 10^{-12}$

Error order:, 4, Error:;  $4.2317900562671336490 \times 10^{-12}$ , New Error:;  $4.2278341775536967139 \times 10^{-16}$

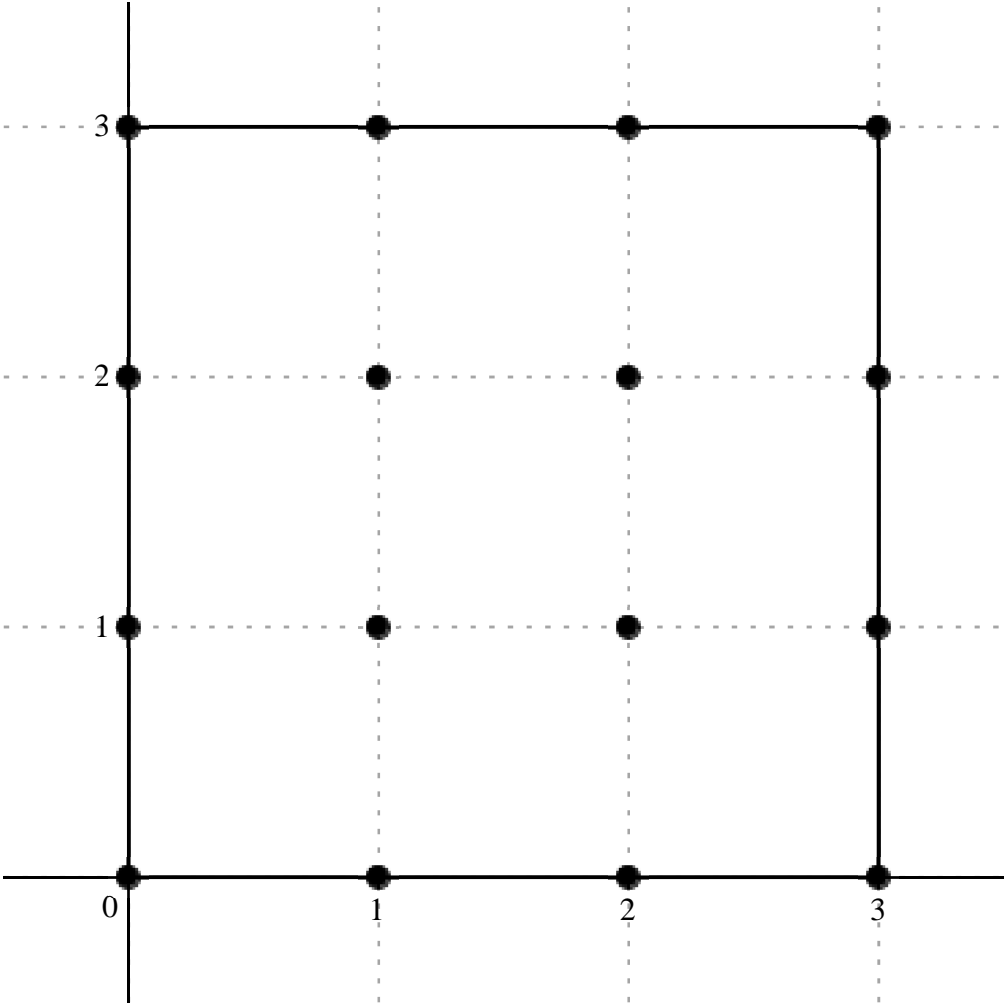
Error order:, 4, Error:;  $4.2278341775536967139 \times 10^{-16}$ , New Error:;  $4.2274384481966326661 \times 10^{-20}$

Error order:, 4, Error:;  $4.2274384481966326661 \times 10^{-20}$ , New Error:;  $4.2273988738499058787 \times 10^{-24}$

Error order:, 4, Error:;  $4.2273988738499058787 \times 10^{-24}$ , New Error:;  $4.2273949164011268307 \times 10^{-28}$

$$x_o + h . , \begin{bmatrix} 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & 3 + 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{13471920}{13} + 5089392 \text{ I} & -\frac{892140480}{13} + \frac{231517440 \text{ I}}{13} & \frac{53588304}{13} - \frac{865895184 \text{ I}}{13} & \frac{56282688}{13} \\ \frac{1053803520}{13} - \frac{13571712 \text{ I}}{13} & -122444784 - 1833079248 \text{ I} & -1722010752 & \frac{53588304}{13} + \frac{865895184 \text{ I}}{13} \\ -\frac{218843856}{13} - \frac{1111183920 \text{ I}}{13} & 1967499072 & -122444784 + 1833079248 \text{ I} & -\frac{892140480}{13} - \frac{231517440 \text{ I}}{13} \\ -\frac{83825280}{13} & -\frac{218843856}{13} + \frac{1111183920 \text{ I}}{13} & \frac{1053803520}{13} + \frac{13571712 \text{ I}}{13} & \frac{13471920}{13} - 5089392 \text{ I} \end{bmatrix}$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d} x_{ol}^{12}} \; u(x_{ol}) = \frac{1}{13 \; \Delta x_{ol}^{12}} \Big( 99792 \Big( (135 + 663 \; \text{I}) \; u_{ol + 3 \text{ I}} + ( -8940 + 2320 \; \text{I}) \; u_{ol + 1 + 3 \text{ I}} + (537 - 8677 \; \text{I}) \; u_{ol + 2 + 3 \text{ I}} + 564 \; u_{ol + 3 + 3 \text{ I}} + (10560 - 136 \; \text{I}) \; u_{ol + 2 \text{ I}} - (15951 + 238797 \; \text{I}) \; u_{ol + 1 + 2 \text{ I}} - 224328 \; u_{ol + 2 + 2 \text{ I}} + (537 + 8677 \; \text{I}) \; u_{ol + 3 + 2 \text{ I}} - (2193 + 11135 \; \text{I}) \; u_{ol + 1} + 256308 \; u_{ol + 1 + 1} + ( -15951 + 238797 \; \text{I}) \; u_{ol + 2 + 1} - (8940 + 2320 \; \text{I}) \; u_{ol + 3 + 1}$$

$$-840\, u_{oI} + (-2193 + 11135\, \mathrm{I})\, u_{oI+1} + (10560 + 136\, \mathrm{I})\, u_{oI+2} + (135 - 663\, \mathrm{I})\, u_{oI+3} \Big) \Big),\, O(\,\Delta x_{oI}^4\,)$$

Formula.: 85, Var.: 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 13

Error order.: 3, Error.:  $6.3213349223978581039 \times 10^{-6}$ , New Error.:  $6.2070491045606570762 \times 10^{-9}$

Error order.: 3, Error.:  $6.2070491045606570762 \times 10^{-9}$ , New Error.:  $6.1956788512535685209 \times 10^{-12}$

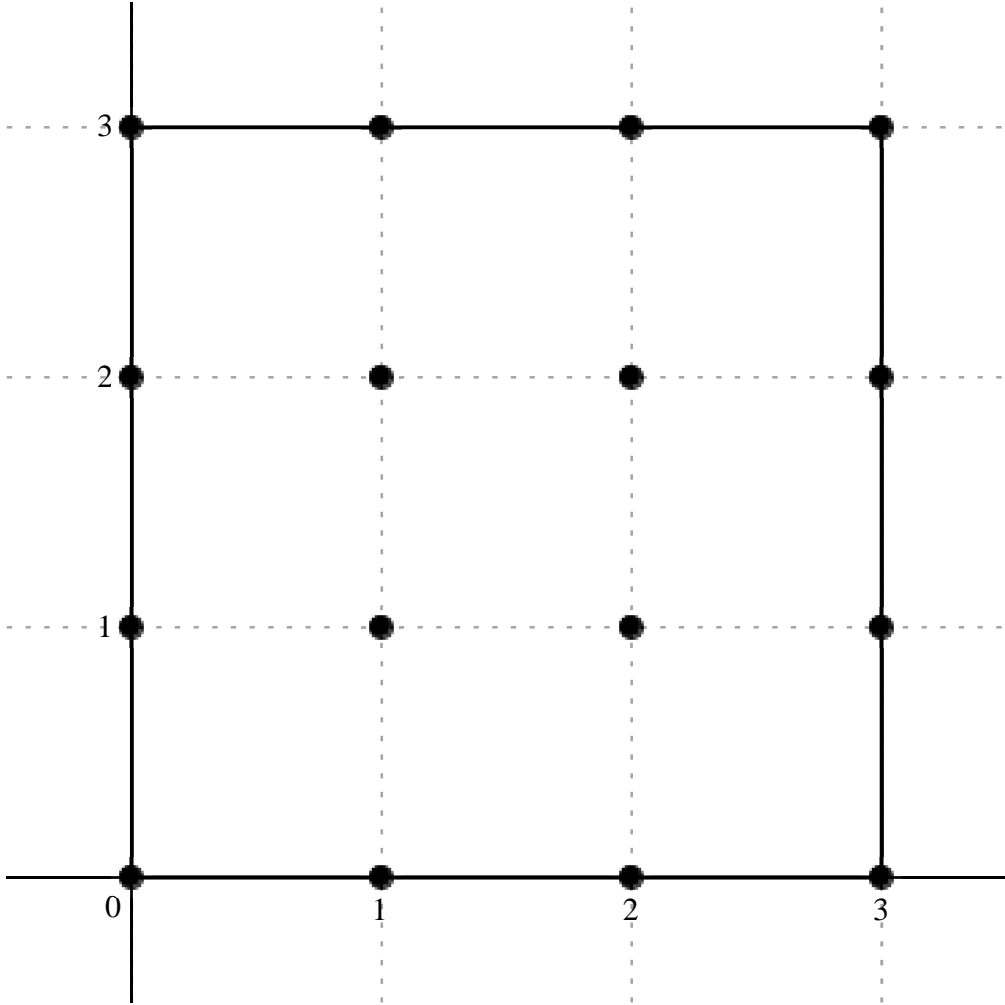
Error order.: 3, Error.:  $6.1956788512535685209 \times 10^{-12}$ , New Error.:  $6.1945424106418630224 \times 10^{-15}$

Error order.: 3, Error.:  $6.1945424106418630224 \times 10^{-15}$ , New Error.:  $6.1944287724292879677 \times 10^{-18}$

Error order.: 3, Error.:  $6.1944287724292879677 \times 10^{-18}$ , New Error.:  $6.1944174086665178198 \times 10^{-21}$

$$x_o+h.,\left[\begin{array}{cccc}3\,\mathrm{I}&1+3\,\mathrm{I}&2+3\,\mathrm{I}&3+3\,\mathrm{I}\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&3+2\,\mathrm{I}\\1&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}\\0&1&2&3\end{array}\right]$$

$$c=,\left[\begin{array}{cccc} -5887728-4490640\,\mathrm{I} & 55683936-86419872\,\mathrm{I} & 63767088+74943792\,\mathrm{I} & -4590432+4590432\,\mathrm{I} \\ -82228608+76640256\,\mathrm{I} & 1918700784+1755241488\,\mathrm{I} & 1759133376-1759133376\,\mathrm{I} & -74943792-63767088\,\mathrm{I} \\ 95900112+67958352\,\mathrm{I} & -1922592672+1922592672\,\mathrm{I} & -1755241488-1918700784\,\mathrm{I} & 86419872-55683936\,\mathrm{I} \\ 5987520-5987520\,\mathrm{I} & -67958352-95900112\,\mathrm{I} & -76640256+82228608\,\mathrm{I} & 4490640+5887728\,\mathrm{I} \end{array}\right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{oI}^{13}}\,u(x_{oI})=\frac{1}{\Delta x_{oI}^{13}}\Big(- (5887728+4490640\,\mathrm{I})\,u_{oI+31}+(55683936-86419872\,\mathrm{I})\,u_{oI+1+31}+(63767088+74943792\,\mathrm{I})\,u_{oI+2+31}+(-4590432+4590432\,\mathrm{I})\,u_{oI+3+31}+(-82228608+76640256\,\mathrm{I})\,u_{oI+1+21}+(1918700784+1755241488\,\mathrm{I})\,u_{oI+1+21}+(1759133376-1759133376\,\mathrm{I})\,u_{oI+2+21}-(74943792+63767088\,\mathrm{I})\,u_{oI+3+21}$$

$$+ (95900112 + 67958352 \, \text{I}) \, u_{oI+1} + ( -1922592672 + 1922592672 \, \text{I}) \, u_{oI+1+1} - (1755241488 + 1918700784 \, \text{I}) \, u_{oI+2+1} + (86419872 - 55683936 \, \text{I}) \, u_{oI+3+1} + (5987520 - 5987520 \, \text{I}) \, u_{oI} - (67958352 + 95900112 \, \text{I}) \, u_{oI+1} + ( -76640256 + 82228608 \, \text{I}) \, u_{oI+2} + (4490640 + 5887728 \, \text{I}) \, u_{oI+3} \Big), \, O( \, \Delta x_{oI}^3 \, )$$

Formula.: 86, Var.: 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 14

Error order.: 2, Error.: 0.00094013699209357197127, New Error.:  $9.3289453386168917133 \times 10^{-6}$

Error order.: 2, Error.:  $9.3289453386168917133 \times 10^{-6}$ , New Error.:  $9.3216789048830398359 \times 10^{-8}$

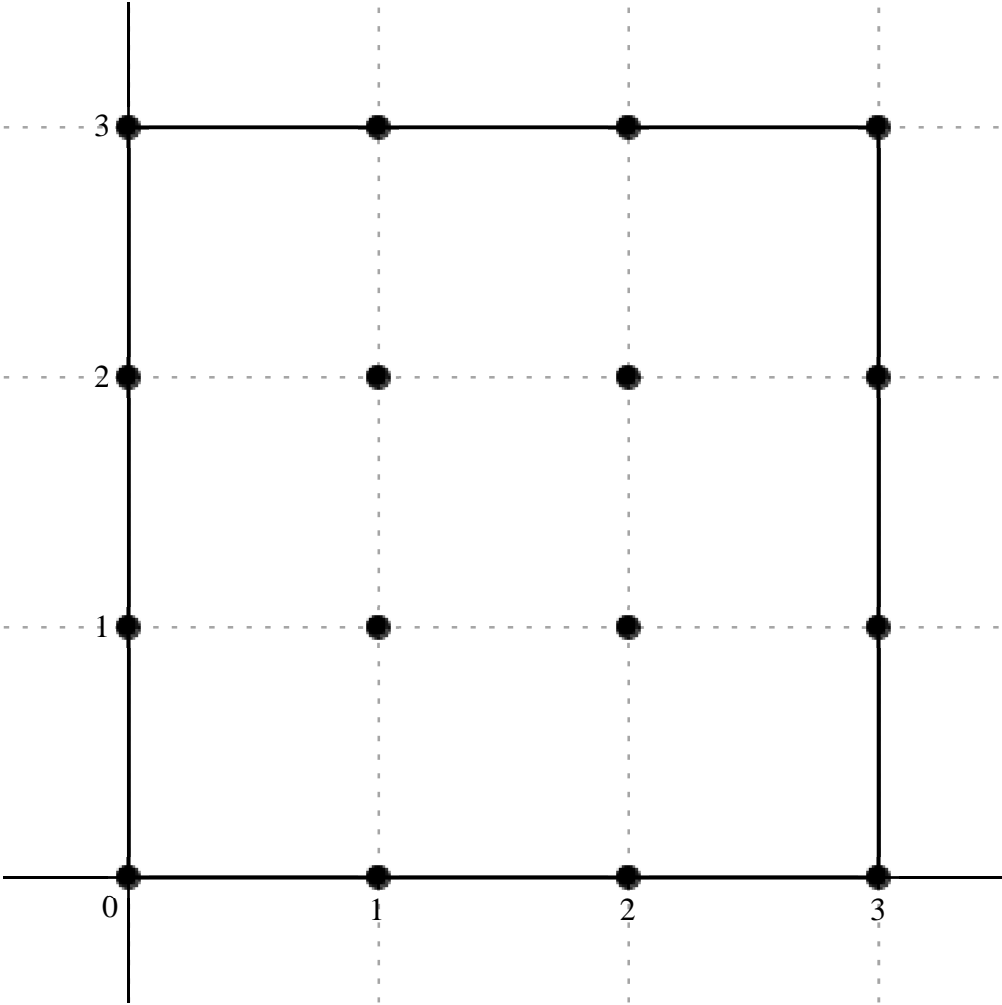
Error order.: 2, Error.:  $9.3216789048830398359 \times 10^{-8}$ , New Error.:  $9.3209520277067676105 \times 10^{-10}$

Error order.: 2, Error.:  $9.3209520277067676105 \times 10^{-10}$ , New Error.:  $9.3208793376570300659 \times 10^{-12}$

Error order.: 2, Error.:  $9.3208793376570300659 \times 10^{-12}$ , New Error.:  $9.3208720686287411235 \times 10^{-14}$

$$x_o \, + h. , \left[ \begin{array}{cccc} 3 \, \text{I} & 1 + 3 \, \text{I} & 2 + 3 \, \text{I} & 3 + 3 \, \text{I} \\ 2 \, \text{I} & 1 + 2 \, \text{I} & 2 + 2 \, \text{I} & 3 + 2 \, \text{I} \\ 1 & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} 6985440 - 465696 \, \text{I} & 16765056 + 97796160 \, \text{I} & -96399072 - 9779616 \, \text{I} & -6519744 \, \text{I} \\ 8382528 - 103384512 \, \text{I} & -2451889440 + 54486432 \, \text{I} & 2397403008 \, \text{I} & 96399072 - 9779616 \, \text{I} \\ -104781600 + 15367968 \, \text{I} & -2506375872 \, \text{I} & 2451889440 + 54486432 \, \text{I} & -16765056 + 97796160 \, \text{I} \\ 7451136 \, \text{I} & 104781600 + 15367968 \, \text{I} & -8382528 - 103384512 \, \text{I} & -6985440 - 465696 \, \text{I} \end{array} \right]$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{oI}^{14}} \, u(x_{oI}) = \frac{1}{\Delta x_{oI}^{14}} \Big( (6985440 - 465696 \, \text{I}) \, u_{oI+31} + (16765056 + 97796160 \, \text{I}) \, u_{oI+1+31} - (96399072 + 9779616 \, \text{I}) \, u_{oI+2+31} - 6519744 \, \text{I} u_{oI+3+31} + (8382528 - 103384512 \, \text{I}) \, u_{oI+21} + ( -2451889440 + 54486432 \, \text{I}) \, u_{oI+1+21} + 2397403008 \, \text{I} u_{oI+2+21} + (96399072 - 9779616 \, \text{I}) \, u_{oI+3+21} + ( -104781600 + 15367968 \, \text{I}) \, u_{oI+1}$$

$$-2506375872 \operatorname{I} u_{oI+1+1} + (2451889440 + 54486432 \operatorname{I}) u_{oI+2+1} + (-16765056 + 97796160 \operatorname{I}) u_{oI+3+1} + 7451136 \operatorname{I} u_{oI} + (104781600 + 15367968 \operatorname{I}) u_{oI+1} - (8382528 + 103384512 \operatorname{I}) u_{oI+2} - (6985440 + 465696 \operatorname{I}) u_{oI+3}), \mathcal{O}(\Delta x_oI^2)$$

Formula.: 87, Var.: 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 15

Error order.: 1, Error.: 0.069189488445469099350, New Error.: 0.0068350814318885929362

Error order.: 1, Error.: 0.0068350814318885929362, New Error.: 0.00068267304057905201583

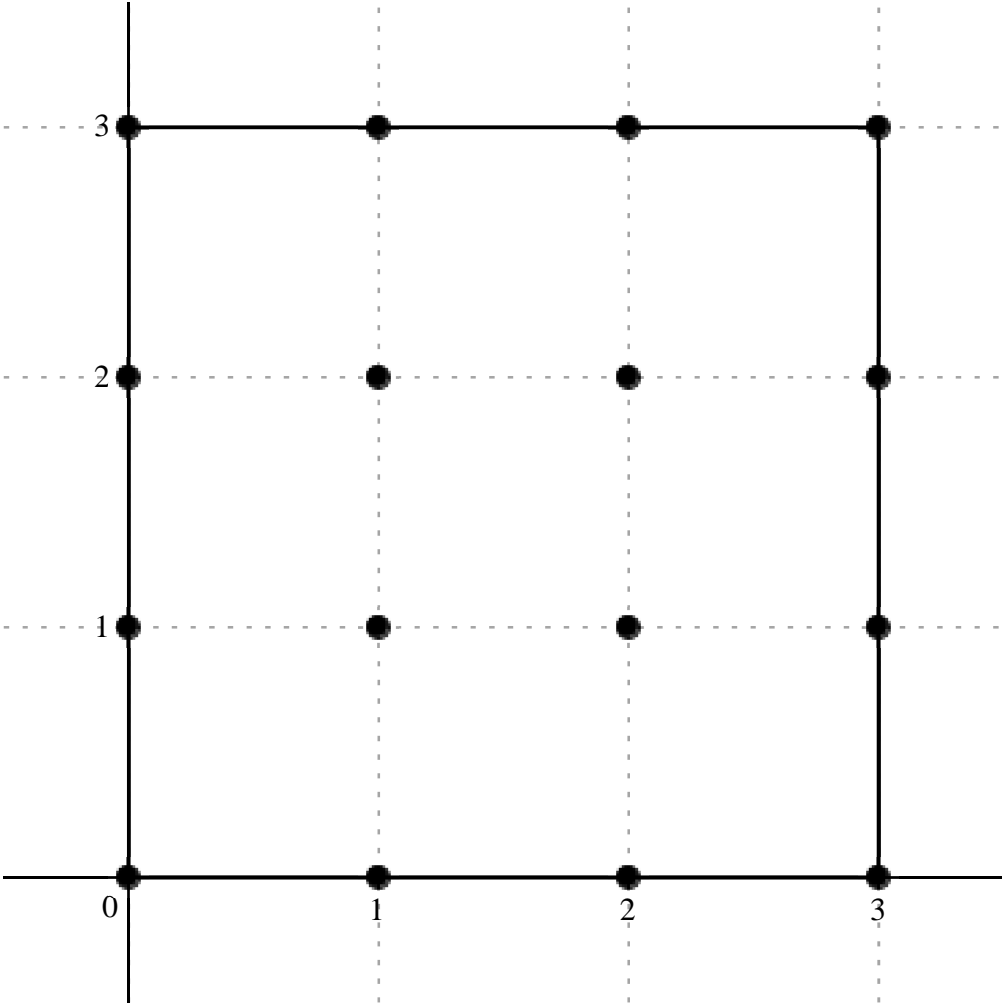
Error order.: 1, Error.: 0.00068267304057905201583, New Error.: 0.000068258956611215805251

Error order.: 1, Error.: 0.000068258956611215805251, New Error.: 6.8258121902348696249 × 10−6

Error order.: 1, Error.: 6.8258121902348696249 × 10−6, New Error.: 6.8258038431820011384 × 10−7

$$x_o+h., \begin{bmatrix} 3 \operatorname{I} & 1+3 \operatorname{I} & 2+3 \operatorname{I} & 3+3 \operatorname{I} \\ 2 \operatorname{I} & 1+2 \operatorname{I} & 2+2 \operatorname{I} & 3+2 \operatorname{I} \\ \operatorname{I} & 1+\operatorname{I} & 2+\operatorname{I} & 3+\operatorname{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$

$$c=, \begin{bmatrix} -2328480+2328480 \operatorname{I} & -37721376-29338848 \operatorname{I} & 37721376-29338848 \operatorname{I} & 2328480+2328480 \operatorname{I} \\ 29338848+37721376 \operatorname{I} & 817296480-817296480 \operatorname{I} & -817296480-817296480 \operatorname{I} & -29338848+37721376 \operatorname{I} \\ 29338848-37721376 \operatorname{I} & 817296480+817296480 \operatorname{I} & -817296480+817296480 \operatorname{I} & -29338848-37721376 \operatorname{I} \\ -2328480-2328480 \operatorname{I} & -37721376+29338848 \operatorname{I} & 37721376+29338848 \operatorname{I} & 2328480-2328480 \operatorname{I} \end{bmatrix}$$



$$\frac{\mathrm{d}15}{\mathrm{d}x_oI^{15}}\,u(x_{oI})=\frac{1}{\Delta x_oI^{15}}\Big(( -2328480+2328480 \operatorname{I}) u_{oI+31}-(37721376+29338848 \operatorname{I}) u_{oI+1+31}+(37721376-29338848 \operatorname{I}) u_{oI+2+31}+(2328480+2328480 \operatorname{I}) u_{oI+3+31}+(29338848+37721376 \operatorname{I}) u_{oI+21}+(817296480-817296480 \operatorname{I}) u_{oI+1+21}-(817296480+817296480 \operatorname{I}) u_{oI+2+21}+( -29338848+37721376 \operatorname{I}) u_{oI+3+21}+(29338848$$

$$-37721376 \operatorname{I} \, u_{ol+1} + (817296480 + 817296480 \operatorname{I}) u_{ol+1+1} + (-817296480 + 817296480 \operatorname{I}) u_{ol+2+1} - (29338848 + 37721376 \operatorname{I}) u_{ol+3+1} - (2328480 + 2328480 \operatorname{I}) u_{ol} + (-37721376 + 29338848 \operatorname{I}) u_{ol+1} + (37721376 + 29338848 \operatorname{I}) u_{ol+2} + (2328480 - 2328480 \operatorname{I}) u_{ol+3} \Big) \cdot O(\Delta x_{ol})$$

Formula.: 88, Var.: 1

Variavel .:  $x_o$  , Derivada de Ordem .: 1

Error order.: 15, Error.:  $2.3064807084955163671 \times 10^{-37}$ , New Error.:  $2.3179574121885626212 \times 10^{-52}$

Error order.: 15, Error.:  $2.3179574121885626212 \times 10^{-52}$ , New Error.:  $2.3190731128712966740 \times 10^{-67}$

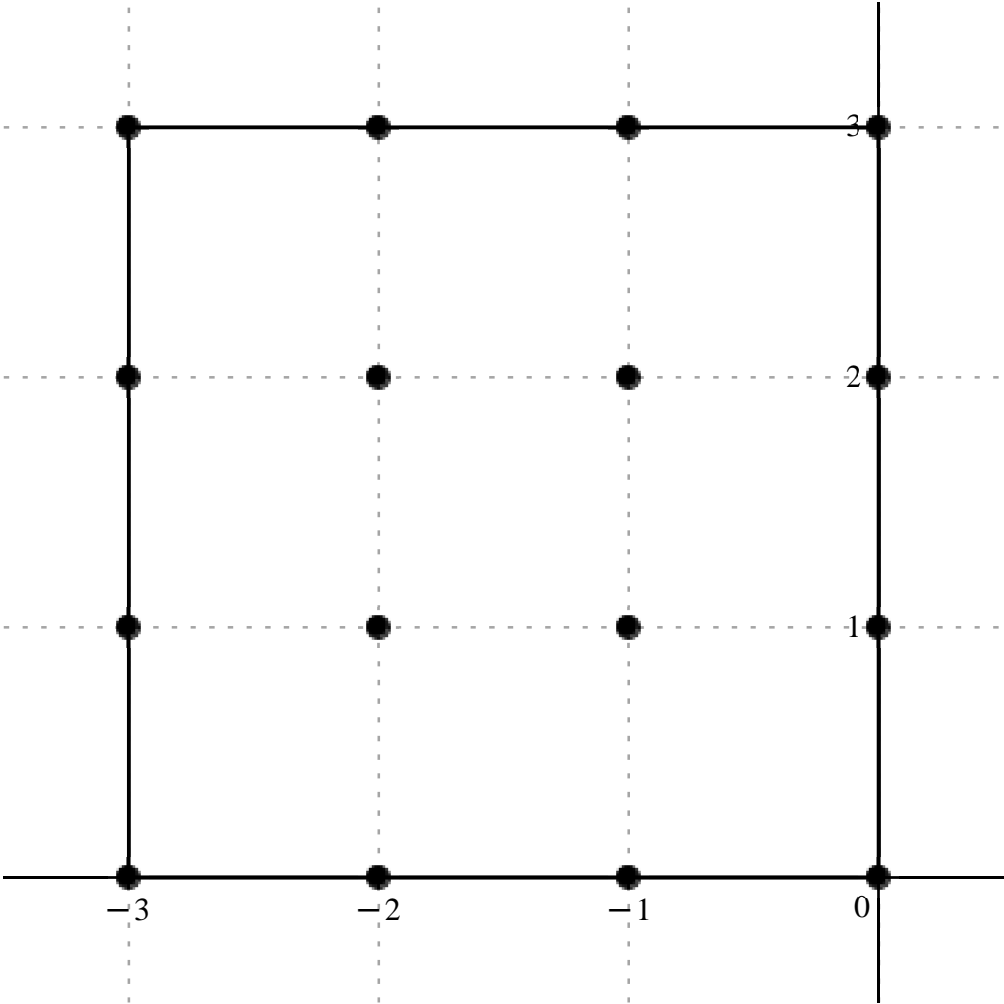
Error order.: 15, Error.:  $2.3190731128712966740 \times 10^{-67}$ , New Error.:  $2.3191843590203848176 \times 10^{-82}$

Error order.: 15, Error.:  $2.3191843590203848176 \times 10^{-82}$ , New Error.:  $2.3191954803918594835 \times 10^{-97}$

Error order.: 15, Error.:  $2.3191954803918594835 \times 10^{-97}$ , New Error.:  $2.3191965924965683643 \times 10^{-112}$

$$x_o+h.\,,\left[\begin{array}{cccc} -3+3\operatorname{I} & -2+3\operatorname{I} & -1+3\operatorname{I} & 3\operatorname{I} \\ -3+2\operatorname{I} & -2+2\operatorname{I} & -1+2\operatorname{I} & 2\operatorname{I} \\ -3+\operatorname{I} & -2+\operatorname{I} & -1+\operatorname{I} & \operatorname{I} \\ -3 & -2 & -1 & 0 \end{array}\right]$$

$$c=\,,\left[\begin{array}{cccc} -\frac{1}{6}-\frac{\operatorname{I}}{6} & \frac{198}{65}-\frac{171\operatorname{I}}{65} & \frac{9}{10}+\frac{9\operatorname{I}}{2} & -\frac{1}{3} \\ -\frac{171}{65}+\frac{198\operatorname{I}}{65} & \frac{351}{4}+\frac{351\operatorname{I}}{4} & \frac{702}{5}-\frac{351\operatorname{I}}{5} & -\frac{9}{10}-\frac{36\operatorname{I}}{5} \\ \frac{9}{2}+\frac{9\operatorname{I}}{10} & -\frac{351}{5}+\frac{702\operatorname{I}}{5} & -\frac{351}{2}-\frac{351\operatorname{I}}{2} & \frac{72}{5}+\frac{9\operatorname{I}}{5} \\ -\frac{\operatorname{I}}{3} & -\frac{36}{5}-\frac{9\operatorname{I}}{10} & \frac{9}{5}+\frac{72\operatorname{I}}{5} & \frac{215}{52}+\frac{215\operatorname{I}}{52} \end{array}\right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u\big(x_{ol}\big)=\frac{1}{780\,\Delta x_{ol}}\Big( -(130+130\,\mathrm{I})\,u_{ol-3+3\mathrm{I}}+(2376-2052\,\mathrm{I})\,u_{ol-2+3\mathrm{I}}+(702+3510\,\mathrm{I})\,u_{ol-1+3\mathrm{I}}-260\,u_{ol+3\mathrm{I}}+(-2052+2376\,\mathrm{I})\,u_{ol-3+2\mathrm{I}}+(68445+68445\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(109512-54756\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}-(702+5616\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(3510+702\,\mathrm{I})\,u_{ol-3+\mathrm{I}}+(-54756+109512\,\mathrm{I})\,u_{ol-2+\mathrm{I}}-(136890+136890\,\mathrm{I})\,u_{ol-1+\mathrm{I}}+(11232+1404\,\mathrm{I})\,u_{ol+\mathrm{I}}-260\,\mathrm{I}u_{ol-3}-(5616+702\,\mathrm{I})\,u_{ol-2}+(1404+11232\,\mathrm{I})\,u_{ol-1}+(3225+3225\,\mathrm{I})\,u_{ol}\Big),\,\,O(\,\,\Delta x_{ol}^{15}\,\,)$$

Formula.: 89, Var.: 1

Variavel .:  $x_{ol}$  , Derivada de Ordem .: 2

Error order.: 14, Error.: 2.8322876005416917666 × 10<sup>−34</sup>, New Error.: 2.8803914008342615494 × 10<sup>−48</sup>

Error order.: 14, Error.: 2.8803914008342615494 × 10<sup>−48</sup>, New Error.: 2.8852147668446159308 × 10<sup>−62</sup>

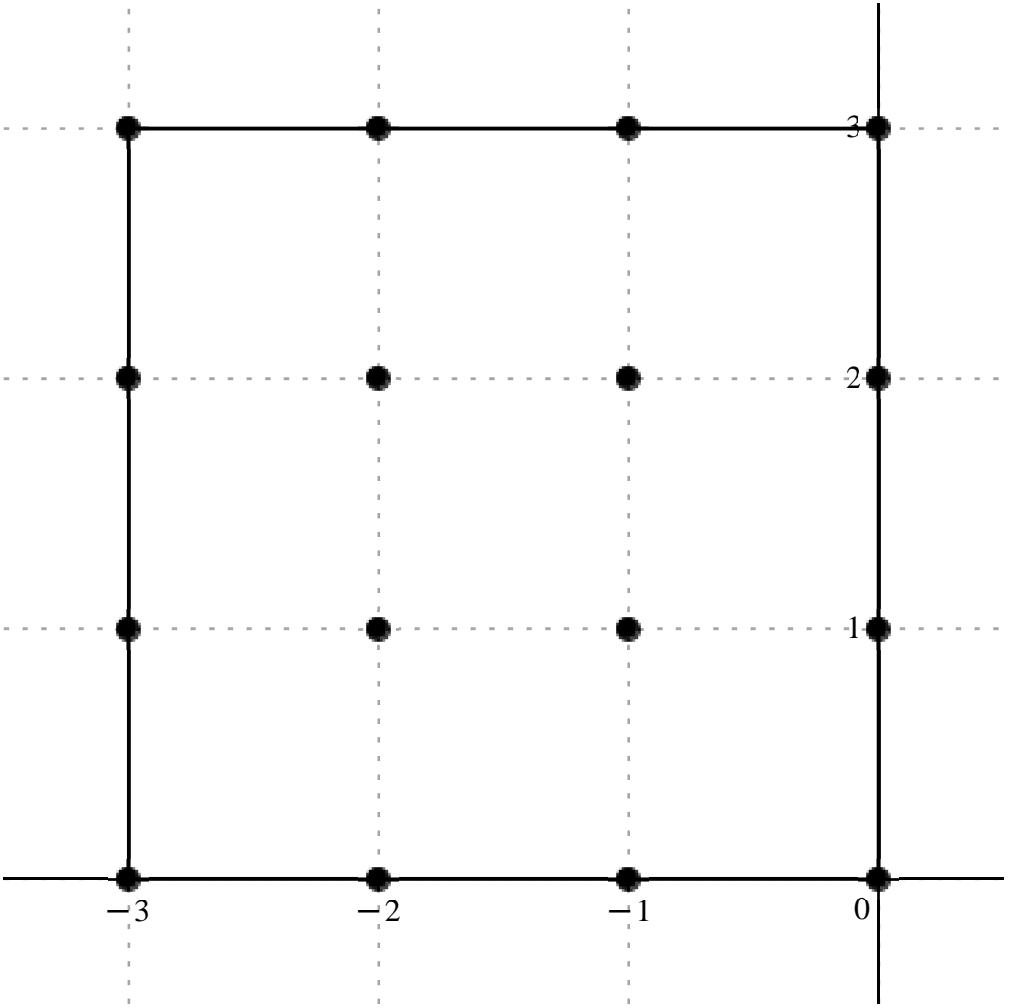
Error order.: 14, Error.: 2.8852147668446159308 × 10<sup>−62</sup>, New Error.: 2.8856972308403772666 × 10<sup>−76</sup>

Error order.: 14, Error.: 2.8856972308403772666 × 10<sup>−76</sup>, New Error.: 2.8857454785114112123 × 10<sup>−90</sup>

Error order.: 14, Error.: 2.8857454785114112123 × 10<sup>−90</sup>, New Error.: 2.8857503032912266931 × 10<sup>−104</sup>

$$x_o\,+\,h\,,\,\left[\begin{array}{cccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} -\frac{619\,\mathrm{I}}{234} & \frac{5823}{130}+\frac{369\,\mathrm{I}}{130} & -\frac{8856}{325}+\frac{28089\,\mathrm{I}}{650} & -\frac{215}{78}-\frac{593\,\mathrm{I}}{234} & & \\ -\frac{5823}{130}+\frac{369\,\mathrm{I}}{130} & \frac{2727\,\mathrm{I}}{2} & \frac{81459}{50}+\frac{24813\,\mathrm{I}}{50} & \frac{11673}{260}-\frac{17181\,\mathrm{I}}{260} & & \\ \frac{8856}{325}+\frac{28089\,\mathrm{I}}{650} & -\frac{81459}{50}+\frac{24813\,\mathrm{I}}{50} & -\frac{5103\,\mathrm{I}}{2} & \frac{14013}{130}+\frac{13671\,\mathrm{I}}{130} & & \\ \frac{215}{78}-\frac{593\,\mathrm{I}}{234} & -\frac{11673}{260}-\frac{17181\,\mathrm{I}}{260} & -\frac{14013}{130}+\frac{13671\,\mathrm{I}}{130} & \frac{96313\,\mathrm{I}}{2925} & & \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{11700 \, \Delta x_{ol}^2} \big( -30950 \, \mathrm{I} u_{ol-3+3\mathrm{I}} + (524070 + 33210 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (-318816 + 505602 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} - (32250 + 29650 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (-524070 + 33210 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + 15952950 \, \mathrm{I} u_{ol-2+2\mathrm{I}} + (19061406 + 5806242 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (525285 - 773145 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (318816 + 505602 \, \mathrm{I}) \, u_{ol-3+\mathrm{I}} + (-19061406 + 5806242 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} - 29852550 \, \mathrm{I} u_{ol-1+\mathrm{I}} + (1261170 + 1230390 \, \mathrm{I}) \, u_{ol+\mathrm{I}} + (32250 - 29650 \, \mathrm{I}) \, u_{ol-3} - (525285 + 773145 \, \mathrm{I}) \, u_{ol-2} + (-1261170 + 1230390 \, \mathrm{I}) \, u_{ol-1} + 385252 \, \mathrm{I} u_{ol} \big), \, O( \, \Delta x_{ol}^{14} \, )$$

Formula.: 90, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 3

Error order.: 13, Error.:  $1.8830871308761019206 \times 10^{-31}$ , New Error.:  $1.8923558755744041505 \times 10^{-44}$

Error order.: 13, Error.:  $1.8923558755744041505 \times 10^{-44}$ , New Error.:  $1.8932571588966691469 \times 10^{-57}$

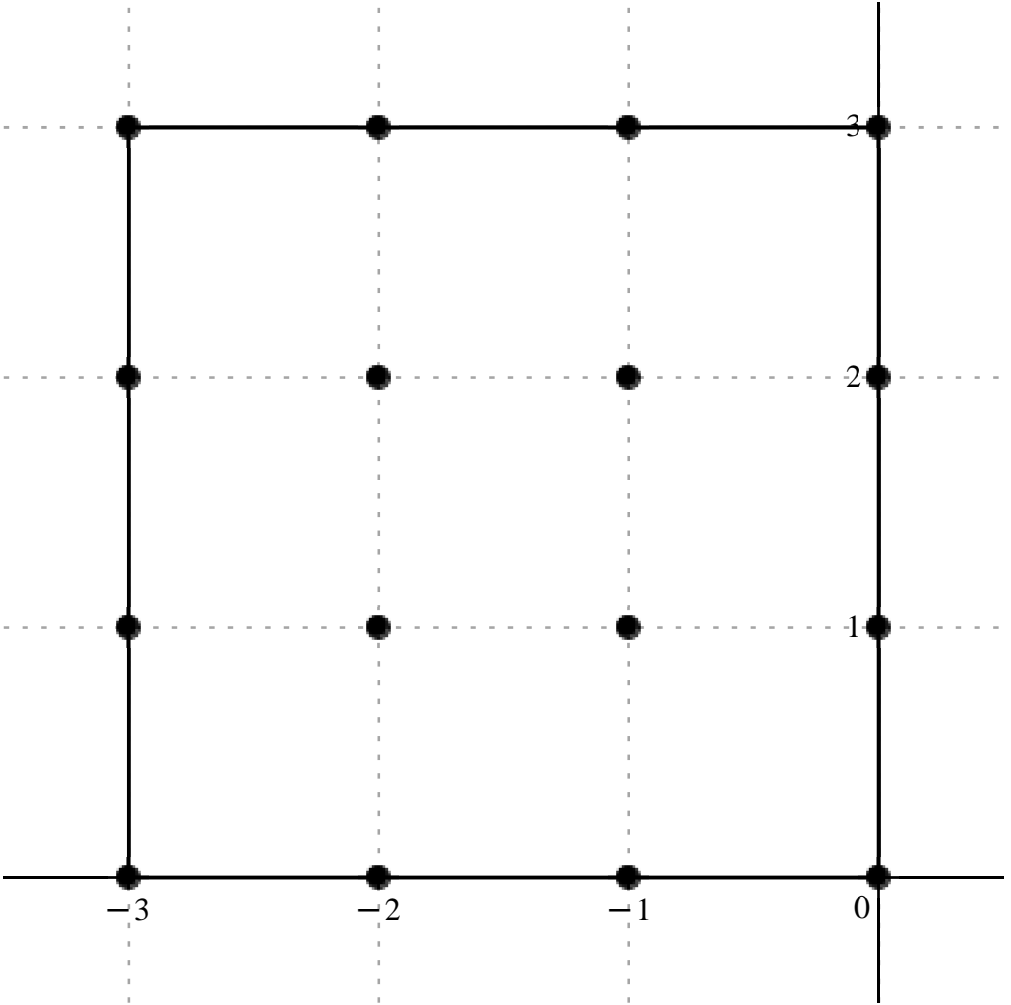
Error order.: 13, Error.:  $1.8932571588966691469 \times 10^{-57}$ , New Error.:  $1.8933470279655265513 \times 10^{-70}$

Error order.: 13, Error.:  $1.8933470279655265513 \times 10^{-70}$ , New Error.:  $1.8933560122764109658 \times 10^{-83}$

Error order.: 13, Error.:  $1.8933560122764109658 \times 10^{-83}$ , New Error.:  $1.8933569106815360248 \times 10^{-96}$

$$x_o + h \, . \, , \left[ \begin{array}{cccc} -3 + 3 \, \mathrm{I} & -2 + 3 \, \mathrm{I} & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ -3 + 2 \, \mathrm{I} & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccc} \frac{13627}{900} - \frac{13627 \text{ I}}{900} & \frac{783789}{3250} + \frac{872907 \text{ I}}{3250} & -\frac{2583453}{6500} + \frac{653019 \text{ I}}{6500} & -\frac{593}{234} - \frac{13577 \text{ I}}{450} \\ -\frac{872907}{3250} - \frac{783789 \text{ I}}{3250} & -\frac{1529109}{200} + \frac{1529109 \text{ I}}{200} & \frac{327627}{50} + \frac{116163 \text{ I}}{10} & \frac{7957473}{13000} - \frac{2031231 \text{ I}}{13000} \\ -\frac{653019}{6500} + \frac{2583453 \text{ I}}{6500} & -\frac{116163}{10} - \frac{327627 \text{ I}}{50} & \frac{1350909}{100} - \frac{1350909 \text{ I}}{100} & \frac{34419}{250} + \frac{274773 \text{ I}}{250} \\ \frac{13577}{450} + \frac{593 \text{ I}}{234} & \frac{2031231}{13000} - \frac{7957473 \text{ I}}{13000} & -\frac{274773}{250} - \frac{34419 \text{ I}}{250} & -\frac{2905559}{23400} + \frac{2905559 \text{ I}}{23400} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{117000 \, \Delta \mathfrak{x}_{ol}^3} \big( (1771510 - 1771510 \, \mathrm{I}) \, u_{ol-3+3\mathrm{I}} + (28216404 + 31424652 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (-46502154 + 11754342 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} - (296500 + 3530020 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (31424652 + 28216404 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + (-894528765 + 894528765 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (766647180 + 1359107100 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (71617257 - 18281079 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (-11754342 + 46502154 \, \mathrm{I}) \, u_{ol-3+\mathrm{I}} - (1359107100 + 766647180 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} + (1580563530 - 1580563530 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} + (16108092 + 128593764 \, \mathrm{I}) \, u_{ol+\mathrm{I}} + (3530020 + 296500 \, \mathrm{I}) \, u_{ol-3} + (18281079 - 71617257 \, \mathrm{I}) \, u_{ol-2} - (128593764 + 16108092 \, \mathrm{I}) \, u_{ol-1} + (-14527795 + 14527795 \, \mathrm{I}) \, u_{ol} \big), \, O( \, \Delta \mathfrak{x}_{ol}^{13} \, )$$

Formula: 91, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 4

Error order: 12, Error: 1.4062272427183852947 × 10<sup>−28</sup>, New Error: 1.4298293982032675453 × 10<sup>−40</sup>

Error order: 12, Error: 1.4298293982032675453 × 10<sup>−40</sup>, New Error: 1.4321959195109110422 × 10<sup>−52</sup>

Error order: 12, Error: 1.4321959195109110422 × 10<sup>−52</sup>, New Error: 1.4324326335125981718 × 10<sup>−64</sup>

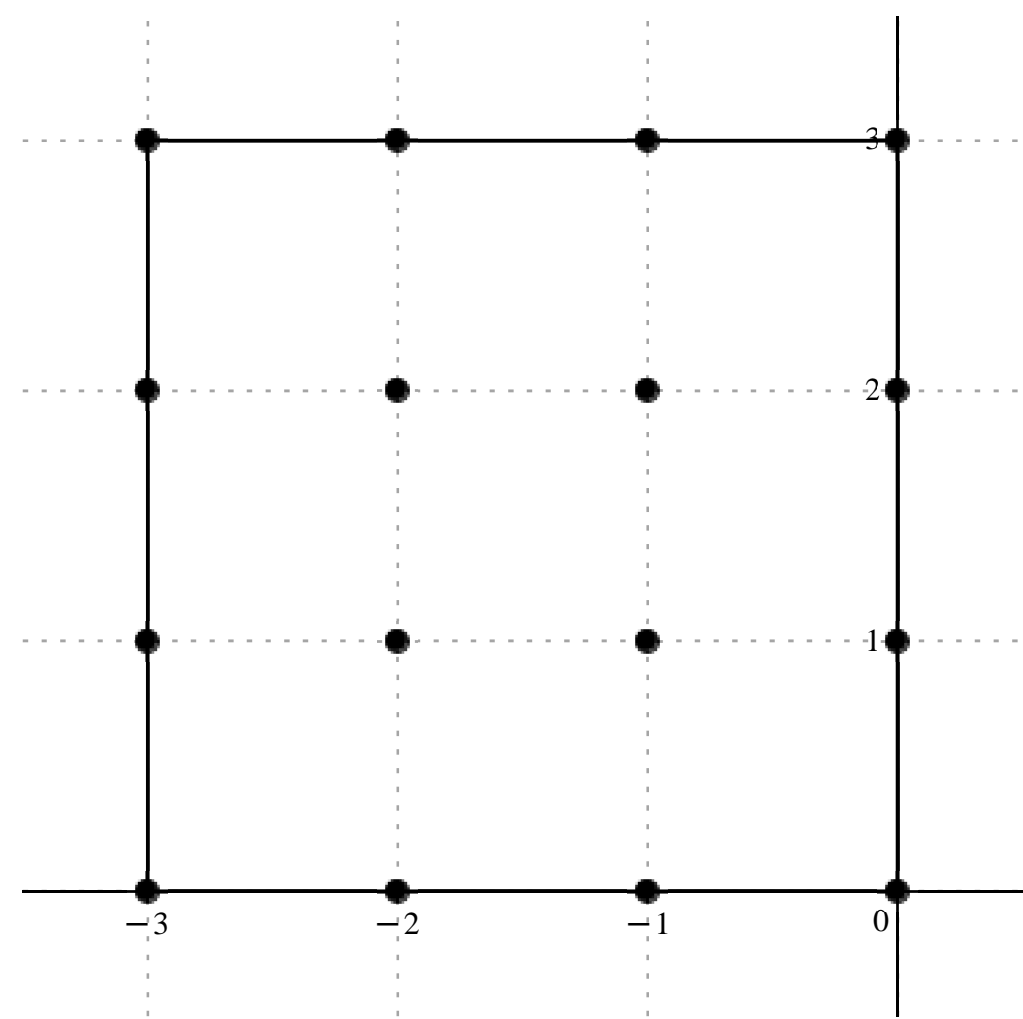
Error order: 12, Error: 1.4324326335125981718 × 10<sup>−64</sup>, New Error: 1.4324563055302778094 × 10<sup>−76</sup>

Error order: 12, Error: 1.4324563055302778094 × 10<sup>−76</sup>, New Error: 1.4324586727382196830 × 10<sup>−88</sup>



$$x_o + h \cdot , \begin{bmatrix} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{94491}{650} & -\frac{69417}{650} + \frac{1580603 \text{ I}}{650} & -\frac{312327}{130} - \frac{87833 \text{ I}}{65} & \frac{16293}{130} - \frac{8109 \text{ I}}{50} \\ -\frac{69417}{650} - \frac{1580603 \text{ I}}{650} & -\frac{1796892}{25} & -\frac{1076133}{50} + \frac{4241151 \text{ I}}{50} & \frac{241188}{65} + \frac{619072 \text{ I}}{325} \\ -\frac{312327}{130} + \frac{87833 \text{ I}}{65} & -\frac{1076133}{50} - \frac{4241151 \text{ I}}{50} & \frac{6014859}{50} & -\frac{2372367}{650} + \frac{148393 \text{ I}}{26} \\ \frac{16293}{130} + \frac{8109 \text{ I}}{50} & \frac{241188}{65} - \frac{619072 \text{ I}}{325} & -\frac{2372367}{650} - \frac{148393 \text{ I}}{26} & -\frac{56886}{65} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{650 \, \Delta x_{ol}^4} \, ( 94491 \, u_{ol-3+3\text{I}} + (-69417 + 1580603 \, \text{I}) \, u_{ol-2+3\text{I}} - (1561635 + 878330 \, \text{I}) \, u_{ol-1+3\text{I}} + (81465 - 105417 \, \text{I}) \, u_{ol+3\text{I}} - (69417 + 1580603 \, \text{I}) \, u_{ol-3+2\text{I}} - 46719192 \, u_{ol-2+2\text{I}} + (-13989729 + 55134963 \, \text{I}) \, u_{ol-1+2\text{I}} + (2411880 + 1238144 \, \text{I}) \, u_{ol+2\text{I}} + (-1561635 + 878330 \, \text{I}) \, u_{ol-3+\text{I}} - (13989729$$

$$+ 55134963 \, \text{I}) \, u_{ol-2+\text{I}} + 78193167 \, u_{ol-1+\text{I}} + (-2372367 + 3709825 \, \text{I}) \, u_{ol+\text{I}} + (81465 + 105417 \, \text{I}) \, u_{ol-3} + (2411880 - 1238144 \, \text{I}) \, u_{ol-2} - (2372367 + 3709825 \, \text{I}) \, u_{ol-1} - 568860 \, u_{ol} ), \, O( \, \Delta x_{ol}^{12} \, )$$

Formula.: 92, Var.: 1

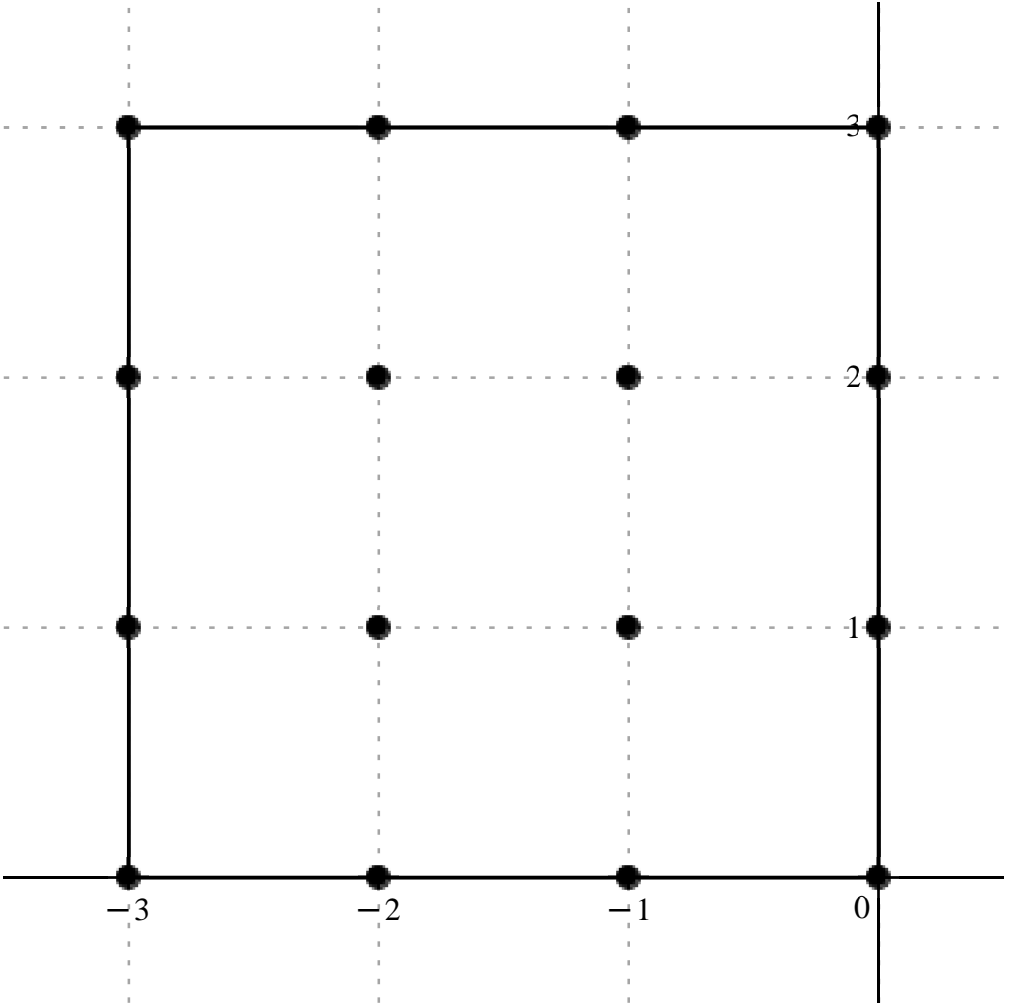
Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 5

Error order.: 11, Error.: 6.8944415039399109581 × 10<sup>−26</sup>, New Error.: 6.9279103769575454401 × 10<sup>−37</sup>

Error order.: 11, Error.: 6.9279103769575454401 × 10<sup>−37</sup>, New Error.: 6.9311658728285504583 × 10<sup>−48</sup>

*Error order:*, 11, *Error:*,  $6.9311658728285504583 \times 10^{-48}$ , *New Error:*,  $6.9314904966520298611 \times 10^{-59}$   
*Error order:*, 11, *Error:*,  $6.9314904966520298611 \times 10^{-59}$ , *New Error:*,  $6.9315229497648371200 \times 10^{-70}$   
*Error order:*, 11, *Error:*,  $6.9315229497648371200 \times 10^{-70}$ , *New Error:*,  $6.9315261949834105290 \times 10^{-81}$

$$\begin{aligned}
 & x_o + h \cdot , \quad \begin{bmatrix} -3 + 3 \operatorname{I} & -2 + 3 \operatorname{I} & -1 + 3 \operatorname{I} & 3 \operatorname{I} \\ -3 + 2 \operatorname{I} & -2 + 2 \operatorname{I} & -1 + 2 \operatorname{I} & 2 \operatorname{I} \\ -3 + \operatorname{I} & -2 + \operatorname{I} & -1 + \operatorname{I} & \operatorname{I} \\ -3 & -2 & -1 & 0 \end{bmatrix} \\
 & c = , \quad \begin{bmatrix} \frac{158123}{260} + \frac{158123 \operatorname{I}}{260} & -\frac{1357401}{130} + \frac{1269389 \operatorname{I}}{130} & -\frac{1238619}{260} - \frac{4007093 \operatorname{I}}{260} & \frac{154481}{130} - \frac{5431 \operatorname{I}}{26} \\ \frac{1269389}{130} - \frac{1357401 \operatorname{I}}{130} & -\frac{2941359}{10} - \frac{2941359 \operatorname{I}}{10} & -\frac{4232001}{10} + \frac{2654067 \operatorname{I}}{10} & \frac{565523}{65} + \frac{1444926 \operatorname{I}}{65} \\ -\frac{4007093}{260} - \frac{1238619 \operatorname{I}}{260} & \frac{2654067}{10} - \frac{4232001 \operatorname{I}}{10} & \frac{9344361}{20} + \frac{9344361 \operatorname{I}}{20} & -\frac{4481759}{130} + \frac{1348419 \operatorname{I}}{130} \\ -\frac{5431}{26} + \frac{154481 \operatorname{I}}{130} & \frac{1444926}{65} + \frac{565523 \operatorname{I}}{65} & \frac{1348419}{130} - \frac{4481759 \operatorname{I}}{130} & -\frac{74123}{26} - \frac{74123 \operatorname{I}}{26} \end{bmatrix}
 \end{aligned}$$



$$\begin{aligned}
 \frac{\mathrm{d}s}{\mathrm{d}x_oI^5} \, u(x_oI) = & \frac{1}{260 \, \Delta x_oI^5} \big( (158123 + 158123 \operatorname{I}) \, u_{oI-3+3I} + (-2714802 + 2538778 \operatorname{I}) \, u_{oI-2+3I} - (1238619 + 4007093 \operatorname{I}) \, u_{oI-1+3I} + (308962 - 54310 \operatorname{I}) \, u_{oI+3I} \\
 & + (2538778 - 2714802 \operatorname{I}) \, u_{oI-3+2I} - (76475334 + 76475334 \operatorname{I}) \, u_{oI-2+2I} + (-110032026 + 69005742 \operatorname{I}) \, u_{oI-1+2I} + (2262092 + 5779704 \operatorname{I}) \, u_{oI+2I} - (4007093 \\
 & + 1238619 \operatorname{I}) \, u_{oI-3+I} + (69005742 - 110032026 \operatorname{I}) \, u_{oI-2+I} + (121476693 + 121476693 \operatorname{I}) \, u_{oI-1+I} + (-8963518 + 2696838 \operatorname{I}) \, u_{oI+I} + (-54310 + 308962 \operatorname{I}) \, u_{oI-3} + (5779704 + 2262092 \operatorname{I}) \, u_{oI-2} + (2696838 - 8963518 \operatorname{I}) \, u_{oI-1} - (741230 + 741230 \operatorname{I}) \, u_{oI} \big), \, O(\, \Delta x_oI^{11} \,)
 \end{aligned}$$

Formula.: 93, Var.: 1

Variavel :  $x_{ol}$  , Derivada de Ordem : 6

Error order.: 10, Error.:  $4.0036285365392520743 \times 10^{-23}$ , New Error.:  $4.0697564205436878118 \times 10^{-33}$

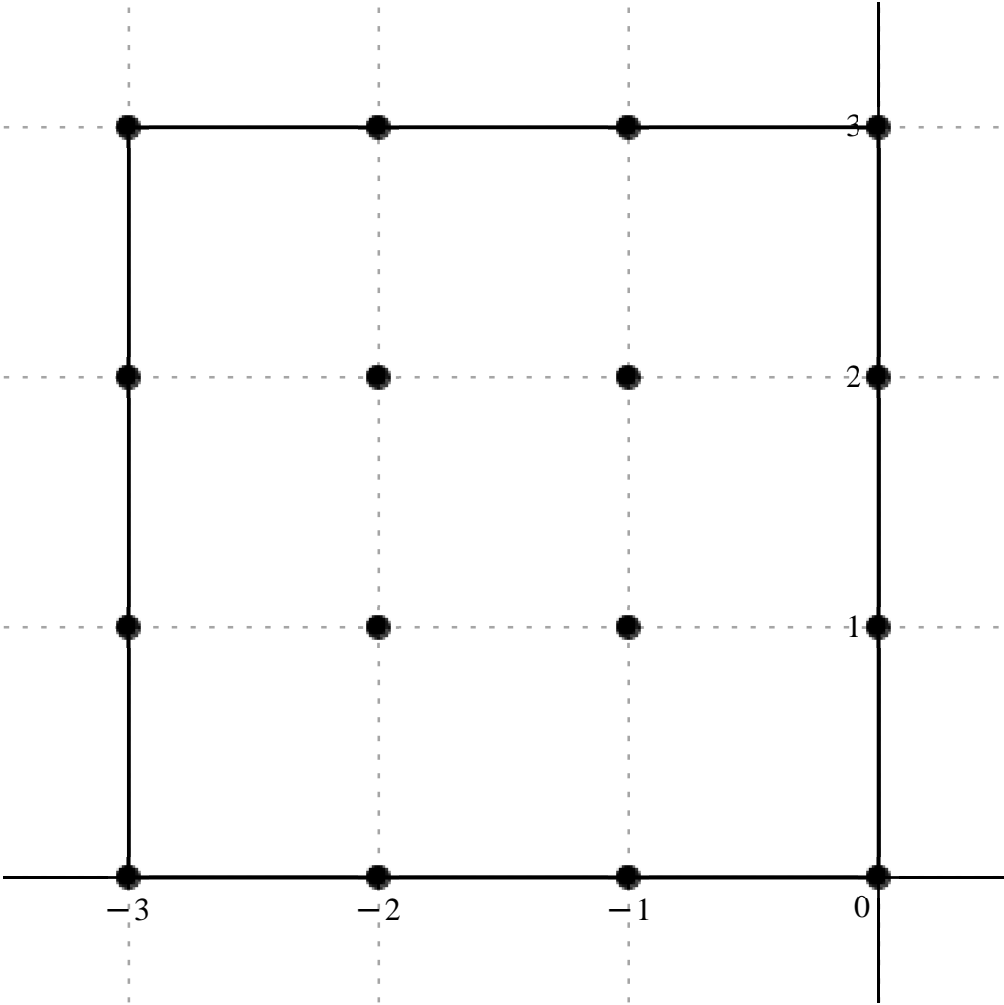
Error order.: 10, Error.:  $4.0697564205436878118 \times 10^{-33}$ , New Error.:  $4.0763866358528200226 \times 10^{-43}$

Error order.: 10, Error.:  $4.0763866358528200226 \times 10^{-43}$ , New Error.:  $4.0770498284098210309 \times 10^{-53}$

Error order.: 10, Error.:  $4.0770498284098210309 \times 10^{-53}$ , New Error.:  $4.0771161493725075350 \times 10^{-63}$

Error order.: 10, Error.:  $4.0771161493725075350 \times 10^{-63}$ , New Error.:  $4.0771227814858427718 \times 10^{-73}$

$$x_o + h. , \begin{bmatrix} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{ I} & -2 + \text{ I} & -1 + \text{ I} & \text{ I} \\ -3 & -2 & -1 & 0 \end{bmatrix}$$
$$c = , \begin{bmatrix} \frac{583107 \text{ I}}{130} & -\frac{4806558}{65} - \frac{107976 \text{ I}}{65} & \frac{2385243}{65} - \frac{9691041 \text{ I}}{130} & 5284 + \frac{216134 \text{ I}}{65} \\ \frac{4806558}{65} - \frac{107976 \text{ I}}{65} & -\frac{10597869 \text{ I}}{5} & -\frac{12287808}{5} - \frac{2518002 \text{ I}}{5} & -\frac{5339691}{130} + \frac{14618751 \text{ I}}{130} \\ -\frac{2385243}{65} - \frac{9691041 \text{ I}}{130} & \frac{12287808}{5} - \frac{2518002 \text{ I}}{5} & \frac{32006547 \text{ I}}{10} & -\frac{1992798}{13} - \frac{4566612 \text{ I}}{65} \\ -5284 + \frac{216134 \text{ I}}{65} & \frac{5339691}{130} + \frac{14618751 \text{ I}}{130} & \frac{1992798}{13} - \frac{4566612 \text{ I}}{65} & -\frac{1104562 \text{ I}}{65} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} u(x_{ol}) = \frac{1}{130 \Delta x_{ol}^6} (583107 \text{ I} u_{ol-3+3\text{I}} - (9613116 + 215952 \text{ I}) u_{ol-2+3\text{I}} + (4770486 - 9691041 \text{ I}) u_{ol-1+3\text{I}} + (686920 + 432268 \text{ I}) u_{ol+3\text{I}} + (9613116 - 215952 \text{ I}) u_{ol-3+2\text{I}} - 275544594 \text{ I} u_{ol-2+2\text{I}} - (319483008 + 65468052 \text{ I}) u_{ol-1+2\text{I}} + (-5339691 + 14618751 \text{ I}) u_{ol+2\text{I}} - (4770486 + 9691041 \text{ I}) u_{ol-3+\text{I}} + (319483008 - 65468052 \text{ I}) u_{ol-2+\text{I}} + 416085111 \text{ I} u_{ol-1+\text{I}} - (19927980 + 9133224 \text{ I}) u_{ol+\text{I}} + (-686920 + 432268 \text{ I}) u_{ol-3} + (5339691 + 14618751 \text{ I}) u_{ol-2} + (19927980 - 9133224 \text{ I}) u_{ol-1} - 2209124 \text{ I} u_{ol}), O(\Delta x_{ol}^{10})$$

Formula.: 94, Var.: 1

Variavel .:  $x_{ol}$  , Derivada de Ordem .: 7

Error order.: 9, Error.:  $1.5490706096838208477 \times 10^{-20}$ , New Error.:  $1.5564453813708616389 \times 10^{-29}$

Error order.: 9, Error.:  $1.5564453813708616389 \times 10^{-29}$ , New Error.:  $1.5571630237311646230 \times 10^{-38}$

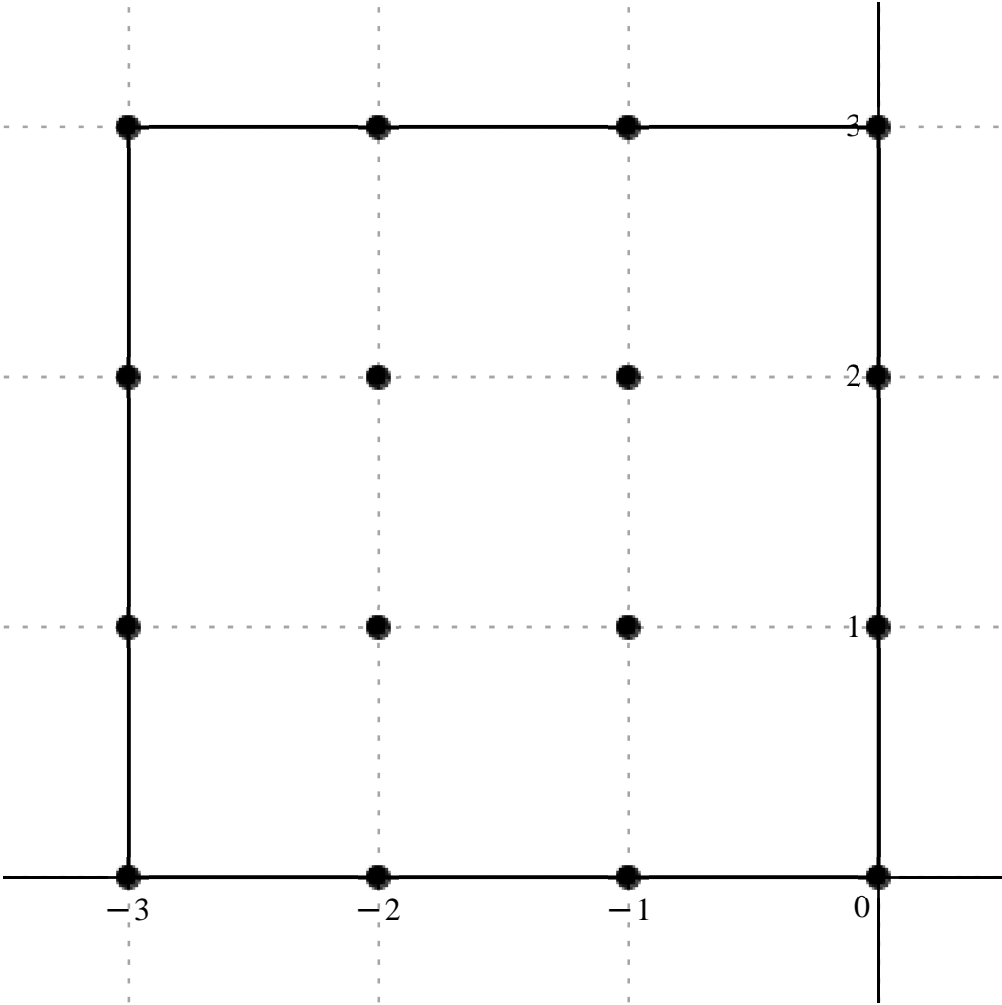
Error order.: 9, Error.:  $1.5571630237311646230 \times 10^{-38}$ , New Error.:  $1.5572345870820917683 \times 10^{-47}$

Error order.: 9, Error.:  $1.5572345870820917683 \times 10^{-47}$ , New Error.:  $1.5572417414057847587 \times 10^{-56}$

Error order.: 9, Error.:  $1.5572417414057847587 \times 10^{-56}$ , New Error.:  $1.5572424568180375106 \times 10^{-65}$

$$x_o + h . , \left[ \begin{array}{cccc} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{ I} & -2 + \text{ I} & -1 + \text{ I} & \text{ I} \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{11382119}{780} + \frac{11382119 \text{ I}}{780} & -\frac{76695318}{325} - \frac{78359694 \text{ I}}{325} & \frac{458968797}{1300} - \frac{171517731 \text{ I}}{1300} & \frac{1512938}{195} + \frac{5327714 \text{ I}}{195} \\ \frac{78359694}{325} + \frac{76695318 \text{ I}}{325} & \frac{26915427}{4} - \frac{26915427 \text{ I}}{4} & -\frac{31599918}{5} - \frac{45573822 \text{ I}}{5} & -\frac{601742211}{1300} + \frac{326063997 \text{ I}}{1300} \\ \frac{171517731}{1300} - \frac{458968797 \text{ I}}{1300} & \frac{45573822}{5} + \frac{31599918 \text{ I}}{5} & -\frac{193478607}{20} + \frac{193478607 \text{ I}}{20} & -\frac{90244014}{325} - \frac{207959598 \text{ I}}{325} \\ -\frac{5327714}{195} - \frac{1512938 \text{ I}}{195} & -\frac{326063997}{1300} + \frac{601742211 \text{ I}}{1300} & \frac{207959598}{325} + \frac{90244014 \text{ I}}{325} & \frac{35749511}{780} - \frac{35749511 \text{ I}}{780} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{3900 \, \Delta x_{ol}^7} \left( 7 \left( (-8130085 + 8130085 \text{ I}) \, u_{ol-3+31} - (131477688 + 134330904 \text{ I}) \, u_{ol-2+31} + (196700913 - 73507599 \text{ I}) \, u_{ol-1+31} + (4322680 + 15222040 \text{ I}) \, u_{ol+31} + (134330904 + 131477688 \text{ I}) \, u_{ol-3+21} + (3748934475 - 3748934475 \text{ I}) \, u_{ol-2+21} - (3521133720 + 5078225880 \text{ I}) \, u_{ol-1+21} + (-257889519 \right.$$

$$+ 139741713 \, \text{I}) \, u_{ol+21} + (73507599 - 196700913 \, \text{I}) \, u_{ol-3+1} + (5078225880 + 3521133720 \, \text{I}) \, u_{ol-2+1} + (-5389761195 + 5389761195 \, \text{I}) \, u_{ol-1+1} - (154704024 + 356502168 \, \text{I}) \, u_{ol+1} - (15222040 + 4322680 \, \text{I}) \, u_{ol-3} + (-139741713 + 257889519 \, \text{I}) \, u_{ol-2} + (356502168 + 154704024 \, \text{I}) \, u_{ol-1} + (25535365 - 25535365 \, \text{I}) \, u_{ol})),$$

$$O(\Delta x_{ol}^9)$$

$$Formula.: 95, \; Var.: 1$$

$$Variavel.: x_{ol}, \; Derivada\ de\ Ordem.: 8$$

$$Error\ order.: 8, \; Error.: 7.0955248398668183127 \times 10^{-18}, \; New\ Error.: 7.2100053037952310383 \times 10^{-26}$$

$$Error\ order.: 8, \; Error.: 7.2100053037952310383 \times 10^{-26}, \; New\ Error.: 7.2214829422775216272 \times 10^{-34}$$

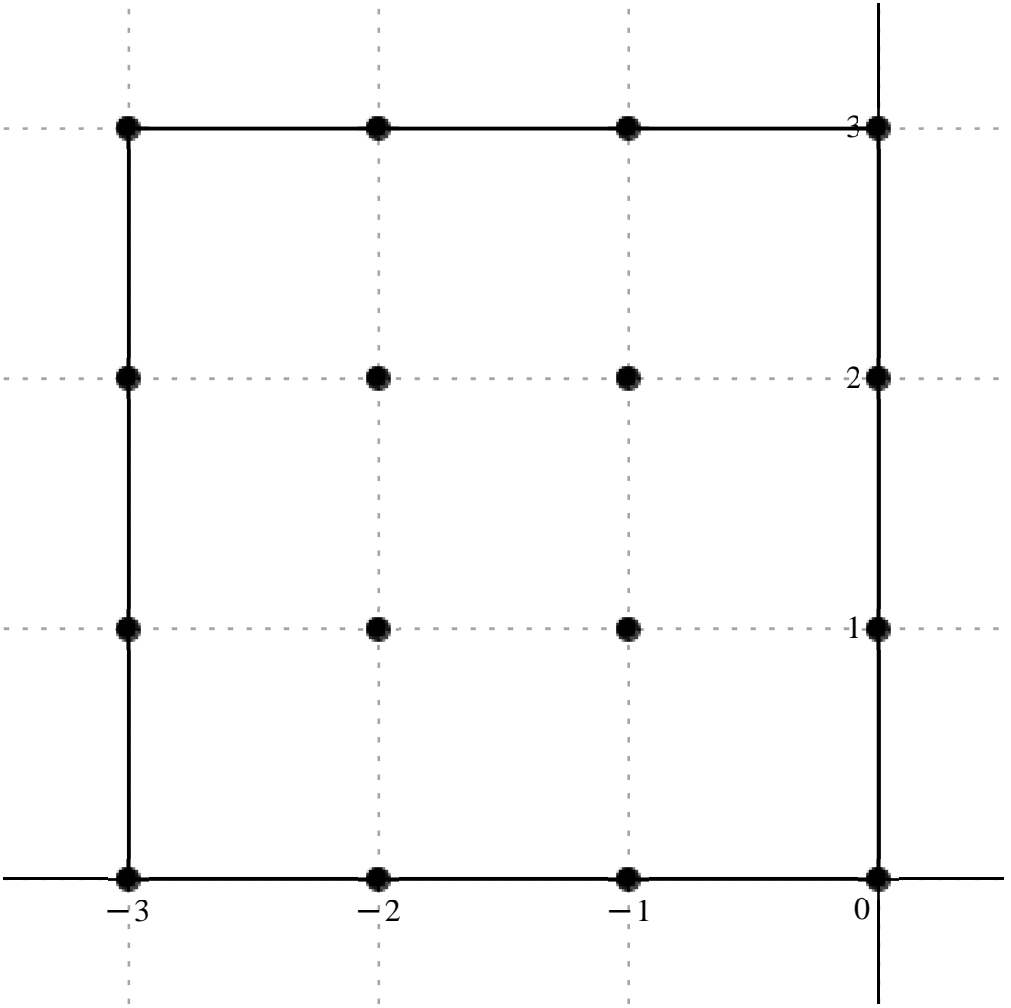
$$Error\ order.: 8, \; Error.: 7.2214829422775216272 \times 10^{-34}, \; New\ Error.: 7.2226309966237285024 \times 10^{-42}$$

$$Error\ order.: 8, \; Error.: 7.2226309966237285024 \times 10^{-42}, \; New\ Error.: 7.2227458049578541235 \times 10^{-50}$$

$$Error\ order.: 8, \; Error.: 7.2227458049578541235 \times 10^{-50}, \; New\ Error.: 7.2227572858202562549 \times 10^{-58}$$

$$x_o+h., \left[ \begin{array}{cccc} -3+3 \, \text{I} & -2+3 \, \text{I} & -1+3 \, \text{I} & 3 \, \text{I} \\ -3+2 \, \text{I} & -2+2 \, \text{I} & -1+2 \, \text{I} & 2 \, \text{I} \\ -3+1 & -2+1 & -1+1 & 1 \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c=, \left[ \begin{array}{ccccc} -\frac{5414976}{65} & -\frac{154098}{65}-\frac{87691338 \, \text{I}}{65} & \frac{17951472}{13}+\frac{7516656 \, \text{I}}{13} & -\frac{641718}{13}+\frac{507654 \, \text{I}}{5} & \\ -\frac{154098}{65}+\frac{87691338 \, \text{I}}{65} & \frac{187168464}{5} & \frac{33421878}{5}-\frac{212056866 \, \text{I}}{5} & -\frac{25566912}{13}-\frac{29799504 \, \text{I}}{65} & \\ \frac{17951472}{13}-\frac{7516656 \, \text{I}}{13} & \frac{33421878}{5}+\frac{212056866 \, \text{I}}{5} & -\frac{256533984}{5} & \frac{53359362}{65}-\frac{31181094 \, \text{I}}{13} & \\ -\frac{641718}{13}-\frac{507654 \, \text{I}}{5} & -\frac{25566912}{13}+\frac{29799504 \, \text{I}}{65} & \frac{53359362}{65}+\frac{31181094 \, \text{I}}{13} & \frac{2871792}{13} & \end{array} \right]$$



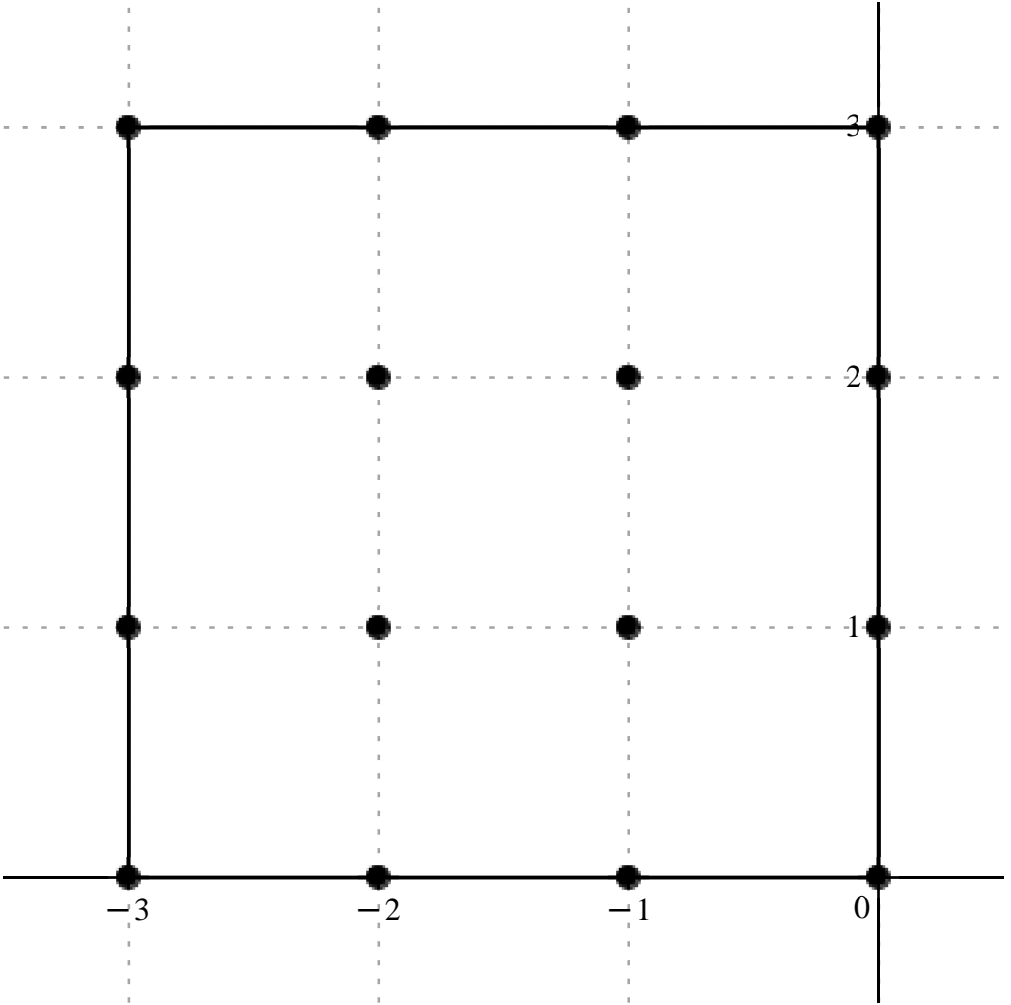
$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{65 \, \Delta x_{ol}^8} \, (126 \, ( -42976 \, u_{ol-3+3\mathrm{I}} - (1223 + 695963 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (712360 + 298280 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + ( -25465 + 52377 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + ( -1223 + 695963 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + 19311032 \, u_{ol-2+2\mathrm{I}} + (3448289 - 21878883 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - (1014560 + 236504 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (712360 - 298280 \, \mathrm{I}) \, u_{ol-3+1\mathrm{I}} + (3448289 + 21878883 \, \mathrm{I}) \, u_{ol-2+1\mathrm{I}} - 26467792 \, u_{ol-1+1\mathrm{I}} + (423487 - 1237345 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} - (25465 + 52377 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + ( -1014560 + 236504 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (423487 + 1237345 \, \mathrm{I}) \, u_{ol-1\mathrm{I}} + 113960 \, u_{ol\mathrm{I}})), \, O( \, \Delta x_{ol}^8 \, )$$

Formula.: 96, Var.: 1  
Variavel .:  $x_{ol}$ , Derivada de Ordem .: 9

Error order.: 7, Error.:  $2.1400782492431748745 \times 10^{-15}$ , New Error.:  $2.1499690320789877752 \times 10^{-22}$   
Error order.: 7, Error.:  $2.1499690320789877752 \times 10^{-22}$ , New Error.:  $2.1509320912767467588 \times 10^{-29}$   
Error order.: 7, Error.:  $2.1509320912767467588 \times 10^{-29}$ , New Error.:  $2.1510281337405676634 \times 10^{-36}$   
Error order.: 7, Error.:  $2.1510281337405676634 \times 10^{-36}$ , New Error.:  $2.1510377353491103192 \times 10^{-43}$   
Error order.: 7, Error.:  $2.1510377353491103192 \times 10^{-43}$ , New Error.:  $2.1510386954835829090 \times 10^{-50}$

$$x_o + h \cdot , \left[ \begin{array}{cccc} -3 + 3 \, \mathrm{I} & -2 + 3 \, \mathrm{I} & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ -3 + 2 \, \mathrm{I} & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} -\frac{13415976}{65} - \frac{13415976 \text{ I}}{65} & \frac{211741614}{65} - \frac{218237166 \text{ I}}{65} & \frac{137000808}{65} + \frac{305368056 \text{ I}}{65} & -\frac{23278374}{65} + \frac{1925154 \text{ I}}{13} \\ -\frac{218237166}{65} + \frac{211741614 \text{ I}}{65} & \frac{451177776}{5} + \frac{451177776 \text{ I}}{5} & \frac{572126814}{5} - \frac{436461858 \text{ I}}{5} & -\frac{250405344}{65} - \frac{355205088 \text{ I}}{65} \\ \frac{305368056}{65} + \frac{137000808 \text{ I}}{65} & -\frac{436461858}{5} + \frac{572126814 \text{ I}}{5} & -\frac{590210712}{5} - \frac{590210712 \text{ I}}{5} & \frac{457771986}{65} - \frac{247619106 \text{ I}}{65} \\ \frac{1925154}{13} - \frac{23278374 \text{ I}}{65} & -\frac{355205088}{65} - \frac{250405344 \text{ I}}{65} & -\frac{247619106}{65} + \frac{457771986 \text{ I}}{65} & \frac{6087312}{13} + \frac{6087312 \text{ I}}{13} \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{65 \, \Delta x_{ol}^9} \Big( 378 \, \big( -(35492 + 35492 \, \text{I}) \, u_{ol-3+31} + (560163 - 577347 \, \text{I}) \, u_{ol-2+31} + (362436 + 807852 \, \text{I}) \, u_{ol-1+31} + (-61583 + 25465 \, \text{I}) \, u_{ol+31} + (-577347 + 560163 \, \text{I}) \, u_{ol-3+21} + (15516696 + 15516696 \, \text{I}) \, u_{ol-2+21} + (19676319 - 15010593 \, \text{I}) \, u_{ol-1+21} - (662448 + 939696 \, \text{I}) \, u_{ol+21} + (807852 + 362436 \, \text{I}) \, u_{ol-3+1} \\ + (-15010593 + 19676319 \, \text{I}) \, u_{ol-2+1} - (20298252 + 20298252 \, \text{I}) \, u_{ol-1+1} + (1211037 - 655077 \, \text{I}) \, u_{ol+1} + (25465 - 61583 \, \text{I}) \, u_{ol-3} - (939696 + 662448 \, \text{I}) \, u_{ol-2} + (-655077 + 1211037 \, \text{I}) \, u_{ol-1} + (80520 + 80520 \, \text{I}) \, u_{ol} \big) \Big) \, O(\, \Delta x_{ol}^7 \, )$$

Formula: 97, Var: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 10

Error order: 6, Error: 7.4937346402613526633 × 10<sup>-13</sup>, New Error: 7.6101786508489727534 × 10<sup>-19</sup>

Error order: 6, Error: 7.6101786508489727534 × 10<sup>-19</sup>, New Error: 7.6218522817513311679 × 10<sup>-25</sup>

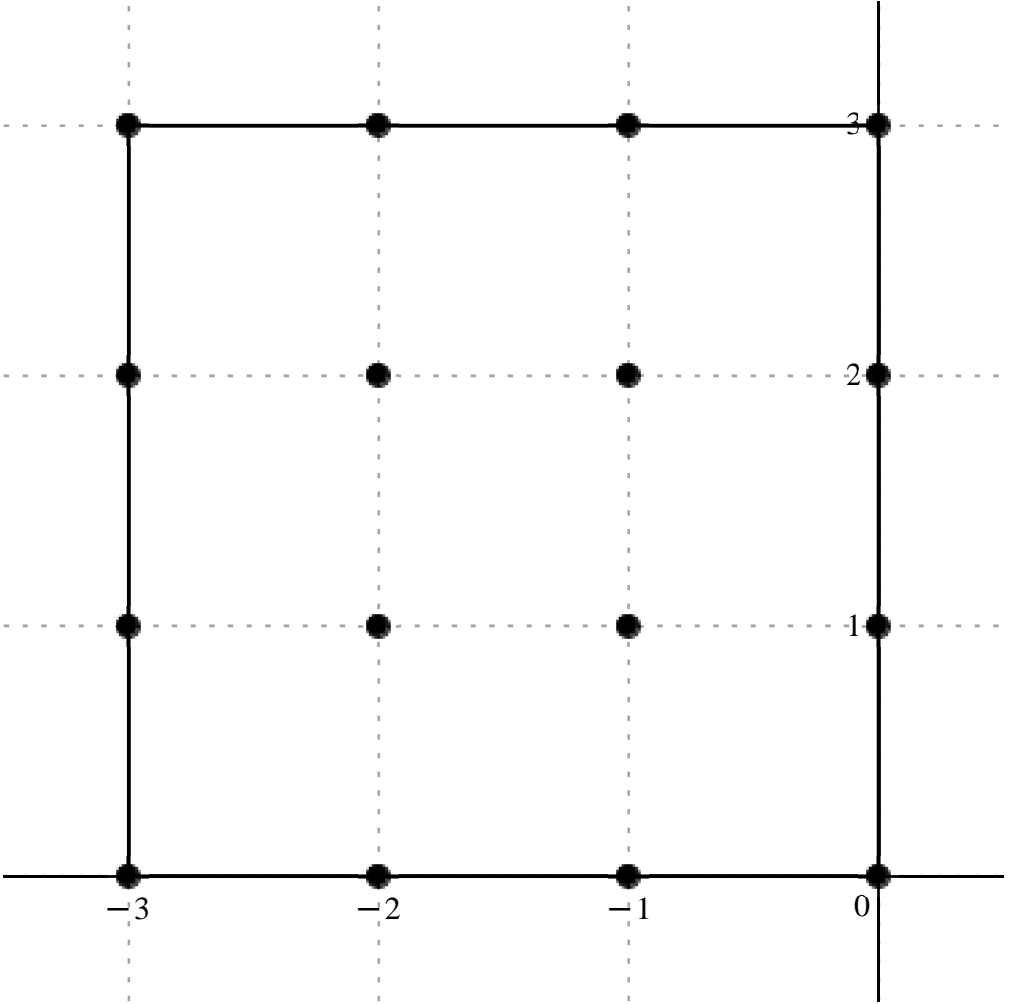
Error order: 6, Error: 7.6218522817513311679 × 10<sup>-25</sup>, New Error: 7.6230199319018546262 × 10<sup>-31</sup>

Error order: 6, Error: 7.6230199319018546262 × 10<sup>-31</sup>, New Error: 7.6231366997822224811 × 10<sup>-37</sup>

Error order: 6, Error: 7.6231366997822224811 × 10<sup>-37</sup>, New Error: 7.6231483765989071293 × 10<sup>-43</sup>

$$x_o + h \cdot , \begin{bmatrix} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c = , \begin{bmatrix} -\frac{11347056 \text{ I}}{13} & \frac{179695908}{13} - \frac{5291244 \text{ I}}{13} & -\frac{63322560}{13} + \frac{185440752 \text{ I}}{13} & -1067220 - \frac{4772124 \text{ I}}{13} \\ -\frac{179695908}{13} - \frac{5291244 \text{ I}}{13} & 370609344 \text{ I} & 408124332 + 45598140 \text{ I} & \frac{282955568}{13} - \frac{242666928 \text{ I}}{13} \\ \frac{63322560}{13} + \frac{185440752 \text{ I}}{13} & -408124332 + 45598140 \text{ I} & -463152816 \text{ I} & \frac{271763100}{13} + \frac{70600572 \text{ I}}{13} \\ 1067220 - \frac{4772124 \text{ I}}{13} & -\frac{28295568}{13} - \frac{242666928 \text{ I}}{13} & -\frac{271763100}{13} + \frac{70600572 \text{ I}}{13} & \frac{22238496 \text{ I}}{13} \end{bmatrix}$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}} \; u(x_{ol}) = \frac{1}{13 \; \Delta x_{ol}^{10}} \big( 252 \; \big( -45028 \; \text{I} \, u_{ol-3+3\text{I}} + (713079 - 20997 \; \text{I}) \, u_{ol-2+3\text{I}} + (-251280 + 735876 \; \text{I}) \, u_{ol-1+3\text{I}} - (55055 + 18937 \; \text{I}) \, u_{ol+3\text{I}} - (713079 + 20997 \; \text{I}) \, u_{ol-3+2\text{I}} + 19118736 \; \text{I} \, u_{ol-2+2\text{I}} + (21054033 + 2352285 \; \text{I}) \, u_{ol-1+2\text{I}} + (112284 - 962964 \; \text{I}) \, u_{ol+2\text{I}} + (251280 + 735876 \; \text{I}) \, u_{ol-3+1} + (-21054033 + 2352285 \; \text{I}) \, u_{ol-2+1} - 23892804 \; \text{I} \, u_{ol-1+1} + (1078425 + 280161 \; \text{I}) \, u_{ol+1} + (55055 - 18937 \; \text{I}) \, u_{ol-3} - (112284 + 962964 \; \text{I}) \, u_{ol-2} + (-1078425 + 280161 \; \text{I}) \, u_{ol-1} + 88248 \; \text{I} \, u_{ol} \big) \big), \; O( \; \Delta x_{ol}^6 \; )$$

Formula.: 98, Var.: 1

Variavel .:, x\_{ol}, Derivada de Ordem .:, 11

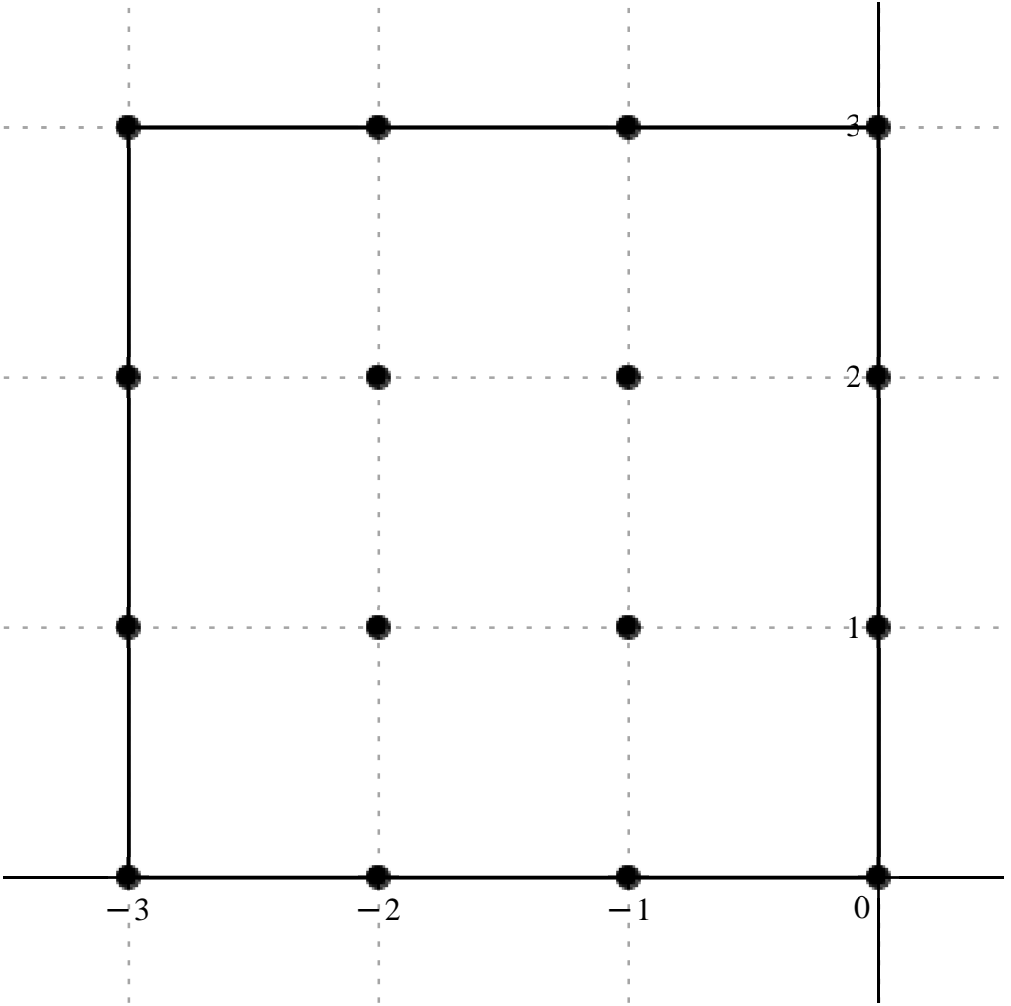
Error order.: 5, Error.: 1.6743883089198094828 × 10<sup>−10</sup>, New Error.: 1.6817439875513256401 × 10<sup>−15</sup>

Error order.: 5, Error.: 1.6817439875513256401 × 10<sup>−15</sup>, New Error.: 1.6824608800498777584 × 10<sup>−20</sup>



*Error order:*, 5,    *Error:*,  $1.6824608800498777584 \times 10^{-20}$ ,    *New Error:*,  $1.6825323802693545412 \times 10^{-25}$   
*Error order:*, 5,    *Error:*,  $1.6825323802693545412 \times 10^{-25}$ ,    *New Error:*,  $1.6825395283987116247 \times 10^{-30}$   
*Error order:*, 5,    *Error:*,  $1.6825395283987116247 \times 10^{-30}$ ,    *New Error:*,  $1.6825402431927191393 \times 10^{-35}$

$$\begin{aligned}
& x_o + h \cdot , \quad \begin{bmatrix} -3 + 3 \, \mathrm{I} & -2 + 3 \, \mathrm{I} & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ -3 + 2 \, \mathrm{I} & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \end{bmatrix} \\
c = , & \quad \begin{bmatrix} \frac{19967640}{13} - \frac{19967640 \, \mathrm{I}}{13} & \frac{1630077372}{65} + \frac{1489819716 \, \mathrm{I}}{65} & -\frac{2095981272}{65} + \frac{1125703656 \, \mathrm{I}}{65} & -\frac{17497788}{13} - \frac{30670332 \, \mathrm{I}}{13} \\ -\frac{1489819716}{65} - \frac{1630077372 \, \mathrm{I}}{65} & -632032632 + 632032632 \, \mathrm{I} & 623724948 + 745870356 \, \mathrm{I} & \frac{2133103896}{65} - \frac{1878933672 \, \mathrm{I}}{65} \\ -\frac{1125703656}{65} + \frac{2095981272 \, \mathrm{I}}{65} & -745870356 - 623724948 \, \mathrm{I} & 755076168 - 755076168 \, \mathrm{I} & \frac{1681420356}{65} + \frac{2665918332 \, \mathrm{I}}{65} \\ \frac{30670332}{13} + \frac{17497788 \, \mathrm{I}}{13} & \frac{1878933672}{65} - \frac{2133103896 \, \mathrm{I}}{65} & -\frac{2665918332}{65} - \frac{1681420356 \, \mathrm{I}}{65} & -\frac{34038312}{13} + \frac{34038312 \, \mathrm{I}}{13} \end{bmatrix}
\end{aligned}$$



$$\begin{aligned}
\frac{\mathrm{d}11}{\mathrm{d}x_{ol}^{11}} \; u(x_{ol}) = & \frac{1}{65 \; \Delta x_{ol}^{11}} \Big( 924 \; \big( (108050 - 108050 \, \mathrm{I}) \; u_{ol - 3 + 3 \, \mathrm{I}} + (1764153 + 1612359 \, \mathrm{I}) \; u_{ol - 2 + 3 \, \mathrm{I}} + (-2268378 + 1218294 \, \mathrm{I}) \; u_{ol - 1 + 3 \, \mathrm{I}} - (94685 + 165965 \, \mathrm{I}) \; u_{ol + 3 \, \mathrm{I}} \\ & - (1612359 + 1764153 \, \mathrm{I}) \; u_{ol - 3 + 2 \, \mathrm{I}} + (-44461170 + 44461170 \, \mathrm{I}) \; u_{ol - 2 + 2 \, \mathrm{I}} + (43876755 + 52469235 \, \mathrm{I}) \; u_{ol - 1 + 2 \, \mathrm{I}} + (2308554 - 2033478 \, \mathrm{I}) \; u_{ol + 2 \, \mathrm{I}} + (-1218294 \\ & + 2268378 \, \mathrm{I}) \; u_{ol - 3 + 1} - (52469235 + 43876755 \, \mathrm{I}) \; u_{ol - 2 + 1} + (53116830 - 53116830 \, \mathrm{I}) \; u_{ol - 1 + 1} + (1819719 + 2885193 \, \mathrm{I}) \; u_{ol + 1} + (165965 + 94685 \, \mathrm{I}) \; u_{ol - 3} + (2033478 - 2308554 \, \mathrm{I}) \; u_{ol - 2} - (2885193 + 1819719 \, \mathrm{I}) \; u_{ol - 1} + (-184190 + 184190 \, \mathrm{I}) \; u_{ol} \big) \Big), \; O( \; \Delta x_{ol}^5 \; )
\end{aligned}$$

Formula.: 99, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

Error order.: 4, Error.:  $4.1604431116319031031 \times 10^{-8}$ , New Error.:  $4.2206848148888403631 \times 10^{-12}$

Error order.: 4, Error.:  $4.2206848148888403631 \times 10^{-12}$ , New Error.:  $4.2267233677414455211 \times 10^{-16}$

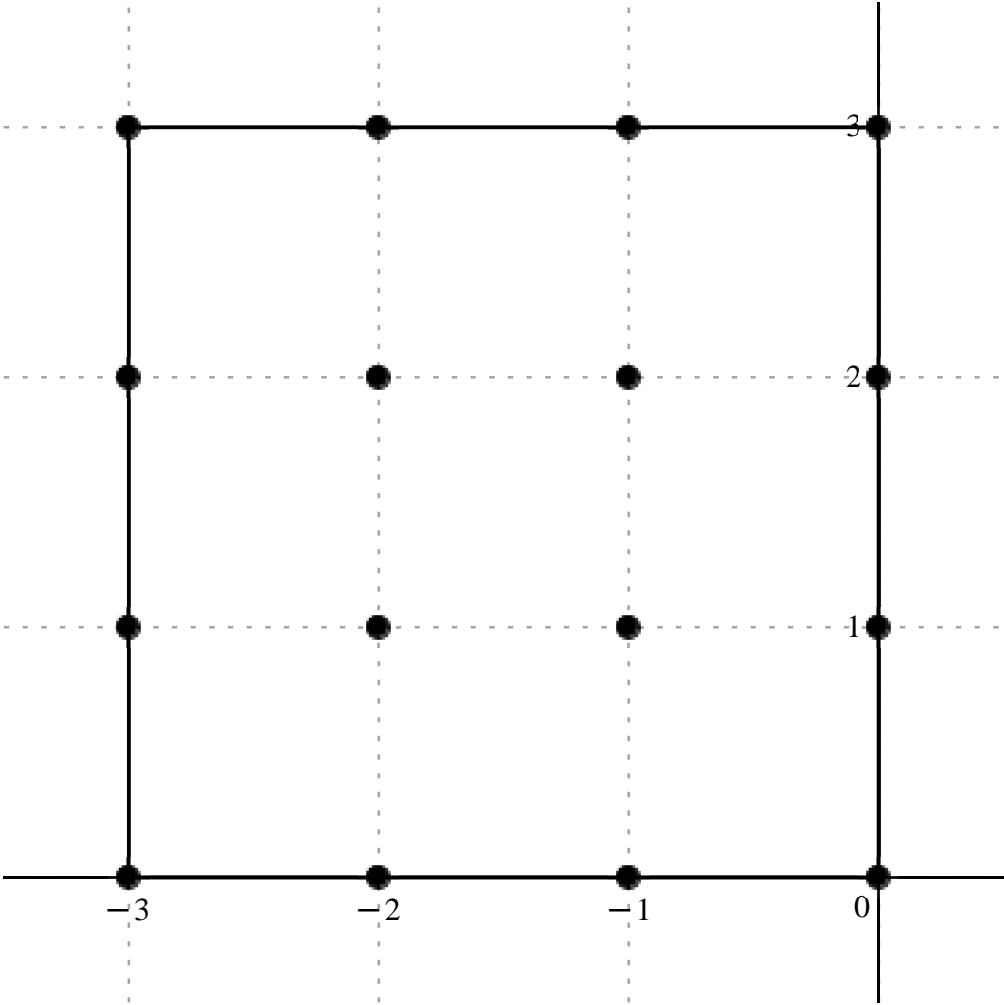
Error order.: 4, Error.:  $4.2267233677414455211 \times 10^{-16}$ , New Error.:  $4.2273273643650161703 \times 10^{-20}$

Error order.: 4, Error.:  $4.2273273643650161703 \times 10^{-20}$ , New Error.:  $4.2273877654382466682 \times 10^{-24}$

Error order.: 4, Error.:  $4.2273877654382466682 \times 10^{-24}$ , New Error.:  $4.2273938055596759403 \times 10^{-28}$

$$x_o + h . , \left[ \begin{array}{cccc} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{ I} & -2 + \text{ I} & -1 + \text{ I} & \text{ I} \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} \frac{56282688}{13} & \frac{53588304}{13} + \frac{865895184 \text{ I}}{13} & -\frac{892140480}{13} - \frac{231517440 \text{ I}}{13} & \frac{13471920}{13} - 5089392 \text{ I} & \\ \frac{53588304}{13} - \frac{865895184 \text{ I}}{13} & -1722010752 & -122444784 + 1833079248 \text{ I} & \frac{1053803520}{13} + \frac{13571712 \text{ I}}{13} & \\ -\frac{892140480}{13} + \frac{231517440 \text{ I}}{13} & -122444784 - 1833079248 \text{ I} & 1967499072 & -\frac{218843856}{13} + \frac{1111183920 \text{ I}}{13} & \\ \frac{13471920}{13} + 5089392 \text{ I} & \frac{1053803520}{13} - \frac{13571712 \text{ I}}{13} & -\frac{218843856}{13} - \frac{1111183920 \text{ I}}{13} & -\frac{83825280}{13} & \end{array} \right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d} x_{ol}^{12}} u(x_{ol}) = \frac{1}{13 \Delta x_{ol}^{12}} (99792 (564 u_{ol-3+31} + (537 + 8677 \text{ I}) u_{ol-2+31} - (8940 + 2320 \text{ I}) u_{ol-1+31} + (135 - 663 \text{ I}) u_{ol+31} + (537 - 8677 \text{ I}) u_{ol-3+21} - 224328 u_{ol-2+21} + (-15951 + 238797 \text{ I}) u_{ol-1+21} + (10560 + 136 \text{ I}) u_{ol+21} + (-8940 + 2320 \text{ I}) u_{ol-3+1} - (15951 + 238797 \text{ I}) u_{ol-2+1} + 256308 u_{ol-1+1} + (-2193 + 11135 \text{ I}) u_{ol+1}$$

$$+ (135 + 663 \text{ I}) u_{ol-3} + (10560 - 136 \text{ I}) u_{ol-2} - (2193 + 11135 \text{ I}) u_{ol-1} - 840 u_{ol})), O( \Delta x_{ol}^4 )$$

Formula:, 100, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 13

Error order:, 3, Error:,  $6.1674642187108230798 \times 10^{-6}$ , New Error:,  $6.1917792861143404004 \times 10^{-9}$

Error order:, 3, Error:,  $6.1917792861143404004 \times 10^{-9}$ , New Error:,  $6.1941530500702114653 \times 10^{-12}$

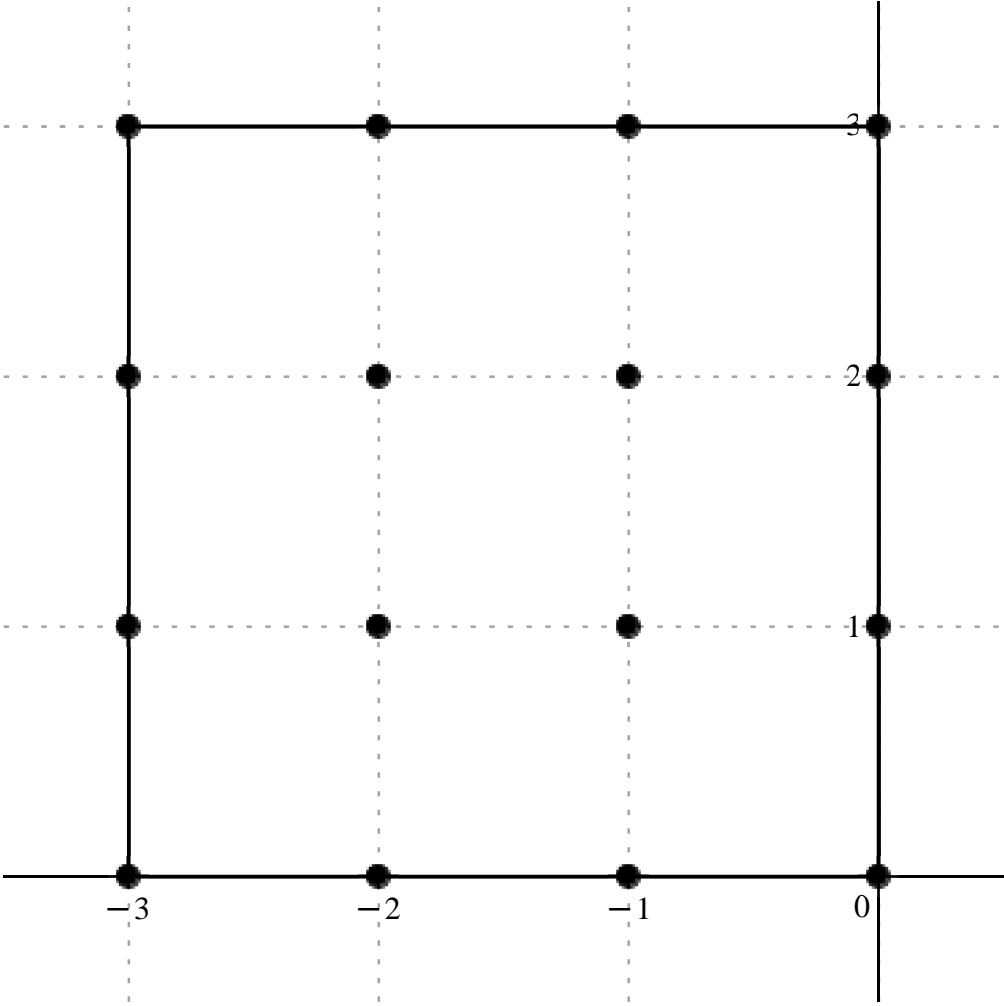
Error order:, 3, Error:,  $6.1941530500702114653 \times 10^{-12}$ , New Error:,  $6.1943898423382819301 \times 10^{-15}$

Error order:, 3, Error:,  $6.1943898423382819301 \times 10^{-15}$ , New Error:,  $6.1944135157170855465 \times 10^{-18}$

Error order:, 3, Error:,  $6.1944135157170855465 \times 10^{-18}$ , New Error:,  $6.1944158829964791427 \times 10^{-21}$

$$x_o + h \cdot , \left[ \begin{array}{cccc} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} 4590432 + 4590432 \text{ I} & -63767088 + 74943792 \text{ I} & -55683936 - 86419872 \text{ I} & 5887728 - 4490640 \text{ I} \\ 74943792 - 63767088 \text{ I} & -1759133376 - 1759133376 \text{ I} & -1918700784 + 1755241488 \text{ I} & 82228608 + 76640256 \text{ I} \\ -86419872 - 55683936 \text{ I} & 1755241488 - 1918700784 \text{ I} & 1922592672 + 1922592672 \text{ I} & -95900112 + 67958352 \text{ I} \\ -4490640 + 5887728 \text{ I} & 76640256 + 82228608 \text{ I} & 67958352 - 95900112 \text{ I} & -5987520 - 5987520 \text{ I} \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}} \; u(x_{ol}) = \frac{1}{\Delta x_{ol}^{13}} \Big( (4590432 + 4590432 \text{ I}) \; u_{ol-3+3\text{I}} + (-63767088 + 74943792 \text{ I}) \; u_{ol-2+3\text{I}} - (55683936 + 86419872 \text{ I}) \; u_{ol-1+3\text{I}} + (5887728 - 4490640 \text{ I}) \; u_{ol+3\text{I}} + (74943792 - 63767088 \text{ I}) \; u_{ol-3+2\text{I}} - (1759133376 + 1759133376 \text{ I}) \; u_{ol-2+2\text{I}} + (-1918700784 + 1755241488 \text{ I}) \; u_{ol-1+2\text{I}} + (82228608 + 76640256 \text{ I}) \; u_{ol+2\text{I}} - (86419872 + 55683936 \text{ I}) \; u_{ol-3+\text{I}} + (1755241488 - 1918700784 \text{ I}) \; u_{ol-2+\text{I}} + (1922592672 + 1922592672 \text{ I}) \; u_{ol-1+\text{I}} + (-95900112 + 67958352 \text{ I}) \; u_{ol+\text{I}} + (-4490640 + 5887728 \text{ I}) \; u_{ol-3} + (76640256 + 82228608 \text{ I}) \; u_{ol-2} + (67958352 - 95900112 \text{ I}) \; u_{ol-1} - (5987520 + 5987520 \text{ I}) \; u_{ol} \Big), \; O(\; \Delta x_{ol}^3 \; )$$

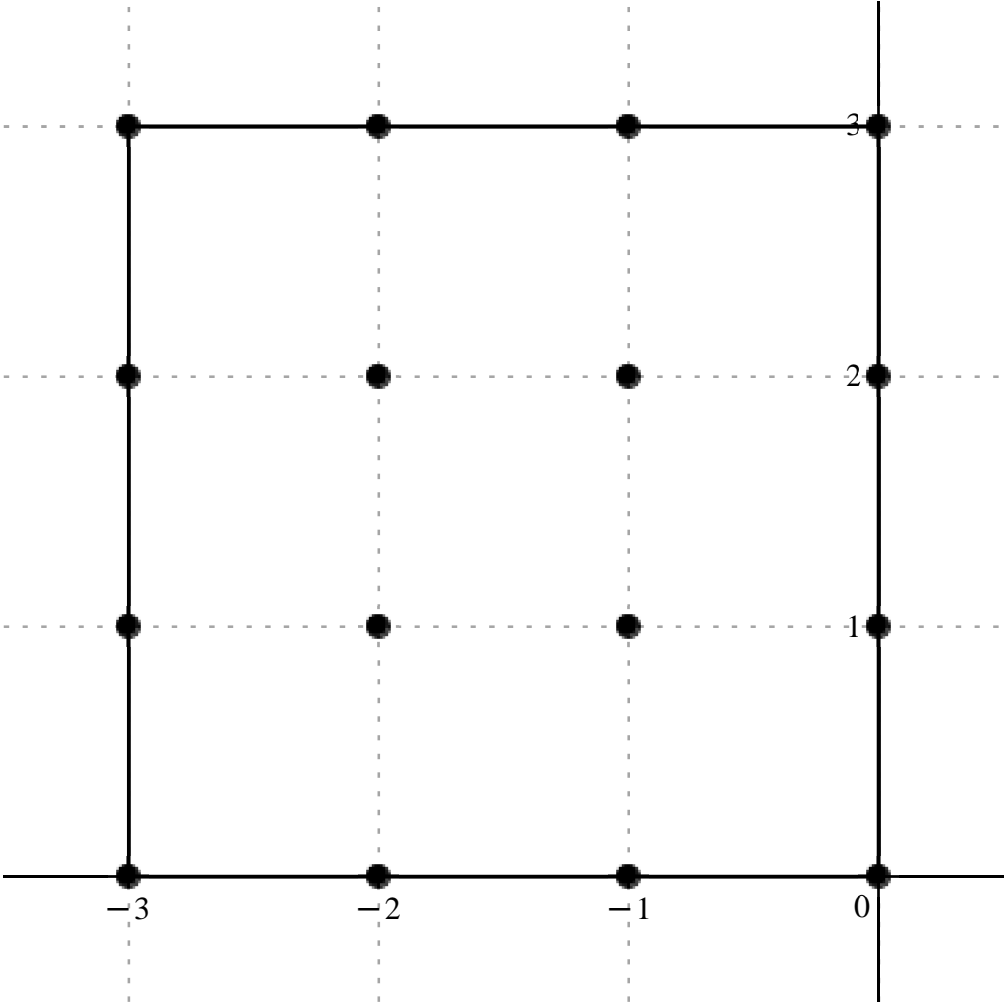
Formula:, 101, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:., 2, Error:., 0.00091978652811525383833, New Error:.,  $9.3085466856683301614 \times 10^{-6}$   
Error order:., 2, Error:.,  $9.3085466856683301614 \times 10^{-6}$ , New Error:.,  $9.3196385674986741265 \times 10^{-8}$   
Error order:., 2, Error:.,  $9.3196385674986741265 \times 10^{-8}$ , New Error:.,  $9.3207479892572359272 \times 10^{-10}$   
Error order:., 2, Error:.,  $9.3207479892572359272 \times 10^{-10}$ , New Error:.,  $9.3208589337649757465 \times 10^{-12}$   
Error order:., 2, Error:.,  $9.3208589337649757465 \times 10^{-12}$ , New Error:.,  $9.3208700282390646898 \times 10^{-14}$

$$x_o + h \cdot , \begin{bmatrix} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c = , \begin{bmatrix} 6519744 \text{ I} & -96399072 + 9779616 \text{ I} & 16765056 - 97796160 \text{ I} & 6985440 + 465696 \text{ I} \\ 96399072 + 9779616 \text{ I} & -2397403008 \text{ I} & -2451889440 - 54486432 \text{ I} & 8382528 + 103384512 \text{ I} \\ -16765056 - 97796160 \text{ I} & 2451889440 - 54486432 \text{ I} & 2506375872 \text{ I} & -104781600 - 15367968 \text{ I} \\ -6985440 + 465696 \text{ I} & -8382528 + 103384512 \text{ I} & 104781600 - 15367968 \text{ I} & -7451136 \text{ I} \end{bmatrix}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}} \; u(x_{ol}) = \frac{1}{\Delta x_{ol}^{14}} \Big( 465696 \Big( 14 \text{ I} u_{ol-3+3\text{I}} + (-207 + 21 \text{ I}) u_{ol-2+3\text{I}} + (36 - 210 \text{ I}) u_{ol-1+3\text{I}} + (15 + \text{I}) u_{ol+3\text{I}} + (207 + 21 \text{ I}) u_{ol-3+2\text{I}} - 5148 \text{ I} u_{ol-2+2\text{I}} - (5265 + 117 \text{ I}) u_{ol-1+2\text{I}} + (18 + 222 \text{ I}) u_{ol+2\text{I}} - (36 + 210 \text{ I}) u_{ol-3+\text{I}} + (5265 - 117 \text{ I}) u_{ol-2+\text{I}} + 5382 \text{ I} u_{ol-1+\text{I}} - (225 + 33 \text{ I}) u_{ol+\text{I}} + (-15 + \text{I}) u_{ol-3} + (-18 + 222 \text{ I}) u_{ol-2} + (225 - 33 \text{ I}) u_{ol-1} - 16 \text{ I} u_{ol} \Big) \Big), \; O(\Delta x_{ol}^2)$$

Formula:, 102, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 15

Error order:, 1, Error:, 0.068060848073829367938, New Error:, 0.0068238668583053410056

Error order:, 1, Error:, 0.0068238668583053410056, New Error:, 0.00068256096712203263279

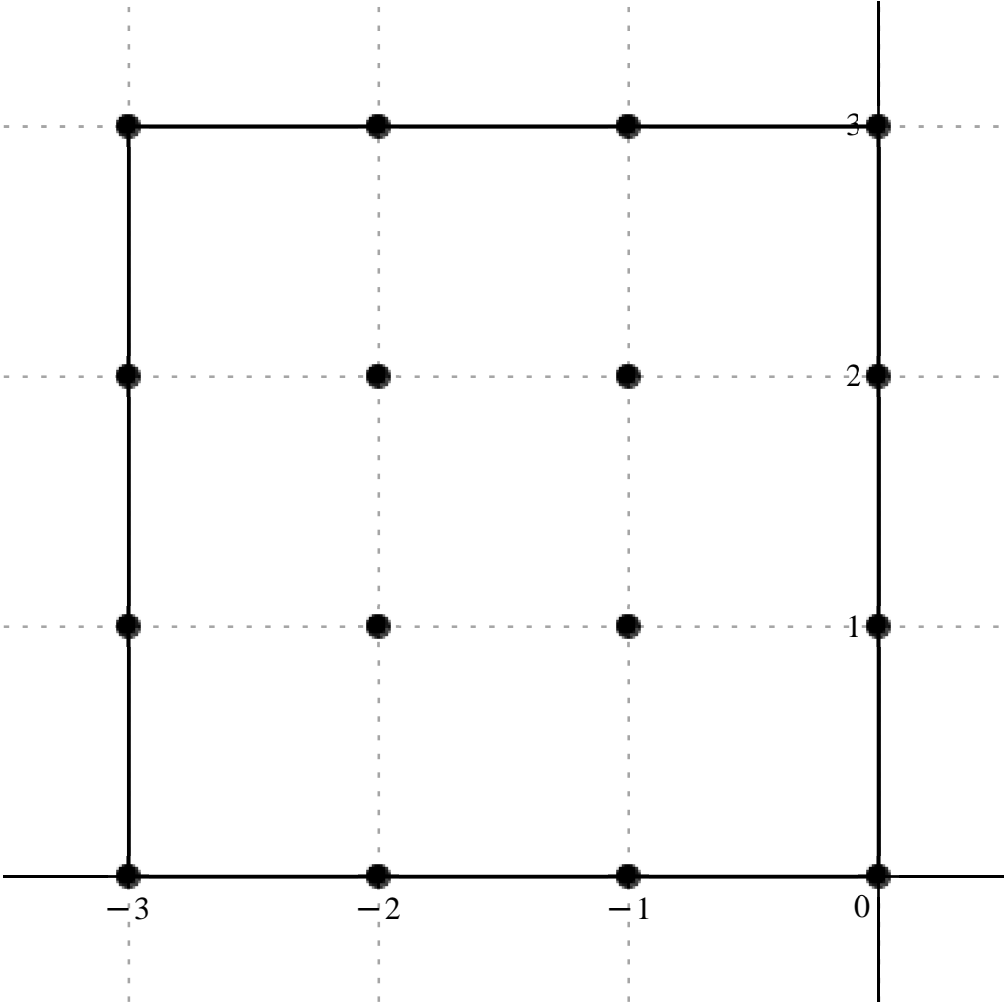
Error order:, 1, Error:, 0.00068256096712203263279, New Error:, 0.000068257835948969291656

Error order:, 1, Error:, 0.000068257835948969291656, New Error:,  $6.8258009836847326558 \times 10^{-6}$

Error order:, 1, Error:,  $6.8258009836847326558 \times 10^{-6}$ , New Error:,  $6.8258027225277107276 \times 10^{-7}$

$$x_o + h \cdot , \begin{bmatrix} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c = , \begin{bmatrix} -2328480 + 2328480 \text{ I} & -37721376 - 29338848 \text{ I} & 37721376 - 29338848 \text{ I} & 2328480 + 2328480 \text{ I} \\ 29338848 + 37721376 \text{ I} & 817296480 - 817296480 \text{ I} & -817296480 - 817296480 \text{ I} & -29338848 + 37721376 \text{ I} \\ 29338848 - 37721376 \text{ I} & 817296480 + 817296480 \text{ I} & -817296480 + 817296480 \text{ I} & -29338848 - 37721376 \text{ I} \\ -2328480 - 2328480 \text{ I} & -37721376 + 29338848 \text{ I} & 37721376 + 29338848 \text{ I} & 2328480 - 2328480 \text{ I} \end{bmatrix}$$



$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}} \; u(x_{ol}) = \frac{1}{\Delta x_{ol}^{15}} \Big( (-2328480 + 2328480 \text{ I}) \; u_{ol-3+3\text{I}} - (37721376 + 29338848 \text{ I}) \; u_{ol-2+3\text{I}} + (37721376 - 29338848 \text{ I}) \; u_{ol-1+3\text{I}} + (2328480 + 2328480 \text{ I}) \; u_{ol+3\text{I}} + (29338848 + 37721376 \text{ I}) \; u_{ol-3+2\text{I}} + (817296480 - 817296480 \text{ I}) \; u_{ol-2+2\text{I}} - (817296480 + 817296480 \text{ I}) \; u_{ol-1+2\text{I}} + (-29338848 + 37721376 \text{ I}) \; u_{ol+2\text{I}} + (29338848 - 37721376 \text{ I}) \; u_{ol+3+1} + (817296480 + 817296480 \text{ I}) \; u_{ol-2+1} + (-817296480 + 817296480 \text{ I}) \; u_{ol-1+1} - (29338848 + 37721376 \text{ I}) \; u_{ol+1} - (2328480 + 2328480 \text{ I}) \; u_{ol-3} + (-37721376 + 29338848 \text{ I}) \; u_{ol-2} + (37721376 + 29338848 \text{ I}) \; u_{ol-1} + (2328480 - 2328480 \text{ I}) \; u_{ol} \Big) \cdot O(\Delta x_{ol})$$

Formula:, 103, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 15, Error:,  $2.3311845292513401724 \times 10^{-37}$ , New Error:,  $2.3204287384393673537 \times 10^{-52}$

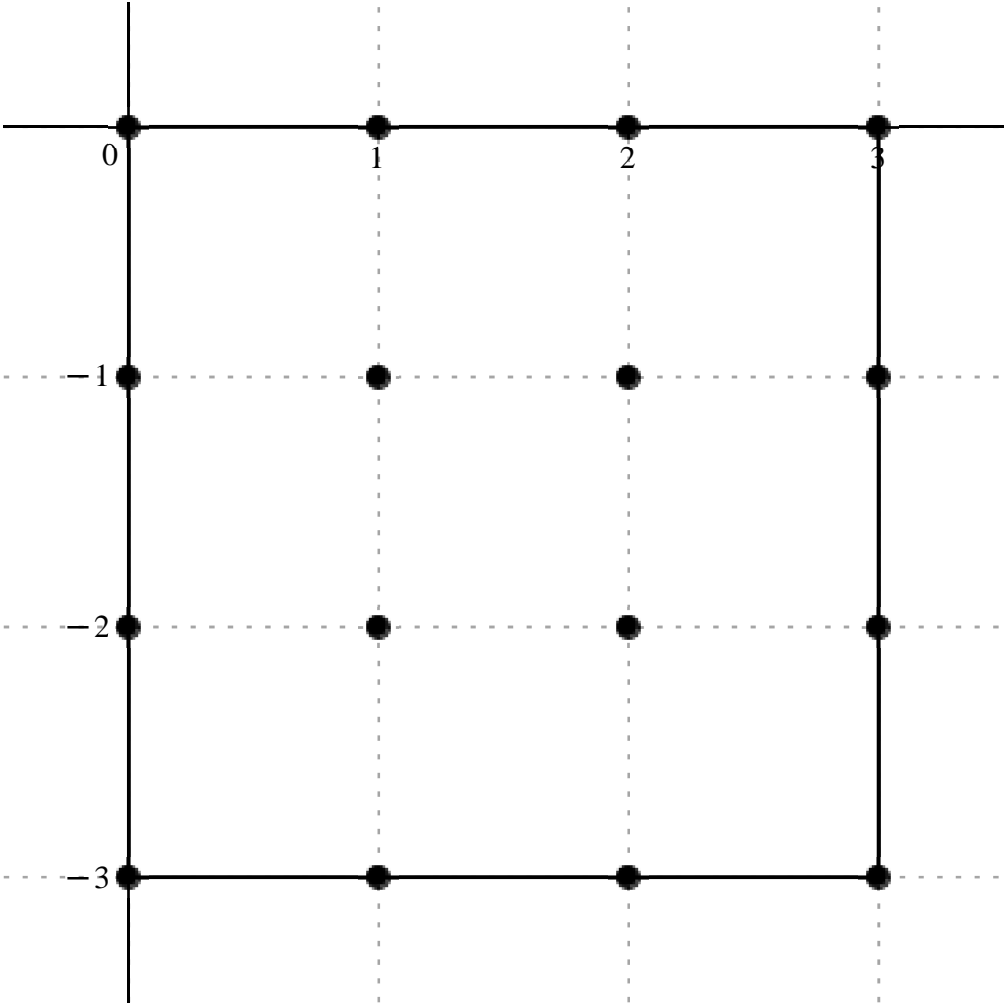
Error order:, 15, Error:,  $2.3204287384393673537 \times 10^{-52}$ , New Error:,  $2.3193202464405475684 \times 10^{-67}$

Error order:, 15, Error:,  $2.3193202464405475684 \times 10^{-67}$ , New Error:,  $2.3192090723782540774 \times 10^{-82}$

Error order:, 15, Error:,  $2.3192090723782540774 \times 10^{-82}$ , New Error:,  $2.3191979517276473536 \times 10^{-97}$

Error order:, 15, Error:,  $2.3191979517276473536 \times 10^{-97}$ , New Error:,  $2.3191968396301471522 \times 10^{-112}$

$$x_o + h., \begin{bmatrix} 0 & 1 & 2 & 3 \\ -1 & 1-1 & 2-1 & 3-1 \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & 3-2\text{ I} \\ -3\text{ I} & 1-3\text{ I} & 2-3\text{ I} & 3-3\text{ I} \end{bmatrix}$$
$$c =, \begin{bmatrix} -\frac{215}{52} - \frac{215\text{ I}}{52} & -\frac{9}{5} - \frac{72\text{ I}}{5} & \frac{36}{5} + \frac{9\text{ I}}{10} & \frac{1}{3} \\ -\frac{72}{5} - \frac{9\text{ I}}{5} & \frac{351}{2} + \frac{351\text{ I}}{2} & \frac{351}{5} - \frac{702\text{ I}}{5} & -\frac{9}{2} - \frac{9\text{ I}}{10} \\ \frac{9}{10} + \frac{36\text{ I}}{5} & -\frac{702}{5} + \frac{351\text{ I}}{5} & -\frac{351}{4} - \frac{351\text{ I}}{4} & \frac{171}{65} - \frac{198\text{ I}}{65} \\ \frac{1}{3} & -\frac{9}{10} - \frac{9\text{ I}}{2} & -\frac{198}{65} + \frac{171\text{ I}}{65} & \frac{1}{6} + \frac{1}{6} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{780\,\Delta x_{ol}}\left(-(3225+3225\text{ I})\,u_{ol}-(1404+11232\text{ I})\,u_{ol+1}+(5616+702\text{ I})\,u_{ol+2}+260\text{ I}u_{ol+3}-(11232+1404\text{ I})\,u_{ol-1}+(136890+136890\text{ I})\,u_{ol+1-1}+(54756-109512\text{ I})\,u_{ol+2-1}-(3510+702\text{ I})\,u_{ol+3-1}+(702+5616\text{ I})\,u_{ol-21}+(-109512+54756\text{ I})\,u_{ol+1-21}-(68445+68445\text{ I})\,u_{ol+2-21}+(2052\right.$$

$$-2376 \operatorname{I} \big) u_{oI+3-21} + 260 u_{oI-31} - (702 + 3510 \operatorname{I}) u_{oI+1-31} + (-2376 + 2052 \operatorname{I}) u_{oI+2-31} + (130 + 130 \operatorname{I}) u_{oI+3-31} \big), \mathcal{O}(\Delta x_o^{15})$$

Formula:, 104, Var:, 1

Variavel :,  $x_o$ , Derivada de Ordem :, 2

Error order:, 14, Error:, 2.9394993612717481874 × 10<sup>−34</sup>, New Error:, 2.8911131312965918518 × 10<sup>−48</sup>

Error order:, 14, Error:, 2.8911131312965918518 × 10<sup>−48</sup>, New Error:, 2.8862869404452177712 × 10<sup>−62</sup>

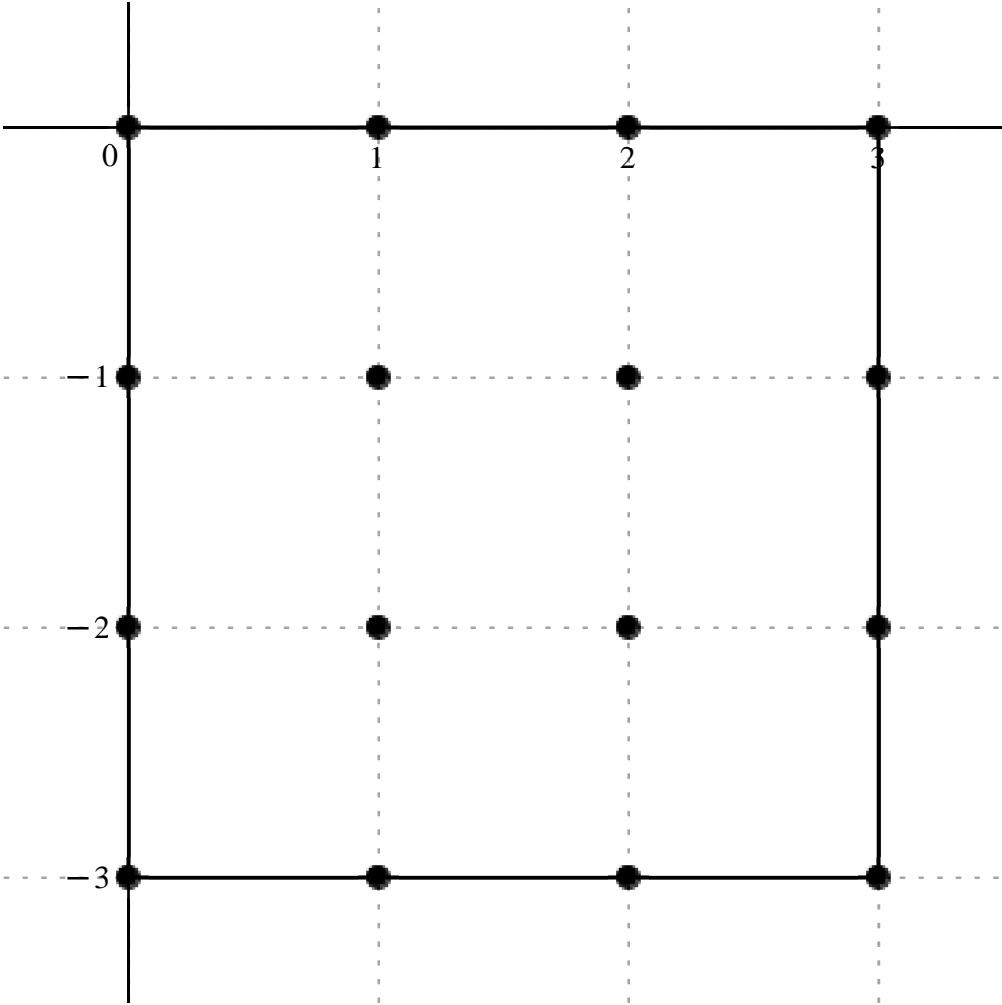
Error order:, 14, Error:, 2.8862869404452177712 × 10<sup>−62</sup>, New Error:, 2.8858044482009918192 × 10<sup>−76</sup>

Error order:, 14, Error:, 2.8858044482009918192 × 10<sup>−76</sup>, New Error:, 2.8857562002474732219 × 10<sup>−90</sup>

Error order:, 14, Error:, 2.8857562002474732219 × 10<sup>−90</sup>, New Error:, 2.8857513754648328946 × 10<sup>−104</sup>

$$x_o+h\cdot,\begin{bmatrix}0&1&2&3\\-\operatorname{I}&1-\operatorname{I}&2-\operatorname{I}&3-\operatorname{I}\\-2\operatorname{I}&1-2\operatorname{I}&2-2\operatorname{I}&3-2\operatorname{I}\\-3\operatorname{I}&1-3\operatorname{I}&2-3\operatorname{I}&3-3\operatorname{I}\end{bmatrix}$$

$$c=,\begin{bmatrix}\frac{96313\operatorname{I}}{2925}&-\frac{14013}{130}+\frac{13671\operatorname{I}}{130}&-\frac{11673}{260}-\frac{17181\operatorname{I}}{260}&\frac{215}{78}-\frac{593\operatorname{I}}{234}\\\frac{14013}{130}+\frac{13671\operatorname{I}}{130}&-\frac{5103\operatorname{I}}{2}&-\frac{81459}{50}+\frac{24813\operatorname{I}}{50}&\frac{8856}{325}+\frac{28089\operatorname{I}}{650}\\\frac{11673}{260}-\frac{17181\operatorname{I}}{260}&\frac{81459}{50}+\frac{24813\operatorname{I}}{50}&\frac{2727\operatorname{I}}{2}&-\frac{5823}{130}+\frac{369\operatorname{I}}{130}\\\frac{215}{78}-\frac{593\operatorname{I}}{234}&-\frac{8856}{325}+\frac{28089\operatorname{I}}{650}&\frac{5823}{130}+\frac{369\operatorname{I}}{130}&-\frac{619\operatorname{I}}{234}\end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u\big(x_{ol}\big) = \frac{1}{11700 \, \Delta x_{ol}^2} \Big( 385252 \, \mathrm{I} \, u_{ol} + \big(-1261170 + 1230390 \, \mathrm{I}\big) \, u_{ol+1} - \big(525285 + 773145 \, \mathrm{I}\big) \, u_{ol+2} + \big(32250 - 29650 \, \mathrm{I}\big) \, u_{ol+3} + \big(1261170 + 1230390 \, \mathrm{I}\big) \, u_{ol-1} - 29852550 \, \mathrm{I} \, u_{ol+1-1} + \big(-19061406 + 5806242 \, \mathrm{I}\big) \, u_{ol+2-1} + \big(318816 + 505602 \, \mathrm{I}\big) \, u_{ol+3-1} + \big(525285 - 773145 \, \mathrm{I}\big) \, u_{ol-21} + \big(19061406 + 5806242 \, \mathrm{I}\big) \, u_{ol+1-21} \\ + 15952950 \, \mathrm{I} \, u_{ol+2-21} + \big(-524070 + 33210 \, \mathrm{I}\big) \, u_{ol+3-21} - \big(32250 + 29650 \, \mathrm{I}\big) \, u_{ol-31} + \big(-318816 + 505602 \, \mathrm{I}\big) \, u_{ol+1-31} + \big(524070 + 33210 \, \mathrm{I}\big) \, u_{ol+2-31} - 30950 \, \mathrm{I} \, u_{ol+3-31} \Big), \, O(\, \Delta x_{ol}^{14} \, )$$

Formula:, 105, Var:., 1

Variavel :, x\_{ol} , Derivada de Ordem :, 3

Error order:., 13, Error:., 1.9030440543382440035 × 10−31, New Error:., 1.8943523174263458447 × 10−44

Error order:., 13, Error:., 1.8943523174263458447 × 10−44, New Error:., 1.8934568038313652854 × 10−57

Error order:., 13, Error:., 1.8934568038313652854 × 10−57, New Error:., 1.8933669924597456671 × 10−70

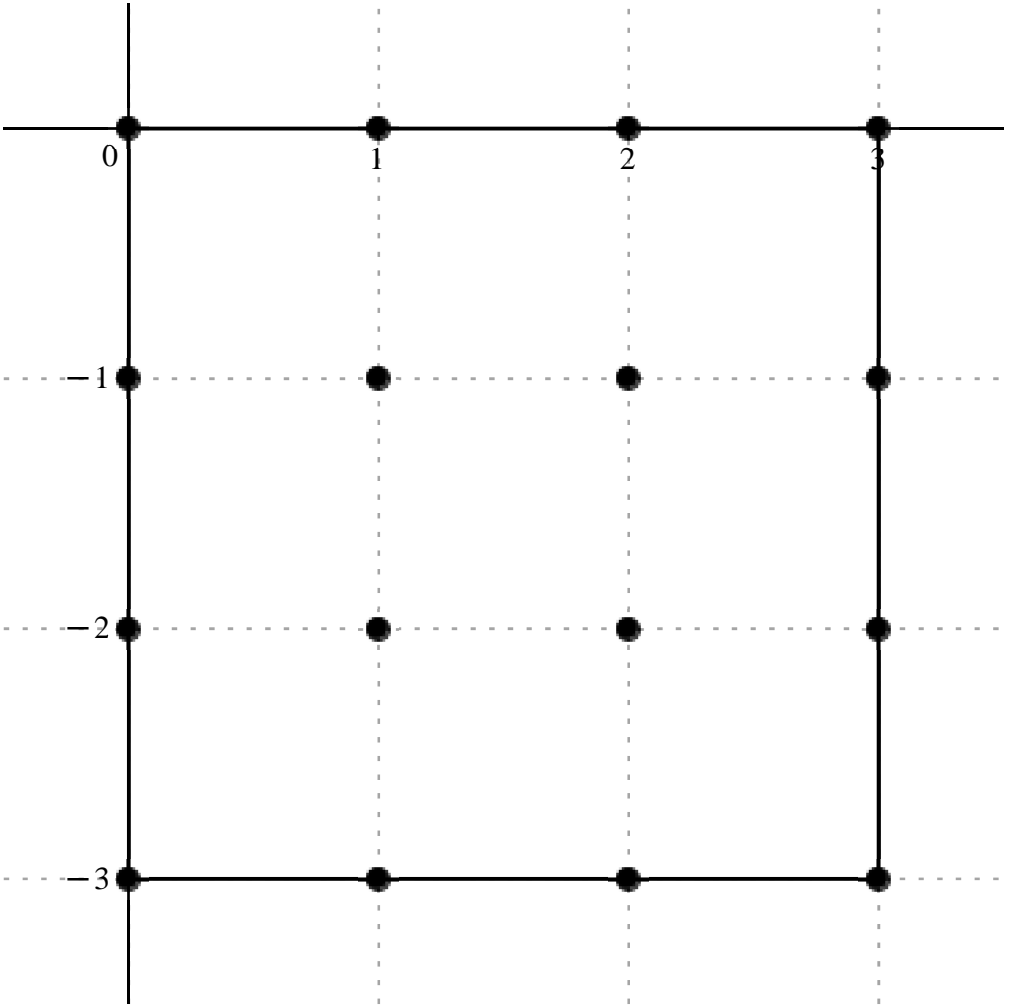
Error order:., 13, Error:., 1.8933669924597456671 × 10−70, New Error:., 1.8933580087258336269 × 10−83

Error order:., 13, Error:., 1.8933580087258336269 × 10−83, New Error:., 1.8933571103264782916 × 10−96

$$x_o \neq h \, , \qquad \left[ \begin{array}{cccc} 0 & 1 & 2 & 3 \\ -1 & 1-1 & 2-1 & 3-1 \\ -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} & 3-2 \, \mathrm{I} \\ -3 \, \mathrm{I} & 1-3 \, \mathrm{I} & 2-3 \, \mathrm{I} & 3-3 \, \mathrm{I} \end{array} \right]$$

$$c = , \qquad \left[ \begin{array}{cccccc} \frac{2905559}{23400} - \frac{2905559 \, \mathrm{I}}{23400} & \frac{274773}{250} + \frac{34419 \, \mathrm{I}}{250} & -\frac{2031231}{13000} + \frac{7957473 \, \mathrm{I}}{13000} & -\frac{13577}{450} - \frac{593 \, \mathrm{I}}{234} \\ -\frac{34419}{250} - \frac{274773 \, \mathrm{I}}{250} & -\frac{1350909}{100} + \frac{1350909 \, \mathrm{I}}{100} & \frac{116163}{10} + \frac{327627 \, \mathrm{I}}{50} & \frac{653019}{6500} - \frac{2583453 \, \mathrm{I}}{6500} \\ -\frac{7957473}{13000} + \frac{2031231 \, \mathrm{I}}{13000} & -\frac{327627}{50} - \frac{116163 \, \mathrm{I}}{10} & \frac{1529109}{200} - \frac{1529109 \, \mathrm{I}}{200} & \frac{872907}{3250} + \frac{783789 \, \mathrm{I}}{3250} \\ \frac{593}{234} + \frac{13577 \, \mathrm{I}}{450} & \frac{2583453}{6500} - \frac{653019 \, \mathrm{I}}{6500} & -\frac{783789}{3250} - \frac{872907 \, \mathrm{I}}{3250} & -\frac{13627}{900} + \frac{13627 \, \mathrm{I}}{900} \end{array} \right]$$





$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{1}{117000 \Delta x_{ol}^3} \big( (14527795 - 14527795 \, \mathrm{I}) \, u_{ol} + (128593764 + 16108092 \, \mathrm{I}) \, u_{ol+1} + (-18281079 + 71617257 \, \mathrm{I}) \, u_{ol+2} - (3530020 + 296500 \, \mathrm{I}) \, u_{ol+3} - (16108092 + 128593764 \, \mathrm{I}) \, u_{ol-1} + (-1580563530 + 1580563530 \, \mathrm{I}) \, u_{ol+1-1} + (1359107100 + 766647180 \, \mathrm{I}) \, u_{ol+2-1} + (11754342 - 46502154 \, \mathrm{I}) \, u_{ol+3-1} + (-71617257 + 18281079 \, \mathrm{I}) \, u_{ol-21} - (766647180 + 1359107100 \, \mathrm{I}) \, u_{ol+1-21} + (894528765 - 894528765 \, \mathrm{I}) \, u_{ol+2-21} + (31424652 + 28216404 \, \mathrm{I}) \, u_{ol+3-21} + (296500 + 3530020 \, \mathrm{I}) \, u_{ol-31} + (46502154 - 11754342 \, \mathrm{I}) \, u_{ol+1-31} - (28216404 + 31424652 \, \mathrm{I}) \, u_{ol+2-31} + (-1771510 + 1771510 \, \mathrm{I}) \, u_{ol+3-31} \big), \, O(\Delta x_{ol}^{13})$$

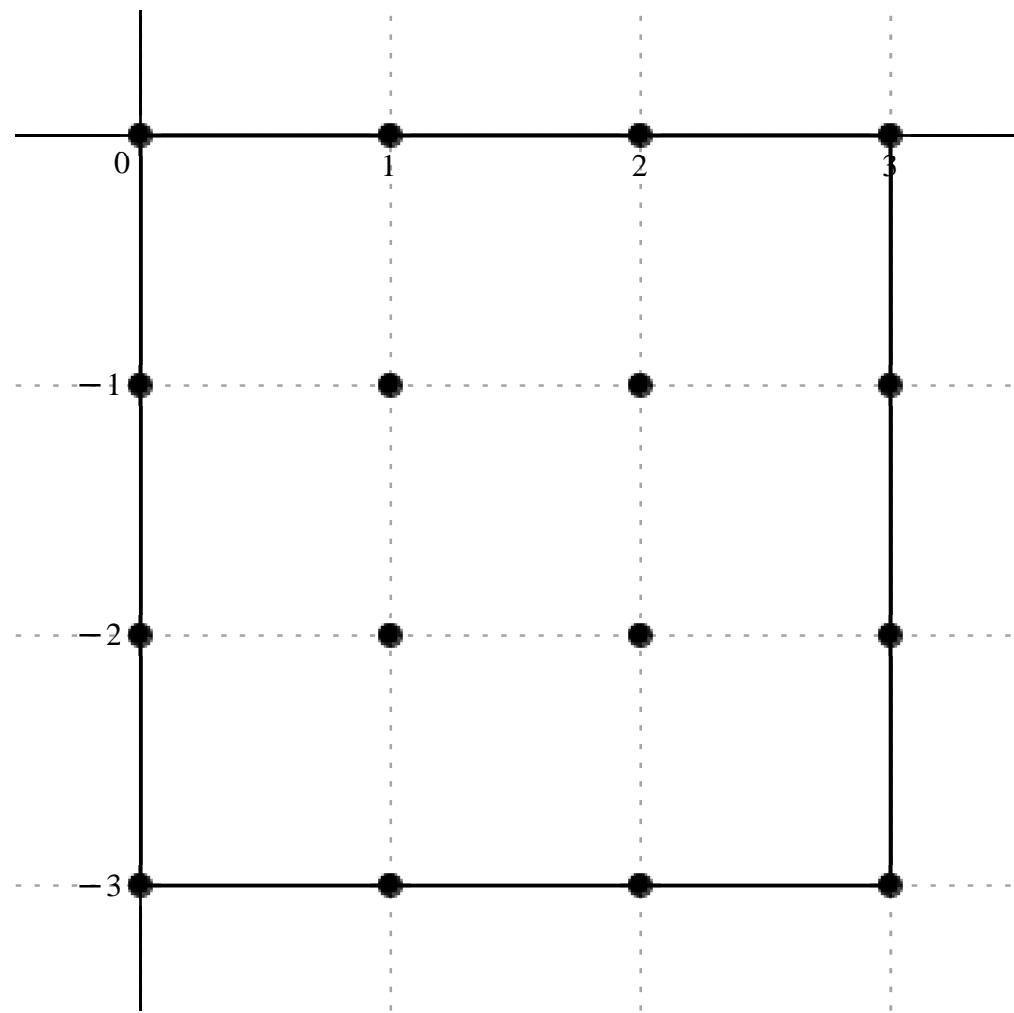
Formula:, 106, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 12, Error:,  $1.4588291833925916272 \times 10^{-28}$ , New Error:,  $1.4350898591253091451 \times 10^{-40}$   
Error order:, 12, Error:,  $1.4350898591253091451 \times 10^{-40}$ , New Error:,  $1.4327219658699600951 \times 10^{-52}$   
Error order:, 12, Error:,  $1.4327219658699600951 \times 10^{-52}$ , New Error:,  $1.4324852381487699219 \times 10^{-64}$   
Error order:, 12, Error:,  $1.4324852381487699219 \times 10^{-64}$ , New Error:,  $1.4324615659938952513 \times 10^{-76}$   
Error order:, 12, Error:,  $1.4324615659938952513 \times 10^{-76}$ , New Error:,  $1.4324591987845814274 \times 10^{-88}$

$$x_o \neq h \text{ , } \begin{bmatrix} 0 & 1 & 2 & 3 \\ -1 & 1-1 & 2-1 & 3-1 \\ -2 \, 1 & 1-2 \, 1 & 2-2 \, 1 & 3-2 \, 1 \\ -3 \, 1 & 1-3 \, 1 & 2-3 \, 1 & 3-3 \, 1 \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{56886}{65} & -\frac{2372367}{650} - \frac{148393 \text{ I}}{26} & \frac{241188}{65} - \frac{619072 \text{ I}}{325} & \frac{16293}{130} + \frac{8109 \text{ I}}{50} \\ -\frac{2372367}{650} + \frac{148393 \text{ I}}{26} & \frac{6014859}{50} & -\frac{1076133}{50} - \frac{4241151 \text{ I}}{50} & -\frac{312327}{130} + \frac{87833 \text{ I}}{65} \\ \frac{241188}{65} + \frac{619072 \text{ I}}{325} & -\frac{1076133}{50} + \frac{4241151 \text{ I}}{50} & -\frac{1796892}{25} & -\frac{69417}{650} - \frac{1580603 \text{ I}}{650} \\ \frac{16293}{130} - \frac{8109 \text{ I}}{50} & -\frac{312327}{130} - \frac{87833 \text{ I}}{65} & -\frac{69417}{650} + \frac{1580603 \text{ I}}{650} & \frac{94491}{650} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{650 \, \Delta x_{ol}^4} \, \big( -568860 \, u_{ol} - (2372367 + 3709825 \, \text{I}) \, u_{ol+1} + (2411880 - 1238144 \, \text{I}) \, u_{ol+2} + (81465 + 105417 \, \text{I}) \, u_{ol+3} + (-2372367 + 3709825 \, \text{I}) \, u_{ol-1} + 78193167 \, u_{ol+1-1} - (13989729 + 55134963 \, \text{I}) \, u_{ol+2-1} + (-1561635 + 878330 \, \text{I}) \, u_{ol+3-1} + (2411880 + 1238144 \, \text{I}) \, u_{ol-21} + (-13989729 + 55134963 \, \text{I}) \, u_{ol+1-21} \\ - 46719192 \, u_{ol+2-21} - (69417 + 1580603 \, \text{I}) \, u_{ol+3-21} + (81465 - 105417 \, \text{I}) \, u_{ol-31} - (1561635 + 878330 \, \text{I}) \, u_{ol+1-31} + (-69417 + 1580603 \, \text{I}) \, u_{ol+2-31} + 94491 \, u_{ol+3-31} \big), \, O( \, \Delta x_{ol}^{12} \, )$$

Formula.: 107, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 5

Error order.: 11, Error.: 6.9665304810677292438 × 10<sup>−26</sup>, New Error.: 6.9351219241342212856 × 10<sup>−37</sup>

Error order.: 11, Error.: 6.9351219241342212856 × 10<sup>−37</sup>, New Error.: 6.9318870301956688698 × 10<sup>−48</sup>

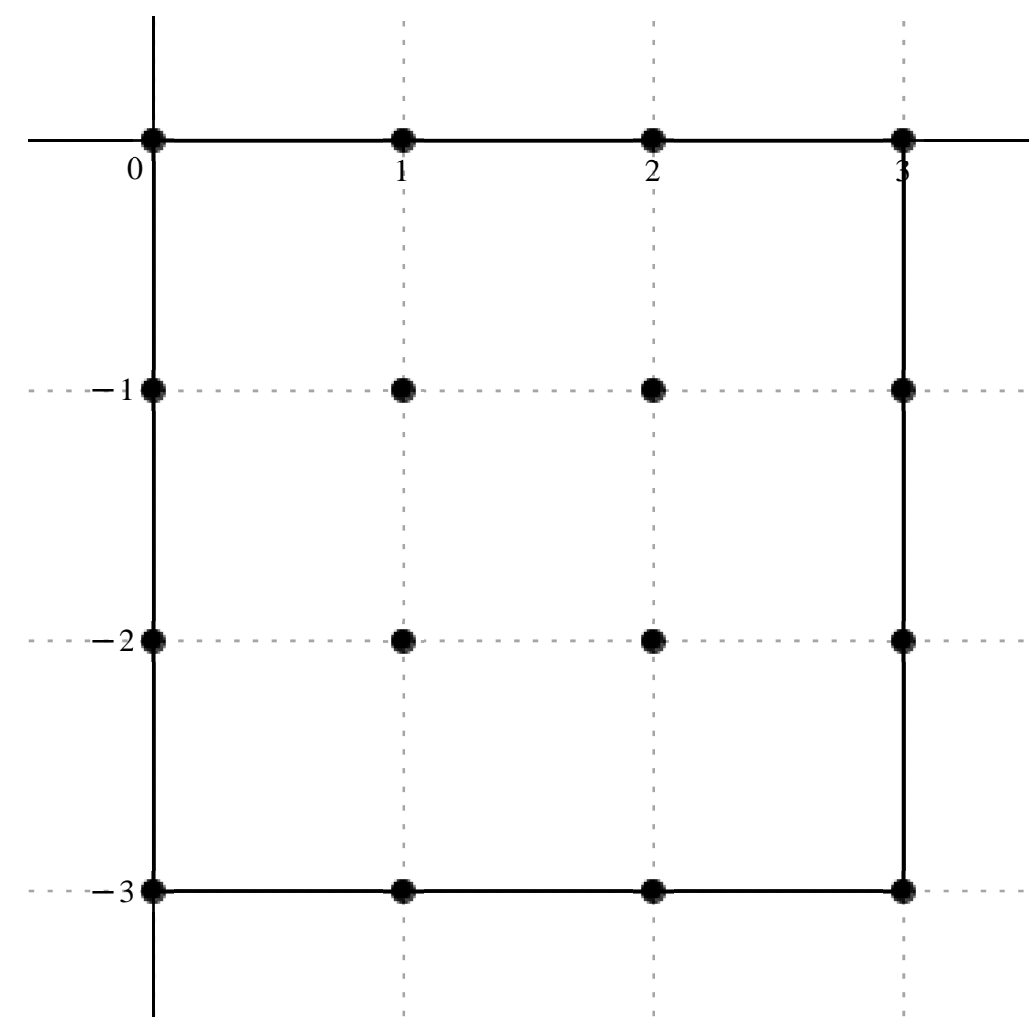
Error order.: 11, Error.: 6.9318870301956688698 × 10<sup>−48</sup>, New Error.: 6.9315626123913911529 × 10<sup>−59</sup>

Error order.: 11, Error.: 6.9315626123913911529 × 10<sup>−59</sup>, New Error.: 6.9315301613387758986 × 10<sup>−70</sup>

Error order.: 11, Error.: 6.9315301613387758986 × 10<sup>−70</sup>, New Error.: 6.9315269161408044095 × 10<sup>−81</sup>

$$x_o + h \cdot , \begin{bmatrix} 0 & 1 & 2 & 3 \\ -1 & 1-1 & 2-1 & 3-1 \\ -2\ 1 & 1-2\ 1 & 2-2\ 1 & 3-2\ 1 \\ -3\ 1 & 1-3\ 1 & 2-3\ 1 & 3-3\ 1 \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{74123}{26} + \frac{74123\ I}{26} & -\frac{1348419}{130} + \frac{4481759\ I}{130} & -\frac{1444926}{65} - \frac{565523\ I}{65} & \frac{5431}{26} - \frac{154481\ I}{130} \\ \frac{4481759}{130} - \frac{1348419\ I}{130} & -\frac{9344361}{20} - \frac{9344361\ I}{20} & -\frac{2654067}{10} + \frac{4232001\ I}{10} & \frac{4007093}{260} + \frac{1238619\ I}{260} \\ -\frac{565523}{65} - \frac{1444926\ I}{65} & \frac{4232001}{10} - \frac{2654067\ I}{10} & \frac{2941359}{10} + \frac{2941359\ I}{10} & -\frac{1269389}{130} + \frac{1357401\ I}{130} \\ -\frac{154481}{130} + \frac{5431\ I}{26} & \frac{1238619}{260} + \frac{4007093\ I}{260} & \frac{1357401}{130} - \frac{1269389\ I}{130} & -\frac{158123}{260} - \frac{158123\ I}{260} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{260 \, \Delta x_{ol}^5} \big( (741230 + 741230\, \mathrm{I}) \, u_{ol} + (-2696838 + 8963518\, \mathrm{I}) \, u_{ol+1} - (5779704 + 2262092\, \mathrm{I}) \, u_{ol+2} + (54310 - 308962\, \mathrm{I}) \, u_{ol+3} + (8963518 - 2696838\, \mathrm{I}) \, u_{ol-1} - (121476693 + 121476693\, \mathrm{I}) \, u_{ol+1-1} + (-69005742 + 110032026\, \mathrm{I}) \, u_{ol+2-1} + (4007093 + 1238619\, \mathrm{I}) \, u_{ol+3-1} - (2262092 + 5779704\, \mathrm{I}) \, u_{ol-21} + (110032026$$

$$- 69005742\, \mathrm{I}) \, u_{ol+1-21} + (76475334 + 76475334\, \mathrm{I}) \, u_{ol+2-21} + (-2538778 + 2714802\, \mathrm{I}) \, u_{ol+3-21} + (-308962 + 54310\, \mathrm{I}) \, u_{ol-31} + (1238619 + 4007093\, \mathrm{I}) \, u_{ol+1-31} + (2714802 - 2538778\, \mathrm{I}) \, u_{ol+2-31} - (158123 + 158123\, \mathrm{I}) \, u_{ol+3-31} \big), \, O( \, \Delta x_{ol}^{11} \, )$$

Formula.: 108, Var.: 1

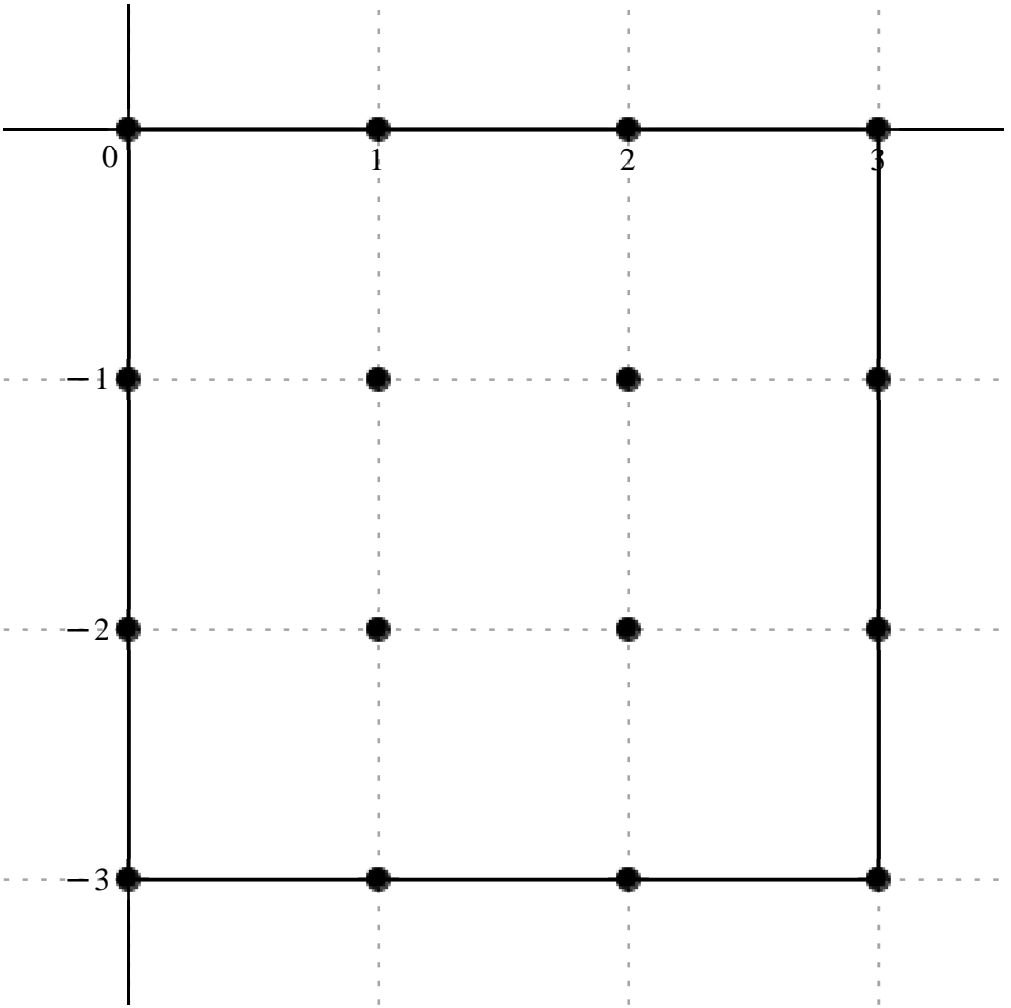
Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 6

Error order.: 10, Error.: 4.1510015093967832765 × 10<sup>−23</sup>, New Error.: 4.0844944470260785186 × 10<sup>−33</sup>

Error order.: 10, Error.: 4.0844944470260785186 × 10<sup>−33</sup>, New Error.: 4.0778604392302296434 × 10<sup>−43</sup>

*Error order:*, 10,    *Error:*,  $4.0778604392302296434 \times 10^{-43}$ ,    *New Error:*,  $4.0771972087482911633 \times 10^{-53}$   
*Error order:*, 10,    *Error:*,  $4.0771972087482911633 \times 10^{-53}$ ,    *New Error:*,  $4.0771308874063552774 \times 10^{-63}$   
*Error order:*, 10,    *Error:*,  $4.0771308874063552774 \times 10^{-63}$ ,    *New Error:*,  $4.0771242552892275468 \times 10^{-73}$

$$x_o + h \cdot , \left[ \begin{array}{cccc} 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} \\ -2\ \mathrm{I} & 1-2\ \mathrm{I} & 2-2\ \mathrm{I} & 3-2\ \mathrm{I} \\ -3\ \mathrm{I} & 1-3\ \mathrm{I} & 2-3\ \mathrm{I} & 3-3\ \mathrm{I} \end{array} \right]$$
$$c = , \left[ \begin{array}{cccc} -\frac{1104562\ \mathrm{I}}{65} & \frac{1992798}{13} - \frac{4566612\ \mathrm{I}}{65} & \frac{5339691}{130} + \frac{14618751\ \mathrm{I}}{130} & -5284 + \frac{216134\ \mathrm{I}}{65} \\ -\frac{1992798}{13} - \frac{4566612\ \mathrm{I}}{65} & \frac{32006547\ \mathrm{I}}{10} & \frac{12287808}{5} - \frac{2518002\ \mathrm{I}}{5} & -\frac{2385243}{65} - \frac{9691041\ \mathrm{I}}{130} \\ -\frac{5339691}{130} + \frac{14618751\ \mathrm{I}}{130} & -\frac{12287808}{5} - \frac{2518002\ \mathrm{I}}{5} & -\frac{10597869\ \mathrm{I}}{5} & \frac{4806558}{65} - \frac{107976\ \mathrm{I}}{65} \\ 5284 + \frac{216134\ \mathrm{I}}{65} & \frac{2385243}{65} - \frac{9691041\ \mathrm{I}}{130} & -\frac{4806558}{65} - \frac{107976\ \mathrm{I}}{65} & \frac{583107\ \mathrm{I}}{130} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{130 \, \Delta x_{ol}^6} \big( -2209124 \, \mathrm{I} \, u_{ol} + (19927980 - 9133224 \, \mathrm{I}) \, u_{ol+1} + (5339691 + 14618751 \, \mathrm{I}) \, u_{ol+2} + (-686920 + 432268 \, \mathrm{I}) \, u_{ol+3} - (19927980 + 9133224 \, \mathrm{I}) \, u_{ol-1} + 416085111 \, \mathrm{I} \, u_{ol+1-1} + (319483008 - 65468052 \, \mathrm{I}) \, u_{ol+2-1} - (4770486 + 9691041 \, \mathrm{I}) \, u_{ol+3-1} + (-5339691 + 14618751 \, \mathrm{I}) \, u_{ol-21} - (319483008$$
$$+ 65468052 \, \mathrm{I}) \, u_{ol+1-21} - 275544594 \, \mathrm{I} \, u_{ol+2-21} + (9613116 - 215952 \, \mathrm{I}) \, u_{ol+3-21} + (686920 + 432268 \, \mathrm{I}) \, u_{ol-31} + (4770486 - 9691041 \, \mathrm{I}) \, u_{ol+1-31} - (9613116 + 215952 \, \mathrm{I}) \, u_{ol+2-31} + 583107 \, \mathrm{I} \, u_{ol+3-31} \big) \cdot O( \, \Delta x_{ol}^{10} \, )$$

Formula:, 109, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 7

Error order:, 9, Error:.,  $1.5649628804308115058 \times 10^{-20}$ , New Error:.,  $1.5580351756802491199 \times 10^{-29}$

Error order:, 9, Error:.,  $1.5580351756802491199 \times 10^{-29}$ , New Error:.,  $1.5573220037293353214 \times 10^{-38}$

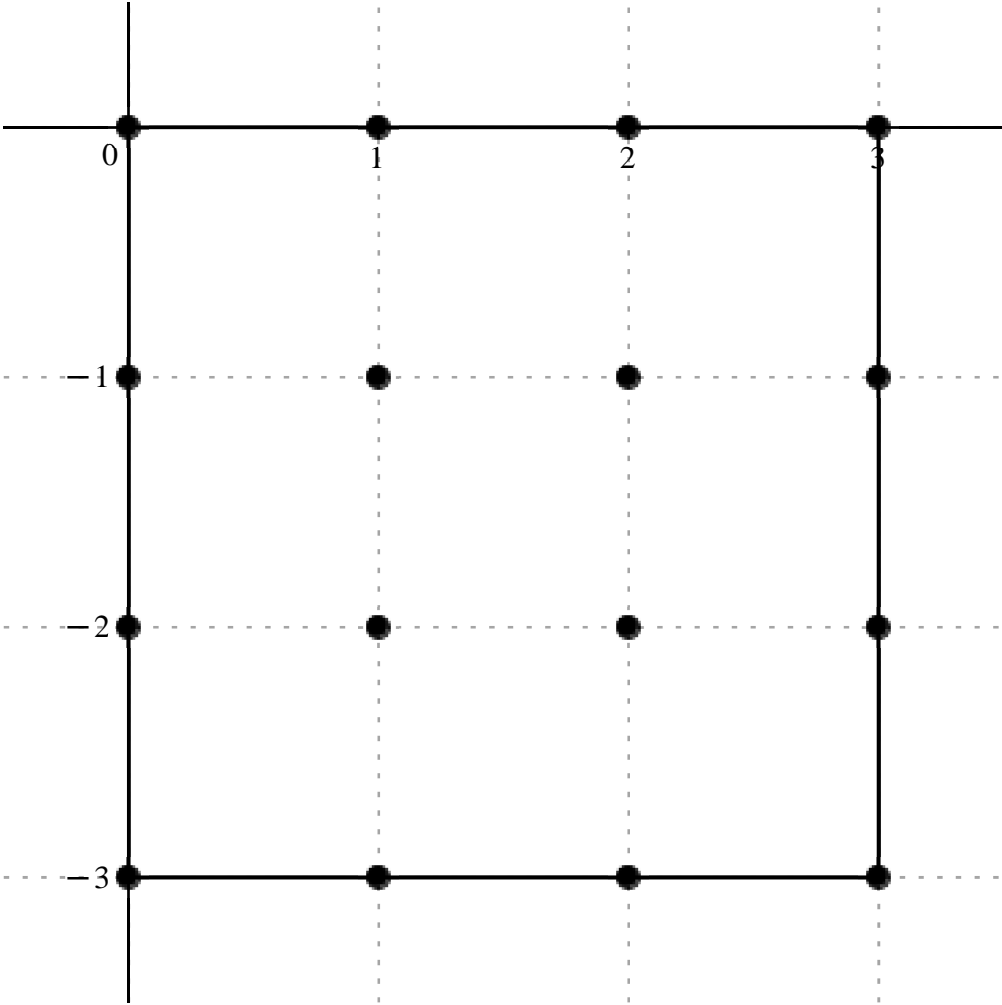
Error order:, 9, Error:.,  $1.5573220037293353214 \times 10^{-38}$ , New Error:.,  $1.5572504850824760701 \times 10^{-47}$

Error order:, 9, Error:.,  $1.5572504850824760701 \times 10^{-47}$ , New Error:.,  $1.5572433312058237561 \times 10^{-56}$

Error order:, 9, Error:.,  $1.5572433312058237561 \times 10^{-56}$ , New Error:.,  $1.5572426157980414109 \times 10^{-65}$

$$x_o \neq h. , \left[ \begin{array}{cccc} 0 & 1 & 2 & 3 \\ -1 & 1-1 & 2-1 & 3-1 \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & 3-2 \text{ I} \\ -3 \text{ I} & 1-3 \text{ I} & 2-3 \text{ I} & 3-3 \text{ I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{35749511}{780} + \frac{35749511 \text{ I}}{780} & -\frac{207959598}{325} - \frac{90244014 \text{ I}}{325} & \frac{326063997}{1300} - \frac{601742211 \text{ I}}{1300} & \frac{5327714}{195} + \frac{1512938 \text{ I}}{195} \\ \frac{90244014}{325} + \frac{207959598 \text{ I}}{325} & \frac{193478607}{20} - \frac{193478607 \text{ I}}{20} & -\frac{45573822}{5} - \frac{31599918 \text{ I}}{5} & -\frac{171517731}{1300} + \frac{458968797 \text{ I}}{1300} \\ \frac{601742211}{1300} - \frac{326063997 \text{ I}}{1300} & \frac{31599918}{5} + \frac{45573822 \text{ I}}{5} & -\frac{26915427}{4} + \frac{26915427 \text{ I}}{4} & -\frac{78359694}{325} - \frac{76695318 \text{ I}}{325} \\ -\frac{1512938}{195} - \frac{5327714 \text{ I}}{195} & -\frac{458968797}{1300} + \frac{171517731 \text{ I}}{1300} & \frac{76695318}{325} + \frac{78359694 \text{ I}}{325} & \frac{11382119}{780} - \frac{11382119 \text{ I}}{780} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \; u(x_{ol}) = \frac{1}{3900 \, \Delta x_{ol}^7} \Big( 7 \, \big( (-25535365 + 25535365 \text{ I}) \, u_{ol} - (356502168 + 154704024 \text{ I}) \, u_{ol+1} + (139741713 - 257889519 \text{ I}) \, u_{ol+2} + (15222040 + 4322680 \text{ I}) \, u_{ol+3} + (154704024 + 356502168 \text{ I}) \, u_{ol-1} + (5389761195 - 5389761195 \text{ I}) \, u_{ol+1-1} - (5078225880 + 3521133720 \text{ I}) \, u_{ol+2-1} + (-73507599 + 196700913 \text{ I}) \, u_{ol+3-1}$$

$$+ (257889519 - 139741713 \text{ I}) \, u_{ol-21} + (3521133720 + 5078225880 \text{ I}) \, u_{ol+1-21} + (-3748934475 + 3748934475 \text{ I}) \, u_{ol+2-21} - (134330904 + 131477688 \text{ I}) \, u_{ol+3-21} - (4322680 + 15222040 \text{ I}) \, u_{ol-31} + (-196700913 + 73507599 \text{ I}) \, u_{ol+1-31} + (131477688 + 134330904 \text{ I}) \, u_{ol+2-31} + (8130085 - 8130085 \text{ I}) \, u_{ol+3-31} \big) \Big) , \; O( \, \Delta x_{ol}^9 \, )$$

Formula:, 110, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 8, Error:,  $7.3506428720905313807 \times 10^{-18}$ , New Error:,  $7.2355183261987731610 \times 10^{-26}$

Error order:, 8, Error:,  $7.2355183261987731610 \times 10^{-26}$ , New Error:,  $7.2240342457370144636 \times 10^{-34}$

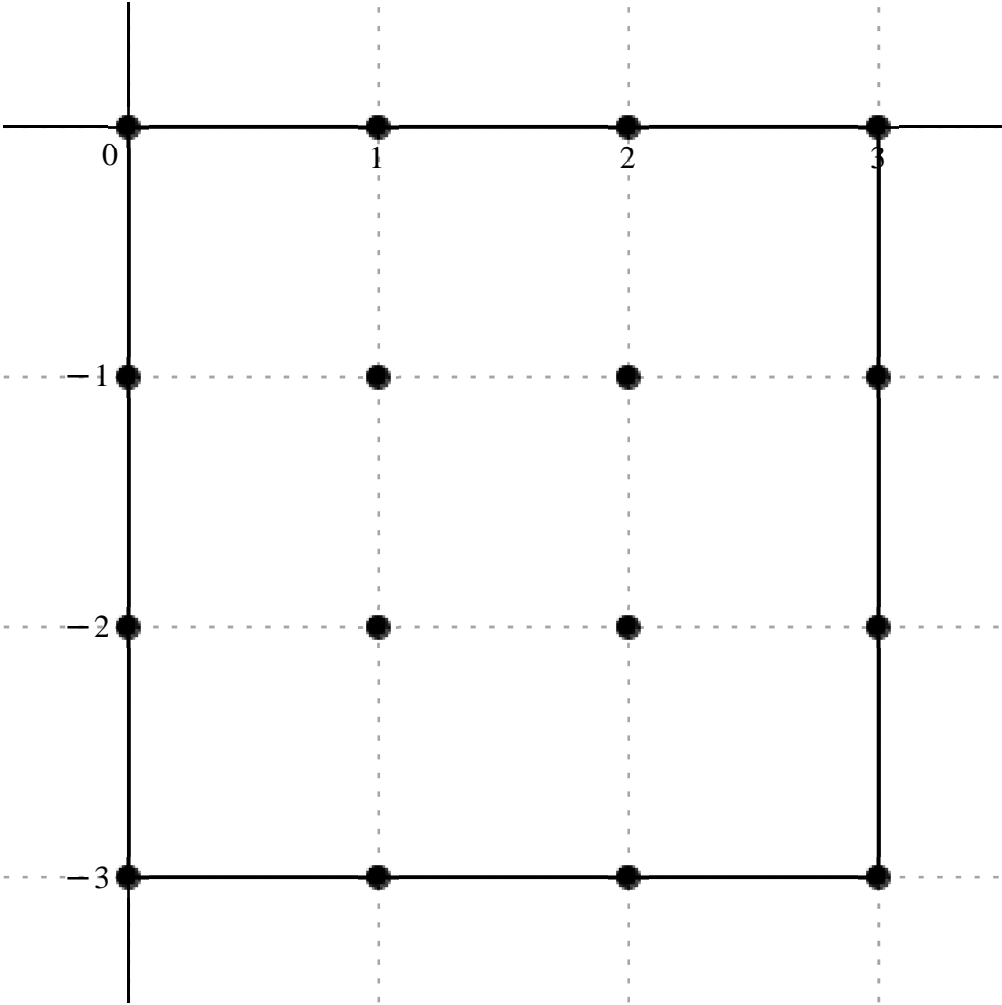
Error order:, 8, Error:,  $7.2240342457370144636 \times 10^{-34}$ , New Error:,  $7.2228861269708969242 \times 10^{-42}$

Error order:, 8, Error:,  $7.2228861269708969242 \times 10^{-42}$ , New Error:,  $7.2227713179925721848 \times 10^{-50}$

Error order:, 8, Error:,  $7.2227713179925721848 \times 10^{-50}$ , New Error:,  $7.2227598371237280623 \times 10^{-58}$

$$x_o + h \cdot , \begin{bmatrix} 0 & 1 & 2 & 3 \\ -I & 1-I & 2-I & 3-I \\ -2\ I & 1-2\ I & 2-2\ I & 3-2\ I \\ -3\ I & 1-3\ I & 2-3\ I & 3-3\ I \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{2871792}{13} & \frac{53359362}{65} + \frac{31181094\ I}{13} & -\frac{25566912}{13} + \frac{29799504\ I}{65} & -\frac{641718}{13} - \frac{507654\ I}{5} \\ \frac{53359362}{65} - \frac{31181094\ I}{13} & -\frac{256533984}{5} & \frac{33421878}{5} + \frac{212056866\ I}{5} & \frac{17951472}{13} - \frac{7516656\ I}{13} \\ -\frac{25566912}{13} - \frac{29799504\ I}{65} & \frac{33421878}{5} - \frac{212056866\ I}{5} & \frac{187168464}{5} & -\frac{154098}{65} + \frac{87691338\ I}{65} \\ -\frac{641718}{13} + \frac{507654\ I}{5} & \frac{17951472}{13} + \frac{7516656\ I}{13} & -\frac{154098}{65} - \frac{87691338\ I}{65} & -\frac{5414976}{65} \end{bmatrix}$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{65 \, \Delta x_{ol}^8} \Big( 126 \, \big( 113960 \, u_{ol} + (423487 + 1237345 \, \mathrm{I}) \, u_{ol+1} + (-1014560 + 236504 \, \mathrm{I}) \, u_{ol+2} - (25465 + 52377 \, \mathrm{I}) \, u_{ol+3} + (423487 - 1237345 \, \mathrm{I}) \, u_{ol-1} - 26467792 \, u_{ol+1-1} + (3448289 + 21878883 \, \mathrm{I}) \, u_{ol+2-1} + (712360 - 298280 \, \mathrm{I}) \, u_{ol+3-1} - (1014560 + 236504 \, \mathrm{I}) \, u_{ol-21} + (3448289 - 21878883 \, \mathrm{I}) \, u_{ol+1-21} \big) \Big)$$

$$+19311032\,u_{oI+2-21}+(-1223+695963\,\mathrm{I})\,u_{oI+3-21}+(-25465+52377\,\mathrm{I})\,u_{oI-31}+(712360+298280\,\mathrm{I})\,u_{oI+1-31}-(1223+695963\,\mathrm{I})\,u_{oI+2-31}-42976\,u_{oI+3-31}))\,,\,O(\,\Delta x_{oI}^8\,)$$

Formula:, 111, Var:, 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 9

Error order:, 7, Error:, 2.1614071323601184536 × 10<sup>−15</sup>, New Error:, 2.1521026503529015634 × 10<sup>−22</sup>

Error order:, 7, Error:, 2.1521026503529015634 × 10<sup>−22</sup>, New Error:, 2.1511454538340969343 × 10<sup>−29</sup>

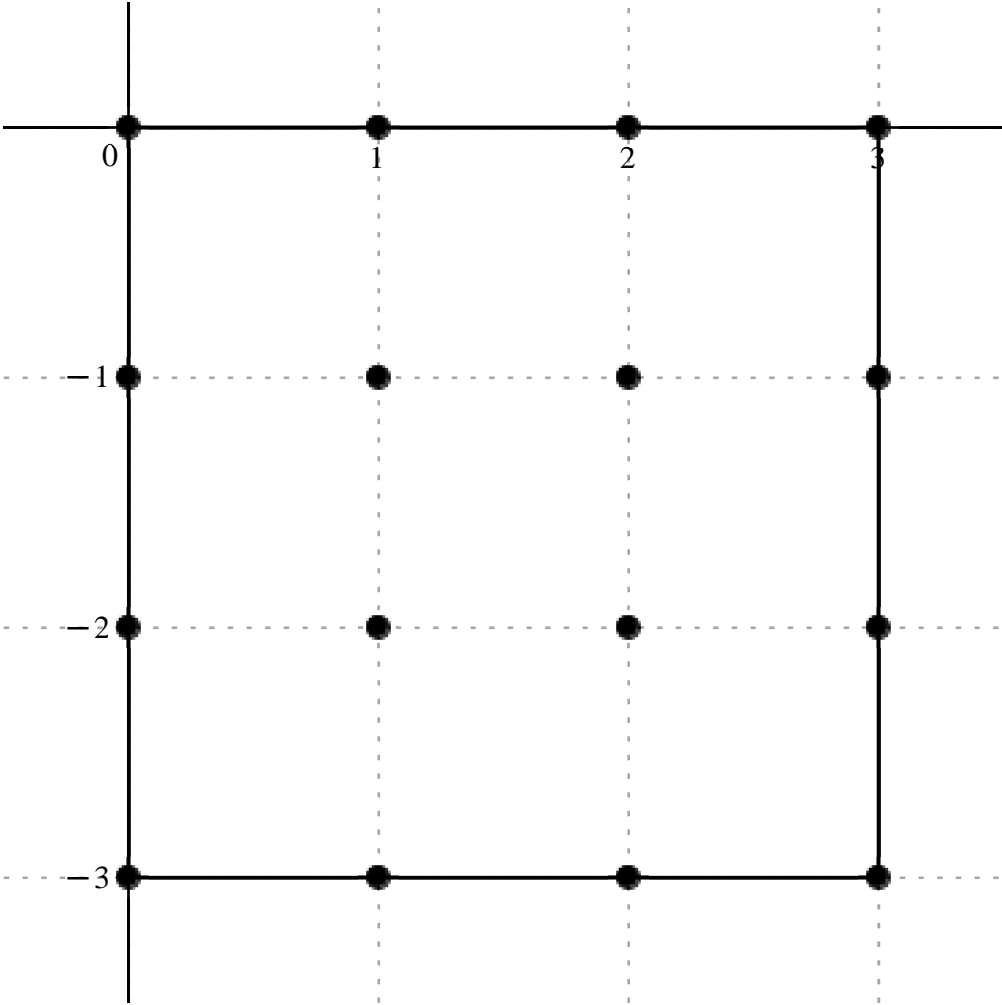
Error order:, 7, Error:, 2.1511454538340969343 × 10<sup>−29</sup>, New Error:, 2.1510494699970326397 × 10<sup>−36</sup>

Error order:, 7, Error:, 2.1510494699970326397 × 10<sup>−36</sup>, New Error:, 2.1510398689747575468 × 10<sup>−43</sup>

Error order:, 7, Error:, 2.1510398689747575468 × 10<sup>−43</sup>, New Error:, 2.1510389088461476325 × 10<sup>−50</sup>

$$x_o\neq h\,.,\left[\begin{array}{cccc}0&1&2&3\\-1&1-1&2-1&3-1\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}&3-2\,\mathrm{I}\\-3\,\mathrm{I}&1-3\,\mathrm{I}&2-3\,\mathrm{I}&3-3\,\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} -\frac{6087312}{13}-\frac{6087312\,\mathrm{I}}{13} & \frac{247619106}{65}-\frac{457771986\,\mathrm{I}}{65} & \frac{355205088}{65}+\frac{250405344\,\mathrm{I}}{65} & -\frac{1925154}{13}+\frac{23278374\,\mathrm{I}}{65} \\ -\frac{457771986}{65}+\frac{247619106\,\mathrm{I}}{65} & \frac{590210712}{5}+\frac{590210712\,\mathrm{I}}{5} & \frac{436461858}{5}-\frac{572126814\,\mathrm{I}}{5} & -\frac{305368056}{65}-\frac{137000808\,\mathrm{I}}{65} \\ \frac{250405344}{65}+\frac{355205088\,\mathrm{I}}{65} & -\frac{572126814}{5}+\frac{436461858\,\mathrm{I}}{5} & -\frac{451177776}{5}-\frac{451177776\,\mathrm{I}}{5} & \frac{218237166}{65}-\frac{211741614\,\mathrm{I}}{65} \\ \frac{23278374}{65}-\frac{1925154\,\mathrm{I}}{13} & -\frac{137000808}{65}-\frac{305368056\,\mathrm{I}}{65} & -\frac{211741614}{65}+\frac{218237166\,\mathrm{I}}{65} & \frac{13415976}{65}+\frac{13415976\,\mathrm{I}}{65} \end{array}\right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9}u\big(x_{ol}\big)=\frac{1}{65\,\mathcal{A}x_{ol}^9}\Big(378\,\Big(-(80520+80520\,\mathrm{I})\,u_{ol}+(655077-1211037\,\mathrm{I})\,u_{ol+1}+(939696+662448\,\mathrm{I})\,u_{ol+2}+(-25465+61583\,\mathrm{I})\,u_{ol+3}+(-1211037+655077\,\mathrm{I})\,u_{ol-1}+(20298252+20298252\,\mathrm{I})\,u_{ol+1-1}+(15010593-19676319\,\mathrm{I})\,u_{ol+2-1}-(807852+362436\,\mathrm{I})\,u_{ol+3-1}+(662448+939696\,\mathrm{I})\,u_{ol-21}+( -19676319+15010593\,\mathrm{I})\,u_{ol+1-21}-(15516696+15516696\,\mathrm{I})\,u_{ol+2-21}+(577347-560163\,\mathrm{I})\,u_{ol+3-21}+(61583-25465\,\mathrm{I})\,u_{ol-31}-(362436+807852\,\mathrm{I})\,u_{ol+1-31}+(-560163+577347\,\mathrm{I})\,u_{ol+2-31}+(35492+35492\,\mathrm{I})\,u_{ol+3-31}\Big)\Big),\,O(\,\mathcal{A}x_{ol}^7\,)$$

Formula:, 112, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 10

Error order:, 6, Error:, 7.7532076332070673618 × 10<sup>−13</sup>, New Error:, 7.6361271275512219274 × 10<sup>−19</sup>

Error order:, 6, Error:, 7.6361271275512219274 × 10<sup>−19</sup>, New Error:, 7.6244471305989240614 × 10<sup>−25</sup>

Error order:, 6, Error:, 7.6244471305989240614 × 10<sup>−25</sup>, New Error:, 7.6232794167877912831 × 10<sup>−31</sup>

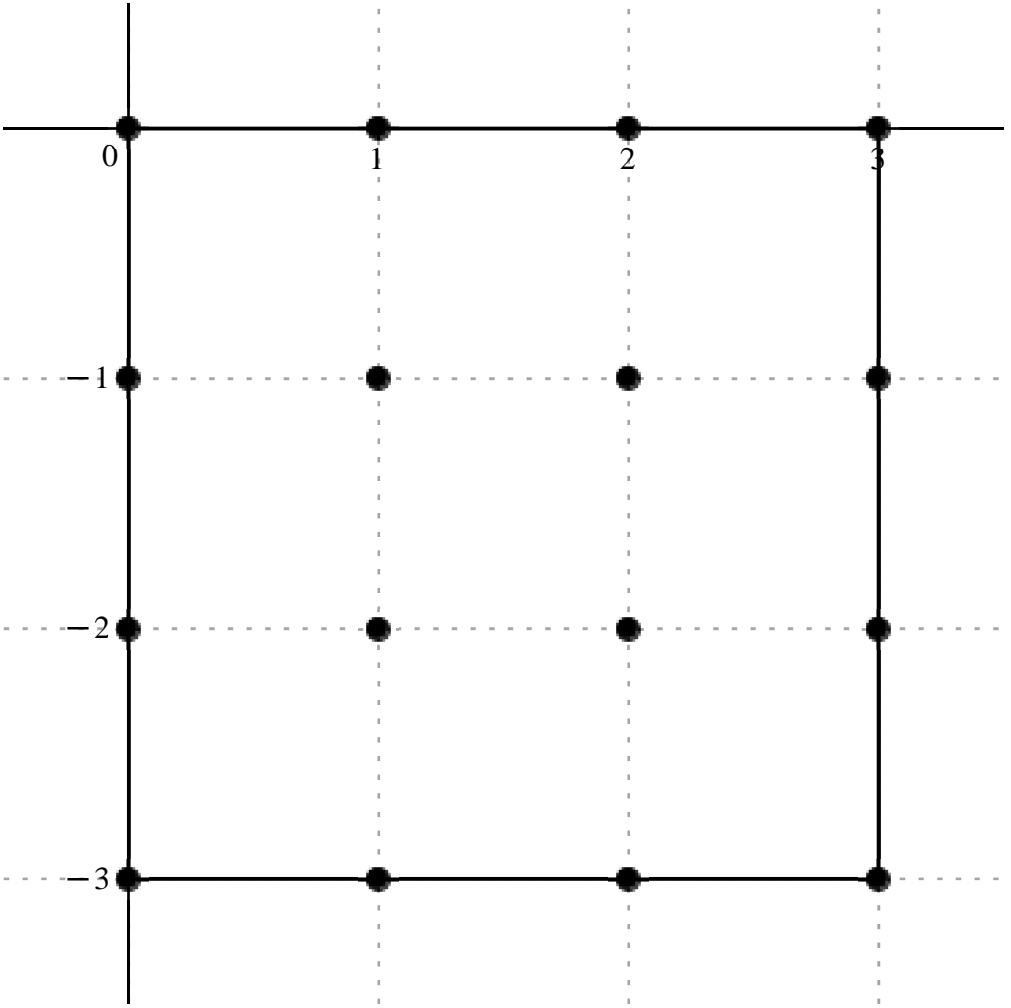
Error order:, 6, Error:, 7.6232794167877912831 × 10<sup>−31</sup>, New Error:, 7.6231626482708173241 × 10<sup>−37</sup>

Error order:, 6, Error:, 7.6231626482708173241 × 10<sup>−37</sup>, New Error:, 7.6231509714477666148 × 10<sup>−43</sup>

$$x_o\neq h\,,\left[\begin{array}{cccc}0&1&2&3\\-1&1-1&2-1&3-1\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}&3-2\,\mathrm{I}\\-3\,\mathrm{I}&1-3\,\mathrm{I}&2-3\,\mathrm{I}&3-3\,\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{ccccc}\frac{22238496\,\mathrm{I}}{13}&-\frac{271763100}{13}+\frac{70600572\,\mathrm{I}}{13}&-\frac{28295568}{13}-\frac{242666928\,\mathrm{I}}{13}&1067220-\frac{4772124\,\mathrm{I}}{13}&\\\frac{271763100}{13}+\frac{70600572\,\mathrm{I}}{13}&-463152816\,\mathrm{I}&-408124332+45598140\,\mathrm{I}&\frac{63322560}{13}+\frac{185440752\,\mathrm{I}}{13}&\\\frac{28295568}{13}-\frac{242666928\,\mathrm{I}}{13}&408124332+45598140\,\mathrm{I}&370609344\,\mathrm{I}&-\frac{179695908}{13}-\frac{5291244\,\mathrm{I}}{13}&\\-1067220-\frac{4772124\,\mathrm{I}}{13}&-\frac{63322560}{13}+\frac{185440752\,\mathrm{I}}{13}&\frac{179695908}{13}-\frac{5291244\,\mathrm{I}}{13}&-\frac{11347056\,\mathrm{I}}{13}&\end{array}\right]$$





$$\frac{d^{10}}{dx_{ol}^{10}} u(x_{ol}) = \frac{1}{13 \Delta x_{ol}^{10}} \Big( 252 \left( 88248 \, I u_{ol} + (-1078425 + 280161 \, I) u_{ol+1} - (112284 + 962964 \, I) u_{ol+2} + (55055 - 18937 \, I) u_{ol+3} + (1078425 + 280161 \, I) u_{ol-1} - 23892804 \, I u_{ol+1-1} + (-21054033 + 2352285 \, I) u_{ol+2-1} + (251280 + 735876 \, I) u_{ol+3-1} + (112284 - 962964 \, I) u_{ol-21} + (21054033 + 2352285 \, I) u_{ol+1-21} \right. \\ \left. + 19118736 \, I u_{ol+2-21} - (713079 + 20997 \, I) u_{ol+3-21} - (55055 + 18937 \, I) u_{ol-31} + (-251280 + 735876 \, I) u_{ol+1-31} + (713079 - 20997 \, I) u_{ol+2-31} - 45028 \, I u_{ol+3-31} \right) \Big), \, O(\Delta x_{ol}^6)$$

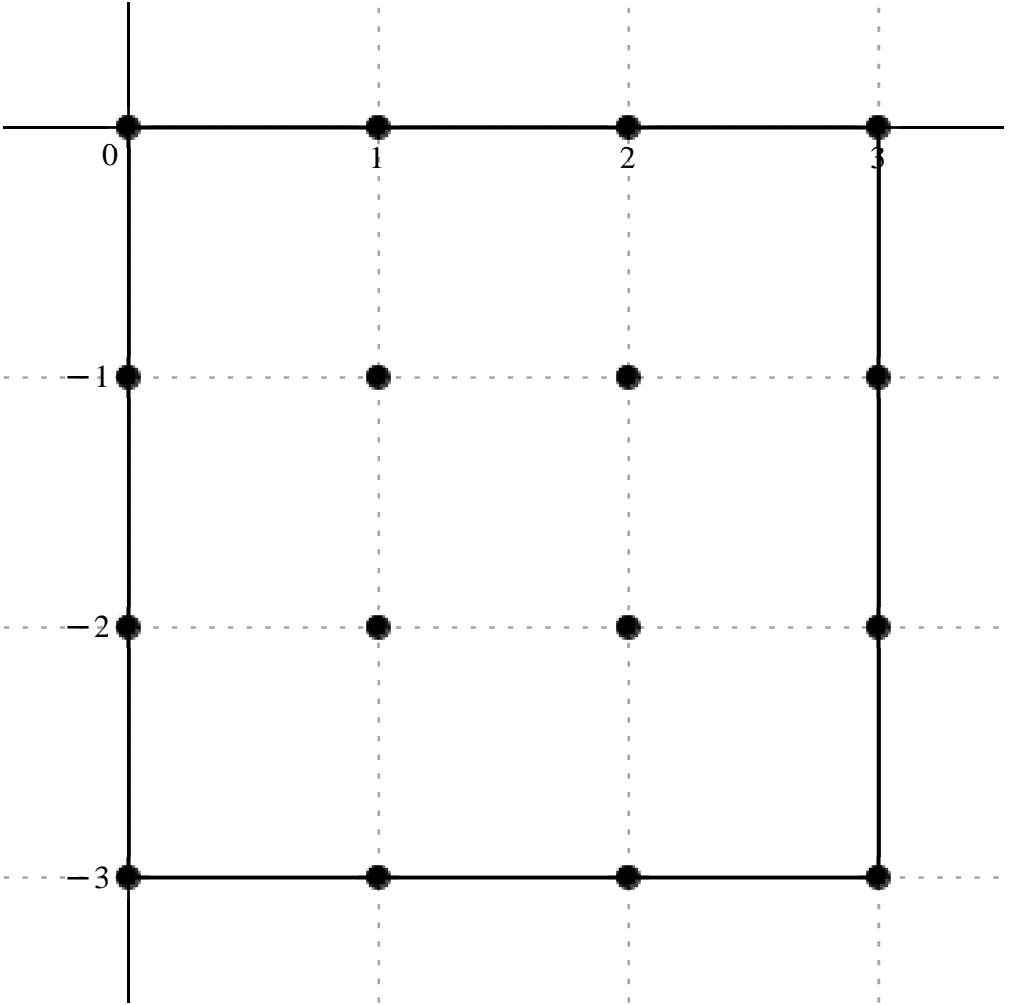
Formula:, 113, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 11

Error order:, 5, Error:,  $1.6902674326486942180 \times 10^{-10}$ , New Error:,  $1.6833324088646612175 \times 10^{-15}$   
Error order:, 5, Error:,  $1.6833324088646612175 \times 10^{-15}$ , New Error:,  $1.6826197226901494735 \times 10^{-20}$   
Error order:, 5, Error:,  $1.6826197226901494735 \times 10^{-20}$ , New Error:,  $1.6825482645338906508 \times 10^{-25}$   
Error order:, 5, Error:,  $1.6825482645338906508 \times 10^{-25}$ , New Error:,  $1.6825411168251657446 \times 10^{-30}$   
Error order:, 5, Error:,  $1.6825411168251657446 \times 10^{-30}$ , New Error:,  $1.6825404020353645518 \times 10^{-35}$

$$x_o \neq h \text{ , } \begin{bmatrix} 0 & 1 & 2 & 3 \\ -1 & 1-1 & 2-1 & 3-1 \\ -2 \, 1 & 1-2 \, 1 & 2-2 \, 1 & 3-2 \, 1 \\ -3 \, 1 & 1-3 \, 1 & 2-3 \, 1 & 3-3 \, 1 \end{bmatrix}$$

$$c = , \left[ \begin{array}{cccccc} \frac{34038312}{13} - \frac{34038312 \text{ I}}{13} & \frac{2665918332}{65} + \frac{1681420356 \text{ I}}{65} & -\frac{1878933672}{65} + \frac{2133103896 \text{ I}}{65} & -\frac{30670332}{13} - \frac{17497788 \text{ I}}{13} \\ -\frac{1681420356}{65} - \frac{2665918332 \text{ I}}{65} & -755076168 + 755076168 \text{ I} & 745870356 + 623724948 \text{ I} & \frac{1125703656}{65} - \frac{2095981272 \text{ I}}{65} \\ -\frac{2133103896}{65} + \frac{1878933672 \text{ I}}{65} & -623724948 - 745870356 \text{ I} & 632032632 - 632032632 \text{ I} & \frac{1489819716}{65} + \frac{1630077372 \text{ I}}{65} \\ \frac{17497788}{13} + \frac{30670332 \text{ I}}{13} & \frac{2095981272}{65} - \frac{1125703656 \text{ I}}{65} & -\frac{1630077372}{65} - \frac{1489819716 \text{ I}}{65} & -\frac{19967640}{13} + \frac{19967640 \text{ I}}{13} \end{array} \right]$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d} x_{o l}^{11}} \; u(x_{o l}) = \frac{1}{65 \; \Delta x_{o l}^{11}} \Big( 924 \; \Big( (184190 - 184190 \; \text{I}) \; u_{o l} + (2885193 + 1819719 \; \text{I}) \; u_{o l + 1} + ( -2033478 + 2308554 \; \text{I}) \; u_{o l + 2} - (165965 + 94685 \; \text{I}) \; u_{o l + 3} - (1819719 + 2885193 \; \text{I}) \; u_{o l - 1} + ( -53116830 + 53116830 \; \text{I}) \; u_{o l + 1 - 1} + (52469235 + 43876755 \; \text{I}) \; u_{o l + 2 - 1} + (1218294 - 2268378 \; \text{I}) \; u_{o l + 3 - 1} + ( -2308554 + 2033478 \; \text{I}) \; u_{o l - 21} \\ - (43876755 + 52469235 \; \text{I}) \; u_{o l + 1 - 21} + (44461170 - 44461170 \; \text{I}) \; u_{o l + 2 - 21} + (1612359 + 1764153 \; \text{I}) \; u_{o l + 3 - 21} + (94685 + 165965 \; \text{I}) \; u_{o l - 31} + (2268378 - 1218294 \; \text{I}) \; u_{o l + 1 - 31} - (1764153 + 1612359 \; \text{I}) \; u_{o l + 2 - 31} + ( -108050 + 108050 \; \text{I}) \; u_{o l + 3 - 31} \Big) \Big) . \; O( \; \Delta x_{o l}^{\; 5} \; )$$

Formula.: 114, Var.: 1

Variavel :, x\_{o l}, Derivada de Ordem :, 12

Error order:., 4, Error:., 4.2946624222276861535 × 10−8, New Error:., 4.2341073047921396991 × 10−12

Error order:., 4, Error:., 4.2341073047921396991 × 10−12, New Error:., 4.2280656172906012669 × 10−16

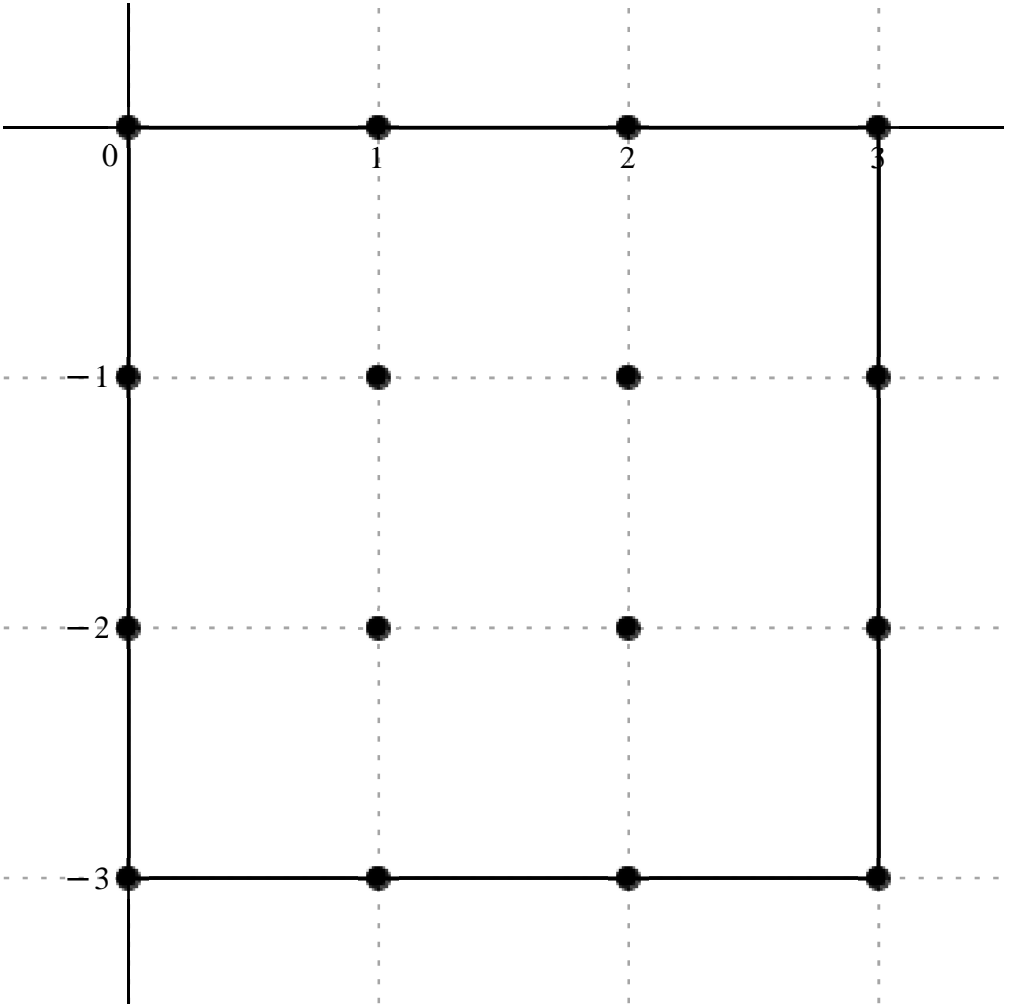
Error order:., 4, Error:., 4.2280656172906012669 × 10−16, New Error:., 4.2274615893204905705 × 10−20

Error order:., 4, Error:., 4.2274615893204905705 × 10−20, New Error:., 4.2274011879337946670 × 10−24

Error order:., 4, Error:., 4.2274011879337946670 × 10−24, New Error:., 4.2273951478092307408 × 10−28

$$x_o + h \cdot , \begin{bmatrix} 0 & 1 & 2 & 3 \\ -I & 1-I & 2-I & 3-I \\ -2\,I & 1-2\,I & 2-2\,I & 3-2\,I \\ -3\,I & 1-3\,I & 2-3\,I & 3-3\,I \end{bmatrix}$$

$$c = , \left[ \begin{array}{ccccc} -\frac{83825280}{13} & -\frac{218843856}{13} & -\frac{1111183920\,I}{13} & \frac{1053803520}{13} & -\frac{13571712\,I}{13} & \frac{13471920}{13} + 5089392\,I \\ -\frac{218843856}{13} + \frac{1111183920\,I}{13} & 1967499072 & -122444784 - 1833079248\,I & -\frac{892140480}{13} + \frac{231517440\,I}{13} & \\ \frac{1053803520}{13} + \frac{13571712\,I}{13} & -122444784 + 1833079248\,I & -1722010752 & \frac{53588304}{13} - \frac{865895184\,I}{13} & \\ \frac{13471920}{13} - 5089392\,I & -\frac{892140480}{13} - \frac{231517440\,I}{13} & \frac{53588304}{13} + \frac{865895184\,I}{13} & \frac{56282688}{13} & \end{array} \right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d} x_{o l}^{12}} \; u(x_o) = \frac{1}{13 \, \Delta x_{o l}^{12}} \Big( 99792 \Big( -840 \, u_{o l} - (2193 + 11135 \, I) \, u_{o l + 1} + (10560 - 136 \, I) \, u_{o l + 2} + (135 + 663 \, I) \, u_{o l + 3} + (-2193 + 11135 \, I) \, u_{o l - 1} + 256308 \, u_{o l + 1 - 1} - (15951 + 238797 \, I) \, u_{o l + 2 - 1} + (-8940 + 2320 \, I) \, u_{o l + 3 - 1} + (10560 + 136 \, I) \, u_{o l - 21} + (-15951 + 238797 \, I) \, u_{o l + 1 - 21} - 224328 \, u_{o l + 2 - 21} + (537 - 8677 \, I) \, u_{o l + 3 - 21} + (135 - 663 \, I) \, u_{o l - 31} - (8940 + 2320 \, I) \, u_{o l + 1 - 31} + (537 + 8677 \, I) \, u_{o l + 2 - 31} + 564 \, u_{o l + 3 - 31} \Big) \Big), \; O( \; \Delta x_{o l}^4 \; )$$

Formula.: 115, Var.: 1

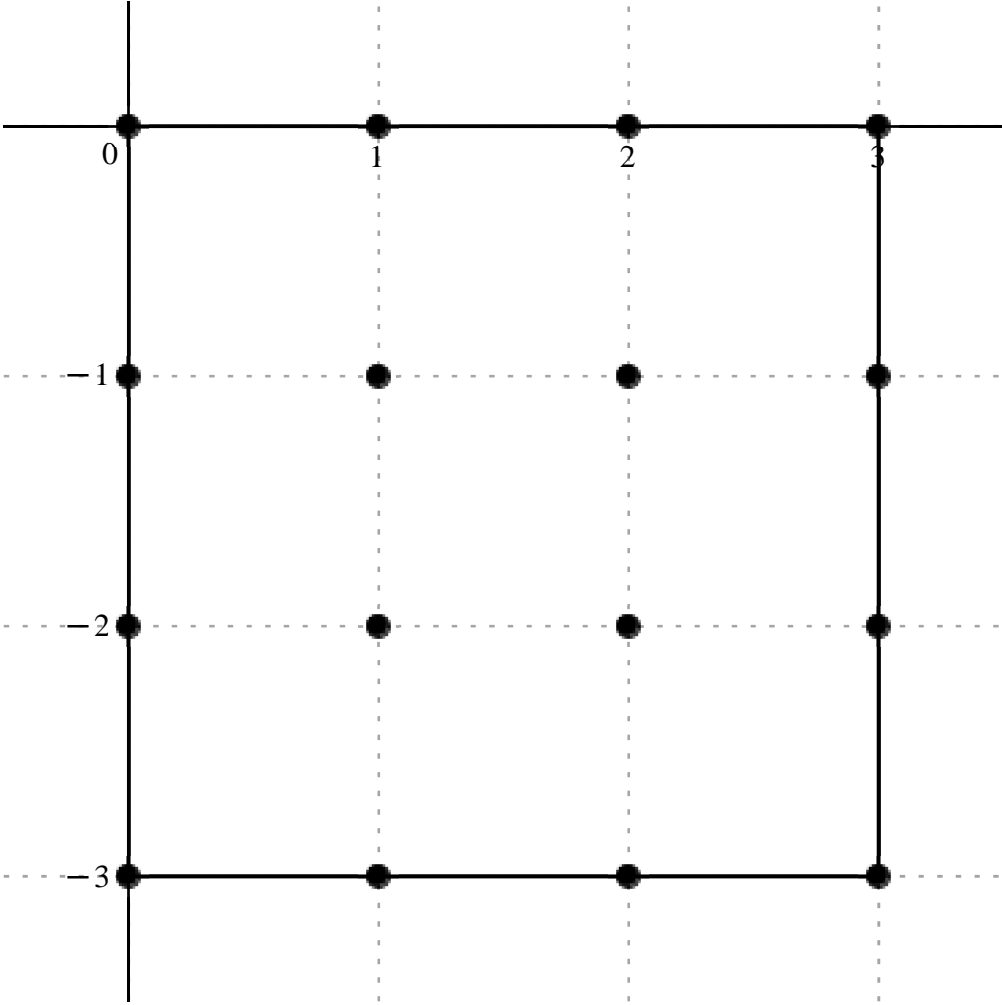
Variavel :, x\_oI, Derivada de Ordem :, 13

Error order.: 3, Error.: 6.2200551579926323996 × 10−6, New Error.: 6.1970398774226659614 × 10−9

Error order.: 3, Error.: 6.1970398774226659614 × 10−9, New Error.: 6.1946791106984178495 × 10−12

*Error order:*, 3,    *Error:*,  $6.1946791106984178495 \times 10^{-12}$ ,    *New Error:*,  $6.1944424484025999423 \times 10^{-15}$   
*Error order:*, 3,    *Error:*,  $6.1944424484025999423 \times 10^{-15}$ ,    *New Error:*,  $6.1944187763235188451 \times 10^{-18}$   
*Error order:*, 3,    *Error:*,  $6.1944187763235188451 \times 10^{-18}$ ,    *New Error:*,  $6.1944164090571224741 \times 10^{-21}$

$$c = \begin{bmatrix} 5987520 + 5987520 \, \text{I} & -67958352 + 95900112 \, \text{I} & -76640256 - 82228608 \, \text{I} & 4490640 - 5887728 \, \text{I} \\ 95900112 - 67958352 \, \text{I} & -1922592672 - 1922592672 \, \text{I} & -1755241488 + 1918700784 \, \text{I} & 86419872 + 55683936 \, \text{I} \\ -82228608 - 76640256 \, \text{I} & 1918700784 - 1755241488 \, \text{I} & 1759133376 + 1759133376 \, \text{I} & -74943792 + 63767088 \, \text{I} \\ -5887728 + 4490640 \, \text{I} & 55683936 + 86419872 \, \text{I} & 63767088 - 74943792 \, \text{I} & -4590432 - 4590432 \, \text{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{\Delta x_{ol}^3} \Big( (5987520 + 5987520 \, \text{I}) \, u_{ol} + (-67958352 + 95900112 \, \text{I}) \, u_{ol+1} - (76640256 + 82228608 \, \text{I}) \, u_{ol+2} + (4490640 - 5887728 \, \text{I}) \, u_{ol+3} + (95900112 - 67958352 \, \text{I}) \, u_{ol-1} - (1922592672 + 1922592672 \, \text{I}) \, u_{ol+1-1} + (-1755241488 + 1918700784 \, \text{I}) \, u_{ol+2-1} + (86419872 + 55683936 \, \text{I}) \, u_{ol+3-1} - (82228608 + 76640256 \, \text{I}) \, u_{ol-21} + (1918700784 - 1755241488 \, \text{I}) \, u_{ol+1-21} + (1759133376 + 1759133376 \, \text{I}) \, u_{ol+2-21} + (-74943792 + 63767088 \, \text{I}) \, u_{ol+3-21} + (-5887728 + 4490640 \, \text{I}) \, u_{ol-31} + (55683936 + 86419872 \, \text{I}) \, u_{ol+1-31} + (63767088 - 74943792 \, \text{I}) \, u_{ol+2-31} - (4590432 + 4590432 \, \text{I}) \, u_{ol+3-31} \Big), \, O(\Delta x_{ol}^3)$$

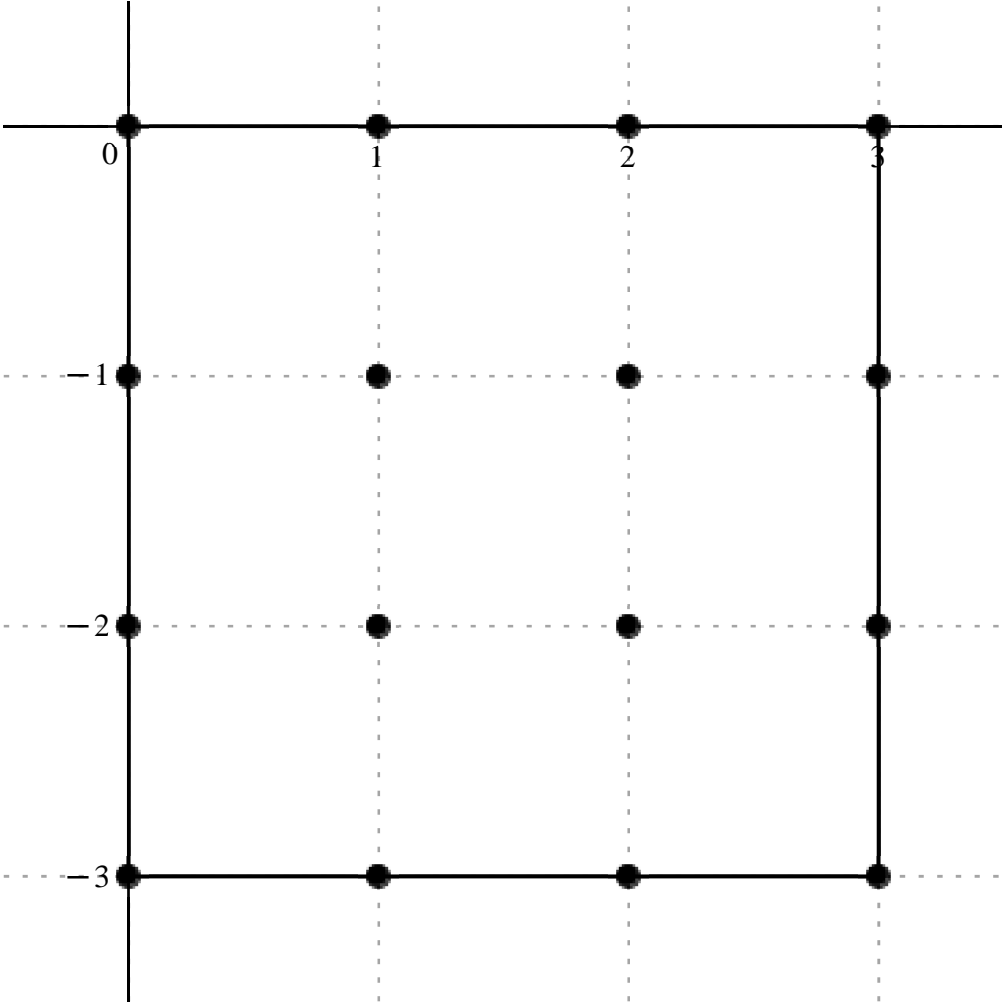
*Formula:*, 116,    *Var:*, 1

*Variavel :*,  $x_{ol}$ ,    *Derivada de Ordem :*, 14

*Error order:*, 2,    *Error:*, 0.00094444004995074285475,    *New Error:*,  $9.3332010695817313733 \times 10^{-6}$   
*Error order:*, 2,    *Error:*,  $9.3332010695817313733 \times 10^{-6}$ ,    *New Error:*,  $9.3221040067520667732 \times 10^{-8}$

Error order.: 2,    Error.:  $9.3221040067520667732 \times 10^{-8}$ ,    New Error.:  $9.3209945331834372442 \times 10^{-10}$   
 Error order.: 2,    Error.:  $9.3209945331834372442 \times 10^{-10}$ ,    New Error.:  $9.3208835881575967402 \times 10^{-12}$   
 Error order.: 2,    Error.:  $9.3208835881575967402 \times 10^{-12}$ ,    New Error.:  $9.3208724936783267900 \times 10^{-14}$

$$x_o + h.$$
$$c = \begin{bmatrix} -7451136 \text{ I} & 104781600 - 15367968 \text{ I} & -8382528 + 103384512 \text{ I} & -6985440 + 465696 \text{ I} \\ -104781600 - 15367968 \text{ I} & 2506375872 \text{ I} & 2451889440 - 54486432 \text{ I} & -16765056 - 97796160 \text{ I} \\ 8382528 + 103384512 \text{ I} & -2451889440 - 54486432 \text{ I} & -2397403008 \text{ I} & 96399072 + 9779616 \text{ I} \\ 6985440 + 465696 \text{ I} & 16765056 - 97796160 \text{ I} & -96399072 + 9779616 \text{ I} & 6519744 \text{ I} \end{bmatrix}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}} \; u(x_{ol}) = \frac{1}{\Delta x_{ol}^{14}} \Big( 465696 \big( -16 \text{ I} u_{ol} + (225 - 33 \text{ I}) u_{ol+1} + (-18 + 222 \text{ I}) u_{ol+2} + (-15 + \text{I}) u_{ol+3} - (225 + 33 \text{ I}) u_{ol-1} + 5382 \text{ I} u_{ol+1-1} + (5265 - 117 \text{ I}) u_{ol+2-1} - (36 + 210 \text{ I}) u_{ol+3-1} + (18 + 222 \text{ I}) u_{ol-21} - (5265 + 117 \text{ I}) u_{ol+1-21} - 5148 \text{ I} u_{ol+2-21} + (207 + 21 \text{ I}) u_{ol+3-21} + (15 + \text{I}) u_{ol-31} + (36 - 210 \text{ I}) u_{ol+1-31} + (-207$$
$$+ 21 \text{ I}) u_{ol+2-31} + 14 \text{ I} u_{ol+3-31} \big) \Big), \; O( \Delta x_{ol}^2 )$$

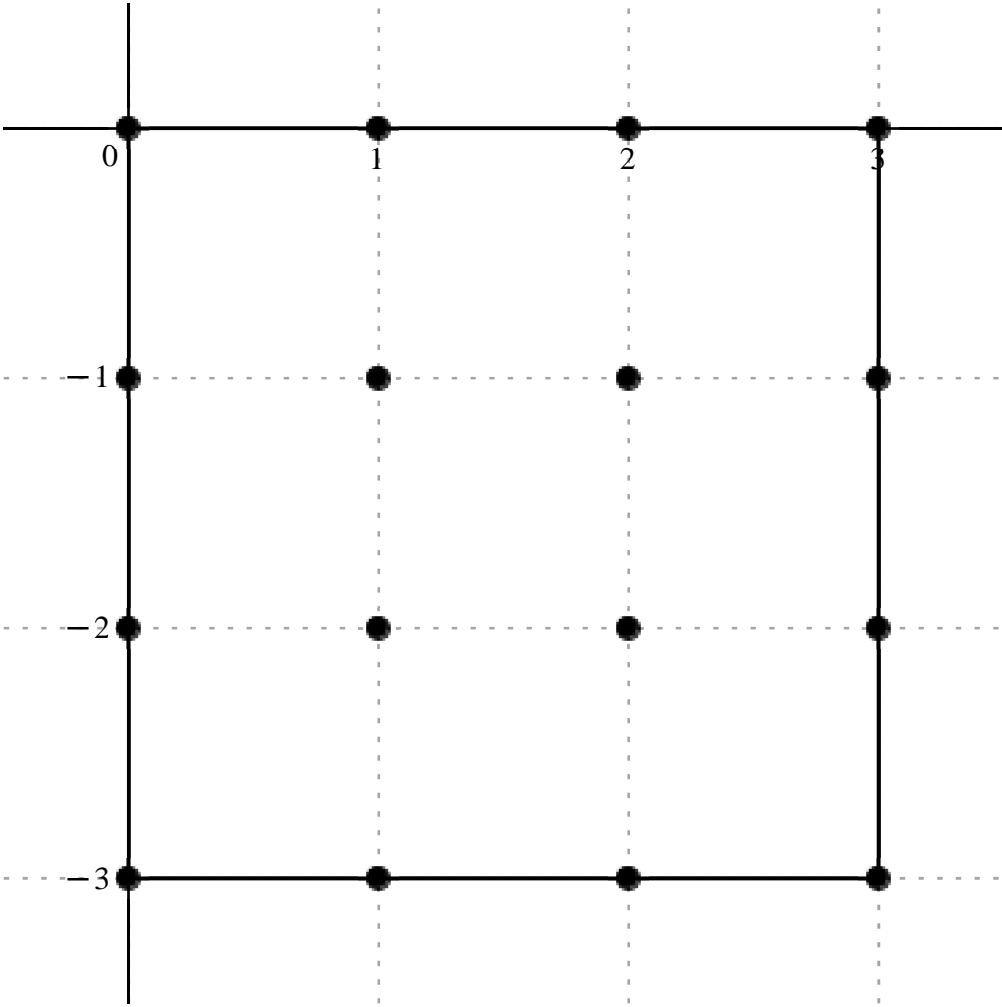
Formula.: 117,    Var.: 1  
 Variavel .:  $x_{ol}$ ,    Derivada de Ordem .: 15

Error order.: 1,    Error.: 0.068447173391448099300,    New Error.: 0.0068277309366371324206  
 Error order.: 1,    Error.: 0.0068277309366371324206,    New Error.: 0.00068259960798786579757

Error order.: 1,    Error.: 0.00068259960798786579757,    New Error.: 0.000068258222357635874828  
 Error order.: 1,    Error.: 0.000068258222357635874828,    New Error.:  $6.8258048477713993127 \times 10^{-6}$   
 Error order.: 1,    Error.:  $6.8258048477713993127 \times 10^{-6}$ ,    New Error.:  $6.8258031089363773941 \times 10^{-7}$

$$x_o + h.$$
$$\begin{bmatrix} 0 & 1 & 2 & 3 \\ -I & 1-I & 2-I & 3-I \\ -2\,I & 1-2\,I & 2-2\,I & 3-2\,I \\ -3\,I & 1-3\,I & 2-3\,I & 3-3\,I \end{bmatrix}$$

$$c =, \begin{bmatrix} -2328480 + 2328480\,I & -37721376 - 29338848\,I & 37721376 - 29338848\,I & 2328480 + 2328480\,I \\ 29338848 + 37721376\,I & 817296480 - 817296480\,I & -817296480 - 817296480\,I & -29338848 + 37721376\,I \\ 29338848 - 37721376\,I & 817296480 + 817296480\,I & -817296480 + 817296480\,I & -29338848 - 37721376\,I \\ -2328480 - 2328480\,I & -37721376 + 29338848\,I & 37721376 + 29338848\,I & 2328480 - 2328480\,I \end{bmatrix}$$



$$\frac{d^{15}}{dx_{ol}^{15}}\;u(x_{ol}) = \frac{1}{\Delta x_{ol}^{15}}\Big(( -2328480 + 2328480\,I)\;u_{ol} - (37721376 + 29338848\,I)\;u_{ol+1} + (37721376 - 29338848\,I)\;u_{ol+2} + (2328480 + 2328480\,I)\;u_{ol+3} + (29338848 + 37721376\,I)\;u_{ol-1} + (817296480 - 817296480\,I)\;u_{ol+1-1} - (817296480 + 817296480\,I)\;u_{ol+2-1} + ( -29338848 + 37721376\,I)\;u_{ol+3-1} + (29338848$$

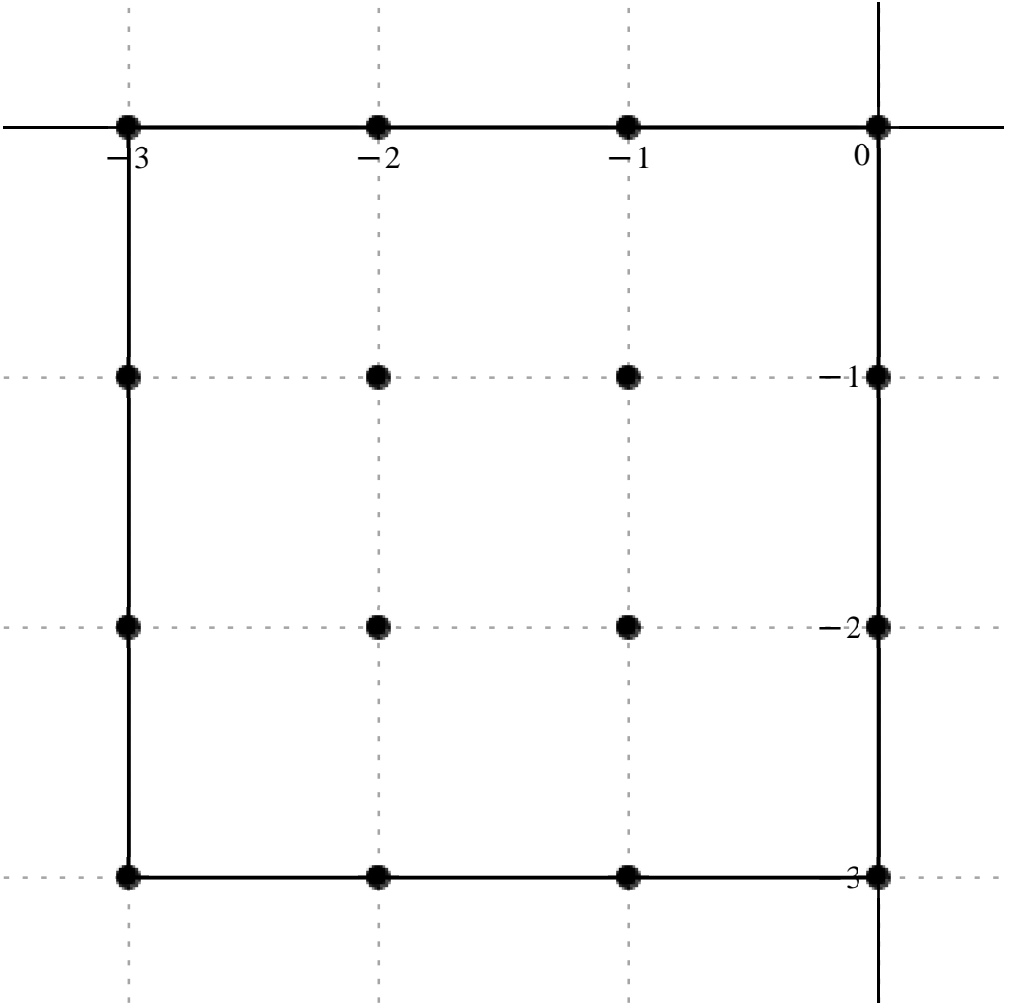
$$- 37721376\,I)\;u_{ol-21} + (817296480 + 817296480\,I)\;u_{ol+1-21} + ( -817296480 + 817296480\,I)\;u_{ol+2-21} - (29338848 + 37721376\,I)\;u_{ol+3-21} - (2328480 + 2328480\,I)\;u_{ol-31} + ( -37721376 + 29338848\,I)\;u_{ol+1-31} + (37721376 + 29338848\,I)\;u_{ol+2-31} + (2328480 - 2328480\,I)\;u_{ol+3-31}\Big),\;O(\;\Delta x_{ol}\;)$$

Formula.: 118,    Var.: 1  
 Variavel .:  $x_o$ ,    Derivada de Ordem .: 1

Error order.: 15,    Error.: 2.2602452849809970763  $\times 10^{-37}$ ,    New Error.: 2.3132687101200985054  $\times 10^{-52}$   
 Error order.: 15,    Error.: 2.3132687101200985054  $\times 10^{-52}$ ,    New Error.: 2.3186035877036988454  $\times 10^{-67}$

*Error order:*, 15,    *Error:*,  $2.3186035877036988454 \times 10^{-67}$ ,    *New Error:*,  $2.3191373999506538486 \times 10^{-82}$   
*Error order:*, 15,    *Error:*,  $2.3191373999506538486 \times 10^{-82}$ ,    *New Error:*,  $2.3191907844193533110 \times 10^{-97}$   
*Error order:*, 15,    *Error:*,  $2.3191907844193533110 \times 10^{-97}$ ,    *New Error:*,  $2.3191961228986624129 \times 10^{-112}$

$$x_o \neq h., \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3-I & -2-I & -1-I & -I \\ -3-2\,I & -2-2\,I & -1-2\,I & -2\,I \\ -3-3\,I & -2-3\,I & -1-3\,I & -3\,I \end{array} \right]$$
$$c =, \left[ \begin{array}{cccc} \frac{1}{3} & -\frac{36}{5} + \frac{9\,I}{10} & \frac{9}{5} - \frac{72\,I}{5} & \frac{215}{52} - \frac{215\,I}{52} \\ \frac{9}{2} - \frac{9\,I}{10} & -\frac{351}{5} - \frac{702\,I}{5} & -\frac{351}{2} + \frac{351\,I}{2} & \frac{72}{5} - \frac{9\,I}{5} \\ -\frac{171}{65} - \frac{198\,I}{65} & \frac{351}{4} - \frac{351\,I}{4} & \frac{702}{5} + \frac{351\,I}{5} & -\frac{9}{10} + \frac{36\,I}{5} \\ -\frac{1}{6} + \frac{I}{6} & \frac{198}{65} + \frac{171\,I}{65} & \frac{9}{10} - \frac{9\,I}{2} & -\frac{1}{3} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{1}{780\,\Delta x_{ol}} \big( 260\,I\,u_{ol-3} + (-5616+702\,I)\,u_{ol-2} + (1404-11232\,I)\,u_{ol-1} + (3225-3225\,I)\,u_{ol} + (3510-702\,I)\,u_{ol-3-1} - (54756+109512\,I)\,u_{ol-2-1} + (-136890+136890\,I)\,u_{ol-1-1} + (11232-1404\,I)\,u_{ol-1} - (2052+2376\,I)\,u_{ol-3-21} + (68445-68445\,I)\,u_{ol-2-21} + (109512+54756\,I)\,u_{ol-1-21} + (-702$$
$$+5616\,I)\,u_{ol-21} + (-130+130\,I)\,u_{ol-3-31} + (2376+2052\,I)\,u_{ol-2-31} + (702-3510\,I)\,u_{ol-1-31} - 260\,u_{ol-31} \big), \, O(\,\Delta x_{ol}^{15}\,)$$

Formula.: 119, Var.: 1

Variavel :  $x_{ol}$  , Derivada de Ordem : 2

Error order.: 14, Error.:  $2.8504883483124162772 \times 10^{-34}$ , New Error.:  $2.8822370101650163335 \times 10^{-48}$

Error order.: 14, Error.:  $2.8822370101650163335 \times 10^{-48}$ , New Error.:  $2.8853995844360474760 \times 10^{-62}$

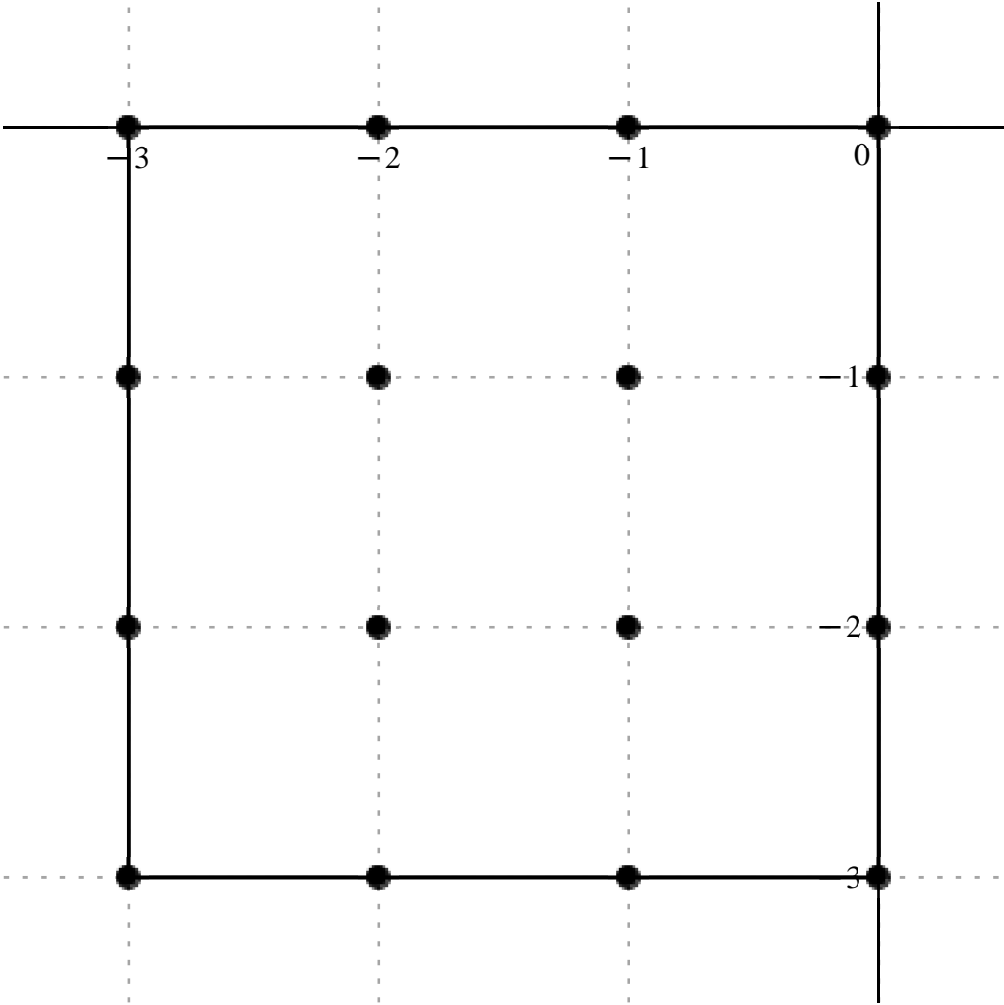
Error order.: 14, Error.:  $2.8853995844360474760 \times 10^{-62}$ , New Error.:  $2.8857157151674168362 \times 10^{-76}$

Error order.: 14, Error.:  $2.8857157151674168362 \times 10^{-76}$ , New Error.:  $2.8857473269697954463 \times 10^{-90}$

Error order.: 14, Error.:  $2.8857473269697954463 \times 10^{-90}$ , New Error.:  $2.8857504881373219206 \times 10^{-104}$

$$x_o \neq h. , \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3 -I & -2 -I & -1 -I & -I \\ -3 -2 I & -2 -2 I & -1 -2 I & -2 I \\ -3 -3 I & -2 -3 I & -1 -3 I & -3 I \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} \frac{215}{78} + \frac{593 I}{234} & -\frac{11673}{260} + \frac{17181 I}{260} & -\frac{14013}{130} - \frac{13671 I}{130} & -\frac{96313 I}{2925} & \\ \frac{8856}{325} - \frac{28089 I}{650} & -\frac{81459}{50} - \frac{24813 I}{50} & \frac{5103 I}{2} & \frac{14013}{130} - \frac{13671 I}{130} & \\ -\frac{5823}{130} - \frac{369 I}{130} & -\frac{2727 I}{2} & \frac{81459}{50} - \frac{24813 I}{50} & \frac{11673}{260} + \frac{17181 I}{260} & \\ \frac{619 I}{234} & \frac{5823}{130} - \frac{369 I}{130} & -\frac{8856}{325} - \frac{28089 I}{650} & -\frac{215}{78} + \frac{593 I}{234} & \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{11700 \, \Delta x_{ol}^2} \big( (32250 + 29650 \, \mathrm{I}) \, u_{ol-3} + (-525285 + 773145 \, \mathrm{I}) \, u_{ol-2} - (1261170 + 1230390 \, \mathrm{I}) \, u_{ol-1} - 385252 \, \mathrm{I} u_{ol} + (318816 - 505602 \, \mathrm{I}) \, u_{ol+3-1} - (19061406 + 5806242 \, \mathrm{I}) \, u_{ol+2-1} + 29852550 \, \mathrm{I} u_{ol+1-1} + (1261170 - 1230390 \, \mathrm{I}) \, u_{ol+1} - (524070 + 33210 \, \mathrm{I}) \, u_{ol+3-21} - 15952950 \, \mathrm{I} u_{ol+2-21} + (19061406$$

$$- 5806242 \, \mathrm{I}) \, u_{ol+1-21} + (525285 + 773145 \, \mathrm{I}) \, u_{ol+21} + 30950 \, \mathrm{I} u_{ol+3-31} + (524070 - 33210 \, \mathrm{I}) \, u_{ol+2-31} - (318816 + 505602 \, \mathrm{I}) \, u_{ol+1-31} + (-32250 + 29650 \, \mathrm{I}) \, u_{ol-31} \big), \, O( \, \Delta x_{ol}^{14} \, )$$



Formula:, 120, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 13, Error:,  $1.8457308265188102314 \times 10^{-31}$ , New Error:,  $1.8885680897811317027 \times 10^{-44}$

Error order:, 13, Error:,  $1.8885680897811317027 \times 10^{-44}$ , New Error:,  $1.8928778560936852025 \times 10^{-57}$

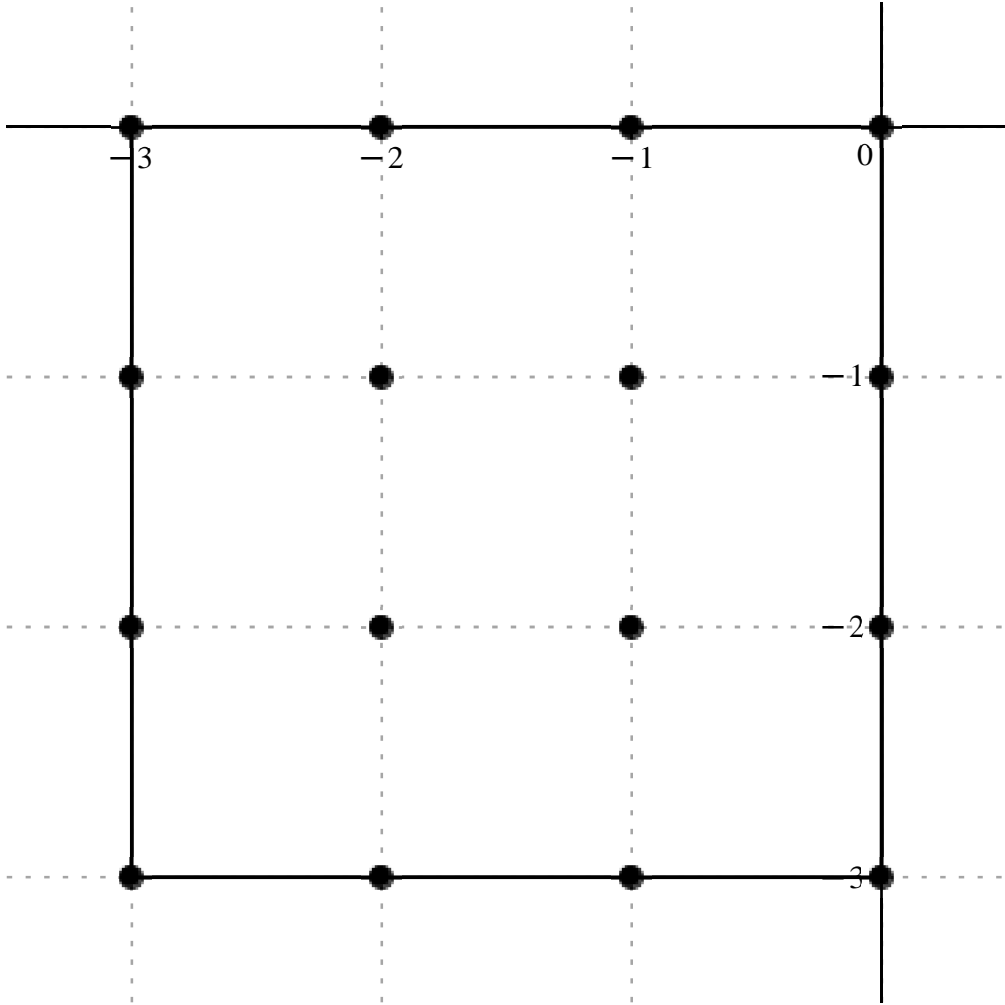
Error order:, 13, Error:,  $1.8928778560936852025 \times 10^{-57}$ , New Error:,  $1.8933090924403214376 \times 10^{-70}$

Error order:, 13, Error:,  $1.8933090924403214376 \times 10^{-70}$ , New Error:,  $1.8933522186714387171 \times 10^{-83}$

Error order:, 13, Error:,  $1.8933522186714387171 \times 10^{-83}$ , New Error:,  $1.8933565313205142799 \times 10^{-96}$

$$x_o + h., \begin{bmatrix} -3 & -2 & -1 & 0 \\ -3 -1 & -2 -1 & -1 -1 & -1 \\ -3 -2 \text{ I} & -2 -2 \text{ I} & -1 -2 \text{ I} & -2 \text{ I} \\ -3 -3 \text{ I} & -2 -3 \text{ I} & -1 -3 \text{ I} & -3 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{13577}{450} - \frac{593 \text{ I}}{234} & \frac{2031231}{13000} + \frac{7957473 \text{ I}}{13000} & -\frac{274773}{250} + \frac{34419 \text{ I}}{250} & -\frac{2905559}{23400} - \frac{2905559 \text{ I}}{23400} \\ -\frac{653019}{6500} - \frac{2583453 \text{ I}}{6500} & -\frac{116163}{10} + \frac{327627 \text{ I}}{50} & \frac{1350909}{100} + \frac{1350909 \text{ I}}{100} & \frac{34419}{250} - \frac{274773 \text{ I}}{250} \\ -\frac{872907}{3250} + \frac{783789 \text{ I}}{3250} & -\frac{1529109}{200} - \frac{1529109 \text{ I}}{200} & \frac{327627}{50} - \frac{116163 \text{ I}}{10} & \frac{7957473}{13000} + \frac{2031231 \text{ I}}{13000} \\ \frac{13627}{900} + \frac{13627 \text{ I}}{900} & \frac{783789}{3250} - \frac{872907 \text{ I}}{3250} & -\frac{2583453}{6500} - \frac{653019 \text{ I}}{6500} & -\frac{593}{234} + \frac{13577 \text{ I}}{450} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{117000 \, \Delta x_{ol}^3} \left( (3530020 - 296500 \, \text{I}) \, u_{ol-3} + (18281079 + 71617257 \, \text{I}) \, u_{ol-2} + (-128593764 + 16108092 \, \text{I}) \, u_{ol-1} - (14527795 + 14527795 \, \text{I}) \, u_{ol} - (11754342 + 46502154 \, \text{I}) \, u_{ol+3-1} + (-1359107100 + 766647180 \, \text{I}) \, u_{ol+2-1} + (1580563530 + 1580563530 \, \text{I}) \, u_{ol+1-1} + (16108092 - 128593764 \, \text{I}) \, u_{ol+1} + (-31424652 \right.$$

$$+28216404 \operatorname{I} \big) u_{oI-3-21} - (894528765 + 894528765 \operatorname{I} \big) u_{oI-2-21} + (766647180 - 1359107100 \operatorname{I} \big) u_{oI-1-21} + (71617257 + 18281079 \operatorname{I} \big) u_{oI-21} + (1771510 + 1771510 \operatorname{I} \big) u_{oI-3-31} + (28216404 - 31424652 \operatorname{I} \big) u_{oI-2-31} - (46502154 + 11754342 \operatorname{I} \big) u_{oI-1-31} + ( -296500 + 3530020 \operatorname{I} \big) u_{oI-31} \big), \mathcal{O}( \mathcal{A}_{oI}^{13} )$$

$$Formula:, 121, \operatorname{Var}:, 1$$

$$Variavel :, x_{oI}, \operatorname{Derivada de Ordem} :, 4$$

$$Error\ order:, 12, \operatorname{Error}:, 1.4151585769103284281 \times 10^{-28}, \operatorname{New\ Error}:, 1.4307349336841720455 \times 10^{-40}$$

$$Error\ order:, 12, \operatorname{Error}:, 1.4307349336841720455 \times 10^{-40}, \operatorname{New\ Error}:, 1.4322865977115431294 \times 10^{-52}$$

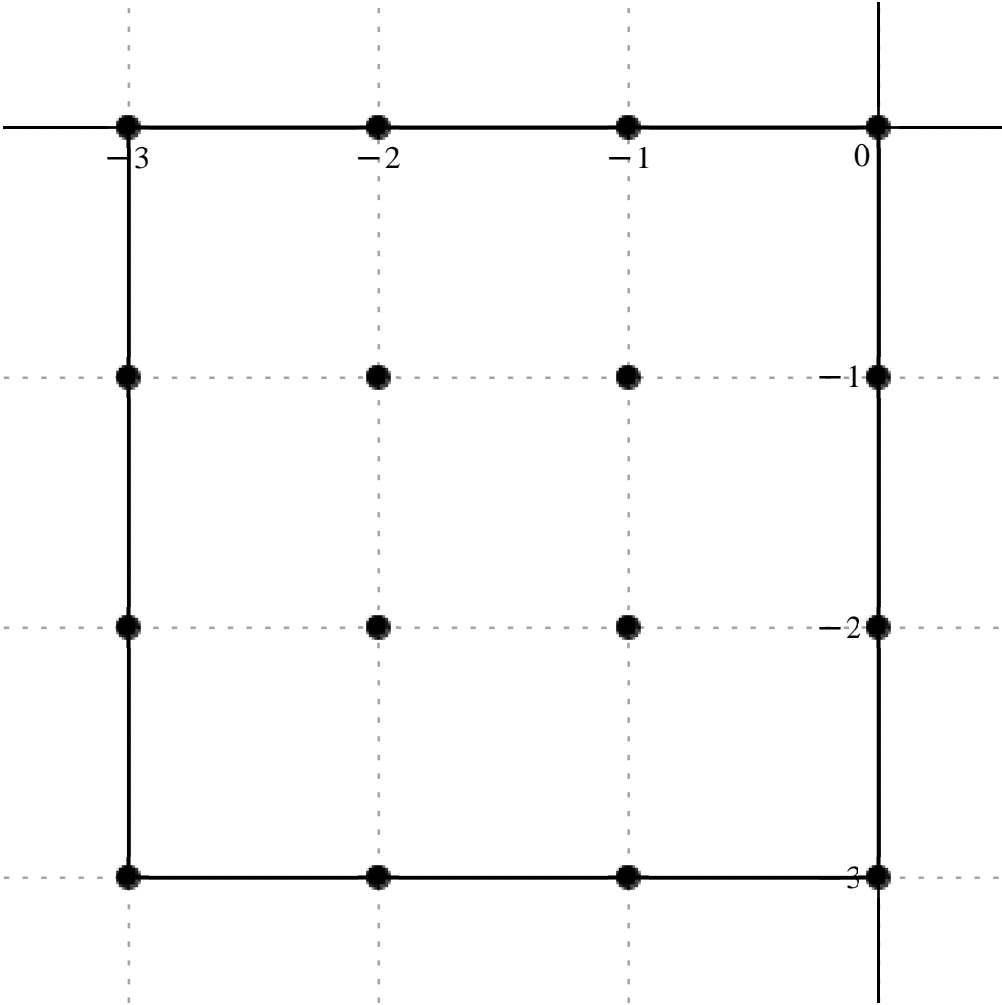
$$Error\ order:, 12, \operatorname{Error}:, 1.4322865977115431294 \times 10^{-52}, \operatorname{New\ Error}:, 1.4324417025798187381 \times 10^{-64}$$

$$Error\ order:, 12, \operatorname{Error}:, 1.4324417025798187381 \times 10^{-64}, \operatorname{New\ Error}:, 1.4324572124494720716 \times 10^{-76}$$

$$Error\ order:, 12, \operatorname{Error}:, 1.4324572124494720716 \times 10^{-76}, \operatorname{New\ Error}:, 1.4324587634302638319 \times 10^{-88}$$

$$x_o \neq h., \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3-1 & -2-1 & -1-1 & -1 \\ -3-2 \operatorname{I} & -2-2 \operatorname{I} & -1-2 \operatorname{I} & -2 \operatorname{I} \\ -3-3 \operatorname{I} & -2-3 \operatorname{I} & -1-3 \operatorname{I} & -3 \operatorname{I} \end{array} \right]$$

$$c=, \left[ \begin{array}{cccc} \frac{16293}{130} - \frac{8109 \operatorname{I}}{50} & \frac{241188}{65} + \frac{619072 \operatorname{I}}{325} & -\frac{2372367}{650} + \frac{148393 \operatorname{I}}{26} & -\frac{56886}{65} \\ -\frac{312327}{130} - \frac{87833 \operatorname{I}}{65} & -\frac{1076133}{50} + \frac{4241151 \operatorname{I}}{50} & \frac{6014859}{50} & -\frac{2372367}{650} - \frac{148393 \operatorname{I}}{26} \\ -\frac{69417}{650} + \frac{1580603 \operatorname{I}}{650} & -\frac{1796892}{25} & -\frac{1076133}{50} - \frac{4241151 \operatorname{I}}{50} & \frac{241188}{65} - \frac{619072 \operatorname{I}}{325} \\ \frac{94491}{650} & -\frac{69417}{650} - \frac{1580603 \operatorname{I}}{650} & -\frac{312327}{130} + \frac{87833 \operatorname{I}}{65} & \frac{16293}{130} + \frac{8109 \operatorname{I}}{50} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u\big(x_{ol}\big) = \frac{1}{650 \, \Delta x_{ol}^4} \big( (81465 - 105417 \, \mathrm{I}) \, u_{ol-3} + (2411880 + 1238144 \, \mathrm{I}) \, u_{ol-2} + (-2372367 + 3709825 \, \mathrm{I}) \, u_{ol-1} - 568860 \, u_{ol} - (1561635 + 878330 \, \mathrm{I}) \, u_{ol-3-1} + (-13989729 + 55134963 \, \mathrm{I}) \, u_{ol-2-1} + 78193167 \, u_{ol-1-1} - (2372367 + 3709825 \, \mathrm{I}) \, u_{ol-1} + (-69417 + 1580603 \, \mathrm{I}) \, u_{ol-3-21} - 46719192 \, u_{ol-2-21} - (13989729 + 55134963 \, \mathrm{I}) \, u_{ol-1-21} + (2411880 - 1238144 \, \mathrm{I}) \, u_{ol-21} + 94491 \, u_{ol-3-31} - (69417 + 1580603 \, \mathrm{I}) \, u_{ol-2-31} + (-1561635 + 878330 \, \mathrm{I}) \, u_{ol-1-31} + (81465 + 105417 \, \mathrm{I}) \, u_{ol-31} \big), \, O(\, \Delta x_{ol}^{12} \, )$$

Formula:, 122, Var.:, 1

Variavel :, x\_{ol} , Derivada de Ordem :, 5

Error order:., 11, Error:., 6.7594791159880910031 × 10−26, New Error:., 6.9142278967166434191 × 10−37

Error order:., 11, Error:., 6.9142278967166434191 × 10−37, New Error:., 6.9297957529513992331 × 10−48

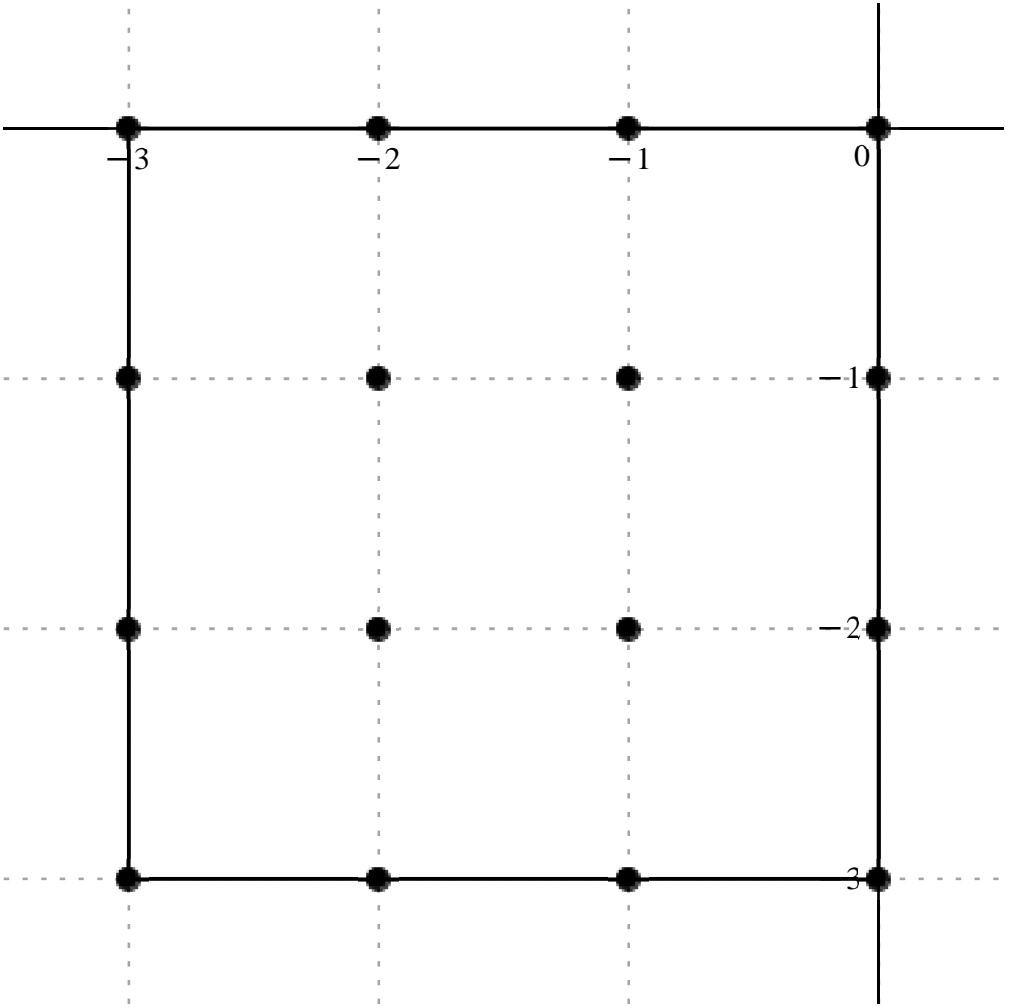
Error order:., 11, Error:., 6.9297957529513992331 × 10−48, New Error:., 6.9313534659363452777 × 10−59

Error order:., 11, Error:., 6.9313534659363452777 × 10−59, New Error:., 6.9315092465059795282 × 10−70

Error order:., 11, Error:., 6.9315092465059795282 × 10−70, New Error:., 6.9315248246556518691 × 10−81

$$x_o \neq h. , \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -3 - 2 \, \mathrm{I} & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \\ -3 - 3 \, \mathrm{I} & -2 - 3 \, \mathrm{I} & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} -\frac{5431}{26} - \frac{154481 \, \mathrm{I}}{130} & \frac{1444926}{65} - \frac{565523 \, \mathrm{I}}{65} & \frac{1348419}{130} + \frac{4481759 \, \mathrm{I}}{130} & -\frac{74123}{26} + \frac{74123 \, \mathrm{I}}{26} \\ -\frac{4007093}{260} + \frac{1238619 \, \mathrm{I}}{260} & \frac{2654067}{10} + \frac{4232001 \, \mathrm{I}}{10} & \frac{9344361}{20} - \frac{9344361 \, \mathrm{I}}{20} & -\frac{4481759}{130} - \frac{1348419 \, \mathrm{I}}{130} \\ \frac{1269389}{130} + \frac{1357401 \, \mathrm{I}}{130} & -\frac{2941359}{10} + \frac{2941359 \, \mathrm{I}}{10} & -\frac{4232001}{10} - \frac{2654067 \, \mathrm{I}}{10} & \frac{565523}{65} - \frac{1444926 \, \mathrm{I}}{65} \\ \frac{158123}{260} - \frac{158123 \, \mathrm{I}}{260} & -\frac{1357401}{130} - \frac{1269389 \, \mathrm{I}}{130} & -\frac{1238619}{260} + \frac{4007093 \, \mathrm{I}}{260} & \frac{154481}{130} + \frac{5431 \, \mathrm{I}}{26} \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{260 \, \Delta x_{ol}^5} \, \big( -(54310 + 308962 \, \mathrm{I}) \, u_{ol-3} + (5779704 - 2262092 \, \mathrm{I}) \, u_{ol-2} + (2696838 + 8963518 \, \mathrm{I}) \, u_{ol-1} + (-741230 + 741230 \, \mathrm{I}) \, u_{ol} + (-4007093 + 1238619 \, \mathrm{I}) \, u_{ol-3-1} + (69005742 + 110032026 \, \mathrm{I}) \, u_{ol-2-1} + (121476693 - 121476693 \, \mathrm{I}) \, u_{ol-1-1} - (8963518 + 2696838 \, \mathrm{I}) \, u_{ol-1} + (2538778 + 2714802 \, \mathrm{I}) \, u_{ol-3-21} \\ + (-76475334 + 76475334 \, \mathrm{I}) \, u_{ol-2-21} - (110032026 + 69005742 \, \mathrm{I}) \, u_{ol-1-21} + (2262092 - 5779704 \, \mathrm{I}) \, u_{ol-21} + (158123 - 158123 \, \mathrm{I}) \, u_{ol-3-31} - (2714802 + 2538778 \, \mathrm{I}) \, u_{ol-2-31} + (-1238619 + 4007093 \, \mathrm{I}) \, u_{ol-1-31} + (308962 + 54310 \, \mathrm{I}) \, u_{ol-31} \big), \, O(\, \Delta x_{ol}^{11} \, )$$

Formula:, 123, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order:, 10, Error:,  $4.0286562312776236244 \times 10^{-23}$ , New Error:,  $4.0722934753697085784 \times 10^{-33}$

Error order:, 10, Error:,  $4.0722934753697085784 \times 10^{-33}$ , New Error:,  $4.0766406859157185701 \times 10^{-43}$

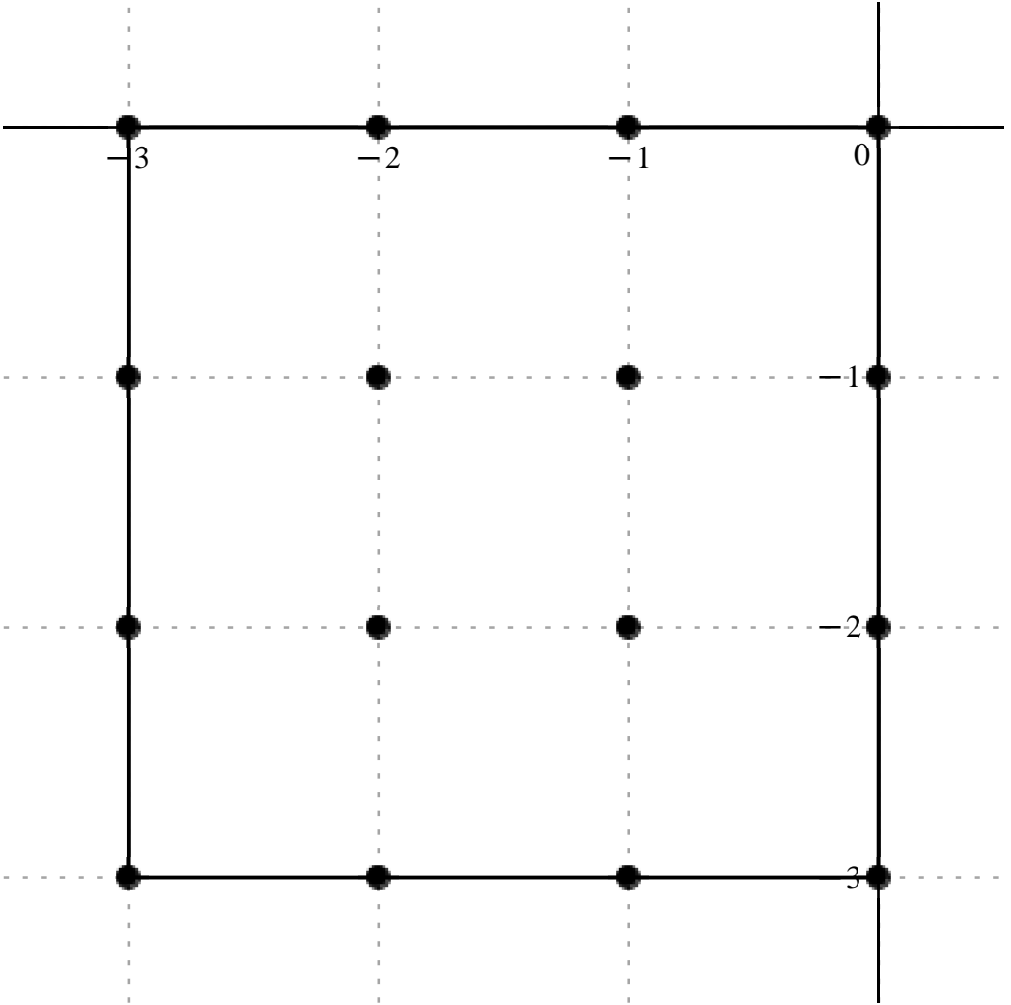
Error order:, 10, Error:,  $4.0766406859157185701 \times 10^{-43}$ , New Error:,  $4.0770752368636406697 \times 10^{-53}$

Error order:, 10, Error:,  $4.0770752368636406697 \times 10^{-53}$ , New Error:,  $4.0771186902523665236 \times 10^{-63}$

Error order:, 10, Error:,  $4.0771186902523665236 \times 10^{-63}$ , New Error:,  $4.0771230355741734427 \times 10^{-73}$

$$x_o \neq h., \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3-1 & -2-1 & -1-1 & -1 \\ -3-2 \, \mathrm{I} & -2-2 \, \mathrm{I} & -1-2 \, \mathrm{I} & -2 \, \mathrm{I} \\ -3-3 \, \mathrm{I} & -2-3 \, \mathrm{I} & -1-3 \, \mathrm{I} & -3 \, \mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{cccc} -5284 - \frac{216134 \text{ I}}{65} & \frac{5339691}{130} - \frac{14618751 \text{ I}}{130} & \frac{1992798}{13} + \frac{4566612 \text{ I}}{65} & \frac{1104562 \text{ I}}{65} \\ -\frac{2385243}{65} + \frac{9691041 \text{ I}}{130} & \frac{12287808}{5} + \frac{2518002 \text{ I}}{5} & -\frac{32006547 \text{ I}}{10} & -\frac{1992798}{13} + \frac{4566612 \text{ I}}{65} \\ \frac{4806558}{65} + \frac{107976 \text{ I}}{65} & \frac{10597869 \text{ I}}{5} & -\frac{12287808}{5} + \frac{2518002 \text{ I}}{5} & -\frac{5339691}{130} - \frac{14618751 \text{ I}}{130} \\ -\frac{583107 \text{ I}}{130} & -\frac{4806558}{65} + \frac{107976 \text{ I}}{65} & \frac{2385243}{65} + \frac{9691041 \text{ I}}{130} & 5284 - \frac{216134 \text{ I}}{65} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{130 \, \Delta x_{ol}^6} \, \big( -(686920 + 432268 \, \text{I}) \, u_{ol-3} + (5339691 - 14618751 \, \text{I}) \, u_{ol-2} + (19927980 + 9133224 \, \text{I}) \, u_{ol-1} + 2209124 \, \text{I} u_{ol} + (-4770486 + 9691041 \, \text{I}) \, u_{ol+3-1} + (319483008 + 65468052 \, \text{I}) \, u_{ol+2-1} - 416085111 \, \text{I} u_{ol+1-1} + (-19927980 + 9133224 \, \text{I}) \, u_{ol+1} + (9613116 + 215952 \, \text{I}) \, u_{ol+3-21} + 275544594 \, \text{I} u_{ol+2-21} \\ + (-319483008 + 65468052 \, \text{I}) \, u_{ol+1-21} - (5339691 + 14618751 \, \text{I}) \, u_{ol-21} - 583107 \, \text{I} u_{ol-3-31} + (-9613116 + 215952 \, \text{I}) \, u_{ol-2-31} + (4770486 + 9691041 \, \text{I}) \, u_{ol-1-31} + (686920 - 432268 \, \text{I}) \, u_{ol-31} \big), \, O( \, \Delta x_{ol}^{10} \, )$$

Formula:, 124, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 7

Error order:, 9, Error:, 1.5193108551953943164 × 10<sup>-20</sup>, New Error:, 1.5534289903890106155 × 10<sup>-29</sup>

Error order:, 9, Error:, 1.5534289903890106155 × 10<sup>-29</sup>, New Error:, 1.5568609784568983405 × 10<sup>-38</sup>

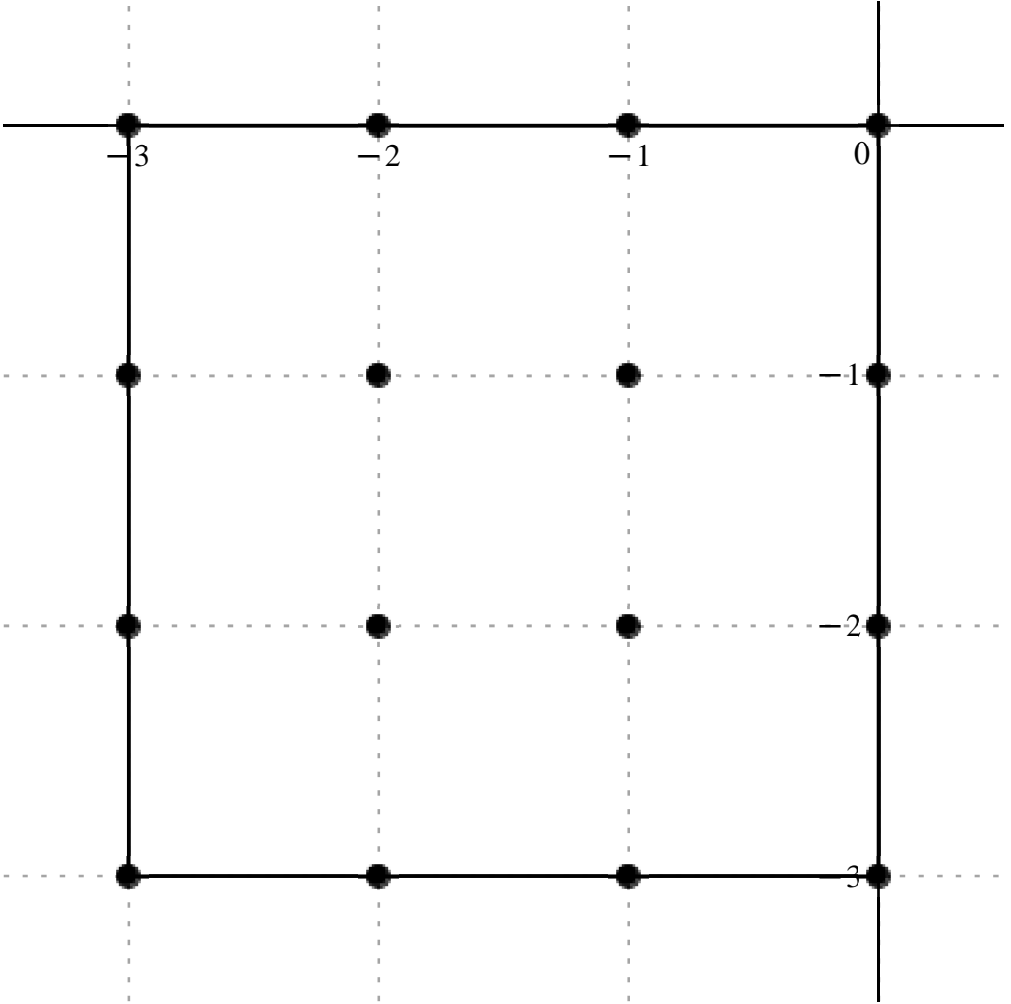
Error order:, 9, Error:, 1.5568609784568983405 × 10<sup>-38</sup>, New Error:, 1.5572043784908835255 × 10<sup>-47</sup>

Error order:, 9, Error:, 1.5572043784908835255 × 10<sup>-47</sup>, New Error:, 1.5572387205060240975 × 10<sup>-56</sup>

Error order:, 9, Error:, 1.5572387205060240975 × 10<sup>-56</sup>, New Error:, 1.5572421547276550441 × 10<sup>-65</sup>

$$x_o + h., \begin{bmatrix} -3 & -2 & -1 & 0 \\ -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ -3 - 2 \text{ I} & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \\ -3 - 3 \text{ I} & -2 - 3 \text{ I} & -1 - 3 \text{ I} & -3 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{5327714}{195} + \frac{1512938 \text{ I}}{195} & -\frac{326063997}{1300} - \frac{601742211 \text{ I}}{1300} & \frac{207959598}{325} - \frac{90244014 \text{ I}}{325} & \frac{35749511}{780} + \frac{35749511 \text{ I}}{780} \\ \frac{171517731}{1300} + \frac{458968797 \text{ I}}{1300} & \frac{45573822}{5} - \frac{31599918 \text{ I}}{5} & -\frac{193478607}{20} - \frac{193478607 \text{ I}}{20} & -\frac{90244014}{325} + \frac{207959598 \text{ I}}{325} \\ \frac{78359694}{325} - \frac{76695318 \text{ I}}{325} & \frac{26915427}{4} + \frac{26915427 \text{ I}}{4} & -\frac{31599918}{5} + \frac{45573822 \text{ I}}{5} & -\frac{601742211}{1300} - \frac{326063997 \text{ I}}{1300} \\ -\frac{11382119}{780} - \frac{11382119 \text{ I}}{780} & -\frac{76695318}{325} + \frac{78359694 \text{ I}}{325} & \frac{458968797}{1300} + \frac{171517731 \text{ I}}{1300} & \frac{1512938}{195} - \frac{5327714 \text{ I}}{195} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{3900 \, \Delta x_{ol}^7} \Big( 7 \, \big( (-15222040 + 4322680 \, \text{I}) \, u_{ol-3} - (139741713 + 257889519 \, \text{I}) \, u_{ol-2} + (356502168 - 154704024 \, \text{I}) \, u_{ol-1} + (25535365 + 25535365 \, \text{I}) \, u_{ol} + (73507599 + 196700913 \, \text{I}) \, u_{ol-3-1} + (5078225880 - 3521133720 \, \text{I}) \, u_{ol-2-1} - (5389761195 + 5389761195 \, \text{I}) \, u_{ol-1-1} + (-154704024 + 356502168 \, \text{I}) \, u_{ol-1}$$

$$+ (134330904 - 131477688 \, \text{I}) \, u_{ol-3-21} + (3748934475 + 3748934475 \, \text{I}) \, u_{ol-2-21} + (-3521133720 + 5078225880 \, \text{I}) \, u_{ol-1-21} - (257889519 + 139741713 \, \text{I}) \, u_{ol-21} - (8130085 + 8130085 \, \text{I}) \, u_{ol-3-31} + (-131477688 + 134330904 \, \text{I}) \, u_{ol-2-31} + (196700913 + 73507599 \, \text{I}) \, u_{ol-1-31} + (4322680 - 15222040 \, \text{I}) \, u_{ol-31} \big) \Big), \, O( \, \Delta x_{ol}^9 \, )$$

Formula.: 125, Var.: 1

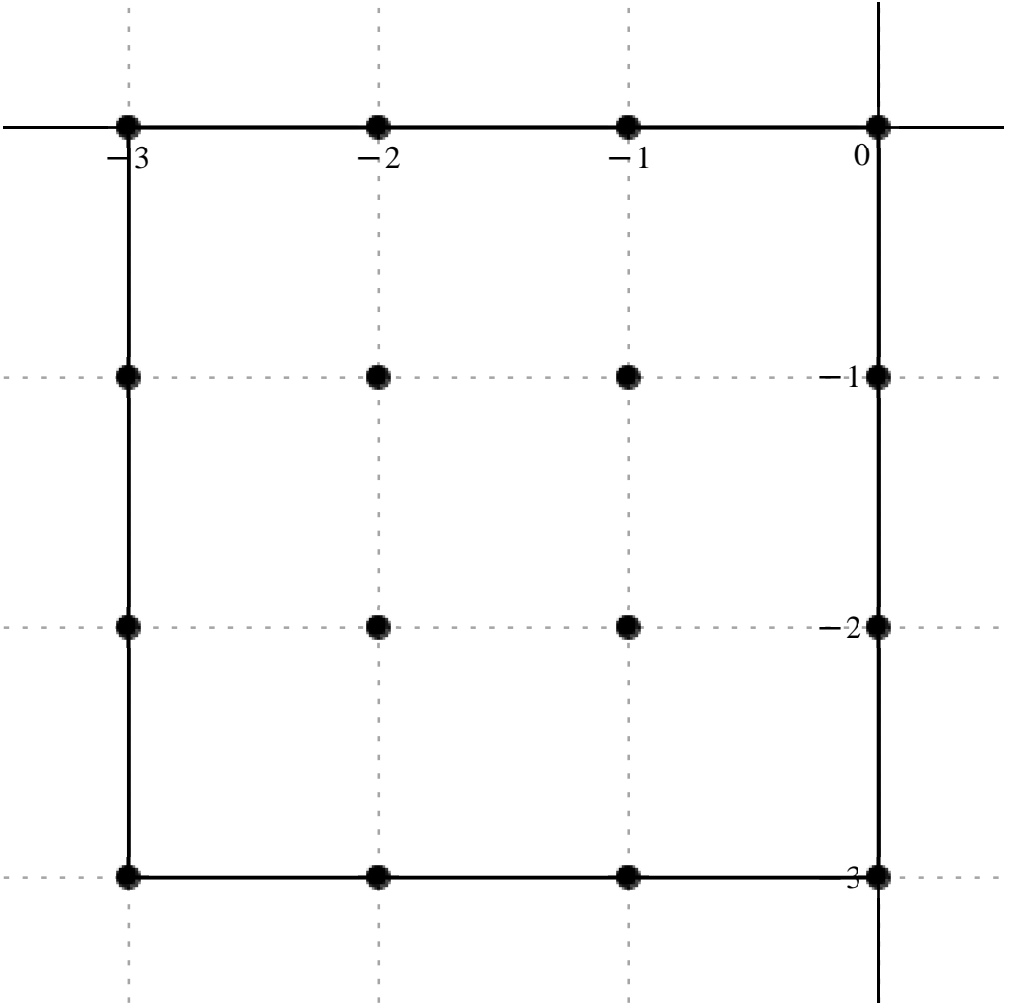
Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 8

Error order.: 8, Error.: 7.1388626534627926766 × 10<sup>−18</sup>, New Error.: 7.2143973279227565970 × 10<sup>−26</sup>

Error order.: 8, Error.: 7.2143973279227565970 × 10<sup>−26</sup>, New Error.: 7.2219227300050407422 × 10<sup>−34</sup>

*Error order:*, 8,    *Error:*,  $7.2219227300050407422 \times 10^{-34}$ ,    *New Error:*,  $7.2226749812525152396 \times 10^{-42}$   
*Error order:*, 8,    *Error:*,  $7.2226749812525152396 \times 10^{-42}$ ,    *New Error:*,  $7.2227502034792960327 \times 10^{-50}$   
*Error order:*, 8,    *Error:*,  $7.2227502034792960327 \times 10^{-50}$ ,    *New Error:*,  $7.2227577256729860811 \times 10^{-58}$

$$\begin{aligned}
 & x_o \neq h \text{ , } \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -3 - 2 \mathrm{I} & -2 - 2 \mathrm{I} & -1 - 2 \mathrm{I} & -2 \mathrm{I} \\ -3 - 3 \mathrm{I} & -2 - 3 \mathrm{I} & -1 - 3 \mathrm{I} & -3 \mathrm{I} \end{array} \right] \\
 c =, & \left[ \begin{array}{cccc} -\frac{641718}{13} + \frac{507654 \mathrm{I}}{5} & -\frac{25566912}{13} - \frac{29799504 \mathrm{I}}{65} & \frac{53359362}{65} - \frac{31181094 \mathrm{I}}{13} & \frac{2871792}{13} \\ \frac{17951472}{13} + \frac{7516656 \mathrm{I}}{13} & \frac{33421878}{5} - \frac{212056866 \mathrm{I}}{5} & -\frac{256533984}{5} & \frac{53359362}{65} + \frac{31181094 \mathrm{I}}{13} \\ -\frac{154098}{65} - \frac{87691338 \mathrm{I}}{65} & \frac{187168464}{5} & \frac{33421878}{5} + \frac{212056866 \mathrm{I}}{5} & -\frac{25566912}{13} + \frac{29799504 \mathrm{I}}{65} \\ -\frac{5414976}{65} & -\frac{154098}{65} + \frac{87691338 \mathrm{I}}{65} & \frac{17951472}{13} - \frac{7516656 \mathrm{I}}{13} & -\frac{641718}{13} - \frac{507654 \mathrm{I}}{5} \end{array} \right]
 \end{aligned}$$



$$\begin{aligned}
 \frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = & \frac{1}{65 \, \Delta x_{ol}^8} \Big( 126 \, \big( (-25465 + 52377 \, \mathrm{I}) \, u_{ol-3} - (1014560 + 236504 \, \mathrm{I}) \, u_{ol-2} + (423487 - 1237345 \, \mathrm{I}) \, u_{ol-1} + 113960 \, u_{ol} + (712360 + 298280 \, \mathrm{I}) \, u_{ol-3-1} + (3448289 - 21878883 \, \mathrm{I}) \, u_{ol-2-1} - 26467792 \, u_{ol-1-1} + (423487 + 1237345 \, \mathrm{I}) \, u_{ol-1} - (1223 + 695963 \, \mathrm{I}) \, u_{ol-3-21} + 19311032 \, u_{ol-2-21} + (3448289 \\
 & + 21878883 \, \mathrm{I}) \, u_{ol-1-21} + (-1014560 + 236504 \, \mathrm{I}) \, u_{ol-21} - 42976 \, u_{ol-3-31} + (-1223 + 695963 \, \mathrm{I}) \, u_{ol-2-31} + (712360 - 298280 \, \mathrm{I}) \, u_{ol-1-31} - (25465 + 52377 \, \mathrm{I}) \, u_{ol-31} \big) \Big), \, O( \, \Delta x_{ol}^8 \, )
 \end{aligned}$$

Formula.: 126, Var.: 1

Variavel :  $x_{ol}$  , Derivada de Ordem : 9

Error order.: 7, Error.:  $2.1001248186088933927 \times 10^{-15}$ , New Error.:  $2.1459206809055348501 \times 10^{-22}$

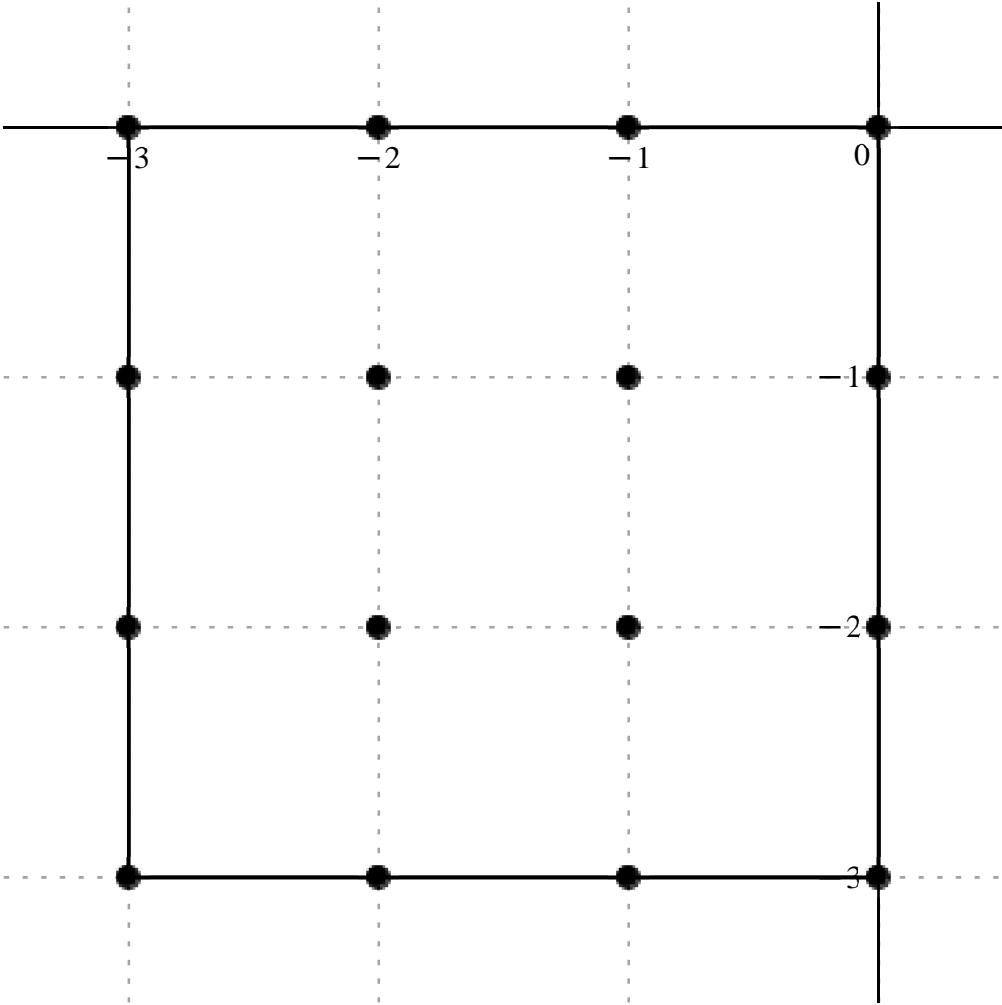
Error order.: 7, Error.:  $2.1459206809055348501 \times 10^{-22}$ , New Error.:  $2.1505267234778374612 \times 10^{-29}$

Error order.: 7, Error.:  $2.1505267234778374612 \times 10^{-29}$ , New Error.:  $2.1509875916312605652 \times 10^{-36}$

Error order.: 7, Error.:  $2.1509875916312605652 \times 10^{-36}$ , New Error.:  $2.1510336810848828471 \times 10^{-43}$

Error order.: 7, Error.:  $2.1510336810848828471 \times 10^{-43}$ , New Error.:  $2.1510382900566271916 \times 10^{-50}$

$$x_o \neq h.$$
$$c = \begin{bmatrix} \frac{1925154}{13} + \frac{23278374 \text{ I}}{65} & -\frac{355205088}{65} + \frac{250405344 \text{ I}}{65} & -\frac{247619106}{65} - \frac{457771986 \text{ I}}{65} & \frac{6087312}{13} - \frac{6087312 \text{ I}}{13} \\ \frac{305368056}{65} - \frac{137000808 \text{ I}}{65} & -\frac{436461858}{5} - \frac{572126814 \text{ I}}{5} & -\frac{590210712}{5} + \frac{590210712 \text{ I}}{5} & \frac{457771986}{65} + \frac{247619106 \text{ I}}{65} \\ -\frac{218237166}{65} - \frac{211741614 \text{ I}}{65} & \frac{451177776}{5} - \frac{451177776 \text{ I}}{5} & \frac{572126814}{5} + \frac{436461858 \text{ I}}{5} & -\frac{250405344}{65} + \frac{355205088 \text{ I}}{65} \\ -\frac{13415976}{65} + \frac{13415976 \text{ I}}{65} & \frac{211741614}{65} + \frac{218237166 \text{ I}}{65} & \frac{137000808}{65} - \frac{305368056 \text{ I}}{65} & -\frac{23278374}{65} - \frac{1925154 \text{ I}}{13} \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} u(x_{ol}) = \frac{1}{65 \Delta x_{ol}^9} \Big( 378 \Big( (25465 + 61583 \text{ I}) u_{ol-3} + (-939696 + 662448 \text{ I}) u_{ol-2} - (655077 + 1211037 \text{ I}) u_{ol-1} + (80520 - 80520 \text{ I}) u_{ol} + (807852 - 362436 \text{ I}) u_{ol-3-1} - (15010593 + 19676319 \text{ I}) u_{ol-2-1} + (-20298252 + 20298252 \text{ I}) u_{ol-1-1} + (1211037 + 655077 \text{ I}) u_{ol-1} - (577347 + 560163 \text{ I}) u_{ol-3-21} + (15516696$$
$$- 15516696 \text{ I}) u_{ol-2-21} + (19676319 + 15010593 \text{ I}) u_{ol-1-21} + (-662448 + 939696 \text{ I}) u_{ol-21} + (-35492 + 35492 \text{ I}) u_{ol-3-31} + (560163 + 577347 \text{ I}) u_{ol-2-31} + (362436 - 807852 \text{ I}) u_{ol-1-31} - (61583 + 25465 \text{ I}) u_{ol-31} \Big) \Big), O(\Delta x_{ol}^7)$$



Formula:, 127, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

Error order:, 6, Error:; 7.5378307488190670756 × 10<sup>-13</sup>, New Error:; 7.6146458251894089718 × 10<sup>-19</sup>

Error order:, 6, Error:; 7.6146458251894089718 × 10<sup>-19</sup>, New Error:; 7.6222995776083925283 × 10<sup>-25</sup>

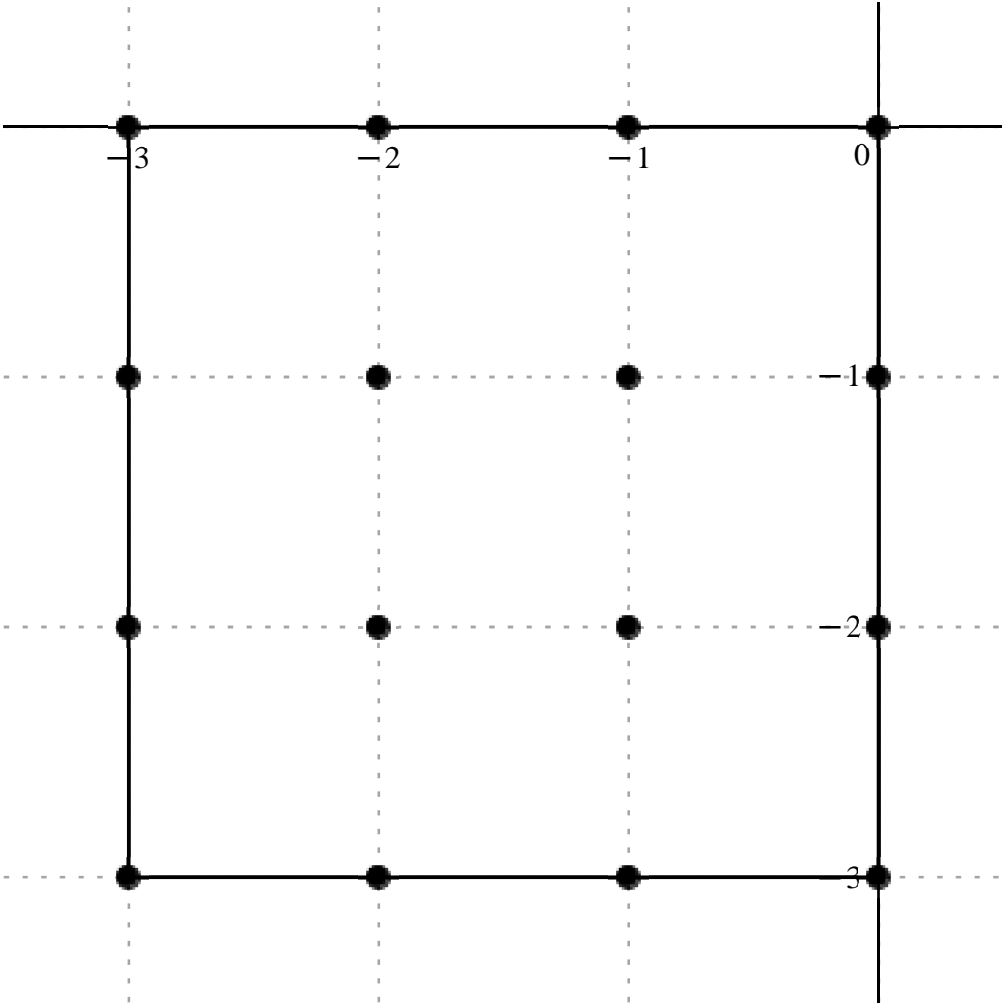
Error order:, 6, Error:; 7.6222995776083925283 × 10<sup>-25</sup>, New Error:; 7.6230646672745791788 × 10<sup>-31</sup>

Error order:, 6, Error:; 7.6230646672745791788 × 10<sup>-31</sup>, New Error:; 7.6231411733773679087 × 10<sup>-37</sup>

Error order:, 6, Error:; 7.6231411733773679087 × 10<sup>-37</sup>, New Error:; 7.6231488239590004046 × 10<sup>-43</sup>

$$x_o + h., \begin{bmatrix} -3 & -2 & -1 & 0 \\ -3 - I & -2 - I & -1 - I & -I \\ -3 - 2 I & -2 - 2 I & -1 - 2 I & -2 I \\ -3 - 3 I & -2 - 3 I & -1 - 3 I & -3 I \end{bmatrix}$$

$$c =, \begin{bmatrix} 1067220 + \frac{4772124 I}{13} & -\frac{28295568}{13} + \frac{242666928 I}{13} & -\frac{271763100}{13} - \frac{70600572 I}{13} & -\frac{22238496 I}{13} \\ \frac{63322560}{13} - \frac{185440752 I}{13} & -408124332 - 45598140 I & 463152816 I & \frac{271763100}{13} - \frac{70600572 I}{13} \\ -\frac{179695908}{13} + \frac{5291244 I}{13} & -370609344 I & 408124332 - 45598140 I & \frac{28295568}{13} + \frac{242666928 I}{13} \\ \frac{11347056 I}{13} & \frac{179695908}{13} + \frac{5291244 I}{13} & -\frac{63322560}{13} - \frac{185440752 I}{13} & -1067220 + \frac{4772124 I}{13} \end{bmatrix}$$



$$\frac{d^{10}}{dx_{ol}^{10}} u(x_{ol}) = \frac{1}{13 \Delta x_{ol}^{10}} \left( 252 \left( (55055 + 18937 I) u_{ol-3} + (-112284 + 962964 I) u_{ol-2} - (1078425 + 280161 I) u_{ol-1} - 88248 I u_{ol} + (251280 - 735876 I) u_{ol-3-1} - (21054033 + 2352285 I) u_{ol-2-1} + 23892804 I u_{ol-1-1} + (1078425 - 280161 I) u_{ol-1} + (-713079 + 20997 I) u_{ol-3-21} - 19118736 I u_{ol-2-21} + (21054033 \right.$$

$$-2352285 \operatorname{I} u_{o l-1-21}+(112284+962964 \operatorname{I}) u_{o l-21}+45028 \operatorname{I} u_{o l-3-31}+(713079+20997 \operatorname{I}) u_{o l-2-31}-(251280+735876 \operatorname{I}) u_{o l-1-31}+(-55055+18937 \operatorname{I}) u_{o l-31})) . \mathcal{O}\left(\Delta x_{o l}^6\right)$$

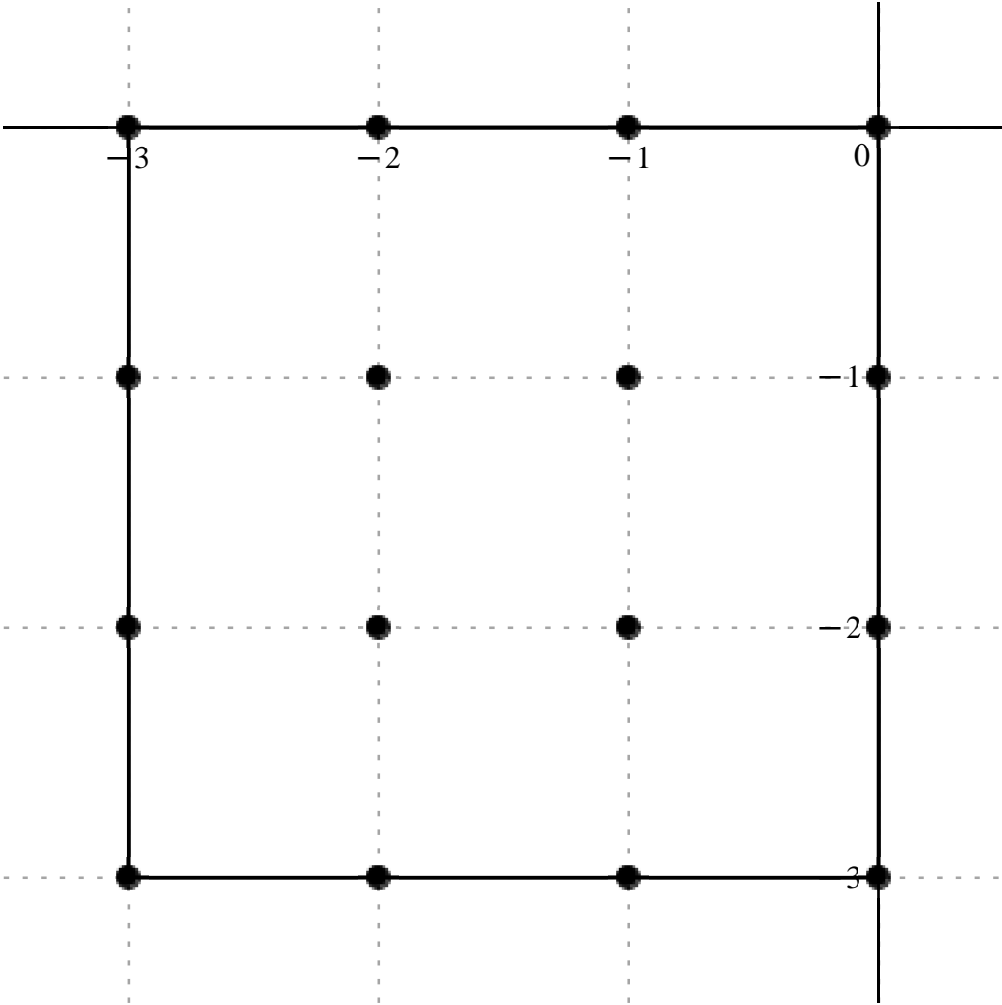
Formula:, 128, Var:, 1

Variavel :,  $x_{o l}$ , Derivada de Ordem :, 11

Error order:, 5, Error:,  $1.6446282128211012756 \times 10^{-10}$ , New Error:,  $1.6787299401068597479 \times 10^{-15}$   
 Error order:, 5, Error:,  $1.6787299401068597479 \times 10^{-15}$ , New Error:,  $1.6821590931140012667 \times 10^{-20}$   
 Error order:, 5, Error:,  $1.6821590931140012667 \times 10^{-20}$ , New Error:,  $1.6825021977520394658 \times 10^{-25}$   
 Error order:, 5, Error:,  $1.6825021977520394658 \times 10^{-25}$ , New Error:,  $1.6825365101087410298 \times 10^{-30}$   
 Error order:, 5, Error:,  $1.6825365101087410298 \times 10^{-30}$ , New Error:,  $1.6825399413633396871 \times 10^{-35}$

$$x_o \neq h. , \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3-1 & -2-1 & -1-1 & -1 \\ -3-2 \operatorname{I} & -2-2 \operatorname{I} & -1-2 \operatorname{I} & -2 \operatorname{I} \\ -3-3 \operatorname{I} & -2-3 \operatorname{I} & -1-3 \operatorname{I} & -3 \operatorname{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{30670332}{13} - \frac{17497788 \operatorname{I}}{13} & \frac{1878933672}{65} + \frac{2133103896 \operatorname{I}}{65} & -\frac{2665918332}{65} + \frac{1681420356 \operatorname{I}}{65} & -\frac{34038312}{13} - \frac{34038312 \operatorname{I}}{13} \\ -\frac{1125703656}{65} - \frac{2095981272 \operatorname{I}}{65} & -745870356 + 623724948 \operatorname{I} & 755076168 + 755076168 \operatorname{I} & \frac{1681420356}{65} - \frac{2665918332 \operatorname{I}}{65} \\ -\frac{1489819716}{65} + \frac{1630077372 \operatorname{I}}{65} & -632032632 - 632032632 \operatorname{I} & 623724948 - 745870356 \operatorname{I} & \frac{2133103896}{65} + \frac{1878933672 \operatorname{I}}{65} \\ \frac{19967640}{13} + \frac{19967640 \operatorname{I}}{13} & \frac{1630077372}{65} - \frac{1489819716 \operatorname{I}}{65} & -\frac{2095981272}{65} - \frac{1125703656 \operatorname{I}}{65} & -\frac{17497788}{13} + \frac{30670332 \operatorname{I}}{13} \end{array} \right]$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d}x_{ol}^{11}}\; u(x_{ol}) = \frac{1}{65\,\Delta x_{ol}^{11}}\Big(924\,\big((165965-94685\,\mathrm{I})\,u_{ol-3} + (2033478+2308554\,\mathrm{I})\,u_{ol-2} + (-2885193+1819719\,\mathrm{I})\,u_{ol-1} - (184190+184190\,\mathrm{I})\,u_{ol} - (1218294+2268378\,\mathrm{I})\,u_{ol-3-1} + (-52469235+43876755\,\mathrm{I})\,u_{ol-2-1} + (53116830+53116830\,\mathrm{I})\,u_{ol-1-1} + (1819719-2885193\,\mathrm{I})\,u_{ol-1} + (-1612359+1764153\,\mathrm{I})\,u_{ol-3-21} \\ - (44461170+44461170\,\mathrm{I})\,u_{ol-2-21} + (43876755-52469235\,\mathrm{I})\,u_{ol-1-21} + (2308554+2033478\,\mathrm{I})\,u_{ol-21} + (108050+108050\,\mathrm{I})\,u_{ol-3-31} + (1764153-1612359\,\mathrm{I})\,u_{ol-2-31} - (2268378+1218294\,\mathrm{I})\,u_{ol-1-31} + (-94685+165965\,\mathrm{I})\,u_{ol-31}\big)\big),\; O(\,\Delta x_{ol}^5\,)$$

Formula:, 129, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 12

Error order:, 4, Error:, 4.1832687724112390210 × 10<sup>-8</sup>, New Error:, 4.2229957307793899337 × 10<sup>-12</sup>

Error order:, 4, Error:, 4.2229957307793899337 × 10<sup>-12</sup>, New Error:, 4.2269547441520055094 × 10<sup>-16</sup>

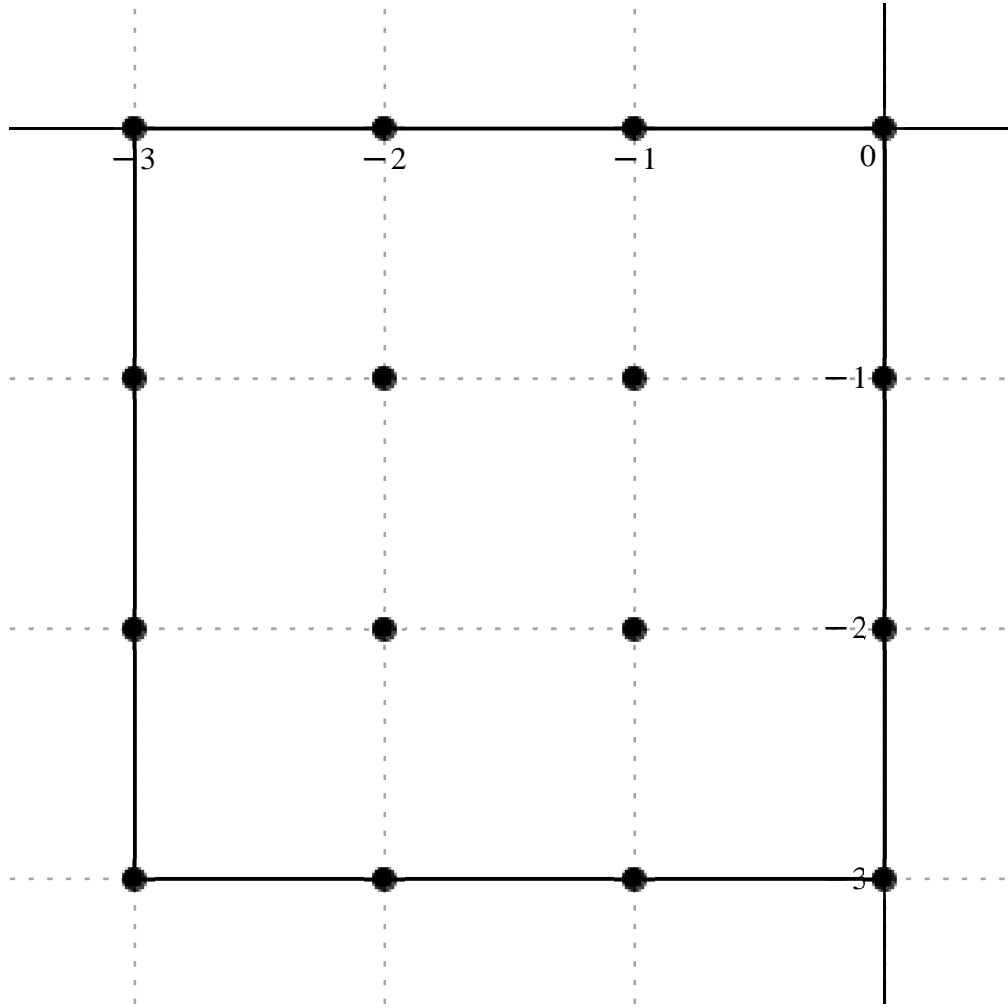
Error order:, 4, Error:, 4.2269547441520055094 × 10<sup>-16</sup>, New Error:, 4.2273505048556106290 × 10<sup>-20</sup>

Error order:, 4, Error:, 4.2273505048556106290 × 10<sup>-20</sup>, New Error:, 4.2273900795158028221 × 10<sup>-24</sup>

Error order:, 4, Error:, 4.2273900795158028221 × 10<sup>-24</sup>, New Error:, 4.2273940369677165241 × 10<sup>-28</sup>

$$x_o \neq h., \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3-1 & -2-1 & -1-1 & -1 \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{cccc} \frac{13471920}{13} - 5089392\,\mathrm{I} & \frac{1053803520}{13} + \frac{13571712\,\mathrm{I}}{13} & -\frac{218843856}{13} + \frac{1111183920\,\mathrm{I}}{13} & -\frac{83825280}{13} \\ -\frac{892140480}{13} - \frac{231517440\,\mathrm{I}}{13} & -122444784 + 1833079248\,\mathrm{I} & 1967499072 & -\frac{218843856}{13} - \frac{1111183920\,\mathrm{I}}{13} \\ \frac{53588304}{13} + \frac{865895184\,\mathrm{I}}{13} & -1722010752 & -122444784 - 1833079248\,\mathrm{I} & \frac{1053803520}{13} - \frac{13571712\,\mathrm{I}}{13} \\ \frac{56282688}{13} & \frac{53588304}{13} - \frac{865895184\,\mathrm{I}}{13} & -\frac{892140480}{13} + \frac{231517440\,\mathrm{I}}{13} & \frac{13471920}{13} + 5089392\,\mathrm{I} \end{array} \right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\,u(x_{ol})=\frac{1}{13\,\mathcal{A}_{ol}^{12}}\Big(99792\,\Big((135-663\,\mathrm{I})\,u_{ol-3}+(10560+136\,\mathrm{I})\,u_{ol-2}+(-2193+11135\,\mathrm{I})\,u_{ol-1}-840\,u_{ol}-(8940+2320\,\mathrm{I})\,u_{ol-3-1}+(-15951+238797\,\mathrm{I})\,u_{ol-2-1}+256308\,u_{ol-1-1}-(2193+11135\,\mathrm{I})\,u_{ol-1}+(537+8677\,\mathrm{I})\,u_{ol-3-21}-224328\,u_{ol-2-21}-(15951+238797\,\mathrm{I})\,u_{ol-1-21}+(10560-136\,\mathrm{I})\,u_{ol-21}+564\,u_{ol-3-31}+(537-8677\,\mathrm{I})\,u_{ol-2-31}+(-8940+2320\,\mathrm{I})\,u_{ol-1-31}+(135+663\,\mathrm{I})\,u_{ol-31})\Big),\,O(\,\mathcal{A}_{ol}^4\,)$$

Formula:., 130, Var.: 1

Variavel :.,  $x_{ol}$ , Derivada de Ordem :., 13

Error order:., 3, Error:.,  $6.0688101563632933086 \times 10^{-6}$ , New Error:.,  $6.1817963159969380799 \times 10^{-9}$

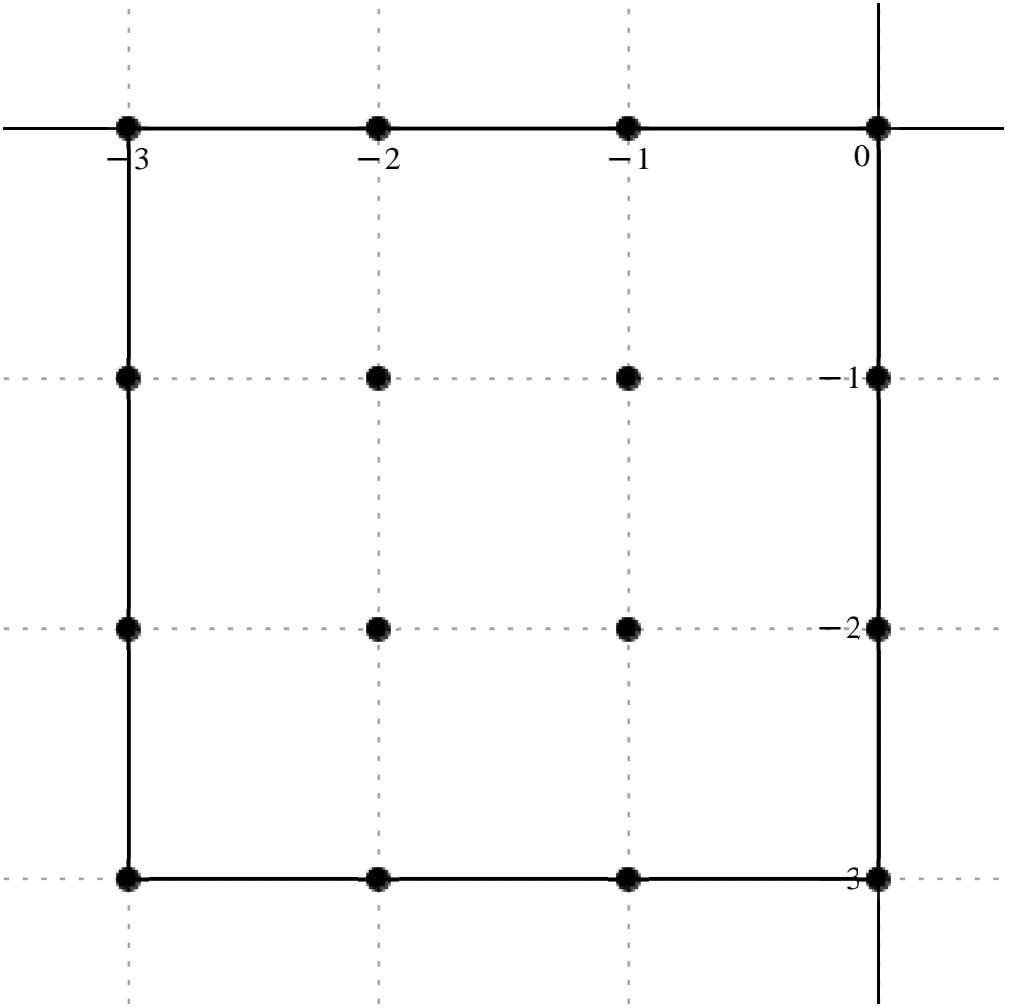
Error order:., 3, Error:.,  $6.1817963159969380799 \times 10^{-9}$ , New Error:.,  $6.1931535720852666818 \times 10^{-12}$

Error order:., 3, Error:.,  $6.1931535720852666818 \times 10^{-12}$ , New Error:.,  $6.1942898827247209089 \times 10^{-15}$

Error order:., 3, Error:.,  $6.1942898827247209089 \times 10^{-15}$ , New Error:.,  $6.1944035196375734445 \times 10^{-18}$

Error order:., 3, Error:.,  $6.1944035196375734445 \times 10^{-18}$ , New Error:.,  $6.1944148833873463672 \times 10^{-21}$

$$x_o \neq h. , \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3-1 & -2-1 & -1-1 & -1 \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \end{array} \right]$$
$$c = , \left[ \begin{array}{cccc} -4490640-5887728\,\mathrm{I} & 76640256-82228608\,\mathrm{I} & 67958352+95900112\,\mathrm{I} & -5987520+5987520\,\mathrm{I} \\ -86419872+55683936\,\mathrm{I} & 1755241488+1918700784\,\mathrm{I} & 1922592672-1922592672\,\mathrm{I} & -95900112-67958352\,\mathrm{I} \\ 74943792+63767088\,\mathrm{I} & -1759133376+1759133376\,\mathrm{I} & -1918700784-1755241488\,\mathrm{I} & 82228608-76640256\,\mathrm{I} \\ 4590432-4590432\,\mathrm{I} & -63767088-74943792\,\mathrm{I} & -55683936+86419872\,\mathrm{I} & 5887728+4490640\,\mathrm{I} \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\,u(x_{ol})=\frac{1}{\Delta x_{ol}^{13}}\left(- (4490640+5887728\,\mathrm{I})\,u_{ol-3}+(76640256-82228608\,\mathrm{I})\,u_{ol-2}+(67958352+95900112\,\mathrm{I})\,u_{ol-1}+(-5987520+5987520\,\mathrm{I})\,u_{ol}+(-86419872+55683936\,\mathrm{I})\,u_{ol-3-1}+(1755241488+1918700784\,\mathrm{I})\,u_{ol-2-1}+(1922592672-1922592672\,\mathrm{I})\,u_{ol-1-1}-(95900112+67958352\,\mathrm{I})\,u_{ol-1}+(74943792+63767088\,\mathrm{I})\,u_{ol-3-21}+(-1759133376+1759133376\,\mathrm{I})\,u_{ol-2-21}-(1918700784+1755241488\,\mathrm{I})\,u_{ol-1-21}+(82228608-76640256\,\mathrm{I})\,u_{ol-21}+(4590432-4590432\,\mathrm{I})\,u_{ol-3-31}-(63767088+74943792\,\mathrm{I})\,u_{ol-2-31}+(-55683936+86419872\,\mathrm{I})\,u_{ol-1-31}+(5887728+4490640\,\mathrm{I})\,u_{ol-31}\right),\,\,O(\,\Delta x_{ol}^3\,)$$

Formula:, 131, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:, 2, Error:, 0.00092398491916745501322, New Error:,  $9.3127919499526686008\times 10^{-6}$

Error order:, 2, Error:,  $9.3127919499526686008\times 10^{-6}$ , New Error:,  $9.3200635647008960516\times 10^{-8}$

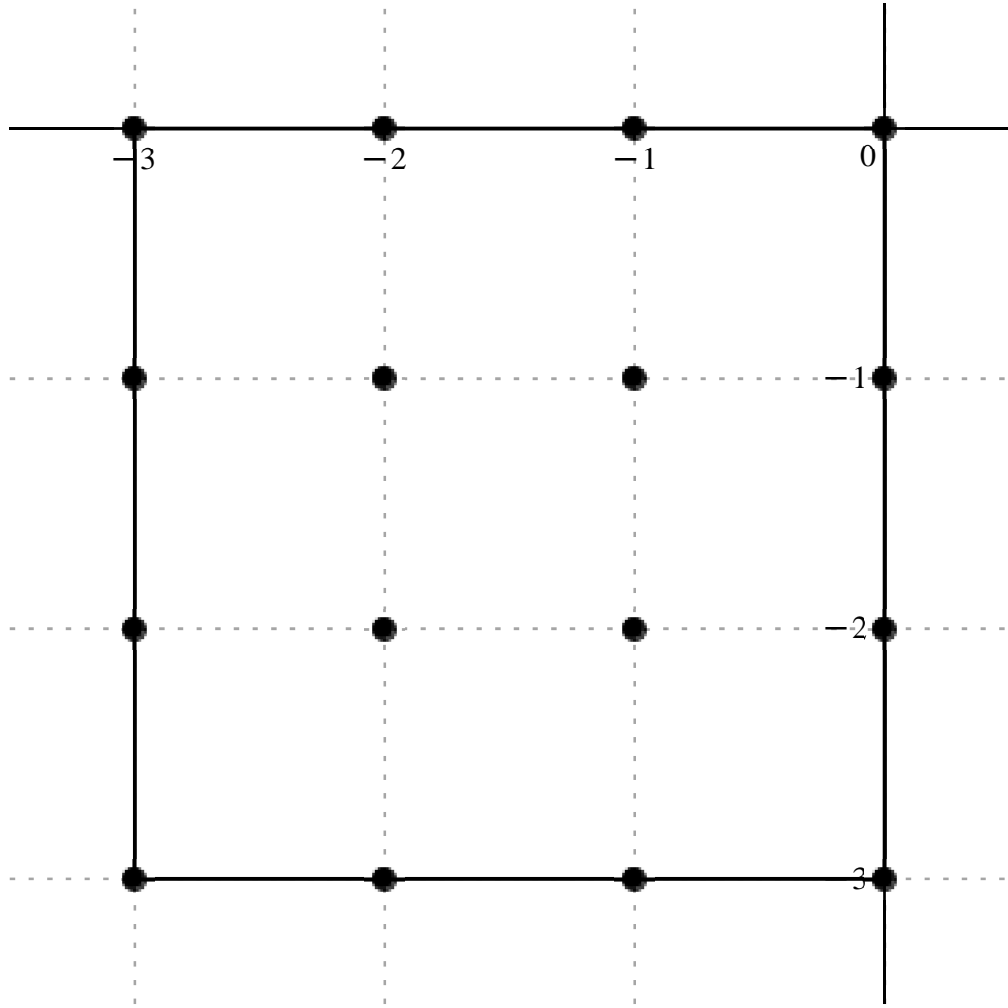
Error order:, 2, Error:,  $9.3200635647008960516\times 10^{-8}$ , New Error:,  $9.3207904936872375108\times 10^{-10}$

Error order:, 2, Error:,  $9.3207904936872375108\times 10^{-10}$ , New Error:,  $9.3208631842550757402\times 10^{-12}$

Error order:, 2, Error:,  $9.3208631842550757402\times 10^{-12}$ , New Error:,  $9.3208704532885456896\times 10^{-14}$

$$x_o\neq h.,\left[\begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3-1 & -2-1 & -1-1 & -1 \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{cccc} -6985440-465696\,\mathrm{I} & -8382528-103384512\,\mathrm{I} & 104781600+15367968\,\mathrm{I} & 7451136\,\mathrm{I} \\ -16765056+97796160\,\mathrm{I} & 2451889440+54486432\,\mathrm{I} & -2506375872\,\mathrm{I} & -104781600+15367968\,\mathrm{I} \\ 96399072-9779616\,\mathrm{I} & 2397403008\,\mathrm{I} & -2451889440+54486432\,\mathrm{I} & 8382528-103384512\,\mathrm{I} \\ -6519744\,\mathrm{I} & -96399072-9779616\,\mathrm{I} & 16765056+97796160\,\mathrm{I} & 6985440-465696\,\mathrm{I} \end{array}\right]$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}}\;u(x_{ol})=\frac{1}{\Delta x_{ol}^{14}}\left(-\left(6985440+465696\,\mathrm{I}\right)u_{ol-3}-\left(8382528+103384512\,\mathrm{I}\right)u_{ol-2}+\left(104781600+15367968\,\mathrm{I}\right)u_{ol-1}+7451136\,\mathrm{I}u_{ol}+\left(-16765056+97796160\,\mathrm{I}\right)u_{ol-3-1}+\left(2451889440+54486432\,\mathrm{I}\right)u_{ol-2-1}-2506375872\,\mathrm{I}u_{ol-1-1}+\left(-104781600+15367968\,\mathrm{I}\right)u_{ol-1}+\left(96399072-9779616\,\mathrm{I}\right)u_{ol-3-21}+2397403008\,\mathrm{I}u_{ol-2-21}+\left(-2451889440+54486432\,\mathrm{I}\right)u_{ol-1-21}+\left(8382528-103384512\,\mathrm{I}\right)u_{ol-21}-6519744\,\mathrm{I}u_{ol-3-31}-\left(96399072+9779616\,\mathrm{I}\right)u_{ol-2-31}+\left(16765056+97796160\,\mathrm{I}\right)u_{ol-1-31}+\left(6985440-465696\,\mathrm{I}\right)u_{ol-31}\right),\;O(\;\Delta x_{ol}^2\;)$$

Formula:, 132, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 15

Error order:, 1, Error:, 0.067334606056573251321, New Error:, 0.0068165324360906509760

Error order:, 1, Error:, 0.0068165324360906509760, New Error:, 0.00068248755060388318501

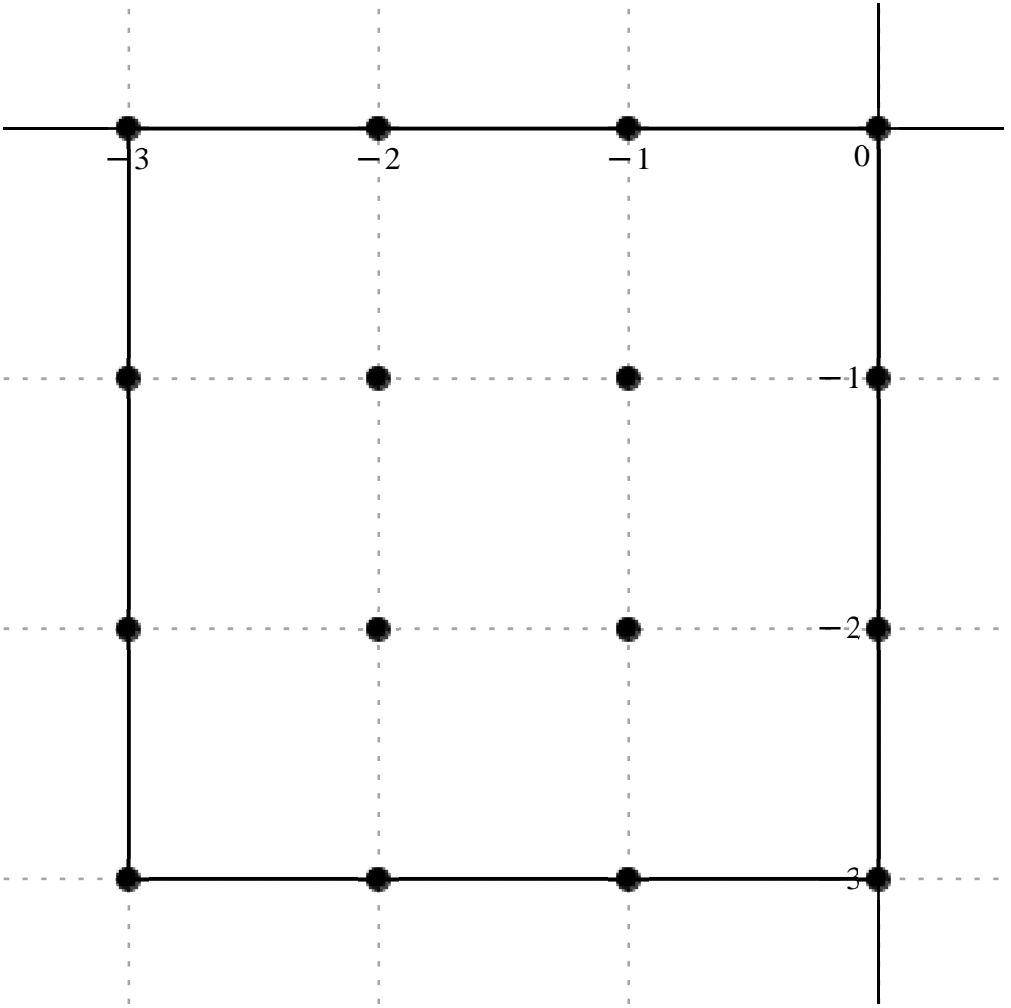
Error order:, 1, Error:, 0.00068248755060388318501, New Error:, 0.000068257101711462398003

Error order:, 1, Error:, 0.000068257101711462398003, New Error:, 6.8257936412373353805 × 10<sup>-6</sup>

Error order:, 1, Error:, 6.8257936412373353805 × 10<sup>-6</sup>, New Error:, 6.8258019882822477138 × 10<sup>-7</sup>

$$x_o\neq h.,\left[\begin{array}{cccc} -3 & -2 & -1 & 0 \\ -3-1 & -2-1 & -1-1 & -1 \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{cccc} -2328480+2328480\,\mathrm{I} & -37721376-29338848\,\mathrm{I} & 37721376-29338848\,\mathrm{I} & 2328480+2328480\,\mathrm{I} \\ 29338848+37721376\,\mathrm{I} & 817296480-817296480\,\mathrm{I} & -817296480-817296480\,\mathrm{I} & -29338848+37721376\,\mathrm{I} \\ 29338848-37721376\,\mathrm{I} & 817296480+817296480\,\mathrm{I} & -817296480+817296480\,\mathrm{I} & -29338848-37721376\,\mathrm{I} \\ -2328480-2328480\,\mathrm{I} & -37721376+29338848\,\mathrm{I} & 37721376+29338848\,\mathrm{I} & 2328480-2328480\,\mathrm{I} \end{array}\right]$$



$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}}\,u(x_{ol})=\frac{1}{\Delta x_{ol}^{15}}\left((\,-2328480+2328480\,\mathrm{I})\,u_{ol-3}-(37721376+29338848\,\mathrm{I})\,u_{ol-2}+(37721376-29338848\,\mathrm{I})\,u_{ol-1}+(2328480+2328480\,\mathrm{I})\,u_{ol}+(29338848+37721376\,\mathrm{I})\,u_{ol-3-1}+(817296480-817296480\,\mathrm{I})\,u_{ol-2-1}-(817296480+817296480\,\mathrm{I})\,u_{ol-1-1}+(\,-29338848+37721376\,\mathrm{I})\,u_{ol-1}+(29338848-37721376\,\mathrm{I})\,u_{ol-3-21}+(817296480+817296480\,\mathrm{I})\,u_{ol-2-21}+(\,-817296480+817296480\,\mathrm{I})\,u_{ol-1-21}-(29338848+37721376\,\mathrm{I})\,u_{ol-21}-(2328480+2328480\,\mathrm{I})\,u_{ol-3-31}+(\,-37721376+29338848\,\mathrm{I})\,u_{ol-2-31}+(37721376+29338848\,\mathrm{I})\,u_{ol-1-31}+(2328480-2328480\,\mathrm{I})\,u_{ol-31}\right),\,O(\,\Delta x_{ol}\,)$$

Square: Interval, 4

Formula:, 133, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 1

Error order:, 24, Error:, 6.4555772024089164228 × 10<sup>−61</sup>, New Error:, 6.3609432977876729482 × 10<sup>−85</sup>

Error order:, 24, Error:, 6.3609432977876729482 × 10<sup>−85</sup>, New Error:, 6.3514252181887374171 × 10<sup>−109</sup>

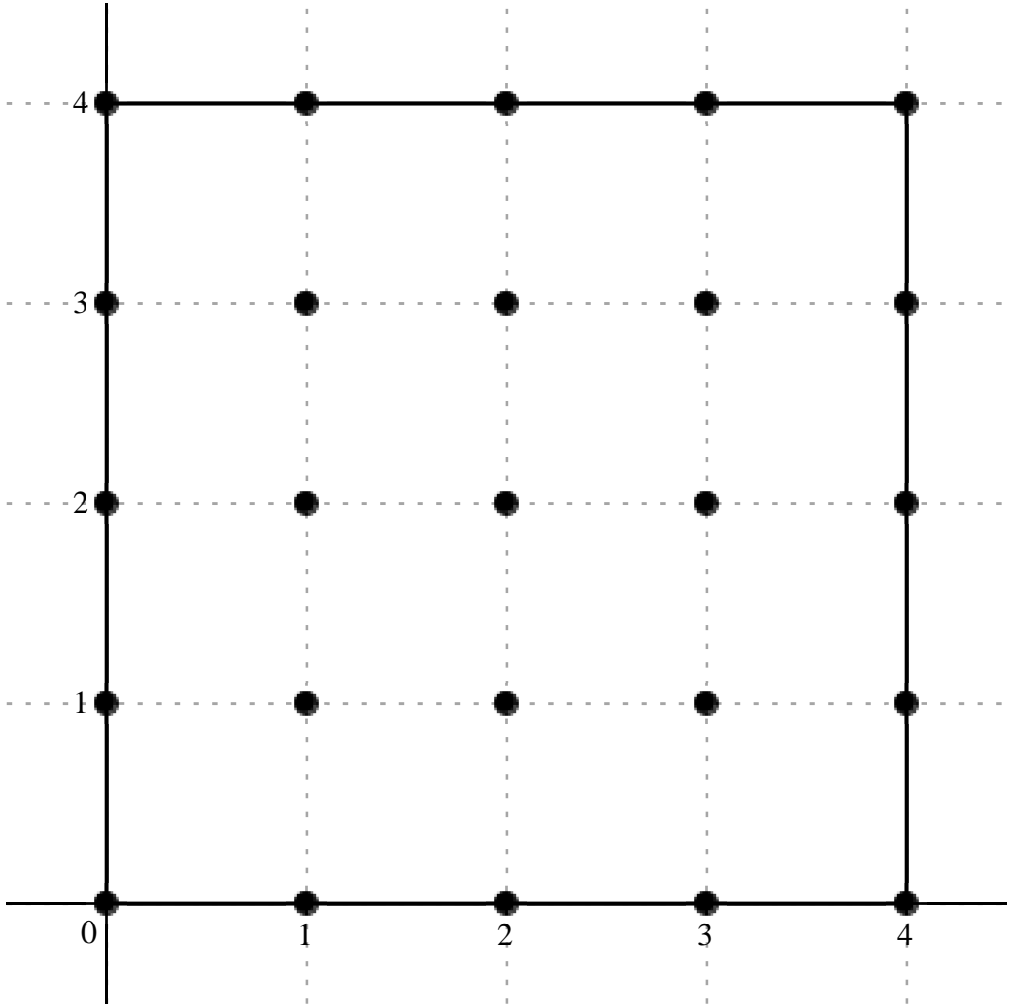
Error order:, 24, Error:, 6.3514252181887374171 × 10<sup>−109</sup>, New Error:, 6.3504728848686469831 × 10<sup>−133</sup>

Error order:, 24, Error:, 6.3504728848686469831 × 10<sup>−133</sup>, New Error:, 6.3503776463043799669 × 10<sup>−157</sup>

Error order:, 24, Error:, 6.3503776463043799669 × 10<sup>−157</sup>, New Error:, 6.3503681223956520109 × 10<sup>−181</sup>

$$x_o \neq h., \left[ \begin{array}{ccccc} 4\,\mathrm{I} & 1+4\,\mathrm{I} & 2+4\,\mathrm{I} & 3+4\,\mathrm{I} & 4+4\,\mathrm{I} \\ 3\,\mathrm{I} & 1+3\,\mathrm{I} & 2+3\,\mathrm{I} & 3+3\,\mathrm{I} & 4+3\,\mathrm{I} \\ 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & 3+2\,\mathrm{I} & 4+2\,\mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & 4+\mathrm{I} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} \frac{\text{I}}{4} & -\frac{16}{17} - \frac{208 \text{ I}}{17} & -18 + 36 \text{ I} & \frac{208}{25} - \frac{144 \text{ I}}{25} & -\frac{1}{8} + \frac{\text{I}}{8} \\ \frac{16}{3} - 16 \text{ I} & 544 - 1632 \text{ I} & \frac{48960}{13} - \frac{73440 \text{ I}}{13} & \frac{2720}{3} - \frac{2720 \text{ I}}{3} & \frac{144}{25} - \frac{208 \text{ I}}{25} \\ 90 \text{ I} & 4896 - 9792 \text{ I} & -29835 + 29835 \text{ I} & \frac{73440}{13} - \frac{48960 \text{ I}}{13} & -36 + 18 \text{ I} \\ -16 - 48 \text{ I} & 2720 - 2720 \text{ I} & 9792 - 4896 \text{ I} & 1632 - 544 \text{ I} & \frac{208}{17} + \frac{16 \text{ I}}{17} \\ -\frac{237961}{44200} + \frac{237961 \text{ I}}{44200} & 48 + 16 \text{ I} & -90 & 16 - \frac{16 \text{ I}}{3} & -\frac{1}{4} \end{array} \right]$$



$$\frac{\text{d}}{\text{d}x_{ol}}\, u(x_{ol}) = \frac{1}{132600 \, \mathcal{A}_{ol}} \big( 33150 \, \text{I} \, u_{ol+4\text{I}} - (124800 + 1622400 \, \text{I}) \, u_{ol+1+4\text{I}} + (-2386800 + 4773600 \, \text{I}) \, u_{ol+2+4\text{I}} + (1103232 - 763776 \, \text{I}) \, u_{ol+3+4\text{I}} + (-16575 + 16575 \, \text{I}) \, u_{ol+4+4\text{I}} + (707200 - 2121600 \, \text{I}) \, u_{ol+3\text{I}} + (72134400 - 216403200 \, \text{I}) \, u_{ol+1+3\text{I}} + (499392000 - 749088000 \, \text{I}) \, u_{ol+2+3\text{I}} + (120224000 - 120224000 \, \text{I}) \, u_{ol+3+3\text{I}} \\ + (763776 - 1103232 \, \text{I}) \, u_{ol+4+3\text{I}} + 11934000 \, \text{I} \, u_{ol+2\text{I}} + (649209600 - 1298419200 \, \text{I}) \, u_{ol+1+2\text{I}} + (-3956121000 + 3956121000 \, \text{I}) \, u_{ol+2+2\text{I}} + (749088000 - 499392000 \, \text{I}) \, u_{ol+3+2\text{I}} + (-4773600 + 2386800 \, \text{I}) \, u_{ol+4+2\text{I}} - (2121600 + 6364800 \, \text{I}) \, u_{ol+1\text{I}} + (360672000 - 360672000 \, \text{I}) \, u_{ol+1+1\text{I}} + (1298419200 - 649209600 \, \text{I}) \, u_{ol+2+1\text{I}} \\ + (216403200 - 72134400 \, \text{I}) \, u_{ol+3+1\text{I}} + (1622400 + 124800 \, \text{I}) \, u_{ol+4+1\text{I}} + (-713883 + 713883 \, \text{I}) \, u_{ol\text{I}} + (6364800 + 2121600 \, \text{I}) \, u_{ol+1\text{I}} - 11934000 \, u_{ol+2\text{I}} + (2121600 - 707200 \, \text{I}) \, u_{ol+3\text{I}} - 33150 \, u_{ol+4\text{I}} \big), \, O(\, \mathcal{A}_{ol}^{24} \, )$$

Formula.: 134, Var.: 1

Variavel .:, x<sub>ol</sub>, Derivada de Ordem .:, 2

Error order.: 23, Error.: 7.7744159732009512579 × 10<sup>−58</sup>, New Error.: 7.5371944316033279028 × 10<sup>−81</sup>

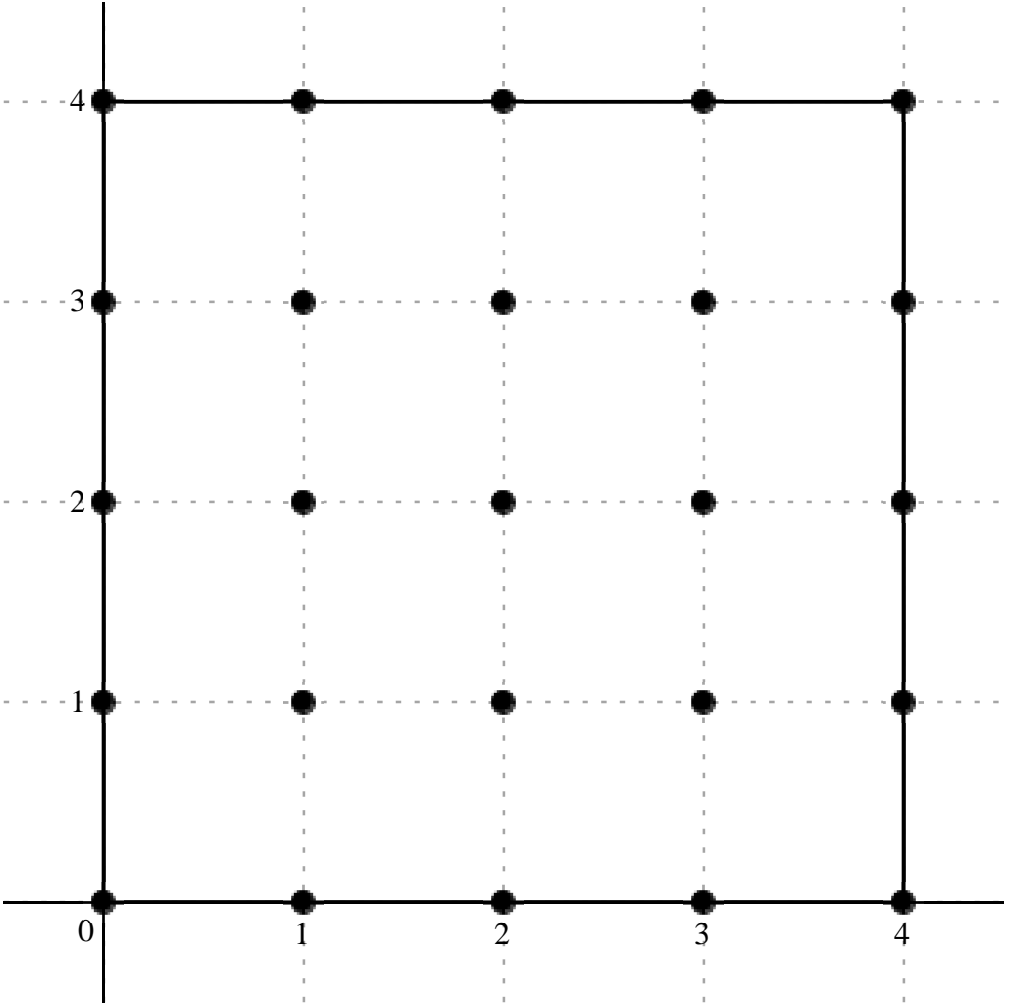
Error order.: 23, Error.: 7.5371944316033279028 × 10<sup>−81</sup>, New Error.: 7.5136653150989763812 × 10<sup>−104</sup>

Error order.: 23, Error.: 7.5136653150989763812 × 10<sup>−104</sup>, New Error.: 7.5113143412301078914 × 10<sup>−127</sup>

Error order.: 23, Error.: 7.5113143412301078914 × 10<sup>−127</sup>, New Error.: 7.5110792632282209101 × 10<sup>−150</sup>



$$c = \left[ \begin{array}{cccccc} -\frac{226911}{88400} - \frac{237961 \, \text{I}}{88400} & \frac{751448}{5525} + \frac{666384 \, \text{I}}{5525} & -\frac{2022309}{11050} - \frac{6265827 \, \text{I}}{11050} & -\frac{757232}{27625} + \frac{4076376 \, \text{I}}{27625} & -\frac{58109 \, \text{I}}{22100} \\ \frac{1726888}{16575} + \frac{11245328 \, \text{I}}{49725} & \frac{3524496}{325} + \frac{7402592 \, \text{I}}{325} & \frac{1223784}{65} + \frac{1272744 \, \text{I}}{13} & \frac{11068528 \, \text{I}}{585} & \frac{757232}{27625} + \frac{4076376 \, \text{I}}{27625} \\ -\frac{1942749}{2210} - \frac{2141649 \, \text{I}}{2210} & \frac{15223752}{325} + \frac{48853656 \, \text{I}}{325} & -\frac{6126597 \, \text{I}}{10} & -\frac{1223784}{65} + \frac{1272744 \, \text{I}}{13} & \frac{2022309}{11050} - \frac{6265827 \, \text{I}}{11050} \\ \frac{3276976}{5525} + \frac{2080488 \, \text{I}}{5525} & \frac{3453776 \, \text{I}}{65} & -\frac{15223752}{325} + \frac{48853656 \, \text{I}}{325} & -\frac{3524496}{325} + \frac{7402592 \, \text{I}}{325} & -\frac{751448}{5525} + \frac{666384 \, \text{I}}{5525} \\ -\frac{112305269 \, \text{I}}{1989000} & -\frac{3276976}{5525} + \frac{2080488 \, \text{I}}{5525} & \frac{1942749}{2210} - \frac{2141649 \, \text{I}}{2210} & -\frac{1726888}{16575} + \frac{11245328 \, \text{I}}{49725} & \frac{226911}{88400} - \frac{237961 \, \text{I}}{88400} \end{array} \right]$$



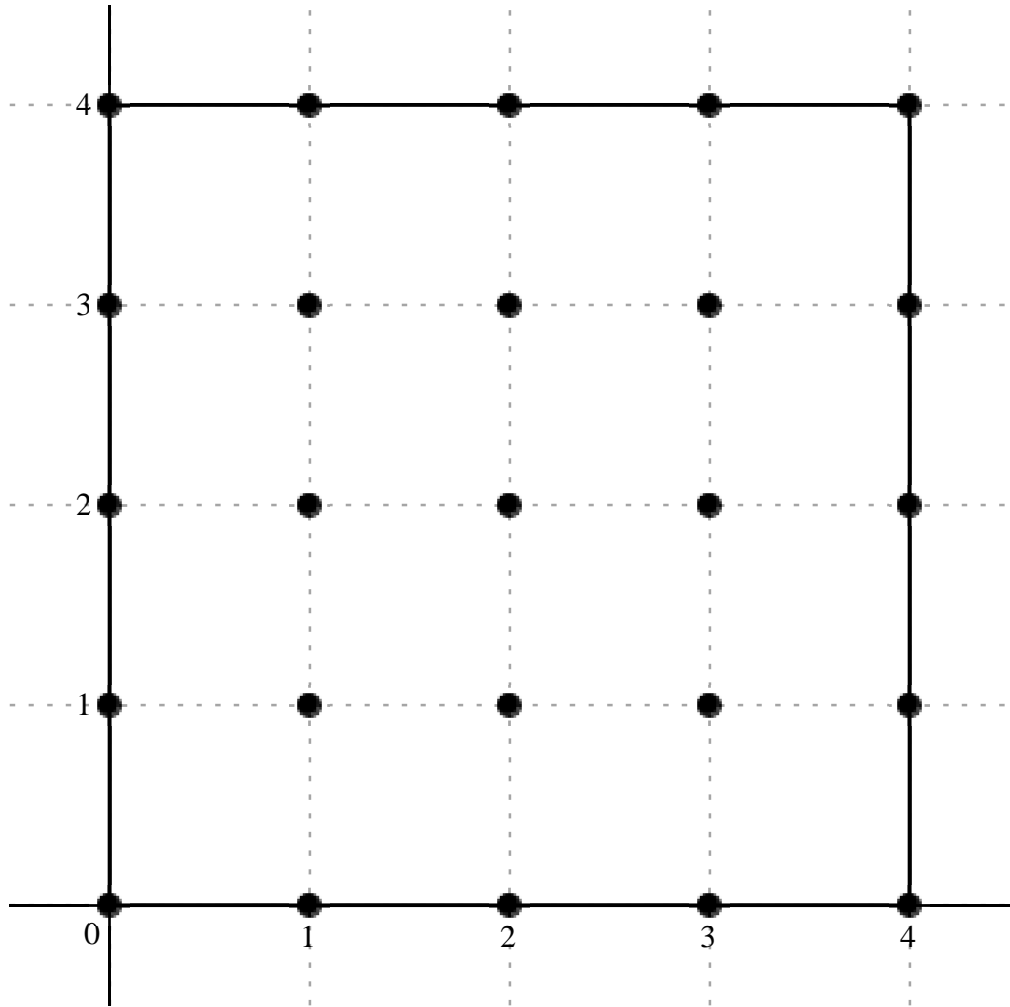
$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{3978000 \, \Delta x_{ol}^2} \Big( \begin{aligned} & -(10210995 + 10708245 \, \text{I}) \, u_{ol+4\text{I}} + (541042560 + 479796480 \, \text{I}) \, u_{ol+1+4\text{I}} - (728031240 + 2255697720 \, \text{I}) \, u_{ol+2+4\text{I}} + (-109041408 + 586998144 \, \text{I}) \, u_{ol+3+4\text{I}} \\ & - 10459620 \, \text{I} u_{ol+4+4\text{I}} + (414453120 + 899626240 \, \text{I}) \, u_{ol+3\text{I}} + (43139831040 + 90607726080 \, \text{I}) \, u_{ol+1+3\text{I}} + (74895580800 \\ & + 389459664000 \, \text{I}) \, u_{ol+2+3\text{I}} + 75265990400 \, \text{I} u_{ol+3+3\text{I}} + (109041408 + 586998144 \, \text{I}) \, u_{ol+4+3\text{I}} - (3496948200 + 3854968200 \, \text{I}) \, u_{ol+2\text{I}} \\ & + (186338724480 + 597968749440 \, \text{I}) \, u_{ol+1+2\text{I}} - 2437160286600 \, \text{I} u_{ol+2+2\text{I}} + (-74895580800 + 389459664000 \, \text{I}) \, u_{ol+3+2\text{I}} \\ & + (728031240 - 2255697720 \, \text{I}) \, u_{ol+4+2\text{I}} + (2359422720 + 1497951360 \, \text{I}) \, u_{ol+1\text{I}} + 211371091200 \, \text{I} u_{ol+1+1\text{I}} \\ & + (-186338724480 + 597968749440 \, \text{I}) \, u_{ol+2+1\text{I}} + (-43139831040 + 90607726080 \, \text{I}) \, u_{ol+3+1\text{I}} + (-541042560 + 479796480 \, \text{I}) \, u_{ol+4+1\text{I}} \\ & - 224610538 \, \text{I} u_{ol\text{I}} + (-2359422720 + 1497951360 \, \text{I}) \, u_{ol+1\text{I}} + (3496948200 - 3854968200 \, \text{I}) \, u_{ol+2\text{I}} + (-414453120 + 899626240 \, \text{I}) \, u_{ol+3\text{I}} \\ & + (10210995 - 10708245 \, \text{I}) \, u_{ol+4\text{I}} \Big) \cdot \, O(\, \Delta x_{ol}^{23} \, ) \end{aligned}$$

Formula:, 135, Var.: 1  
Variavel :,  $x_{oi}$  , Derivada de Ordem :, 3

Error order:., 22, Error:.,  $9.0366917115747472485 \times 10^{-55}$ , New Error:.,  $8.9047146125888203846 \times 10^{-77}$   
Error order:., 22, Error:.,  $8.9047146125888203846 \times 10^{-77}$ , New Error:.,  $8.8914409140310405660 \times 10^{-99}$   
Error order:., 22, Error:.,  $8.8914409140310405660 \times 10^{-99}$ , New Error:.,  $8.8901128141113832657 \times 10^{-121}$   
Error order:., 22, Error:.,  $8.8901128141113832657 \times 10^{-121}$ , New Error:.,  $8.8899799968483429792 \times 10^{-143}$   
Error order:., 22, Error:.,  $8.8899799968483429792 \times 10^{-143}$ , New Error:.,  $8.8899667150493577434 \times 10^{-165}$

$$x_o + h \cdot \begin{bmatrix} 4\text{ I} & 1+4\text{ I} & 2+4\text{ I} & 3+4\text{ I} & 4+4\text{ I} \\ 3\text{ I} & 1+3\text{ I} & 2+3\text{ I} & 3+3\text{ I} & 4+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I} & 4+2\text{ I} \\ 1 & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} \\ 0 & 1 & 2 & 3 & 4 \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{213902293}{5304000} + \frac{680733\text{ I}}{353600} & -\frac{162716042}{82875} + \frac{7019834\text{ I}}{82875} & \frac{25206789}{4420} + \frac{16512609\text{ I}}{5525} & -\frac{9718926}{10625} - \frac{556522898\text{ I}}{414375} & \frac{107075459}{5304000} + \frac{107075459\text{ I}}{5304000} \\ -\frac{617604974}{248625} - \frac{250513858\text{ I}}{248625} & -\frac{410622668}{1625} - \frac{463490108\text{ I}}{4875} & -\frac{286146828}{325} - \frac{196883472\text{ I}}{325} & -\frac{421549756}{2925} - \frac{421549756\text{ I}}{2925} & -\frac{556522898}{414375} - \frac{9718926\text{ I}}{10625} \\ \frac{76197768}{5525} + \frac{5828247\text{ I}}{4420} & -\frac{2356533264}{1625} - \frac{1292444772\text{ I}}{1625} & \frac{459424233}{100} + \frac{459424233\text{ I}}{100} & -\frac{196883472}{325} - \frac{286146828\text{ I}}{325} & \frac{16512609}{5525} + \frac{25206789\text{ I}}{4420} \\ -\frac{193403218}{27625} + \frac{77146618\text{ I}}{82875} & -\frac{371511116}{975} - \frac{371511116\text{ I}}{975} & -\frac{1292444772}{1625} - \frac{2356533264\text{ I}}{1625} & -\frac{463490108}{4875} - \frac{410622668\text{ I}}{1625} & \frac{7019834}{82875} - \frac{162716042\text{ I}}{82875} \\ \frac{22773831179}{79560000} + \frac{22773831179\text{ I}}{79560000} & \frac{77146618}{82875} - \frac{193403218\text{ I}}{27625} & \frac{5828247}{4420} + \frac{76197768\text{ I}}{5525} & -\frac{250513858}{248625} - \frac{617604974\text{ I}}{248625} & \frac{680733}{353600} + \frac{213902293\text{ I}}{5304000} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{79560000 \, \Delta x_{ol}^3} \big( (3208534395 + 153164925 \, \mathrm{I}) \, u_{ol+41} + ( -156207400320 + 6739040640 \, \mathrm{I}) \, u_{ol+1+41} + (453722202000 + 237781569600 \, \mathrm{I}) \, u_{ol+2+41} - (72775317888 + 106852396416 \, \mathrm{I}) \, u_{ol+3+41} + (1606131885 + 1606131885 \, \mathrm{I}) \, u_{ol+4+41} - (197633591680 + 80164434560 \, \mathrm{I}) \, u_{ol+31} - (20104085825280$$

$$+ 7564158562560 \, \mathrm{I}) \, u_{ol+1+31} - (70048743494400 + 48197073945600 \, \mathrm{I}) \, u_{ol+2+31} - (11466153363200 + 11466153363200 \, \mathrm{I}) \, u_{ol+3+31} - (106852396416 + 72775317888 \, \mathrm{I}) \, u_{ol+4+31} + (1097247859200 + 104908446000 \, \mathrm{I}) \, u_{ol+21} - (115375868605440 + 63278096037120 \, \mathrm{I}) \, u_{ol+1+21} + (365517919774800$$

$$+ 365517919774800 \, \mathrm{I}) \, u_{ol+2+21} - (48197073945600 + 70048743494400 \, \mathrm{I}) \, u_{ol+3+21} + (237781569600 + 453722202000 \, \mathrm{I}) \, u_{ol+4+21} + ( -557001267840 + 74060753280 \, \mathrm{I}) \, u_{ol+1} - (30315307065600 + 30315307065600 \, \mathrm{I}) \, u_{ol+1+1} - (63278096037120 + 115375868605440 \, \mathrm{I}) \, u_{ol+2+1} - (7564158562560 + 20104085825280 \, \mathrm{I}) \, u_{ol+3+1}$$

$$+ (6739040640 - 156207400320 \, \mathrm{I}) \, u_{ol+4+1} + (22773831179 + 22773831179 \, \mathrm{I}) \, u_{ol} + (74060753280 - 557001267840 \, \mathrm{I}) \, u_{ol+1} + (104908446000 + 1097247859200 \, \mathrm{I}) \, u_{ol+2} - (80164434560 + 197633591680 \, \mathrm{I}) \, u_{ol+3} + (153164925 + 3208534395 \, \mathrm{I}) \, u_{ol+4} \big), \, O( \, \Delta x_{ol}^{22} \, )$$

Formula:, 136, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:., 21, Error:., 6.8314030354919054856 × 10<sup>−52</sup>, New Error:., 6.6237818178868140963 × 10<sup>−73</sup>

Error order:., 21, Error:., 6.6237818178868140963 × 10<sup>−73</sup>, New Error:., 6.6031880230385507606 × 10<sup>−94</sup>

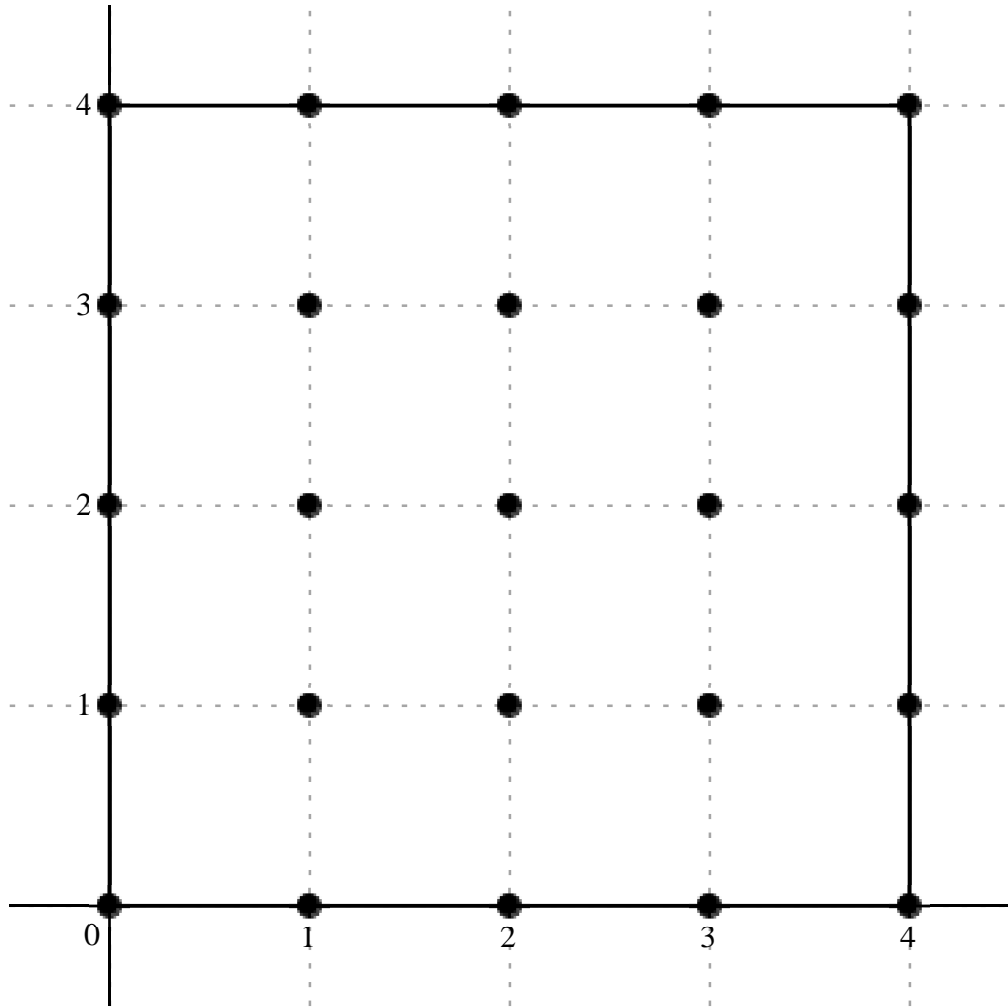
Error order:., 21, Error:., 6.6031880230385507606 × 10<sup>−94</sup>, New Error:., 6.6011303332568843157 × 10<sup>−115</sup>

Error order:., 21, Error:., 6.6011303332568843157 × 10<sup>−115</sup>, New Error:., 6.6009245811819920463 × 10<sup>−136</sup>

Error order:., 21, Error:., 6.6009245811819920463 × 10<sup>−136</sup>, New Error:., 6.6009040061435417869 × 10<sup>−157</sup>

$$x_o \neq h. , \left[ \begin{array}{ccccc} 4 \, \mathrm{I} & 1+4 \, \mathrm{I} & 2+4 \, \mathrm{I} & 3+4 \, \mathrm{I} & 4+4 \, \mathrm{I} \\ 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & 2+3 \, \mathrm{I} & 3+3 \, \mathrm{I} & 4+3 \, \mathrm{I} \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & 3+2 \, \mathrm{I} & 4+2 \, \mathrm{I} \\ 1 & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & 4+\mathrm{I} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{11310333127}{39780000} + \frac{1222831049 \, \mathrm{I}}{4972500} & \frac{5200152388}{414375} - \frac{16432976258 \, \mathrm{I}}{1243125} & -\frac{63158797197}{1105000} + \frac{19053482099 \, \mathrm{I}}{1105000} & \frac{92133162946}{6215625} + \frac{17850865972 \, \mathrm{I}}{6215625} & & -\frac{622579391}{2340000} \\ \frac{9565005284}{414375} - \frac{11065187626 \, \mathrm{I}}{1243125} & \frac{166456619464}{73125} - \frac{71702641292 \, \mathrm{I}}{73125} & \frac{629167478}{65} - \frac{2788783966 \, \mathrm{I}}{1625} & \frac{27554776532}{14625} & \frac{92133162946}{6215625} - \frac{17850865972 \, \mathrm{I}}{6215625} & \\ -\frac{22191006479}{221000} + \frac{16678009739 \, \mathrm{I}}{221000} & \frac{116877295842}{8125} - \frac{31865175334 \, \mathrm{I}}{8125} & -\frac{59133008877}{1000} & \frac{629167478}{65} + \frac{2788783966 \, \mathrm{I}}{1625} & -\frac{63158797197}{1105000} - \frac{19053482099 \, \mathrm{I}}{1105000} & \\ \frac{50176459438}{1243125} - \frac{56282745476 \, \mathrm{I}}{1243125} & \frac{68804657756}{14625} & \frac{116877295842}{8125} + \frac{31865175334 \, \mathrm{I}}{8125} & \frac{166456619464}{73125} + \frac{71702641292 \, \mathrm{I}}{73125} & \frac{5200152388}{414375} + \frac{16432976258 \, \mathrm{I}}{1243125} & \\ & -\frac{554759931179}{198900000} & \frac{50176459438}{1243125} + \frac{56282745476 \, \mathrm{I}}{1243125} & -\frac{22191006479}{221000} - \frac{16678009739 \, \mathrm{I}}{221000} & \frac{9565005284}{414375} + \frac{11065187626 \, \mathrm{I}}{1243125} & -\frac{11310333127}{39780000} - \frac{1222831049 \, \mathrm{I}}{4972500} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{198900000 \, \Delta x_{ol}^4} \, \big( (-56551665635 + 48913241960 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (2496073146240 - 2629276201280 \, \mathrm{I}) \, u_{ol+1+4\mathrm{I}} + (-11368583495460 + 3429626777820 \, \mathrm{I}) \, u_{ol+2+4\mathrm{I}} + (2948261214272 + 571227711104 \, \mathrm{I}) \, u_{ol+3+4\mathrm{I}} - 52919248235 \, u_{ol+4+4\mathrm{I}} + (4591202536320 - 1770430020160 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (452762004942080 - 195031184314240 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (1925252482680000 - 341347157438400 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} + 374744960835200 \, u_{ol+3+3\mathrm{I}} + (2948261214272 - 571227711104 \, \mathrm{I}) \, u_{ol+4+3\mathrm{I}} + (-19971905831100 + 15010208765100 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (2861156202212160 - 780059492176320 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} - 11761555465635300 \, u_{ol+2+2\mathrm{I}} + (1925252482680000 + 341347157438400 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} - (11368583495460 + 3429626777820 \, \mathrm{I}) \, u_{ol+4+2\mathrm{I}} + (8028233510080 - 9005239276160 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} + 935743345481600 \, u_{ol+1+1\mathrm{I}} + (2861156202212160 + 780059492176320 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} + (452762004942080 + 195031184314240 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} + (2496073146240 + 2629276201280 \, \mathrm{I}) \, u_{ol+4+1\mathrm{I}} - 554759931179 \, u_{ol} + (8028233510080 + 9005239276160 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} - (19971905831100 + 15010208765100 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (4591202536320 + 1770430020160 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (56551665635 + 48913241960 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} \big), \, O(\, \Delta x_{ol}^{21} \, )$$

Formula:, 137, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 20, Error:, 6.1481838852853960206 × 10−49, New Error:, 6.0587797437637106279 × 10−69

Error order:, 20, Error:, 6.0587797437637106279 × 10−69, New Error:, 6.0497880710047334697 × 10−89

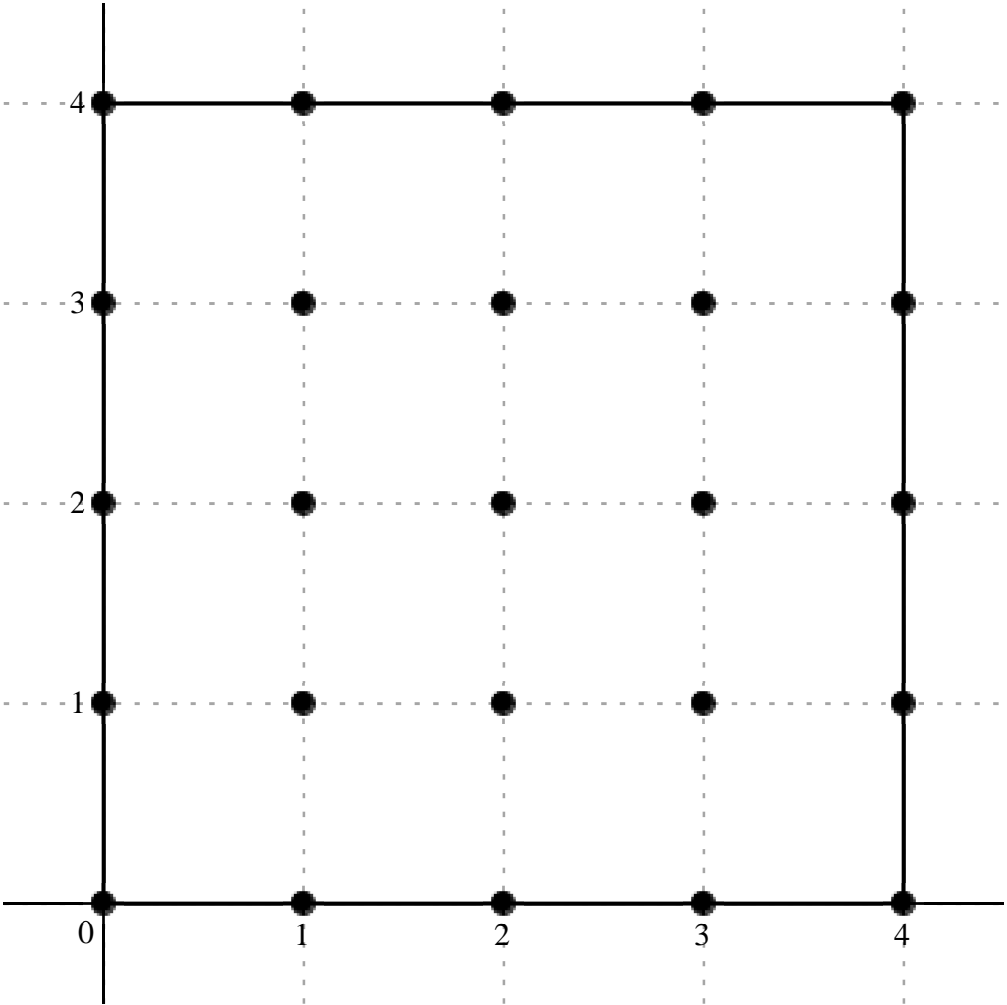
Error order:, 20, Error:, 6.0497880710047334697 × 10−89, New Error:, 6.0488884111877461486 × 10−109

Error order:, 20, Error:, 6.0488884111877461486 × 10−109, New Error:, 6.0487984403005083588 × 10−129

Error order:, 20, Error:, 6.0487984403005083588 × 10−129, New Error:, 6.0487894431627490438 × 10−149

$$x_o \neq h., \left[ \begin{array}{ccccc} 4 \, \mathrm{I} & 1+4 \, \mathrm{I} & 2+4 \, \mathrm{I} & 3+4 \, \mathrm{I} & 4+4 \, \mathrm{I} \\ 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & 2+3 \, \mathrm{I} & 3+3 \, \mathrm{I} & 4+3 \, \mathrm{I} \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & 3+2 \, \mathrm{I} & 4+2 \, \mathrm{I} \\ 1 & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & 4+\mathrm{I} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{1222831049}{3978000} - \frac{20758677731 \text{ I}}{6630000} & \frac{349316683}{276250} + \frac{125951589337 \text{ I}}{828750} & \frac{26485404909}{110500} - \frac{192829757173 \text{ I}}{442000} & - \frac{17376728533}{165750} + \frac{34903034183 \text{ I}}{497250} & \frac{2613753557}{1657500} - \frac{2613753557 \text{ I}}{1657500} \\ - \frac{24644881757}{276250} + \frac{153036626113 \text{ I}}{828750} & - \frac{38605705559}{4875} + \frac{275748708739 \text{ I}}{14625} & - \frac{76466134796}{1625} + \frac{107727242279 \text{ I}}{1625} & - \frac{4152760597}{375} + \frac{4152760597 \text{ I}}{375} & - \frac{34903034183}{497250} + \frac{17376728533 \text{ I}}{165750} \\ \frac{16678009739}{88400} - \frac{2133677398 \text{ I}}{2125} & - \frac{100322597201}{1625} + \frac{168780019068 \text{ I}}{1625} & \frac{42769210911}{125} - \frac{42769210911 \text{ I}}{125} & - \frac{107727242279}{1625} + \frac{76466134796 \text{ I}}{1625} & \frac{192829757173}{442000} - \frac{26485404909 \text{ I}}{110500} \\ - \frac{68953193}{21250} + \frac{89424246089 \text{ I}}{191250} & - \frac{42527587421}{1625} + \frac{42527587421 \text{ I}}{1625} & - \frac{168780019068}{1625} + \frac{100322597201 \text{ I}}{1625} & - \frac{275748708739}{14625} + \frac{38605705559 \text{ I}}{4875} & - \frac{125951589337}{828750} - \frac{349316683 \text{ I}}{276250} \\ \frac{574403647}{44200} - \frac{574403647 \text{ I}}{44200} & - \frac{89424246089}{191250} + \frac{68953193 \text{ I}}{21250} & \frac{2133677398}{2125} - \frac{16678009739 \text{ I}}{88400} & - \frac{153036626113}{828750} + \frac{24644881757 \text{ I}}{276250} & \frac{20758677731}{6630000} - \frac{1222831049 \text{ I}}{3978000} \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^s} \, u(x_{ol}) = \frac{1}{19890000 \, \Delta x_{ol}^s} \, \big( (6114155245 - 62276033193 \, \text{I}) \, u_{ol+41} + (25150801176 + 3022838144088 \, \text{I}) \, u_{ol+1+41} + (4767372883620 - 8677339072785 \, \text{I}) \, u_{ol+2+41} + (-2085207423960 + 1396121367320 \, \text{I}) \, u_{ol+3+41} + (31365042684 - 31365042684 \, \text{I}) \, u_{ol+4+41} + (-1774431486504 + 3672879026712 \, \text{I}) \, u_{ol+31} + (-157511278680720 + 375018243885040 \, \text{I}) \, u_{ol+1+31} + (-935945489903040 + 1318581445494960 \, \text{I}) \, u_{ol+2+31} + (-220262422064880 + 220262422064880 \, \text{I}) \, u_{ol+3+31} + (-1396121367320 + 2085207423960 \, \text{I}) \, u_{ol+4+31} + (3752552191275 - 19971220445280 \, \text{I}) \, u_{ol+21} + (-1227948589740240 + 2065867433392320 \, \text{I}) \, u_{ol+1+21} + (6805436840158320 - 6805436840158320 \, \text{I}) \, u_{ol+2+21} + (-1318581445494960 + 935945489903040 \, \text{I}) \, u_{ol+3+21} + (8677339072785 - 4767372883620 \, \text{I}) \, u_{ol+4+21} + (-64540188648 + 9300121593256 \, \text{I}) \, u_{ol+1} + (-520537670033040 + 520537670033040 \, \text{I}) \, u_{ol+1+1} + (-2065867433392320 + 1227948589740240 \, \text{I}) \, u_{ol+2+1} + (-375018243885040 + 157511278680720 \, \text{I}) \, u_{ol+3+1} - (3022838144088 + 25150801176 \, \text{I}) \, u_{ol+4+1} + (258481641150 - 258481641150 \, \text{I}) \, u_{ol} + (-9300121593256 + 64540188648 \, \text{I}) \, u_{ol+1} + (19971220445280 - 3752552191275 \, \text{I}) \, u_{ol+2} + (-3672879026712 + 1774431486504 \, \text{I}) \, u_{ol+3} + (62276033193 - 6114155245 \, \text{I}) \, u_{ol+4} \big) , \, O( \, \Delta x_{ol}^{20} \, )$$

Formula.: 138, Var.: 1

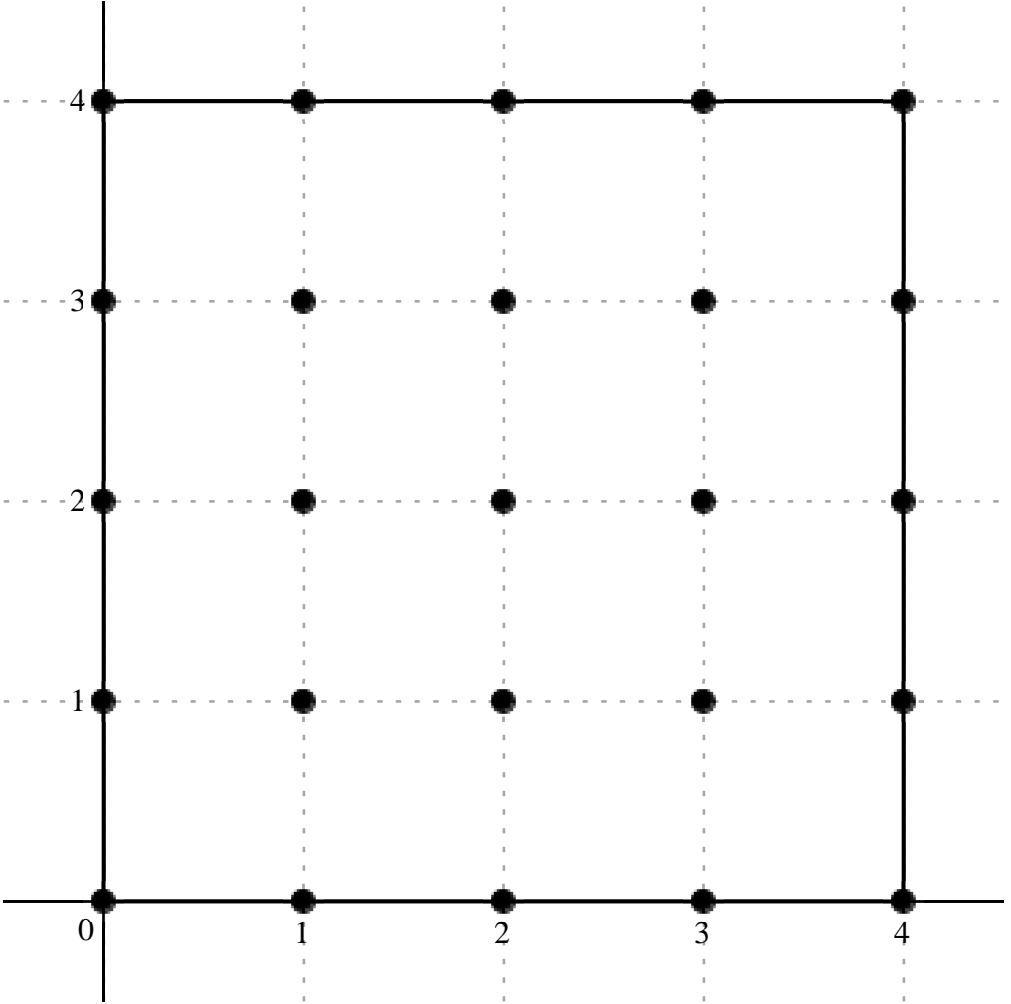
Variavel .:  $x_{ol}$  , Derivada de Ordem .: 6

Error order.: 19, Error.: 3.8441285830420129897 × 10−46, New Error.: 3.7278483320704684389 × 10−65

Error order.: 19, Error.: 3.7278483320704684389 × 10−65, New Error.: 3.7163141692608734755 × 10−84

*Error order:*, 19,    *Error:*,  $3.7163141692608734755 \times 10^{-84}$ ,    *New Error:*,  $3.7151616951755285902 \times 10^{-103}$   
*Error order:*, 19,    *Error:*,  $3.7151616951755285902 \times 10^{-103}$ ,    *New Error:*,  $3.7150464571924171659 \times 10^{-122}$   
*Error order:*, 19,    *Error:*,  $3.7150464571924171659 \times 10^{-122}$ ,    *New Error:*,  $3.7150349334883637105 \times 10^{-141}$

$$\begin{aligned}
& x_o \neq h \text{ , } \left[ \begin{array}{ccccc} 4 \text{ I} & 1+4 \text{ I} & 2+4 \text{ I} & 3+4 \text{ I} & 4+4 \text{ I} \\ 3 \text{ I} & 1+3 \text{ I} & 2+3 \text{ I} & 3+3 \text{ I} & 4+3 \text{ I} \\ 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} & 3+2 \text{ I} & 4+2 \text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right] \\
c = , & \left[ \begin{array}{cccccc} \frac{65401869319}{4420000} + \frac{50473497181 \text{ I}}{2652000} & -\frac{112214177059}{138125} - \frac{114476078827 \text{ I}}{138125} & \frac{17404815459}{17000} + \frac{1618240018413 \text{ I}}{442000} & \frac{15871688231}{82875} - \frac{26152114629 \text{ I}}{27625} & \frac{37852766411 \text{ I}}{2210000} & \\ -\frac{191605562087}{414375} - \frac{205116577043 \text{ I}}{138125} & -\frac{90428274644}{1625} - \frac{702501239926 \text{ I}}{4875} & -\frac{2461873314}{25} - \frac{987675471948 \text{ I}}{1625} & -\frac{581312600878 \text{ I}}{4875} & -\frac{15871688231}{82875} - \frac{26152114629 \text{ I}}{27625} & \\ \frac{221295624681}{55250} + \frac{570321909543 \text{ I}}{88400} & -\frac{335671009638}{1625} - \frac{1417757560116 \text{ I}}{1625} & \frac{906552119709 \text{ I}}{250} & \frac{2461873314}{25} - \frac{987675471948 \text{ I}}{1625} & -\frac{17404815459}{17000} + \frac{1618240018413 \text{ I}}{442000} & \\ -\frac{905337930043}{414375} - \frac{341953013673 \text{ I}}{138125} & -\frac{434118851874 \text{ I}}{1625} & \frac{335671009638}{1625} - \frac{1417757560116 \text{ I}}{1625} & \frac{90428274644}{1625} - \frac{702501239926 \text{ I}}{4875} & \frac{112214177059}{138125} - \frac{114476078827 \text{ I}}{138125} & \\ \frac{15294778547 \text{ I}}{132600} & \frac{905337930043}{414375} - \frac{341953013673 \text{ I}}{138125} & -\frac{221295624681}{55250} + \frac{570321909543 \text{ I}}{88400} & \frac{191605562087}{414375} - \frac{205116577043 \text{ I}}{138125} & -\frac{65401869319}{4420000} + \frac{50473497181 \text{ I}}{2652000} & \end{array} \right]
\end{aligned}$$



$$\begin{aligned}
\frac{d_6}{dx_{ol}^6} u(x_{ol}) = & \frac{1}{13260000 \Delta x_{ol}^6} \big( (196205607957 + 252367485905 \text{ I}) u_{ol+41} - (10772560997664 + 10989703567392 \text{ I}) u_{ol+1+41} + (13575756058020 + 48547200552390 \text{ I}) u_{ol+2+41} \\
& + (2539470116960 - 12553015021920 \text{ I}) u_{ol+3+41} + 227116598466 \text{ I} u_{ol+4+41} - (6131377986784 + 19691191396128 \text{ I}) u_{ol+31} - (737894721095040 \\
& + 1910803372598720 \text{ I}) u_{ol+1+31} - (1305777605745600 + 8059431851095680 \text{ I}) u_{ol+2+31} - 1581170274388160 \text{ I} u_{ol+3+31} - (2539470116960 + 12553015021920 \text{ I}) u_{ol+4+31} \\
& + (53110949923440 + 85548286431450 \text{ I}) u_{ol+21} - (2739075438646080 + 11568901690546560 \text{ I}) u_{ol+1+21} + 48083524429365360 \text{ I} u_{ol+2+21} \\
& + (1305777605745600 - 8059431851095680 \text{ I}) u_{ol+3+21} + (-13575756058020 + 48547200552390 \text{ I}) u_{ol+4+21} - (28970813761376 + 32827489312608 \text{ I}) u_{ol+1} - 3542409831291840 \text{ I} u_{ol+1+1} \\
& + (2739075438646080 - 11568901690546560 \text{ I}) u_{ol+2+1} + (737894721095040 - 1910803372598720 \text{ I}) u_{ol+3+1} + (10772560997664 - 10989703567392 \text{ I}) u_{ol+4+1} \\
& + 1529477854700 \text{ I} u_{ol} + (28970813761376 - 32827489312608 \text{ I}) u_{ol+1} + (-53110949923440 + 85548286431450 \text{ I}) u_{ol+2} + (6131377986784 - 19691191396128 \text{ I}) u_{ol+3} \\
& + (-196205607957 + 252367485905 \text{ I}) u_{ol+4} \big), \quad O(\Delta x_{ol}^{19})
\end{aligned}$$

Formula:, 139, Var.: 1

Variavel :,  $x_o$  , Derivada de Ordem :, 7

Error order:, 18, Error:,  $2.9415856150793635519 \times 10^{-43}$ , New Error:,  $2.8990343721848282084 \times 10^{-61}$

Error order:, 18, Error:,  $2.8990343721848282084 \times 10^{-61}$ , New Error:,  $2.8947549757233046626 \times 10^{-79}$

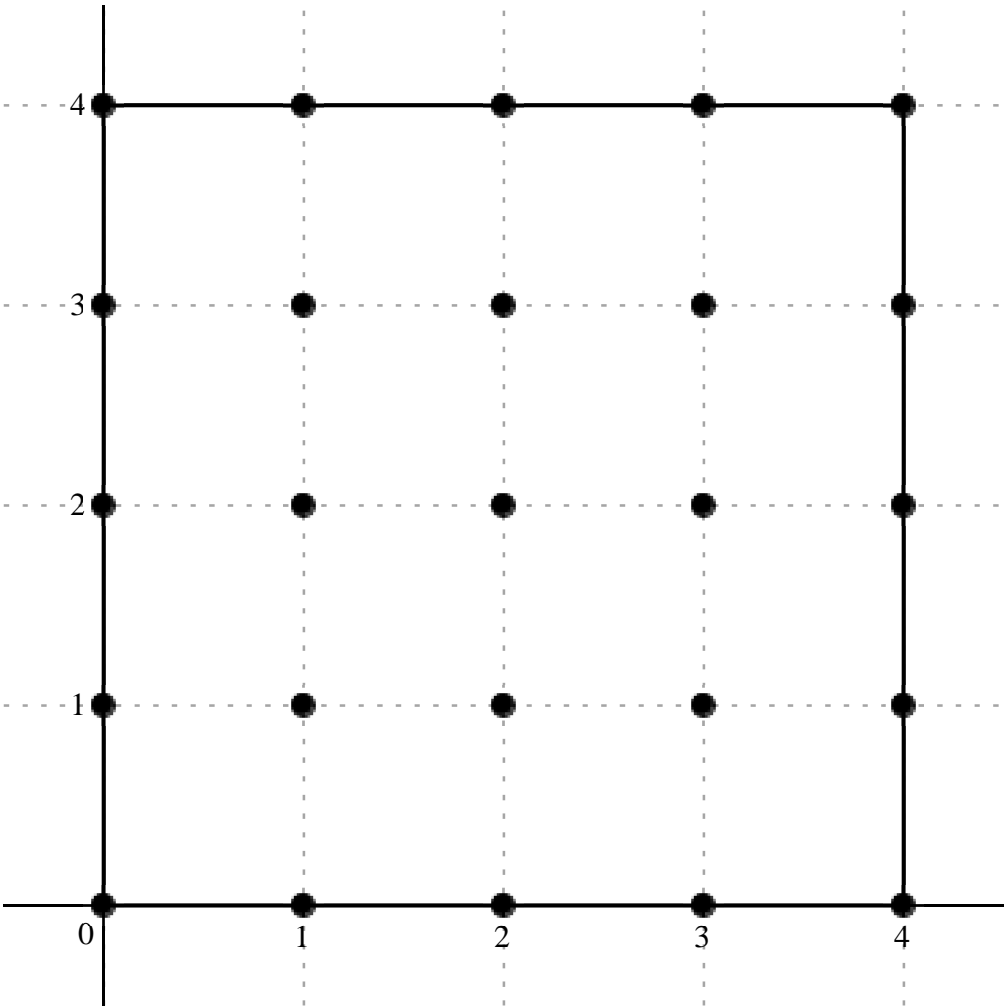
Error order:, 18, Error:,  $2.8947549757233046626 \times 10^{-79}$ , New Error:,  $2.8943268028066461850 \times 10^{-97}$

Error order:, 18, Error:,  $2.8943268028066461850 \times 10^{-97}$ , New Error:,  $2.8942839831916451835 \times 10^{-115}$

Error order:, 18, Error:,  $2.8942839831916451835 \times 10^{-115}$ , New Error:,  $2.8942797012069210936 \times 10^{-133}$

$$x_o + h \cdot , \left[ \begin{array}{ccccc} 4 \text{ I} & 1 + 4 \text{ I} & 2 + 4 \text{ I} & 3 + 4 \text{ I} & 4 + 4 \text{ I} \\ 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & 3 + 3 \text{ I} & 4 + 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} & 4 + 2 \text{ I} \\ 1 & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} & 4 + \text{I} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{cc} -\frac{595984838771}{3536000} - \frac{457813085233 \text{ I}}{17680000} & \frac{3389338473479}{414375} + \frac{98165925067 \text{ I}}{414375} & -\frac{197409813699}{8500} - \frac{911472963009 \text{ I}}{68000} & \frac{20725968823}{5525} + \frac{157683439809 \text{ I}}{27625} & -\frac{4558264396819}{53040000} - \frac{4558264396819 \text{ I}}{53040000} \\ \frac{3917356452149}{414375} + \frac{2231470475353 \text{ I}}{414375} & \frac{1586218336381}{1625} + \frac{739738752963 \text{ I}}{1625} & \frac{5644278093804}{1625} + \frac{4136236181826 \text{ I}}{1625} & \frac{2890583626609}{4875} + \frac{2890583626609 \text{ I}}{4875} & \frac{157683439809}{27625} + \frac{20725968823 \text{ I}}{5525} \\ -\frac{8855360612679}{176800} - \frac{1549069372767 \text{ I}}{110500} & \frac{646765645974}{125} + \frac{5378825232564 \text{ I}}{1625} & -\frac{8871705686781}{500} - \frac{8871705686781 \text{ I}}{500} & \frac{4136236181826}{1625} + \frac{5644278093804 \text{ I}}{1625} & -\frac{911472963009}{68000} - \frac{197409813699 \text{ I}}{8500} \\ \frac{2959501395739}{138125} + \frac{328064339617 \text{ I}}{138125} & \frac{6148097038223}{4875} + \frac{6148097038223 \text{ I}}{4875} & \frac{5378825232564}{1625} + \frac{646765645974 \text{ I}}{125} & \frac{739738752963}{1625} + \frac{1586218336381 \text{ I}}{1625} & \frac{98165925067}{414375} + \frac{3389338473479 \text{ I}}{414375} \\ -\frac{5152854524377}{10608000} - \frac{5152854524377 \text{ I}}{10608000} & \frac{328064339617}{138125} + \frac{2959501395739 \text{ I}}{138125} & -\frac{1549069372767}{110500} - \frac{8855360612679 \text{ I}}{176800} & \frac{2231470475353}{414375} + \frac{3917356452149 \text{ I}}{414375} & -\frac{457813085233}{17680000} - \frac{595984838771 \text{ I}}{3536000} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} u(x_{ol}) = \frac{1}{53040000 \Delta x_{ol}^7} \Big( 7 \Big( -(1277110368795 + 196205607957 \, \mathrm{I}) \, u_{ol+41} + (61976474943616 + 1795034058368 \, \mathrm{I}) \, u_{ol+1+41} - (175976748211680 + 101564130163860 \, \mathrm{I}) \, u_{ol+2+41} + (28424185814400 + 43250314919040 \, \mathrm{I}) \, u_{ol+3+41} - (651180628117 + 651180628117 \, \mathrm{I}) \, u_{ol+4+41} + (71631660839296 + 40804031549312 \, \mathrm{I}) \, u_{ol+31} \\ + (7396309499925120 + 3449296128101760 \, \mathrm{I}) \, u_{ol+1+31} + (26318462425966080 + 19286678424971520 \, \mathrm{I}) \, u_{ol+2+31} + (4492792836786560 + 4492792836786560 \, \mathrm{I}) \, u_{ol+3+31} + (43250314919040 + 28424185814400 \, \mathrm{I}) \, u_{ol+4+31} - (379515454829100 + 106221899846880 \, \mathrm{I}) \, u_{ol+21} + (39205085557098240 \\ + 25080693655841280 \, \mathrm{I}) \, u_{ol+1+21} - (134444362750532640 + 134444362750532640 \, \mathrm{I}) \, u_{ol+2+21} + (19286678424971520 + 26318462425966080 \, \mathrm{I}) \, u_{ol+3+21} - (101564130163860 + 175976748211680 \, \mathrm{I}) \, u_{ol+4+21} + (162349790851968 + 17996672344704 \, \mathrm{I}) \, u_{ol+1} + (9555899396552320 + 9555899396552320 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} \\ + (25080693655841280 + 39205085557098240 \, \mathrm{I}) \, u_{ol+2+1} + (3449296128101760 + 7396309499925120 \, \mathrm{I}) \, u_{ol+3+1} + (1795034058368 + 61976474943616 \, \mathrm{I}) \, u_{ol+4+1} - (3680610374555 + 3680610374555 \, \mathrm{I}) \, u_{ol} + (17996672344704 + 162349790851968 \, \mathrm{I}) \, u_{ol+1} - (106221899846880 + 379515454829100 \, \mathrm{I}) \, u_{ol+2} + (40804031549312 \\ + 71631660839296 \, \mathrm{I}) \, u_{ol+3} - (196205607957 + 1277110368795 \, \mathrm{I}) \, u_{ol+4} \Big) \Big), \quad O(\Delta x_{ol}^{18})$$

Formula.: 140, Var.: 1

Variavel .: x<sub>ol</sub>., Derivada de Ordem .: 8

Error order.: 17, Error.: 1.5830084484802553082 × 10<sup>−40</sup>, New Error.: 1.5354021896890709262 × 10<sup>−57</sup>

Error order.: 17, Error.: 1.5354021896890709262 × 10<sup>−57</sup>, New Error.: 1.5306797880566980284 × 10<sup>−74</sup>

Error order.: 17, Error.: 1.5306797880566980284 × 10<sup>−74</sup>, New Error.: 1.5302079315835458583 × 10<sup>−91</sup>

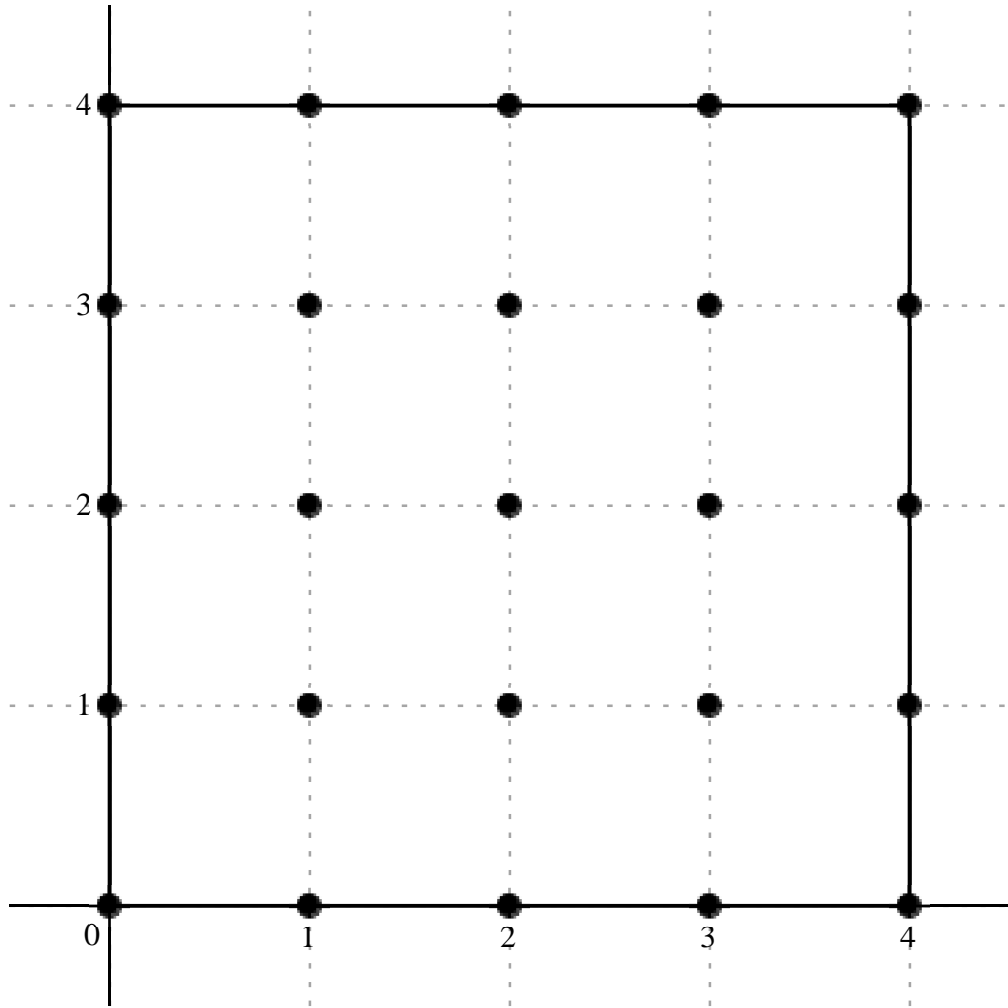
Error order.: 17, Error.: 1.5302079315835458583 × 10<sup>−91</sup>, New Error.: 1.5301607497745364186 × 10<sup>−108</sup>

Error order.: 17, Error.: 1.5301607497745364186 × 10<sup>−108</sup>, New Error.: 1.5301560316320199331 × 10<sup>−125</sup>

$$x_o \neq h. , \left[ \begin{array}{ccccc} 4 \, \mathrm{I} & 1+4 \, \mathrm{I} & 2+4 \, \mathrm{I} & 3+4 \, \mathrm{I} & 4+4 \, \mathrm{I} \\ 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & 2+3 \, \mathrm{I} & 3+3 \, \mathrm{I} & 4+3 \, \mathrm{I} \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & 3+2 \, \mathrm{I} & 4+2 \, \mathrm{I} \\ 1 & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & 4+\mathrm{I} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} \frac{12195416683093}{13260000} - \frac{3092738978 \, \mathrm{I}}{4875} & - \frac{5468926550444}{138125} + \frac{1144915443238 \, \mathrm{I}}{31875} & \frac{37529907186807}{221000} - \frac{141413897457 \, \mathrm{I}}{3250} & - \frac{3630553621534}{82875} - \frac{768267018652 \, \mathrm{I}}{82875} & \frac{10603004112533}{13260000} \\ - \frac{9467258520524}{138125} + \frac{2243299291842 \, \mathrm{I}}{138125} & - \frac{32089793166368}{4875} + \frac{10966019082676 \, \mathrm{I}}{4875} & - \frac{44873081599374}{1625} + \frac{1312349852142 \, \mathrm{I}}{325} & - \frac{8881380163852}{1625} & - \frac{3630553621534}{82875} + \frac{768267018652 \, \mathrm{I}}{82875} \\ \frac{64900262883519}{221000} - \frac{97105925889 \, \mathrm{I}}{650} & - \frac{4775878096794}{125} + \frac{12617796645846 \, \mathrm{I}}{1625} & \frac{160904808102717}{1000} & - \frac{44873081599374}{1625} - \frac{1312349852142 \, \mathrm{I}}{325} & \frac{37529907186807}{221000} + \frac{141413897457 \, \mathrm{I}}{3250} \\ - \frac{43655001092962}{414375} + \frac{32029056989804 \, \mathrm{I}}{414375} & - \frac{53872314181756}{4875} & - \frac{4775878096794}{125} - \frac{12617796645846 \, \mathrm{I}}{1625} & - \frac{32089793166368}{4875} - \frac{10966019082676 \, \mathrm{I}}{4875} & - \frac{5468926550444}{138125} - \frac{1144915443238 \, \mathrm{I}}{31875} \\ & \frac{683937714271}{176800} & - \frac{43655001092962}{414375} - \frac{32029056989804 \, \mathrm{I}}{414375} & \frac{64900262883519}{221000} + \frac{97105925889 \, \mathrm{I}}{650} & - \frac{9467258520524}{138125} - \frac{2243299291842 \, \mathrm{I}}{138125} & \frac{12195416683093}{13260000} + \frac{3092738978 \, \mathrm{I}}{4875} \end{array} \right]$$





$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{13260000 \, \Delta x_{ol}^8} \, (7 \, ((1742202383299 - 1201750002880 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (-75002421263232 + 68040689198144 \, \mathrm{I}) \, u_{ol+1+4\mathrm{I}} + (321684918744060 - 82424100232080 \, \mathrm{I}) \, u_{ol+2+4\mathrm{I}} - (82984082777920 + 17560388997760 \, \mathrm{I}) \, u_{ol+3+4\mathrm{I}} + 1514714873219 \, u_{ol+4+4\mathrm{I}} + (-129836688281472 + 30765247430976 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} \\ + (-12469176773217280 + 4261081700696960 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (-52309192264413120 + 7649124852484800 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} - 10353151733861760 \, u_{ol+3+3\mathrm{I}} + (-82984082777920 + 17560388997760 \, \mathrm{I}) \, u_{ol+4+3\mathrm{I}} + (556287967573020 - 282994412590800 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (-72375021215415360 + 14708745804300480 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} \\ + 304799679348861060 \, u_{ol+2+2\mathrm{I}} - (52309192264413120 + 7649124852484800 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (321684918744060 + 82424100232080 \, \mathrm{I}) \, u_{ol+4+2\mathrm{I}} + (-199565719282112 + 146418546239104 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} - 20933242082053760 \, u_{ol+1+1\mathrm{I}} - (72375021215415360 + 14708745804300480 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} - (12469176773217280 \\ + 4261081700696960 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} - (75002421263232 + 68040689198144 \, \mathrm{I}) \, u_{ol+4+1\mathrm{I}} + 7327904081475 \, u_{ol} - (199565719282112 + 146418546239104 \, \mathrm{I}) \, u_{ol+1} + (556287967573020 + 282994412590800 \, \mathrm{I}) \, u_{ol+2} - (129836688281472 + 30765247430976 \, \mathrm{I}) \, u_{ol+3} + (1742202383299 + 1201750002880 \, \mathrm{I}) \, u_{ol+4})). \, O(\, \Delta x_{ol}^{17} \, )$$

Formula:, 141, Var:., 1

Variavel :., x\_{ol}, Derivada de Ordem :., 9

Error order:., 16, Error:., 1.0481632683748319048 × 10<sup>−37</sup>, New Error:., 1.0330999578078706723 × 10<sup>−53</sup>

Error order:., 16, Error:., 1.0330999578078706723 × 10<sup>−53</sup>, New Error:., 1.0315850879935736085 × 10<sup>−69</sup>

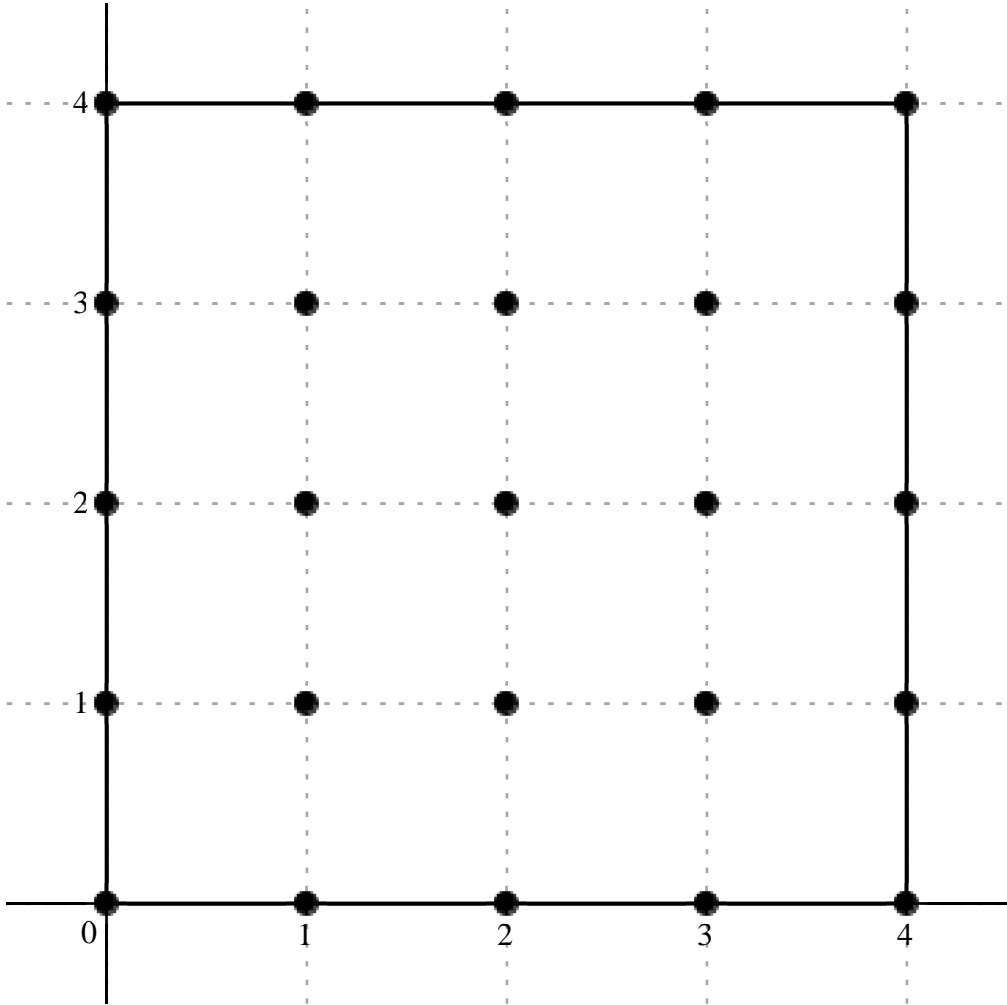
Error order:., 16, Error:., 1.0315850879935736085 × 10<sup>−69</sup>, New Error:., 1.0314335189321265791 × 10<sup>−85</sup>

Error order:., 16, Error:., 1.0314335189321265791 × 10<sup>−85</sup>, New Error:., 1.0314183612084609456 × 10<sup>−101</sup>

Error order:., 16, Error:., 1.0314183612084609456 × 10<sup>−101</sup>, New Error:., 1.0314168454279224493 × 10<sup>−117</sup>

$$x_o \neq h. , \left[ \begin{array}{ccccc} 4 \, \mathrm{I} & 1+4 \, \mathrm{I} & 2+4 \, \mathrm{I} & 3+4 \, \mathrm{I} & 4+4 \, \mathrm{I} \\ 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & 2+3 \, \mathrm{I} & 3+3 \, \mathrm{I} & 4+3 \, \mathrm{I} \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & 3+2 \, \mathrm{I} & 4+2 \, \mathrm{I} \\ 1 & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & 4+\mathrm{I} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = \left[ \begin{array}{ccccccccc} -\frac{4639108467}{3250} + \frac{53906128521 \text{ I}}{8125} & \frac{362930639001}{16250} - \frac{5250697917087 \text{ I}}{16250} & -\frac{897275968533}{1625} + \frac{5905482671151 \text{ I}}{6500} & \frac{744271033443}{3250} - \frac{479271279291 \text{ I}}{3250} & -\frac{112203100527}{32500} + \frac{112203100527 \text{ I}}{32500} \\ \frac{3809124960081}{16250} - \frac{5710731446343 \text{ I}}{16250} & \frac{31019676366693}{1625} - \frac{60160971852051 \text{ I}}{1625} & \frac{164569192619076}{1625} - \frac{217325917255419 \text{ I}}{1625} & \frac{2921019871119}{125} - \frac{2921019871119 \text{ I}}{125} & \frac{479271279291}{3250} - \frac{744271033443 \text{ I}}{3250} \\ -\frac{873953333001}{1300} + \frac{226490810364 \text{ I}}{125} & \frac{210663294739821}{1625} - \frac{307766419667028 \text{ I}}{1625} & -\frac{84586823164746}{125} + \frac{84586823164746 \text{ I}}{125} & \frac{217325917255419}{1625} - \frac{164569192619076 \text{ I}}{1625} & -\frac{5905482671151}{6500} + \frac{897275968533 \text{ I}}{1625} \\ \frac{173250480669}{1250} - \frac{903746382693 \text{ I}}{1250} & \frac{73077514438341}{1625} - \frac{73077514438341 \text{ I}}{1625} & \frac{307766419667028}{1625} - \frac{210663294739821 \text{ I}}{1625} & \frac{60160971852051}{1625} - \frac{31019676366693 \text{ I}}{1625} & \frac{5250697917087}{16250} - \frac{362930639001 \text{ I}}{16250} \\ -\frac{18863939199}{1300} + \frac{18863939199 \text{ I}}{1300} & \frac{903746382693}{1250} - \frac{173250480669 \text{ I}}{1250} & -\frac{226490810364}{125} + \frac{873953333001 \text{ I}}{1300} & \frac{5710731446343}{16250} - \frac{3809124960081 \text{ I}}{16250} & -\frac{53906128521}{8125} + \frac{4639108467 \text{ I}}{3250} \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{32500 \, \Delta x_{ol}^9} \big( 21 \, \big( \, ( -2209099270 + 10267834004 \, \text{I} ) \, u_{ol+4\text{I}} + ( 34564822762 - 500066468294 \, \text{I} ) \, u_{ol+1+4\text{I}} + ( -854548541460 + 1406067302655 \, \text{I} ) \, u_{ol+2+4\text{I}} + ( 354414777830 - 228224418710 \, \text{I} ) \, u_{ol+3+4\text{I}} + ( -5343004787 + 5343004787 \, \text{I} ) \, u_{ol+4+4\text{I}} + ( 362773805722 - 543879185366 \, \text{I} ) \, u_{ol+3\text{I}} + ( 29542548920660 \\ - 57296163668620 \, \text{I} ) \, u_{ol+1+3\text{I}} + ( 156732564399120 - 206977064052780 \, \text{I} ) \, u_{ol+2+3\text{I}} + ( 36165007928140 - 36165007928140 \, \text{I} ) \, u_{ol+3+3\text{I}} + ( 228224418710 - 354414777830 \, \text{I} ) \, u_{ol+4+3\text{I}} + ( -1040420634525 + 2804171937840 \, \text{I} ) \, u_{ol+2\text{I}} + ( 200631709276020 - 293110875873360 \, \text{I} ) \, u_{ol+1+2\text{I}} + ( -1047265429658760 \\ + 1047265429658760 \, \text{I} ) \, u_{ol+2+2\text{I}} + ( 206977064052780 - 156732564399120 \, \text{I} ) \, u_{ol+3+2\text{I}} + ( -1406067302655 + 854548541460 \, \text{I} ) \, u_{ol+4+2\text{I}} + ( 214500595114 - 1118924092858 \, \text{I} ) \, u_{ol+1\text{I}} + ( 69597632798420 - 69597632798420 \, \text{I} ) \, u_{ol+1+1\text{I}} + ( 293110875873360 - 200631709276020 \, \text{I} ) \, u_{ol+2+1\text{I}} + ( 57296163668620 \\ - 29542548920660 \, \text{I} ) \, u_{ol+3+1\text{I}} + ( 500066468294 - 34564822762 \, \text{I} ) \, u_{ol+4+1\text{I}} + ( -22457070475 + 22457070475 \, \text{I} ) \, u_{ol\text{I}} + ( 1118924092858 - 214500595114 \, \text{I} ) \, u_{ol+1\text{I}} + ( -2804171937840 + 1040420634525 \, \text{I} ) \, u_{ol+2\text{I}} + ( 543879185366 - 362773805722 \, \text{I} ) \, u_{ol+3\text{I}} + ( -10267834004 + 2209099270 \, \text{I} ) \, u_{ol+4\text{I}} \big) \big) , \, O( \, \Delta x_{ol}^{16} \, )$$

Formula:, 142, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 10

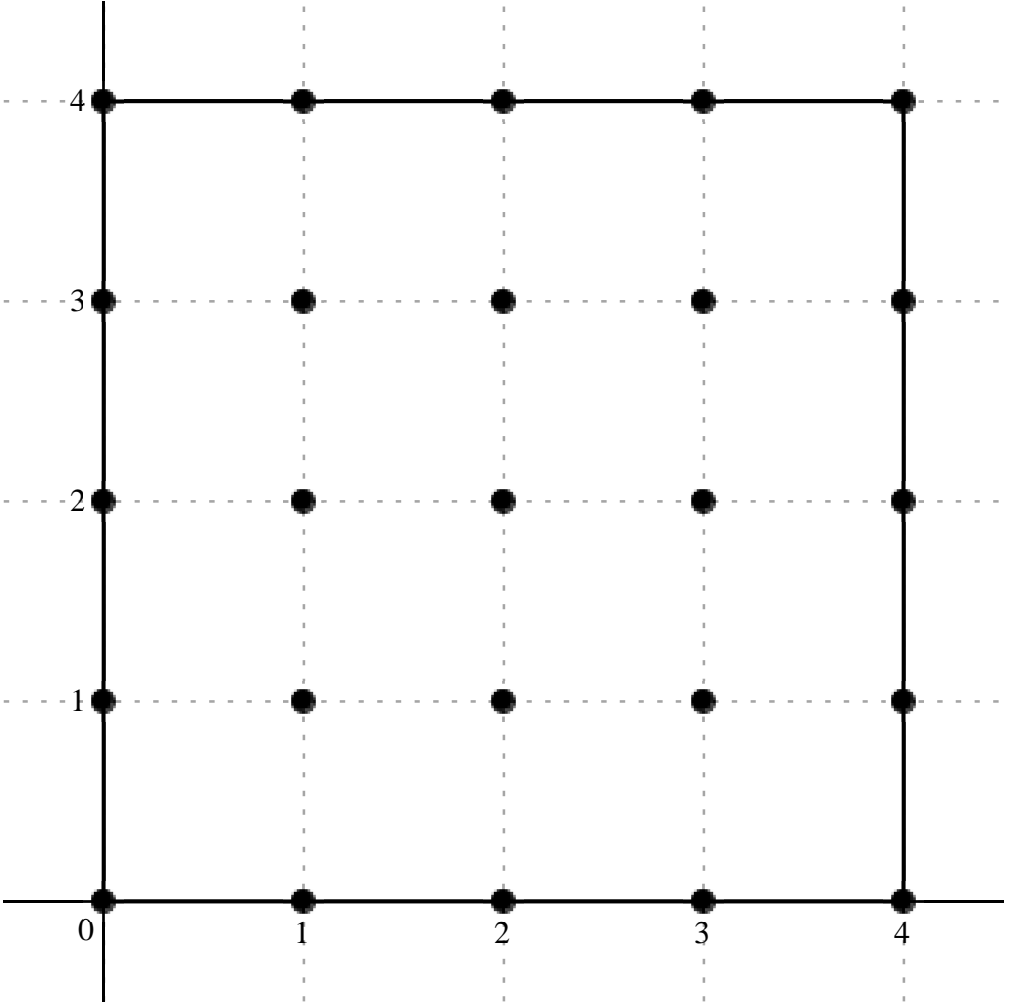
Error order:, 15, Error:, 4.8839708083813225734 × 10−35, New Error:, 4.7381666453116828000 × 10−50

Error order:, 15, Error:, 4.7381666453116828000 × 10−50, New Error:, 4.7237025266428574897 × 10−65

*Error order:*, 15,    *Error:*,  $4.7237025266428574897 \times 10^{-65}$ ,    *New Error:*,  $4.7222572821294695967 \times 10^{-80}$   
*Error order:*, 15,    *Error:*,  $4.7222572821294695967 \times 10^{-80}$ ,    *New Error:*,  $4.7221127693559144612 \times 10^{-95}$   
*Error order:*, 15,    *Error:*,  $4.7221127693559144612 \times 10^{-95}$ ,    *New Error:*,  $4.7220983181953410202 \times 10^{-110}$

$$x_o \rightarrow h \rightarrow \begin{bmatrix} 4\text{ I} & 1+4\text{ I} & 2+4\text{ I} & 3+4\text{ I} & 4+4\text{ I} \\ 3\text{ I} & 1+3\text{ I} & 2+3\text{ I} & 3+3\text{ I} & 4+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I} & 4+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} \\ 0 & 1 & 2 & 3 & 4 \end{bmatrix}$$

$$c =, \left[ \begin{array}{cc} \frac{-255973965891}{13000} - \frac{85041479061\text{ I}}{2600} & \frac{1892892278109}{1625} + \frac{2268884329677\text{ I}}{1625} & \frac{-875568381093}{650} - \frac{7569789083577\text{ I}}{1300} & \frac{-108100091547}{325} + \frac{487414740939\text{ I}}{325} & \frac{-44924422431\text{ I}}{1625} \\ \frac{611614744419}{1625} + \frac{3760675466373\text{ I}}{1625} & \frac{21417266783388}{325} + \frac{71975829052134\text{ I}}{325} & \frac{7827605321886}{65} + \frac{301203582319836\text{ I}}{325} & \frac{60201018819102\text{ I}}{325} & \frac{108100091547}{325} + \frac{487414740939\text{ I}}{325} \\ -\frac{1300005785043}{325} - \frac{2521555722819\text{ I}}{260} & \frac{68946797958066}{325} + \frac{401046643728612\text{ I}}{325} & \frac{-131876879143779\text{ I}}{25} & \frac{-7827605321886}{65} + \frac{301203582319836\text{ I}}{325} & \frac{875568381093}{650} - \frac{7569789083577\text{ I}}{1300} \\ \frac{3342448384191}{1625} + \frac{5293319430903\text{ I}}{1625} & \frac{110394544229718\text{ I}}{325} & \frac{-68946797958066}{325} + \frac{401046643728612\text{ I}}{325} & \frac{-21417266783388}{325} + \frac{71975829052134\text{ I}}{325} & \frac{-1892892278109}{1625} + \frac{2268884329677\text{ I}}{1625} \\ & \frac{-26557160343\text{ I}}{260} & \frac{-3342448384191}{1625} + \frac{5293319430903\text{ I}}{1625} & \frac{1300005785043}{325} - \frac{2521555722819\text{ I}}{260} & \frac{-611614744419}{1625} + \frac{3760675466373\text{ I}}{1625} & \frac{255973965891}{13000} - \frac{85041479061\text{ I}}{2600} \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\; u(x_{ol}) = \frac{1}{13000\; \Delta x_{ol}^{10}} \Big( 21 \Big( \; -(12189236471 + 20247971205\text{ I})\; u_{ol+4\text{ I}} + (721101820232 + 864336887496\text{ I})\; u_{ol+1+4\text{ I}} - (833874648660 + 3604661468370\text{ I})\; u_{ol+2+4\text{ I}} + (-205904936280 + 928409030360\text{ I})\; u_{ol+3+4\text{ I}} - 17114065688\text{ I}\; u_{ol+4+4\text{ I}} + (232996093112 + 1432638272904\text{ I})\; u_{ol+3\text{ I}} + (40794793873120$$

$$+ 137096817242160\text{ I})\; u_{ol+1+3\text{ I}} + (74548622113200 + 573721109180640\text{ I})\; u_{ol+2+3\text{ I}} + 114668607274480\text{ I}\; u_{ol+3+3\text{ I}} + (205904936280 + 928409030360\text{ I})\; u_{ol+4+3\text{ I}} - (2476201495320 + 6003704101950\text{ I})\; u_{ol+2\text{ I}} + (131327234205840 + 763898369006880\text{ I})\; u_{ol+1+2\text{ I}} - 3265522721655480\text{ I}\; u_{ol+2+2\text{ I}} + (-74548622113200$$

$$+ 573721109180640\text{ I})\; u_{ol+3+2\text{ I}} + (833874648660 - 3604661468370\text{ I})\; u_{ol+4+2\text{ I}} + (1273313670168 + 2016502640344\text{ I})\; u_{ol+1\text{ I}} + 210275322342320\text{ I}\; u_{ol+1+1\text{ I}} + (-131327234205840 + 763898369006880\text{ I})\; u_{ol+2+1\text{ I}} + (-40794793873120 + 137096817242160\text{ I})\; u_{ol+3+1\text{ I}} + (-721101820232 + 864336887496\text{ I})\; u_{ol+4+1\text{ I}}$$

$$- 63231334150\text{ I}\; u_{ol} + (-1273313670168 + 2016502640344\text{ I})\; u_{ol+1} + (2476201495320 - 6003704101950\text{ I})\; u_{ol+2} + (-232996093112 + 1432638272904\text{ I})\; u_{ol+3} + (12189236471 - 20247971205\text{ I})\; u_{ol+4} \Big) \Big) ,\; O(\; \Delta x_{ol}^{15} \; )$$

Formula:, 143, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 1

Error order:, 24, Error:,  $6.1894580802442821666 \times 10^{-61}$ , New Error:,  $6.3342218055842021687 \times 10^{-85}$

Error order:, 24, Error:,  $6.3342218055842021687 \times 10^{-85}$ , New Error:,  $6.3487520084997584009 \times 10^{-109}$

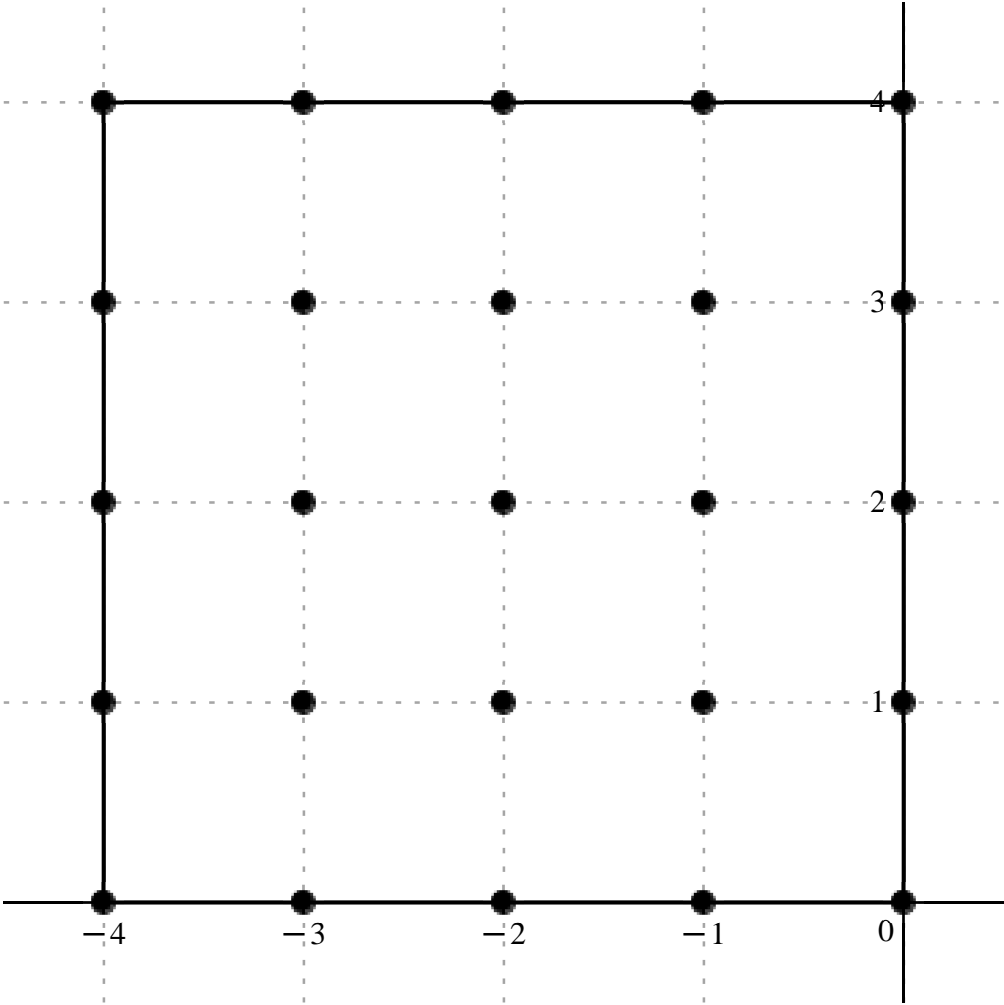
Error order:, 24, Error:,  $6.3487520084997584009 \times 10^{-109}$ , New Error:,  $6.3502055533303922487 \times 10^{-133}$

Error order:, 24, Error:,  $6.3502055533303922487 \times 10^{-133}$ , New Error:,  $6.3503509130448962546 \times 10^{-157}$

Error order:, 24, Error:,  $6.3503509130448962546 \times 10^{-157}$ , New Error:,  $6.3503654490686470926 \times 10^{-181}$

$$x_o + h . , \begin{bmatrix} -4 + 4 \text{ I} & -3 + 4 \text{ I} & -2 + 4 \text{ I} & -1 + 4 \text{ I} & 4 \text{ I} \\ -4 + 3 \text{ I} & -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -4 + 2 \text{ I} & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -4 + \text{ I} & -3 + \text{ I} & -2 + \text{ I} & -1 + \text{ I} & \text{ I} \\ -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{1}{8} + \frac{\text{I}}{8} & -\frac{208}{25} - \frac{144 \text{ I}}{25} & 18 + 36 \text{ I} & \frac{16}{17} - \frac{208 \text{ I}}{17} & \frac{\text{I}}{4} \\ -\frac{144}{25} - \frac{208 \text{ I}}{25} & -\frac{2720}{3} - \frac{2720 \text{ I}}{3} & -\frac{48960}{13} - \frac{73440 \text{ I}}{13} & -544 - 1632 \text{ I} & -\frac{16}{3} - 16 \text{ I} \\ 36 + 18 \text{ I} & -\frac{73440}{13} - \frac{48960 \text{ I}}{13} & 29835 + 29835 \text{ I} & -4896 - 9792 \text{ I} & 90 \text{ I} \\ -\frac{208}{17} + \frac{16 \text{ I}}{17} & -1632 - 544 \text{ I} & -9792 - 4896 \text{ I} & -2720 - 2720 \text{ I} & 16 - 48 \text{ I} \\ \frac{1}{4} & -16 - \frac{16 \text{ I}}{3} & 90 & -48 + 16 \text{ I} & \frac{237961}{44200} + \frac{237961 \text{ I}}{44200} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u\big(x_{ol}\big)=\frac{1}{132600\,\mathcal{A}x_{ol}}\Big((16575+16575\,\mathrm{I})\,u_{ol-4+4\,\mathrm{I}}-(1103232+763776\,\mathrm{I})\,u_{ol-3+4\,\mathrm{I}}+(2386800+4773600\,\mathrm{I})\,u_{ol-2+4\,\mathrm{I}}+(124800-1622400\,\mathrm{I})\,u_{ol-1+4\,\mathrm{I}}+33150\,\mathrm{I}\,u_{ol+4\,\mathrm{I}}-(763776+1103232\,\mathrm{I})\,u_{ol-4+3\,\mathrm{I}}-(120224000+120224000\,\mathrm{I})\,u_{ol-3+3\,\mathrm{I}}-(499392000+749088000\,\mathrm{I})\,u_{ol-2+3\,\mathrm{I}}-(72134400+216403200\,\mathrm{I})\,u_{ol-1+3\,\mathrm{I}}\\-(707200+2121600\,\mathrm{I})\,u_{ol+3\,\mathrm{I}}+(4773600+2386800\,\mathrm{I})\,u_{ol-4+2\,\mathrm{I}}-(749088000+499392000\,\mathrm{I})\,u_{ol-3+2\,\mathrm{I}}+(3956121000+3956121000\,\mathrm{I})\,u_{ol-2+2\,\mathrm{I}}-(649209600+1298419200\,\mathrm{I})\,u_{ol-1+2\,\mathrm{I}}+11934000\,\mathrm{I}\,u_{ol+2\,\mathrm{I}}+(-1622400+124800\,\mathrm{I})\,u_{ol-4+1\,\mathrm{I}}-(216403200+72134400\,\mathrm{I})\,u_{ol-3+1\,\mathrm{I}}-(1298419200+649209600\,\mathrm{I})\,u_{ol-2+1\,\mathrm{I}}\\-(360672000+360672000\,\mathrm{I})\,u_{ol-1+1\,\mathrm{I}}+(2121600-6364800\,\mathrm{I})\,u_{ol+1\,\mathrm{I}}+33150\,u_{ol-4}-(2121600+707200\,\mathrm{I})\,u_{ol-3}+11934000\,u_{ol-2}+(\,-6364800+2121600\,\mathrm{I})\,u_{ol-1}+(713883+713883\,\mathrm{I})\,u_{ol}\Big),\,O(\,\mathcal{A}x_{ol}^{24}\,)$$

Formula.: 144, Var.: 1

Variavel .: x<sub>ol</sub> , Derivada de Ordem .: 2

Error order.: 23, Error.: 7.4545041235818922779 × 10<sup>−58</sup>, New Error.: 7.5055902596457578322 × 10<sup>−81</sup>

Error order.: 23, Error.: 7.5055902596457578322 × 10<sup>−81</sup>, New Error.: 7.5105088096065491180 × 10<sup>−104</sup>

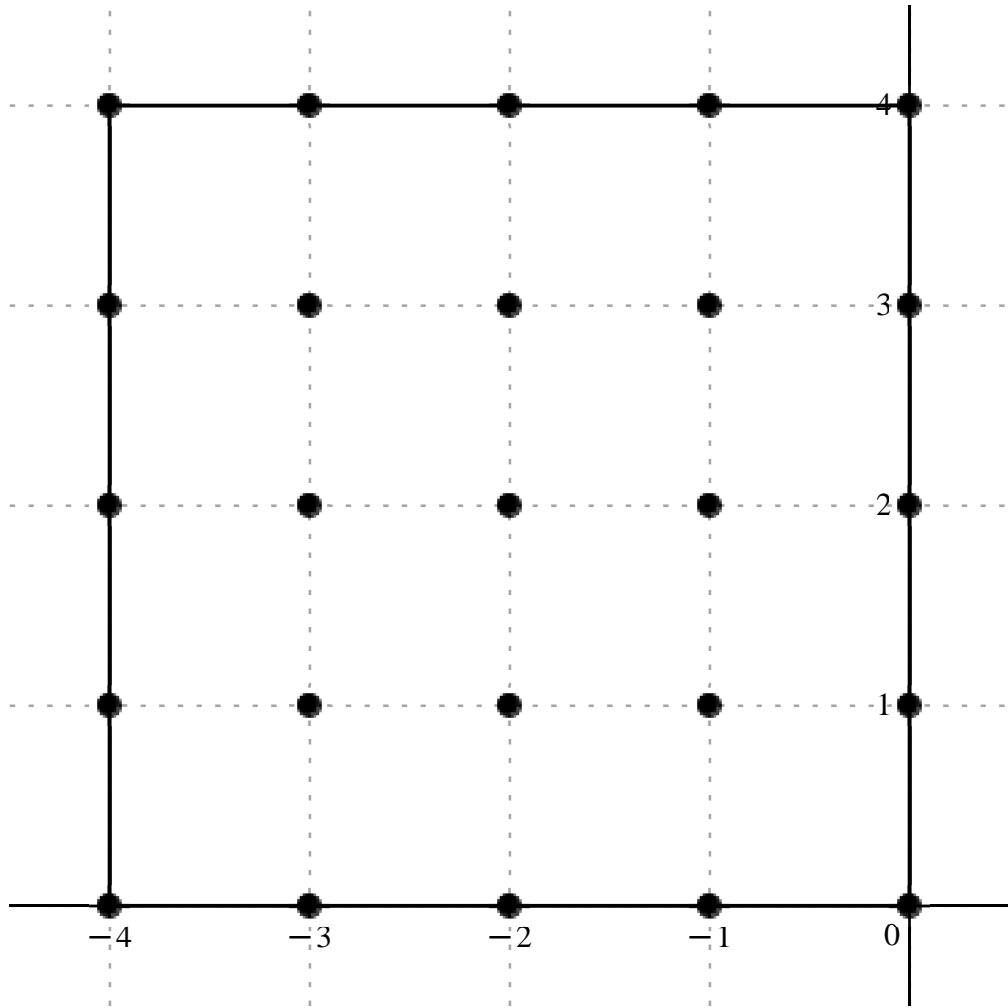
Error order.: 23, Error.: 7.5105088096065491180 × 10<sup>−104</sup>, New Error.: 7.5109987298394696811 × 10<sup>−127</sup>

Error order.: 23, Error.: 7.5109987298394696811 × 10<sup>−127</sup>, New Error.: 7.5110477024807847055 × 10<sup>−150</sup>

Error order.: 23, Error.: 7.5110477024807847055 × 10<sup>−150</sup>, New Error.: 7.5110525995510620702 × 10<sup>−173</sup>

$$x_o\neq h\,.\, , \left[\begin{array}{ccccc} -4+4\,\mathrm{I} & -3+4\,\mathrm{I} & -2+4\,\mathrm{I} & -1+4\,\mathrm{I} & 4\,\mathrm{I} \\ -4+3\,\mathrm{I} & -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ -4+2\,\mathrm{I} & -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -4+\mathrm{I} & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -4 & -3 & -2 & -1 & 0 \end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} \frac{58109\,\mathrm{I}}{22100} & -\frac{757232}{27625}-\frac{4076376\,\mathrm{I}}{27625} & -\frac{2022309}{11050}+\frac{6265827\,\mathrm{I}}{11050} & \frac{751448}{5525}-\frac{666384\,\mathrm{I}}{5525} & -\frac{226911}{88400}+\frac{237961\,\mathrm{I}}{88400} \\ \frac{757232}{27625}-\frac{4076376\,\mathrm{I}}{27625} & -\frac{11068528\,\mathrm{I}}{585} & \frac{1223784}{65}-\frac{1272744\,\mathrm{I}}{13} & \frac{3524496}{325}-\frac{7402592\,\mathrm{I}}{325} & \frac{1726888}{16575}-\frac{11245328\,\mathrm{I}}{49725} \\ \frac{2022309}{11050}+\frac{6265827\,\mathrm{I}}{11050} & -\frac{1223784}{65}-\frac{1272744\,\mathrm{I}}{13} & \frac{6126597\,\mathrm{I}}{10} & \frac{15223752}{325}-\frac{48853656\,\mathrm{I}}{325} & -\frac{1942749}{2210}+\frac{2141649\,\mathrm{I}}{2210} \\ -\frac{751448}{5525}-\frac{666384\,\mathrm{I}}{5525} & -\frac{3524496}{325}-\frac{7402592\,\mathrm{I}}{325} & -\frac{15223752}{325}-\frac{48853656\,\mathrm{I}}{325} & -\frac{3453776\,\mathrm{I}}{65} & \frac{3276976}{5525}-\frac{2080488\,\mathrm{I}}{5525} \\ \frac{226911}{88400}+\frac{237961\,\mathrm{I}}{88400} & -\frac{1726888}{16575}-\frac{11245328\,\mathrm{I}}{49725} & \frac{1942749}{2210}+\frac{2141649\,\mathrm{I}}{2210} & -\frac{3276976}{5525}-\frac{2080488\,\mathrm{I}}{5525} & \frac{112305269\,\mathrm{I}}{1989000} \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{1}{3978000 \Delta x_{ol}^2} \left( 10459620 \operatorname{I} u_{ol-4+4\operatorname{I}} - (109041408 + 586998144 \operatorname{I}) u_{ol-3+4\operatorname{I}} + (-728031240 + 2255697720 \operatorname{I}) u_{ol-2+4\operatorname{I}} + (541042560 - 479796480 \operatorname{I}) u_{ol-1+4\operatorname{I}} + (-10210995 + 10708245 \operatorname{I}) u_{ol+4\operatorname{I}} + (109041408 - 586998144 \operatorname{I}) u_{ol-4+3\operatorname{I}} - 75265990400 \operatorname{I} u_{ol-3+3\operatorname{I}} + (74895580800 - 389459664000 \operatorname{I}) u_{ol-2+3\operatorname{I}} \right. \\ \left. + (43139831040 - 90607726080 \operatorname{I}) u_{ol-1+3\operatorname{I}} + (414453120 - 899626240 \operatorname{I}) u_{ol+3\operatorname{I}} + (728031240 + 2255697720 \operatorname{I}) u_{ol-4+2\operatorname{I}} - (74895580800 + 389459664000 \operatorname{I}) u_{ol-3+2\operatorname{I}} + 2437160286600 \operatorname{I} u_{ol-2+2\operatorname{I}} + (186338724480 - 597968749440 \operatorname{I}) u_{ol-1+2\operatorname{I}} + (-3496948200 + 3854968200 \operatorname{I}) u_{ol+2\operatorname{I}} - (541042560 + 479796480 \operatorname{I}) u_{ol-4+1\operatorname{I}} \right. \\ \left. - (43139831040 + 90607726080 \operatorname{I}) u_{ol-3+1\operatorname{I}} - (186338724480 + 597968749440 \operatorname{I}) u_{ol-2+1\operatorname{I}} - 211371091200 \operatorname{I} u_{ol-1+1\operatorname{I}} + (2359422720 - 1497951360 \operatorname{I}) u_{ol+1\operatorname{I}} + (10210995 + 10708245 \operatorname{I}) u_{ol-4} - (414453120 + 899626240 \operatorname{I}) u_{ol-3} + (3496948200 + 3854968200 \operatorname{I}) u_{ol-2} - (2359422720 + 1497951360 \operatorname{I}) u_{ol-1} + 224610538 \operatorname{I} u_{ol} \right), \\ O(\Delta x_{ol}^{23})$$

Formula:, 145, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 22, Error:,  $8.6655626683507032146 \times 10^{-55}$ , New Error:,  $8.8674494465868990016 \times 10^{-77}$

Error order:, 22, Error:,  $8.8674494465868990016 \times 10^{-77}$ , New Error:,  $8.8877129237525862350 \times 10^{-99}$

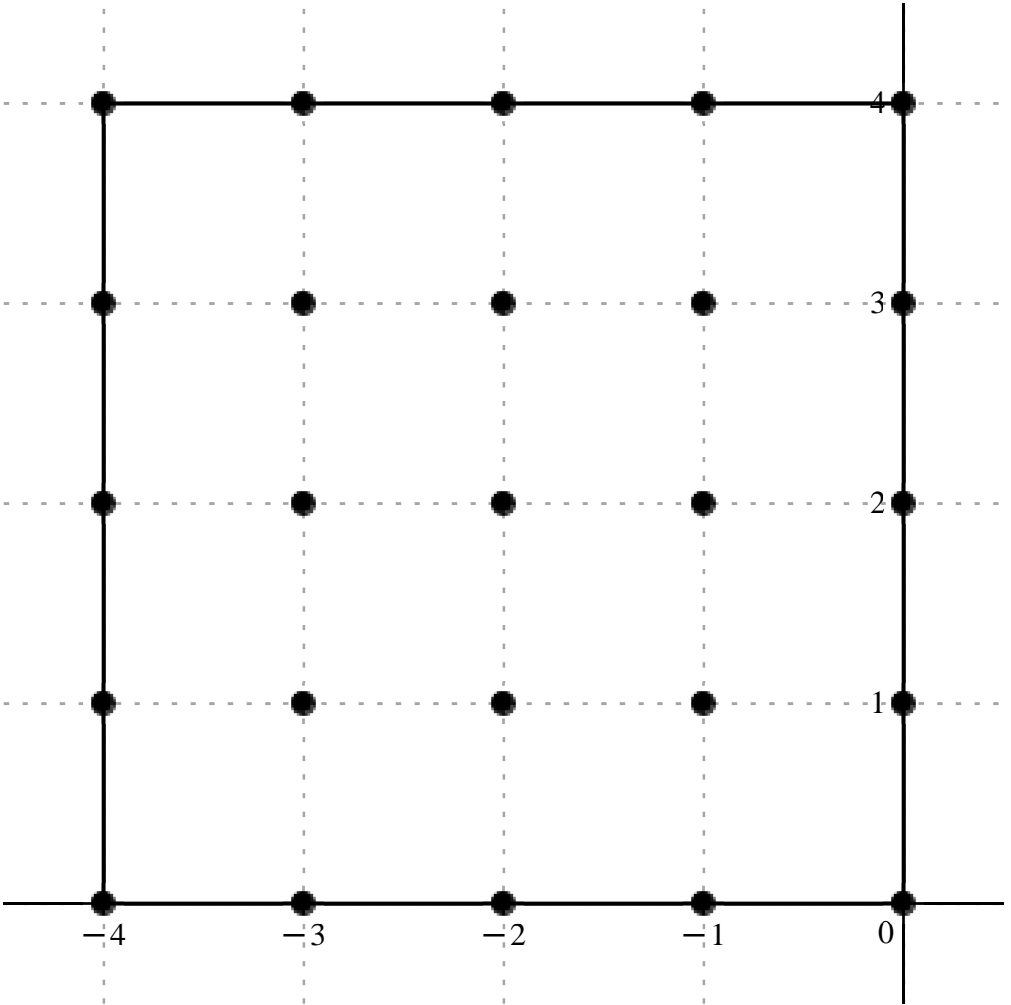
Error order:, 22, Error:,  $8.8877129237525862350 \times 10^{-99}$ , New Error:,  $8.8897400003956913317 \times 10^{-121}$

Error order:, 22, Error:,  $8.8897400003956913317 \times 10^{-121}$ , New Error:,  $8.8899427153299442569 \times 10^{-143}$

Error order:, 22, Error:,  $8.8899427153299442569 \times 10^{-143}$ , New Error:,  $8.8899629868960496249 \times 10^{-165}$

$$x_o \neq h., \left[ \begin{array}{ccccc} -4+4 \operatorname{I} & -3+4 \operatorname{I} & -2+4 \operatorname{I} & -1+4 \operatorname{I} & 4 \operatorname{I} \\ -4+3 \operatorname{I} & -3+3 \operatorname{I} & -2+3 \operatorname{I} & -1+3 \operatorname{I} & 3 \operatorname{I} \\ -4+2 \operatorname{I} & -3+2 \operatorname{I} & -2+2 \operatorname{I} & -1+2 \operatorname{I} & 2 \operatorname{I} \\ -4+\operatorname{I} & -3+\operatorname{I} & -2+\operatorname{I} & -1+\operatorname{I} & \operatorname{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} -\frac{107075459}{5304000} + \frac{107075459 \text{ I}}{5304000} & \frac{9718926}{10625} - \frac{556522898 \text{ I}}{414375} & -\frac{25206789}{4420} + \frac{16512609 \text{ I}}{5525} & \frac{162716042}{82875} + \frac{7019834 \text{ I}}{82875} & -\frac{213902293}{5304000} + \frac{680733 \text{ I}}{353600} \\ \frac{556522898}{414375} - \frac{9718926 \text{ I}}{10625} & \frac{421549756}{2925} - \frac{421549756 \text{ I}}{2925} & \frac{286146828}{325} - \frac{196883472 \text{ I}}{325} & \frac{410622668}{1625} - \frac{463490108 \text{ I}}{4875} & \frac{617604974}{248625} - \frac{250513858 \text{ I}}{248625} \\ -\frac{16512609}{5525} + \frac{25206789 \text{ I}}{4420} & \frac{196883472}{325} - \frac{286146828 \text{ I}}{325} & -\frac{459424233}{100} + \frac{459424233 \text{ I}}{100} & \frac{2356533264}{1625} - \frac{1292444772 \text{ I}}{1625} & -\frac{76197768}{5525} + \frac{5828247 \text{ I}}{4420} \\ -\frac{7019834}{82875} - \frac{162716042 \text{ I}}{82875} & \frac{463490108}{4875} - \frac{410622668 \text{ I}}{1625} & \frac{1292444772}{1625} - \frac{2356533264 \text{ I}}{1625} & \frac{371511116}{975} - \frac{371511116 \text{ I}}{975} & \frac{193403218}{27625} + \frac{77146618 \text{ I}}{82875} \\ -\frac{680733}{353600} + \frac{213902293 \text{ I}}{5304000} & \frac{250513858}{248625} - \frac{617604974 \text{ I}}{248625} & -\frac{5828247}{4420} + \frac{76197768 \text{ I}}{5525} & -\frac{77146618}{82875} - \frac{193403218 \text{ I}}{27625} & -\frac{22773831179}{79560000} + \frac{22773831179 \text{ I}}{79560000} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \; u(x_{ol}) = \frac{1}{79560000 \; \mathcal{A}x_{ol}^3} \big( (-1606131885 + 1606131885 \text{ I}) \; u_{ol-4+4\text{I}} + (72775317888 - 106852396416 \text{ I}) \; u_{ol-3+4\text{I}} + (-453722202000 + 237781569600 \text{ I}) \; u_{ol-2+4\text{I}} + (156207400320 + 6739040640 \text{ I}) \; u_{ol-1+4\text{I}} + (-3208534395 + 153164925 \text{ I}) \; u_{ol+4\text{I}} + (106852396416 - 72775317888 \text{ I}) \; u_{ol-4+3\text{I}} + (11466153363200 \\ - 11466153363200 \text{ I}) \; u_{ol-3+3\text{I}} + (70048743494400 - 48197073945600 \text{ I}) \; u_{ol-2+3\text{I}} + (20104085825280 - 7564158562560 \text{ I}) \; u_{ol-1+3\text{I}} + (197633591680 - 80164434560 \text{ I}) \; u_{ol+3\text{I}} + (-237781569600 + 453722202000 \text{ I}) \; u_{ol-4+2\text{I}} + (48197073945600 - 70048743494400 \text{ I}) \; u_{ol-3+2\text{I}} + (-365517919774800 \\ + 365517919774800 \text{ I}) \; u_{ol-2+2\text{I}} + (115375868605440 - 63278096037120 \text{ I}) \; u_{ol-1+2\text{I}} + (-1097247859200 + 104908446000 \text{ I}) \; u_{ol+2\text{I}} - (6739040640 + 156207400320 \text{ I}) \; u_{ol-4+1\text{I}} + (7564158562560 - 20104085825280 \text{ I}) \; u_{ol-3+1\text{I}} + (63278096037120 - 115375868605440 \text{ I}) \; u_{ol-2+1\text{I}} + (30315307065600 - 30315307065600 \text{ I}) \; u_{ol-1+1\text{I}} \\ + (557001267840 + 74060753280 \text{ I}) \; u_{ol+1\text{I}} + (-153164925 + 3208534395 \text{ I}) \; u_{ol-4\text{I}} + (80164434560 - 197633591680 \text{ I}) \; u_{ol-3\text{I}} + (-104908446000 + 1097247859200 \text{ I}) \; u_{ol-2\text{I}} - (74060753280 + 557001267840 \text{ I}) \; u_{ol-1\text{I}} + (-22773831179 + 22773831179 \text{ I}) \; u_{ol\text{I}} \big), \; O(\; \mathcal{A}x_{ol}^{22} \;)$$

Formula.: 146, Var.: 1

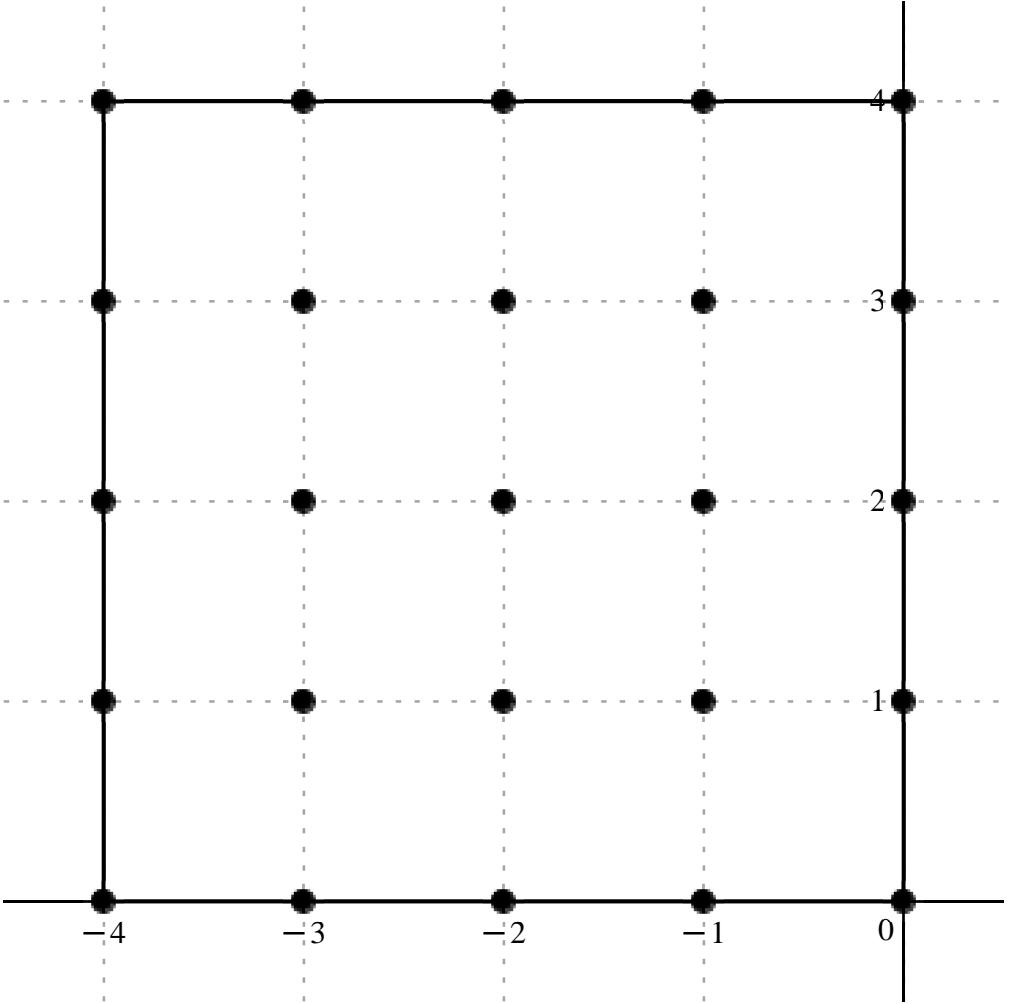
Variavel .:  $x_{ol}$ , Derivada de Ordem .: 4

Error order.: 21, Error.:  $6.5514140572121691033 \times 10^{-52}$ , New Error.:  $6.5961204003544340882 \times 10^{-73}$

Error order.: 21, Error.:  $6.5961204003544340882 \times 10^{-73}$ , New Error.:  $6.6004252922141298659 \times 10^{-94}$

*Error order:*, 21, *Error:*,  $6.6004252922141298659 \times 10^{-94}$ , *New Error:*,  $6.6008540943198544727 \times 10^{-115}$   
*Error order:*, 21, *Error:*,  $6.6008540943198544727 \times 10^{-115}$ , *New Error:*,  $6.6008969576297793085 \times 10^{-136}$   
*Error order:*, 21, *Error:*,  $6.6008969576297793085 \times 10^{-136}$ , *New Error:*,  $6.6009012437917354517 \times 10^{-157}$

$$\begin{aligned}
 x_o & \neq h \text{ , } \begin{bmatrix} -4+4\text{ I} & -3+4\text{ I} & -2+4\text{ I} & -1+4\text{ I} & 4\text{ I} \\ -4+3\text{ I} & -3+3\text{ I} & -2+3\text{ I} & -1+3\text{ I} & 3\text{ I} \\ -4+2\text{ I} & -3+2\text{ I} & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} \\ -4+\text{ I} & -3+\text{ I} & -2+\text{ I} & -1+\text{ I} & \text{ I} \\ -4 & -3 & -2 & -1 & 0 \end{bmatrix} \\
 c =, & \left[ \begin{array}{cccccc} -\frac{622579391}{2340000} & \frac{92133162946}{6215625} - \frac{17850865972\text{ I}}{6215625} & -\frac{63158797197}{1105000} - \frac{19053482099\text{ I}}{1105000} & \frac{5200152388}{414375} + \frac{16432976258\text{ I}}{1243125} & -\frac{11310333127}{39780000} - \frac{1222831049\text{ I}}{4972500} \\ \frac{92133162946}{6215625} + \frac{17850865972\text{ I}}{6215625} & \frac{27554776532}{14625} & \frac{629167478}{65} + \frac{2788783966\text{ I}}{1625} & \frac{166456619464}{73125} + \frac{71702641292\text{ I}}{73125} & \frac{9565005284}{414375} + \frac{11065187626\text{ I}}{1243125} \\ -\frac{63158797197}{1105000} + \frac{19053482099\text{ I}}{1105000} & \frac{629167478}{65} - \frac{2788783966\text{ I}}{1625} & -\frac{59133008877}{1000} & \frac{116877295842}{8125} + \frac{31865175334\text{ I}}{8125} & -\frac{22191006479}{221000} - \frac{16678009739\text{ I}}{221000} \\ \frac{5200152388}{414375} - \frac{16432976258\text{ I}}{1243125} & \frac{166456619464}{73125} - \frac{71702641292\text{ I}}{73125} & \frac{116877295842}{8125} - \frac{31865175334\text{ I}}{8125} & \frac{68804657756}{14625} & \frac{50176459438}{1243125} + \frac{56282745476\text{ I}}{1243125} \\ -\frac{11310333127}{39780000} + \frac{1222831049\text{ I}}{4972500} & \frac{9565005284}{414375} - \frac{11065187626\text{ I}}{1243125} & -\frac{22191006479}{221000} + \frac{16678009739\text{ I}}{221000} & \frac{50176459438}{1243125} - \frac{56282745476\text{ I}}{1243125} & -\frac{554759931179}{198900000} \end{array} \right]
 \end{aligned}$$



$$\begin{aligned}
 \frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = & \frac{1}{198900000 \Delta x_{ol}^4} \big( -52919248235 u_{ol-4+4\text{ I}} + (2948261214272 - 571227711104\text{ I}) u_{ol-3+4\text{ I}} - (11368583495460 + 3429626777820\text{ I}) u_{ol-2+4\text{ I}} \\
 & + (2496073146240 + 2629276201280\text{ I}) u_{ol-1+4\text{ I}} - (56551665635 + 48913241960\text{ I}) u_{ol+4\text{ I}} + (2948261214272 + 571227711104\text{ I}) u_{ol-4+3\text{ I}} + 374744960835200 u_{ol-3+3\text{ I}} \\
 & + (1925252482680000 + 341347157438400\text{ I}) u_{ol-2+3\text{ I}} + (452762004942080 + 195031184314240\text{ I}) u_{ol-1+3\text{ I}} + (4591202536320 + 1770430020160\text{ I}) u_{ol+3\text{ I}} \\
 & + (-11368583495460 + 3429626777820\text{ I}) u_{ol-4+2\text{ I}} + (1925252482680000 - 341347157438400\text{ I}) u_{ol-3+2\text{ I}} - 11761555465635300 u_{ol-2+2\text{ I}} + (2861156202212160 \\
 & + 780059492176320\text{ I}) u_{ol-1+2\text{ I}} - (19971905831100 + 15010208765100\text{ I}) u_{ol+2\text{ I}} + (2496073146240 - 2629276201280\text{ I}) u_{ol-4+1\text{ I}} + (452762004942080 - 195031184314240\text{ I}) u_{ol-3+1\text{ I}} \\
 & + (2861156202212160 - 780059492176320\text{ I}) u_{ol-2+1\text{ I}} + 935743345481600 u_{ol-1+1\text{ I}} + (8028233510080 + 9005239276160\text{ I}) u_{ol+1\text{ I}} \\
 & + (-56551665635 + 48913241960\text{ I}) u_{ol-4} + (4591202536320 - 1770430020160\text{ I}) u_{ol-3} + (-19971905831100 + 15010208765100\text{ I}) u_{ol-2} + (8028233510080 - 9005239276160\text{ I}) u_{ol-1} \\
 & - 554759931179 u_{ol} \big), \quad O(\Delta x_{ol}^{21})
 \end{aligned}$$



Formula:, 147, Var.: 1

Variavel :,  $x_o$  , Derivada de Ordem :, 5

Error order:., 20, Error:.,  $5.8967750013119051109 \times 10^{-49}$ , New Error:.,  $6.0335361432044874433 \times 10^{-69}$

Error order:., 20, Error:.,  $6.0335361432044874433 \times 10^{-69}$ , New Error:.,  $6.0472627167217173107 \times 10^{-89}$

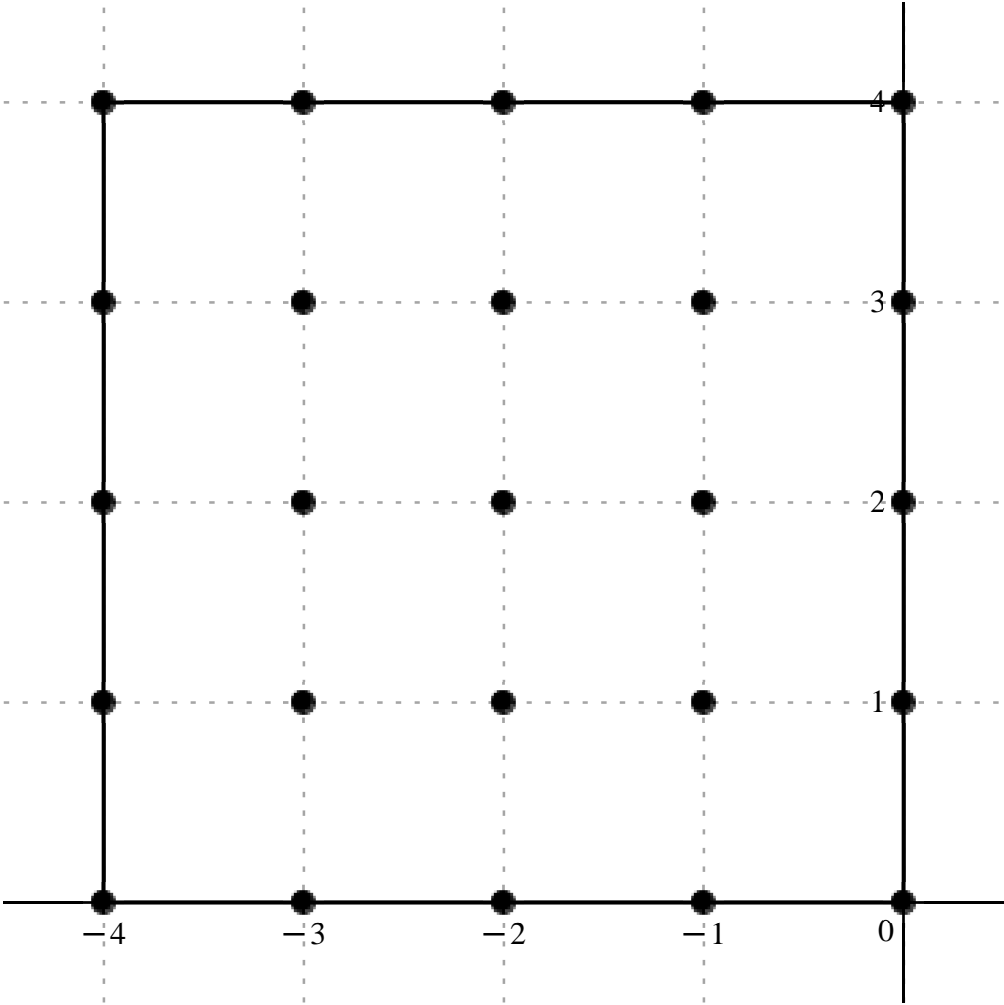
Error order:., 20, Error:.,  $6.0472627167217173107 \times 10^{-89}$ , New Error:.,  $6.0486358658500665087 \times 10^{-109}$

Error order:., 20, Error:.,  $6.0486358658500665087 \times 10^{-109}$ , New Error:.,  $6.0487731856676795074 \times 10^{-129}$

Error order:., 20, Error:.,  $6.0487731856676795074 \times 10^{-129}$ , New Error:.,  $6.0487869176984755827 \times 10^{-149}$

$$x_o + h . , \left[ \begin{array}{ccccc} -4 + 4 \text{ I} & -3 + 4 \text{ I} & -2 + 4 \text{ I} & -1 + 4 \text{ I} & 4 \text{ I} \\ -4 + 3 \text{ I} & -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -4 + 2 \text{ I} & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -4 + \text{ I} & -3 + \text{ I} & -2 + \text{ I} & -1 + \text{ I} & \text{ I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cc} -\frac{2613753557}{1657500} - \frac{2613753557 \text{ I}}{1657500} & \frac{17376728533}{165750} + \frac{34903034183 \text{ I}}{497250} & -\frac{26485404909}{110500} - \frac{192829757173 \text{ I}}{442000} & -\frac{349316683}{276250} + \frac{125951589337 \text{ I}}{828750} & -\frac{1222831049}{3978000} - \frac{20758677731 \text{ I}}{6630000} \\ \frac{34903034183}{497250} + \frac{17376728533 \text{ I}}{165750} & \frac{4152760597}{375} + \frac{4152760597 \text{ I}}{375} & \frac{76466134796}{1625} + \frac{107727242279 \text{ I}}{1625} & \frac{38605705559}{4875} + \frac{275748708739 \text{ I}}{14625} & \frac{24644881757}{276250} + \frac{153036626113 \text{ I}}{828750} \\ -\frac{192829757173}{442000} - \frac{26485404909 \text{ I}}{110500} & \frac{107727242279}{1625} + \frac{76466134796 \text{ I}}{1625} & -\frac{42769210911}{125} - \frac{42769210911 \text{ I}}{125} & \frac{100322597201}{1625} + \frac{168780019068 \text{ I}}{1625} & -\frac{16678009739}{88400} - \frac{2133677398 \text{ I}}{2125} \\ \frac{125951589337}{828750} - \frac{349316683 \text{ I}}{276250} & \frac{275748708739}{14625} + \frac{38605705559 \text{ I}}{4875} & \frac{168780019068}{1625} + \frac{100322597201 \text{ I}}{1625} & \frac{42527587421}{1625} + \frac{42527587421 \text{ I}}{1625} & \frac{68953193}{21250} + \frac{89424246089 \text{ I}}{191250} \\ -\frac{20758677731}{6630000} - \frac{1222831049 \text{ I}}{3978000} & \frac{153036626113}{828750} + \frac{24644881757 \text{ I}}{276250} & -\frac{2133677398}{2125} - \frac{16678009739 \text{ I}}{88400} & \frac{89424246089}{191250} + \frac{68953193 \text{ I}}{21250} & -\frac{574403647}{44200} - \frac{574403647 \text{ I}}{44200} \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u\big(x_{ol}\big) = \frac{1}{19890000 \, \Delta x_{ol}^5} \Big( \begin{aligned} &-(31365042684 + 31365042684 \, \mathrm{I}) \, u_{ol-4+41} + (2085207423960 + 1396121367320 \, \mathrm{I}) \, u_{ol-3+41} - (4767372883620 + 8677339072785 \, \mathrm{I}) \, u_{ol-2+41} \\ &+ (-25150801176 + 3022838144088 \, \mathrm{I}) \, u_{ol-1+41} - (6114155245 + 62276033193 \, \mathrm{I}) \, u_{ol+41} + (1396121367320 + 2085207423960 \, \mathrm{I}) \, u_{ol-4+31} \\ &+ (220262422064880 \, \mathrm{I}) \, u_{ol-3+31} + (935945489903040 + 1318581445494960 \, \mathrm{I}) \, u_{ol-2+31} + (157511278680720 + 375018243885040 \, \mathrm{I}) \, u_{ol-1+31} \\ &+ (1774431486504 + 3672879026712 \, \mathrm{I}) \, u_{ol+31} - (8677339072785 + 4767372883620 \, \mathrm{I}) \, u_{ol-4+21} + (1318581445494960 + 935945489903040 \, \mathrm{I}) \, u_{ol-3+21} \\ &- (6805436840158320 \, \mathrm{I}) \, u_{ol-2+21} + (1227948589740240 + 2065867433392320 \, \mathrm{I}) \, u_{ol-1+21} - (3752552191275 + 19971220445280 \, \mathrm{I}) \, u_{ol+21} \\ &+ (3022838144088 - 25150801176 \, \mathrm{I}) \, u_{ol-4+1} + (375018243885040 + 157511278680720 \, \mathrm{I}) \, u_{ol-3+1} + (2065867433392320 + 1227948589740240 \, \mathrm{I}) \, u_{ol-2+1} \\ &+ (520537670033040 + 520537670033040 \, \mathrm{I}) \, u_{ol-1+1} + (64540188648 + 9300121593256 \, \mathrm{I}) \, u_{ol+1} \\ &- (62276033193 + 6114155245 \, \mathrm{I}) \, u_{ol-4} + (3672879026712 + 1774431486504 \, \mathrm{I}) \, u_{ol-3} - (19971220445280 + 3752552191275 \, \mathrm{I}) \, u_{ol-2} \\ &+ (9300121593256 + 64540188648 \, \mathrm{I}) \, u_{ol-1} - (258481641150 + 258481641150 \, \mathrm{I}) \, u_{ol} \Big), \, O(\, \Delta x_{ol}^{20} \, ) \end{aligned}$$

Formula:, 148, Var.:, 1

Variavel .:,  $x_{ol}$  , Derivada de Ordem .:, 6

Error order:., 19, Error:., 3.6873210487369936908 × 10<sup>−46</sup>, New Error:., 3.7123557698077108133 × 10<sup>−65</sup>

Error order:., 19, Error:., 3.7123557698077108133 × 10<sup>−65</sup>, New Error:., 3.7147668150089727294 × 10<sup>−84</sup>

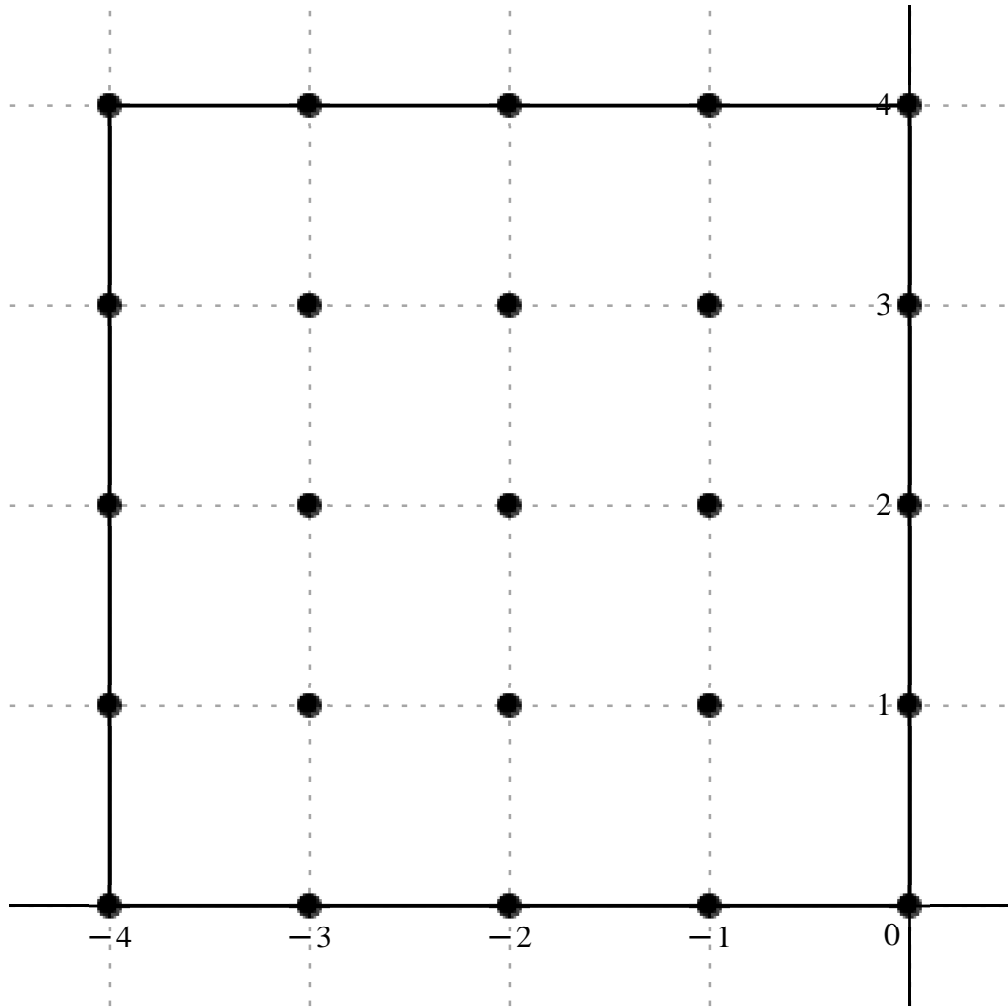
Error order:., 19, Error:., 3.7147668150089727294 × 10<sup>−84</sup>, New Error:., 3.7150069787901439787 × 10<sup>−103</sup>

Error order:., 19, Error:., 3.7150069787901439787 × 10<sup>−103</sup>, New Error:., 3.7150309857442968211 × 10<sup>−122</sup>

Error order:., 19, Error:., 3.7150309857442968211 × 10<sup>−122</sup>, New Error:., 3.7150333863454558773 × 10<sup>−141</sup>

$$x_o \neq h. , \left[ \begin{array}{ccccc} -4 + 4 \, \mathrm{I} & -3 + 4 \, \mathrm{I} & -2 + 4 \, \mathrm{I} & -1 + 4 \, \mathrm{I} & 4 \, \mathrm{I} \\ -4 + 3 \, \mathrm{I} & -3 + 3 \, \mathrm{I} & -2 + 3 \, \mathrm{I} & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ -4 + 2 \, \mathrm{I} & -3 + 2 \, \mathrm{I} & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -4 + \mathrm{I} & -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{37852766411 \, \mathrm{I}}{2210000} & \frac{15871688231}{82875} + \frac{26152114629 \, \mathrm{I}}{27625} & \frac{17404815459}{17000} - \frac{1618240018413 \, \mathrm{I}}{442000} & -\frac{112214177059}{138125} + \frac{114476078827 \, \mathrm{I}}{138125} & \frac{65401869319}{4420000} - \frac{50473497181 \, \mathrm{I}}{2652000} \\ -\frac{15871688231}{82875} + \frac{26152114629 \, \mathrm{I}}{27625} & \frac{581312600878 \, \mathrm{I}}{4875} & -\frac{2461873314}{25} + \frac{987675471948 \, \mathrm{I}}{1625} & -\frac{90428274644}{1625} + \frac{702501239926 \, \mathrm{I}}{4875} & -\frac{191605562087}{414375} + \frac{205116577043 \, \mathrm{I}}{138125} \\ -\frac{17404815459}{17000} - \frac{1618240018413 \, \mathrm{I}}{442000} & \frac{2461873314}{25} + \frac{987675471948 \, \mathrm{I}}{1625} & -\frac{906552119709 \, \mathrm{I}}{250} & -\frac{335671009638}{1625} + \frac{1417757560116 \, \mathrm{I}}{1625} & \frac{221295624681}{55250} - \frac{570321909543 \, \mathrm{I}}{88400} \\ \frac{112214177059}{138125} + \frac{114476078827 \, \mathrm{I}}{138125} & \frac{90428274644}{1625} + \frac{702501239926 \, \mathrm{I}}{4875} & \frac{335671009638}{1625} + \frac{1417757560116 \, \mathrm{I}}{1625} & \frac{434118851874 \, \mathrm{I}}{1625} & -\frac{905337930043}{414375} + \frac{341953013673 \, \mathrm{I}}{138125} \\ -\frac{65401869319}{4420000} - \frac{50473497181 \, \mathrm{I}}{2652000} & \frac{191605562087}{414375} + \frac{205116577043 \, \mathrm{I}}{138125} & -\frac{221295624681}{55250} - \frac{570321909543 \, \mathrm{I}}{88400} & \frac{905337930043}{414375} + \frac{341953013673 \, \mathrm{I}}{138125} & -\frac{15294778547 \, \mathrm{I}}{132600} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{13260000 \, \Delta x_{ol}^6} \, \big( -227116598466 \, \mathrm{I} u_{ol-4+4\mathrm{I}} + (2539470116960 + 12553015021920 \, \mathrm{I}) \, u_{ol-3+4\mathrm{I}} + (13575756058020 - 48547200552390 \, \mathrm{I}) \, u_{ol-2+4\mathrm{I}} + (-10772560997664 + 10989703567392 \, \mathrm{I}) \, u_{ol-1+4\mathrm{I}} + (196205607957 - 252367485905 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (-2539470116960 + 12553015021920 \, \mathrm{I}) \, u_{ol-4+3\mathrm{I}} \\ + 1581170274388160 \, \mathrm{I} u_{ol-3+3\mathrm{I}} + (-1305777605745600 + 8059431851095680 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (-737894721095040 + 1910803372598720 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (-6131377986784 + 19691191396128 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (13575756058020 + 48547200552390 \, \mathrm{I}) \, u_{ol-4+2\mathrm{I}} + (1305777605745600 + 8059431851095680 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} \\ - 48083524429365360 \, \mathrm{I} u_{ol-2+2\mathrm{I}} + (-2739075438646080 + 11568901690546560 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (53110949923440 - 85548286431450 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (10772560997664 + 10989703567392 \, \mathrm{I}) \, u_{ol-4+1\mathrm{I}} + (737894721095040 + 1910803372598720 \, \mathrm{I}) \, u_{ol-3+1\mathrm{I}} + (2739075438646080 + 11568901690546560 \, \mathrm{I}) \, u_{ol-2+1\mathrm{I}} \\ + 3542409831291840 \, \mathrm{I} u_{ol-1+1\mathrm{I}} + (-28970813761376 + 32827489312608 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} - (196205607957 + 252367485905 \, \mathrm{I}) \, u_{ol-4\mathrm{I}} + (6131377986784 + 19691191396128 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} - (53110949923440 + 85548286431450 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (28970813761376 + 32827489312608 \, \mathrm{I}) \, u_{ol-1\mathrm{I}} - 1529477854700 \, \mathrm{I} u_{ol} \big), \, O(\, \Delta x_{ol}^{19} \, )$$

Formula:, 149, Var.:, 1

Variavel :,  $x_o$  , Derivada de Ordem :, 7

Error order:., 18, Error:.,  $2.8219305220957118964 \times 10^{-43}$ , New Error:.,  $2.8870202244696507131 \times 10^{-61}$

Error order:., 18, Error:.,  $2.8870202244696507131 \times 10^{-61}$ , New Error:.,  $2.8935530900779978243 \times 10^{-79}$

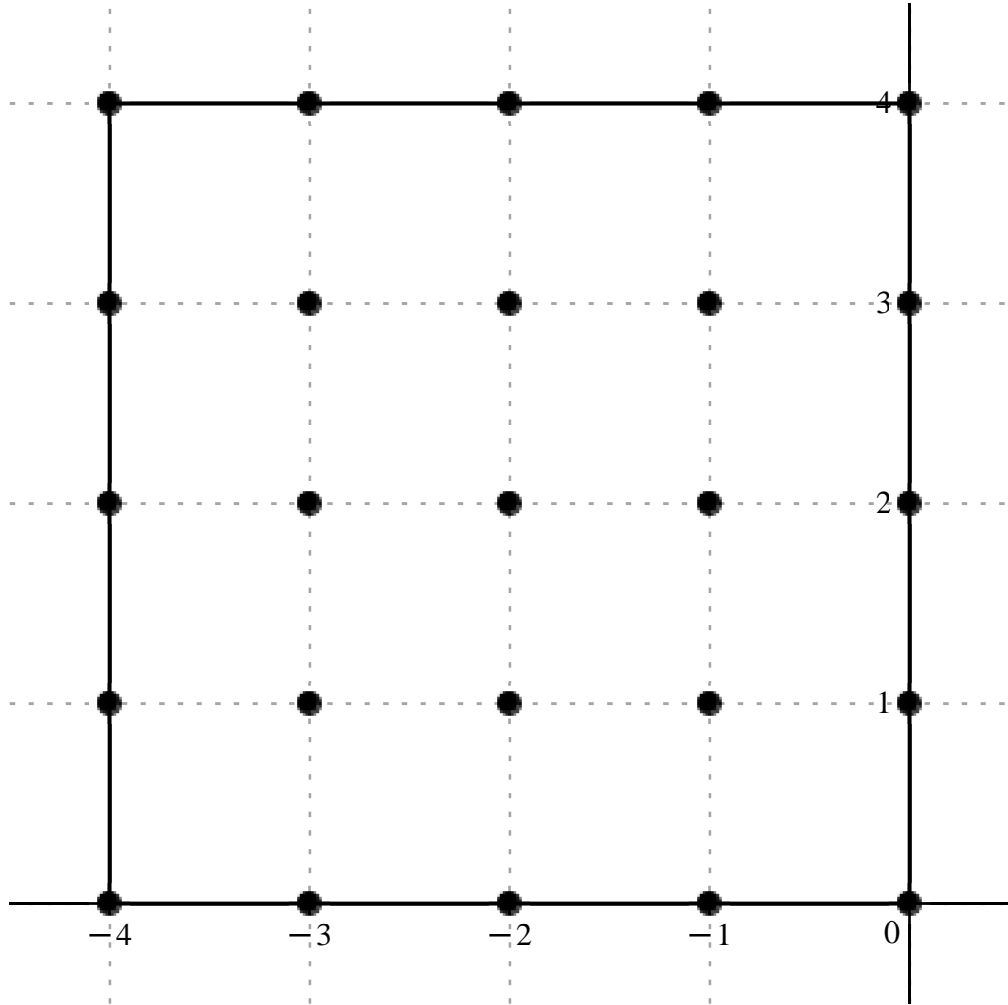
Error order:., 18, Error:.,  $2.8935530900779978243 \times 10^{-79}$ , New Error:.,  $2.8942066095488872357 \times 10^{-97}$

Error order:., 18, Error:.,  $2.8942066095488872357 \times 10^{-97}$ , New Error:.,  $2.8942719638189525155 \times 10^{-115}$

Error order:., 18, Error:.,  $2.8942719638189525155 \times 10^{-115}$ , New Error:.,  $2.8942784992691826746 \times 10^{-133}$

$$x_o \neq h. \, , \quad \left[ \begin{array}{ccccc} -4+4 \, \mathrm{I} & -3+4 \, \mathrm{I} & -2+4 \, \mathrm{I} & -1+4 \, \mathrm{I} & 4 \, \mathrm{I} \\ -4+3 \, \mathrm{I} & -3+3 \, \mathrm{I} & -2+3 \, \mathrm{I} & -1+3 \, \mathrm{I} & 3 \, \mathrm{I} \\ -4+2 \, \mathrm{I} & -3+2 \, \mathrm{I} & -2+2 \, \mathrm{I} & -1+2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -4+\mathrm{I} & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cc} \frac{4558264396819}{53040000} - \frac{4558264396819 \text{ I}}{53040000} & - \frac{20725968823}{5525} + \frac{157683439809 \text{ I}}{27625} & \frac{197409813699}{8500} - \frac{911472963009 \text{ I}}{68000} & - \frac{3389338473479}{414375} + \frac{98165925067 \text{ I}}{414375} & \frac{595984838771}{3536000} - \frac{457813085233 \text{ I}}{17680000} \\ - \frac{157683439809}{27625} + \frac{20725968823 \text{ I}}{5525} & - \frac{2890583626609}{4875} + \frac{2890583626609 \text{ I}}{4875} & - \frac{5644278093804}{1625} + \frac{4136236181826 \text{ I}}{1625} & - \frac{1586218336381}{1625} + \frac{739738752963 \text{ I}}{1625} & - \frac{3917356452149}{414375} + \frac{2231470475353 \text{ I}}{414375} \\ \frac{911472963009}{68000} - \frac{197409813699 \text{ I}}{8500} & - \frac{4136236181826}{1625} + \frac{5644278093804 \text{ I}}{1625} & \frac{8871705686781}{500} - \frac{8871705686781 \text{ I}}{500} & - \frac{646765645974}{125} + \frac{5378825232564 \text{ I}}{1625} & \frac{8855360612679}{176800} - \frac{1549069372767 \text{ I}}{110500} \\ - \frac{98165925067}{414375} + \frac{3389338473479 \text{ I}}{414375} & - \frac{739738752963}{1625} + \frac{1586218336381 \text{ I}}{1625} & - \frac{5378825232564}{1625} + \frac{646765645974 \text{ I}}{125} & - \frac{6148097038223}{4875} + \frac{6148097038223 \text{ I}}{4875} & - \frac{2959501395739}{138125} + \frac{328064339617 \text{ I}}{138125} \\ \frac{457813085233}{17680000} - \frac{595984838771 \text{ I}}{3536000} & - \frac{2231470475353}{414375} + \frac{3917356452149 \text{ I}}{414375} & \frac{1549069372767}{110500} - \frac{8855360612679 \text{ I}}{176800} & - \frac{328064339617}{138125} + \frac{2959501395739 \text{ I}}{138125} & \frac{5152854524377}{10608000} - \frac{5152854524377 \text{ I}}{10608000} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}{}^7} \, u(x_{ol}) = \frac{1}{53040000 \, \mathcal{A}x_{ol}{}^7} \, (7 \, ((651180628117 - 651180628117 \, \text{I}) \, u_{ol-4+4\text{I}} + (-28424185814400 + 43250314919040 \, \text{I}) \, u_{ol-3+4\text{I}} + (175976748211680 - 101564130163860 \, \text{I}) \, u_{ol-2+4\text{I}} + (-61976474943616 + 1795034058368 \, \text{I}) \, u_{ol-1+4\text{I}} + (1277110368795 - 196205607957 \, \text{I}) \, u_{ol+4\text{I}} + (-43250314919040 \\ + 28424185814400 \, \text{I}) \, u_{ol-4+3\text{I}} + (-4492792836786560 + 4492792836786560 \, \text{I}) \, u_{ol-3+3\text{I}} + (-26318462425966080 + 19286678424971520 \, \text{I}) \, u_{ol-2+3\text{I}} + (-7396309499925120 + 3449296128101760 \, \text{I}) \, u_{ol-1+3\text{I}} + (-71631660839296 + 40804031549312 \, \text{I}) \, u_{ol+3\text{I}} + (101564130163860 - 175976748211680 \, \text{I}) \, u_{ol-4+2\text{I}} \\ + (-19286678424971520 + 26318462425966080 \, \text{I}) \, u_{ol-3+2\text{I}} + (134444362750532640 - 134444362750532640 \, \text{I}) \, u_{ol-2+2\text{I}} + (-39205085557098240 + 25080693655841280 \, \text{I}) \, u_{ol-1+2\text{I}} + (379515454829100 - 106221899846880 \, \text{I}) \, u_{ol+2\text{I}} + (-1795034058368 + 61976474943616 \, \text{I}) \, u_{ol-4+1\text{I}} + (-3449296128101760 \\ + 7396309499925120 \, \text{I}) \, u_{ol-3+1\text{I}} + (-25080693655841280 + 39205085557098240 \, \text{I}) \, u_{ol-2+1\text{I}} + (-9555899396552320 + 9555899396552320 \, \text{I}) \, u_{ol-1+1\text{I}} + (-162349790851968 + 17996672344704 \, \text{I}) \, u_{ol+1\text{I}} + (196205607957 - 1277110368795 \, \text{I}) \, u_{ol-4\text{I}} + (-40804031549312 + 71631660839296 \, \text{I}) \, u_{ol-3\text{I}} + (106221899846880 \\ - 379515454829100 \, \text{I}) \, u_{ol-2\text{I}} + (-17996672344704 + 162349790851968 \, \text{I}) \, u_{ol-1\text{I}} + (3680610374555 - 3680610374555 \, \text{I}) \, u_{ol\text{I}})), \, O(\, \mathcal{A}x_{ol}^{18} \, )$$

Formula.: 150, Var.: 1

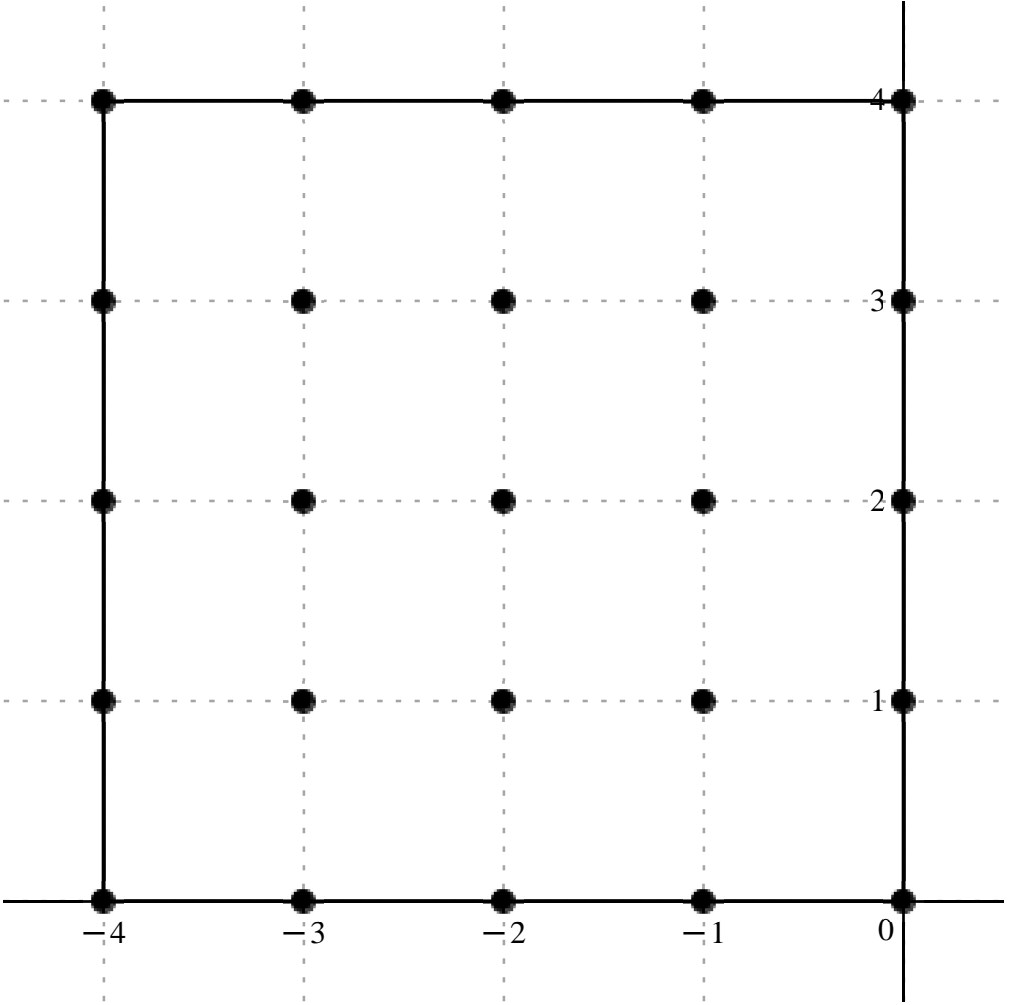
Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 8

Error order.: 17, Error.: 1.5188114045996694109 × 10<sup>−40</sup>, New Error.: 1.5290591266156950253 × 10<sup>−57</sup>

*Error order:*, 17, *Error:*,  $1.5290591266156950253 \times 10^{-57}$ , *New Error:*,  $1.5300462562927882536 \times 10^{-74}$   
*Error order:*, 17, *Error:*,  $1.5300462562927882536 \times 10^{-74}$ , *New Error:*,  $1.5301445861607190443 \times 10^{-91}$   
*Error order:*, 17, *Error:*,  $1.5301445861607190443 \times 10^{-91}$ , *New Error:*,  $1.5301544153097975087 \times 10^{-108}$   
*Error order:*, 17, *Error:*,  $1.5301544153097975087 \times 10^{-108}$ , *New Error:*,  $1.5301553981863214880 \times 10^{-125}$

$$x_o + h \cdot , \begin{bmatrix} -4 + 4 \text{ I} & -3 + 4 \text{ I} & -2 + 4 \text{ I} & -1 + 4 \text{ I} & 4 \text{ I} \\ -4 + 3 \text{ I} & -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -4 + 2 \text{ I} & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -4 + \text{I} & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c = , \left[ \begin{array}{cccccc} \frac{10603004112533}{13260000} & -\frac{3630553621534}{82875} + \frac{768267018652 \text{ I}}{82875} & \frac{37529907186807}{221000} + \frac{141413897457 \text{ I}}{3250} & -\frac{5468926550444}{138125} - \frac{1144915443238 \text{ I}}{31875} & \frac{12195416683093}{13260000} + \frac{3092738978 \text{ I}}{4875} & \\ -\frac{3630553621534}{82875} - \frac{768267018652 \text{ I}}{82875} & -\frac{8881380163852}{1625} & -\frac{44873081599374}{1625} - \frac{1312349852142 \text{ I}}{325} & -\frac{32089793166368}{4875} - \frac{10966019082676 \text{ I}}{4875} & -\frac{9467258520524}{138125} - \frac{2243299291842 \text{ I}}{138125} & \\ \frac{37529907186807}{221000} - \frac{141413897457 \text{ I}}{3250} & -\frac{44873081599374}{1625} + \frac{1312349852142 \text{ I}}{325} & \frac{160904808102717}{1000} & -\frac{4775878096794}{125} - \frac{12617796645846 \text{ I}}{1625} & \frac{64900262883519}{221000} + \frac{97105925889 \text{ I}}{650} & \\ -\frac{5468926550444}{138125} + \frac{1144915443238 \text{ I}}{31875} & -\frac{32089793166368}{4875} + \frac{10966019082676 \text{ I}}{4875} & -\frac{4775878096794}{125} + \frac{12617796645846 \text{ I}}{1625} & -\frac{53872314181756}{4875} & -\frac{43655001092962}{414375} - \frac{32029056989804 \text{ I}}{414375} & \\ \frac{12195416683093}{13260000} - \frac{3092738978 \text{ I}}{4875} & -\frac{9467258520524}{138125} + \frac{2243299291842 \text{ I}}{138125} & \frac{64900262883519}{221000} - \frac{97105925889 \text{ I}}{650} & -\frac{43655001092962}{414375} + \frac{32029056989804 \text{ I}}{414375} & \frac{683937714271}{176800} & \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_o) = \frac{1}{13260000 \, \Delta x_{ol}^8} \big( 7 \, (1514714873219 \, u_{ol-4+4\text{I}} + (-82984082777920 + 17560388997760 \, \text{I}) \, u_{ol-3+4\text{I}} + (321684918744060 + 82424100232080 \, \text{I}) \, u_{ol-2+4\text{I}} - (75002421263232 + 68040689198144 \, \text{I}) \, u_{ol-1+4\text{I}} + (1742202383299 + 1201750002880 \, \text{I}) \, u_{ol+4\text{I}} - (82984082777920 + 17560388997760 \, \text{I}) \, u_{ol-4+3\text{I}}$$

$$- 10353151733861760 \, u_{ol-3+3\text{I}} - (52309192264413120 + 7649124852484800 \, \text{I}) \, u_{ol-2+3\text{I}} - (12469176773217280 + 4261081700696960 \, \text{I}) \, u_{ol-1+3\text{I}} - (129836688281472 + 30765247430976 \, \text{I}) \, u_{ol+3\text{I}} + (321684918744060 - 82424100232080 \, \text{I}) \, u_{ol-4+2\text{I}} + (-52309192264413120 + 7649124852484800 \, \text{I}) \, u_{ol-3+2\text{I}}$$

$$+ 304799679348861060 \, u_{ol-2+2\text{I}} - (72375021215415360 + 14708745804300480 \, \text{I}) \, u_{ol-1+2\text{I}} + (556287967573020 + 282994412590800 \, \text{I}) \, u_{ol+2\text{I}} + (-75002421263232 + 68040689198144 \, \text{I}) \, u_{ol-4+1\text{I}} + (-12469176773217280 + 4261081700696960 \, \text{I}) \, u_{ol-3+1\text{I}} + (-72375021215415360 + 14708745804300480 \, \text{I}) \, u_{ol-2+1\text{I}}$$

$$- 20933242082053760 \, u_{ol-1+1\text{I}} - (199565719282112 + 146418546239104 \, \text{I}) \, u_{ol+1\text{I}} + (1742202383299 - 1201750002880 \, \text{I}) \, u_{ol-4\text{I}} + (-129836688281472 + 30765247430976 \, \text{I}) \, u_{ol-3\text{I}} + (556287967573020 - 282994412590800 \, \text{I}) \, u_{ol-2\text{I}} + (-199565719282112 + 146418546239104 \, \text{I}) \, u_{ol-1\text{I}} + 7327904081475 \, u_{ol\text{I}} \big) \big), \, O(\, \Delta x_{ol}^{17} \, )$$

Formula.: 151, Var.: 1

Variavel .:  $x_{oi}$ , Derivada de Ordem .: 9

Error order.: 16, Error.:  $1.0058053681619103959 \times 10^{-37}$ , New Error.:  $1.0288470564269732492 \times 10^{-53}$

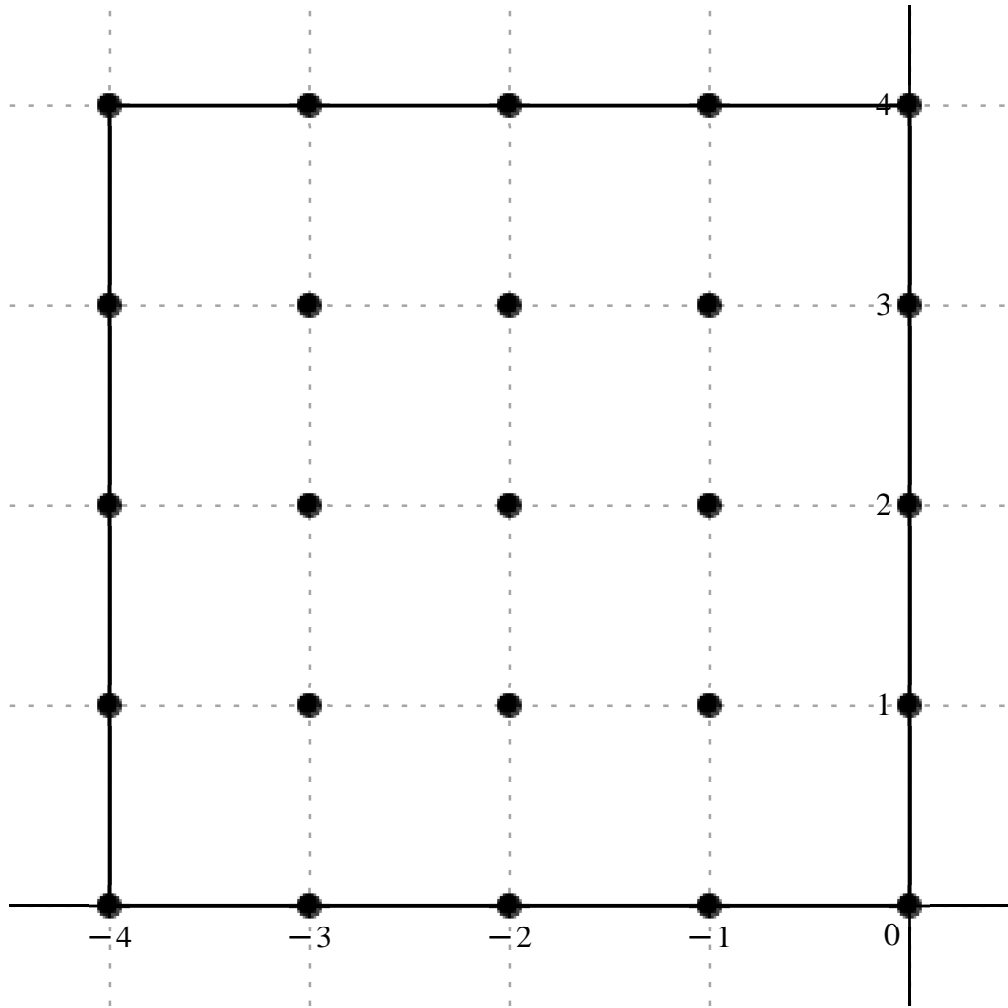
Error order.: 16, Error.:  $1.0288470564269732492 \times 10^{-53}$ , New Error.:  $1.0311596321701709357 \times 10^{-69}$

Error order.: 16, Error.:  $1.0311596321701709357 \times 10^{-69}$ , New Error.:  $1.0313909716983612044 \times 10^{-85}$

Error order.: 16, Error.:  $1.0313909716983612044 \times 10^{-85}$ , New Error.:  $1.0314141064685755850 \times 10^{-101}$

Error order.: 16, Error.:  $1.0314141064685755850 \times 10^{-101}$ , New Error.:  $1.0314164199537688305 \times 10^{-117}$

$$x_o + h . . \left[ \begin{array}{ccccc} -4 + 4 \text{ I} & -3 + 4 \text{ I} & -2 + 4 \text{ I} & -1 + 4 \text{ I} & 4 \text{ I} \\ -4 + 3 \text{ I} & -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -4 + 2 \text{ I} & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -4 + \text{I} & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$
$$c = , \left[ \begin{array}{ccccccccc} \frac{112203100527}{32500} + \frac{112203100527 \text{ I}}{32500} & -\frac{744271033443}{3250} - \frac{479271279291 \text{ I}}{3250} & \frac{897275968533}{1625} + \frac{5905482671151 \text{ I}}{6500} & -\frac{362930639001}{16250} - \frac{5250697917087 \text{ I}}{16250} & \frac{4639108467}{3250} + \frac{53906128521 \text{ I}}{8125} \\ -\frac{479271279291}{3250} - \frac{744271033443 \text{ I}}{3250} & -\frac{2921019871119}{125} - \frac{2921019871119 \text{ I}}{125} & -\frac{164569192619076}{1625} - \frac{217325917255419 \text{ I}}{1625} & -\frac{31019676366693}{1625} - \frac{60160971852051 \text{ I}}{1625} & -\frac{3809124960081}{16250} - \frac{5710731446343 \text{ I}}{16250} \\ \frac{5905482671151}{6500} + \frac{897275968533 \text{ I}}{1625} & -\frac{217325917255419}{1625} - \frac{164569192619076 \text{ I}}{1625} & \frac{84586823164746}{125} + \frac{84586823164746 \text{ I}}{125} & -\frac{210663294739821}{1625} - \frac{307766419667028 \text{ I}}{1625} & \frac{873953333001}{1300} + \frac{226490810364 \text{ I}}{125} \\ -\frac{5250697917087}{16250} - \frac{362930639001 \text{ I}}{16250} & -\frac{60160971852051}{1625} - \frac{31019676366693 \text{ I}}{1625} & -\frac{307766419667028}{1625} - \frac{210663294739821 \text{ I}}{1625} & -\frac{73077514438341}{1625} - \frac{73077514438341 \text{ I}}{1625} & -\frac{173250480669}{1250} - \frac{903746382693 \text{ I}}{1250} \\ \frac{53906128521}{8125} + \frac{4639108467 \text{ I}}{3250} & -\frac{5710731446343}{16250} - \frac{3809124960081 \text{ I}}{16250} & \frac{226490810364}{125} + \frac{873953333001 \text{ I}}{1300} & -\frac{903746382693}{1250} - \frac{173250480669 \text{ I}}{1250} & \frac{18863939199}{1300} + \frac{18863939199 \text{ I}}{1300} \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} u(x_{ol}) = \frac{1}{32500 \Delta x_{ol}^9} \left( 21 \left( (5343004787 + 5343004787 \, \mathrm{I}) u_{ol-4+4\mathrm{I}} - (354414777830 + 228224418710 \, \mathrm{I}) u_{ol-3+4\mathrm{I}} + (854548541460 + 1406067302655 \, \mathrm{I}) u_{ol-2+4\mathrm{I}} - (34564822762 + 500066468294 \, \mathrm{I}) u_{ol-1+4\mathrm{I}} + (2209099270 + 10267834004 \, \mathrm{I}) u_{ol+4\mathrm{I}} - (228224418710 + 354414777830 \, \mathrm{I}) u_{ol-4+3\mathrm{I}} - (36165007928140 + 36165007928140 \, \mathrm{I}) u_{ol-3+3\mathrm{I}} - (156732564399120 + 206977064052780 \, \mathrm{I}) u_{ol-2+3\mathrm{I}} - (29542548920660 + 57296163668620 \, \mathrm{I}) u_{ol-1+3\mathrm{I}} - (362773805722 + 543879185366 \, \mathrm{I}) u_{ol+3\mathrm{I}} + (1406067302655 + 854548541460 \, \mathrm{I}) u_{ol-4+2\mathrm{I}} - (206977064052780 + 156732564399120 \, \mathrm{I}) u_{ol-3+2\mathrm{I}} + (1047265429658760 + 1047265429658760 \, \mathrm{I}) u_{ol-2+2\mathrm{I}} - (200631709276020 + 293110875873360 \, \mathrm{I}) u_{ol-1+2\mathrm{I}} + (1040420634525 + 2804171937840 \, \mathrm{I}) u_{ol+2\mathrm{I}} - (500066468294 + 34564822762 \, \mathrm{I}) u_{ol-4+1\mathrm{I}} - (57296163668620 + 29542548920660 \, \mathrm{I}) u_{ol-3+1\mathrm{I}} - (293110875873360 + 200631709276020 \, \mathrm{I}) u_{ol-2+1\mathrm{I}} - (69597632798420 + 69597632798420 \, \mathrm{I}) u_{ol-1+1\mathrm{I}} - (214500595114 + 1118924092858 \, \mathrm{I}) u_{ol+1\mathrm{I}} + (10267834004 + 2209099270 \, \mathrm{I}) u_{ol-4\mathrm{I}} - (543879185366 + 362773805722 \, \mathrm{I}) u_{ol-3\mathrm{I}} + (2804171937840 + 1040420634525 \, \mathrm{I}) u_{ol-2\mathrm{I}} - (1118924092858 + 214500595114 \, \mathrm{I}) u_{ol-1\mathrm{I}} + (22457070475 + 22457070475 \, \mathrm{I}) u_{ol\mathrm{I}} \right), \quad O(\Delta x_{ol}^{16})$$

Formula:, 152, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

Error order:, 15, Error:,  $4.6873594766394681913 \times 10^{-35}$ , New Error:,  $4.7187387045218855180 \times 10^{-50}$

Error order:, 15, Error:,  $4.7187387045218855180 \times 10^{-50}$ , New Error:,  $4.7217620890753445481 \times 10^{-65}$

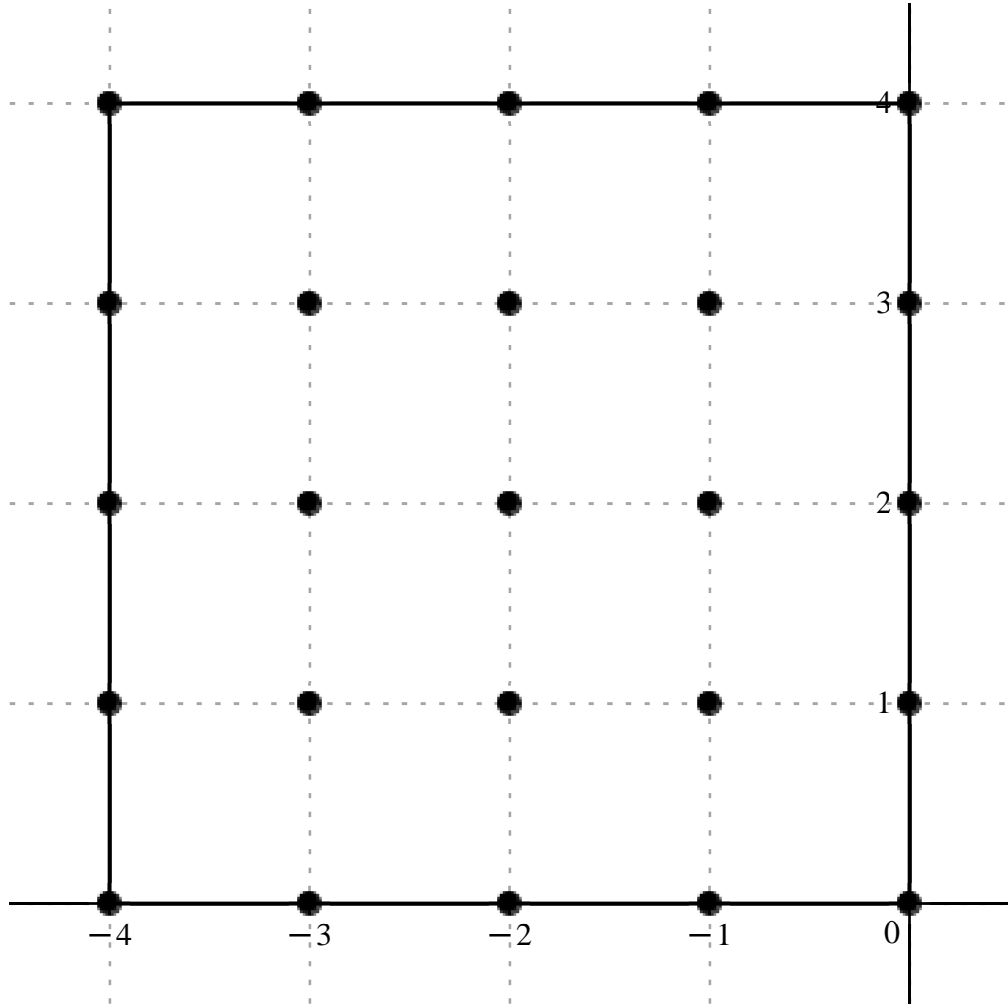
Error order:, 15, Error:,  $4.7217620890753445481 \times 10^{-65}$ , New Error:,  $4.7220632619624194091 \times 10^{-80}$

Error order:, 15, Error:,  $4.7220632619624194091 \times 10^{-80}$ , New Error:,  $4.7220933675751310400 \times 10^{-95}$

Error order:, 15, Error:,  $4.7220933675751310400 \times 10^{-95}$ , New Error:,  $4.7220963780196219186 \times 10^{-110}$

$$x_o \neq h \text{ , } \begin{bmatrix} -4+4\mathrm{I} & -3+4\mathrm{I} & -2+4\mathrm{I} & -1+4\mathrm{I} & 4\mathrm{I} \\ -4+3\mathrm{I} & -3+3\mathrm{I} & -2+3\mathrm{I} & -1+3\mathrm{I} & 3\mathrm{I} \\ -4+2\mathrm{I} & -3+2\mathrm{I} & -2+2\mathrm{I} & -1+2\mathrm{I} & 2\mathrm{I} \\ -4+\mathrm{I} & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c = \left[ \begin{array}{cccccc} \frac{44924422431 \text{ I}}{1625} & -\frac{108100091547}{325} - \frac{487414740939 \text{ I}}{325} & -\frac{875568381093}{650} + \frac{7569789083577 \text{ I}}{1300} & \frac{1892892278109}{1625} - \frac{2268884329677 \text{ I}}{1625} & -\frac{255973965891}{13000} + \frac{85041479061 \text{ I}}{2600} \\ \frac{108100091547}{325} - \frac{487414740939 \text{ I}}{325} & -\frac{60201018819102 \text{ I}}{325} & \frac{7827605321886}{65} - \frac{301203582319836 \text{ I}}{325} & \frac{21417266783388}{325} - \frac{71975829052134 \text{ I}}{325} & \frac{611614744419}{1625} - \frac{3760675466373 \text{ I}}{1625} \\ \frac{875568381093}{650} + \frac{7569789083577 \text{ I}}{1300} & -\frac{7827605321886}{65} - \frac{301203582319836 \text{ I}}{325} & \frac{131876879143779 \text{ I}}{25} & \frac{68946797958066}{325} - \frac{401046643728612 \text{ I}}{325} & -\frac{1300005785043}{325} + \frac{2521555722819 \text{ I}}{260} \\ -\frac{1892892278109}{1625} - \frac{2268884329677 \text{ I}}{1625} & -\frac{21417266783388}{325} - \frac{71975829052134 \text{ I}}{325} & -\frac{68946797958066}{325} - \frac{401046643728612 \text{ I}}{325} & -\frac{110394544229718 \text{ I}}{325} & \frac{3342448384191}{1625} - \frac{5293319430903 \text{ I}}{1625} \\ \frac{255973965891}{13000} + \frac{85041479061 \text{ I}}{2600} & -\frac{611614744419}{1625} - \frac{3760675466373 \text{ I}}{1625} & \frac{1300005785043}{325} + \frac{2521555722819 \text{ I}}{260} & -\frac{3342448384191}{1625} - \frac{5293319430903 \text{ I}}{1625} & \frac{26557160343 \text{ I}}{260} \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{13000\;\mathcal{A}x_{ol}^{10}}\left(21\left(17114065688\;\text{I}\,u_{ol-4+41}-(205904936280+928409030360\;\text{I})\,u_{ol-3+41}+(-833874648660+3604661468370\;\text{I})\,u_{ol-2+41}+(721101820232-864336887496\;\text{I})\,u_{ol-1+41}+(-12189236471+20247971205\;\text{I})\,u_{ol+41}+(205904936280-928409030360\;\text{I})\,u_{ol-4+31}-114668607274480\;\text{I}\,u_{ol-3+31}\right.\right.\\ \left.\left.+(74548622113200-573721109180640\;\text{I})\,u_{ol-2+31}+(40794793873120-137096817242160\;\text{I})\,u_{ol-1+31}+(232996093112-1432638272904\;\text{I})\,u_{ol+31}+(833874648660+3604661468370\;\text{I})\,u_{ol-4+21}-(74548622113200+573721109180640\;\text{I})\,u_{ol-3+21}+3265522721655480\;\text{I}\,u_{ol-2+21}+(131327234205840\right.\\ \left.-763898369006880\;\text{I})\,u_{ol-1+21}+(-2476201495320+6003704101950\;\text{I})\,u_{ol+21}-(721101820232+864336887496\;\text{I})\,u_{ol-4+1}-(40794793873120+137096817242160\;\text{I})\,u_{ol-3+1}-(131327234205840+763898369006880\;\text{I})\,u_{ol-2+1}-210275322342320\;\text{I}\,u_{ol-1+1}+(1273313670168-2016502640344\;\text{I})\,u_{ol+1}+(12189236471\right.\\ \left.+20247971205\;\text{I})\,u_{ol-4}-(232996093112+1432638272904\;\text{I})\,u_{ol-3}+(2476201495320+6003704101950\;\text{I})\,u_{ol-2}-(1273313670168+2016502640344\;\text{I})\,u_{ol-1}+63231334150\;\text{I}\,u_{ol}\right)\Big),\;O(\;\mathcal{A}x_{ol}^{15}\;)$$

Formula:, 153, Var.:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 1

Error order:., 24, Error:., 6.5124495658825148346 × 10<sup>−61</sup>, New Error:., 6.3665240621080123283 × 10<sup>−85</sup>

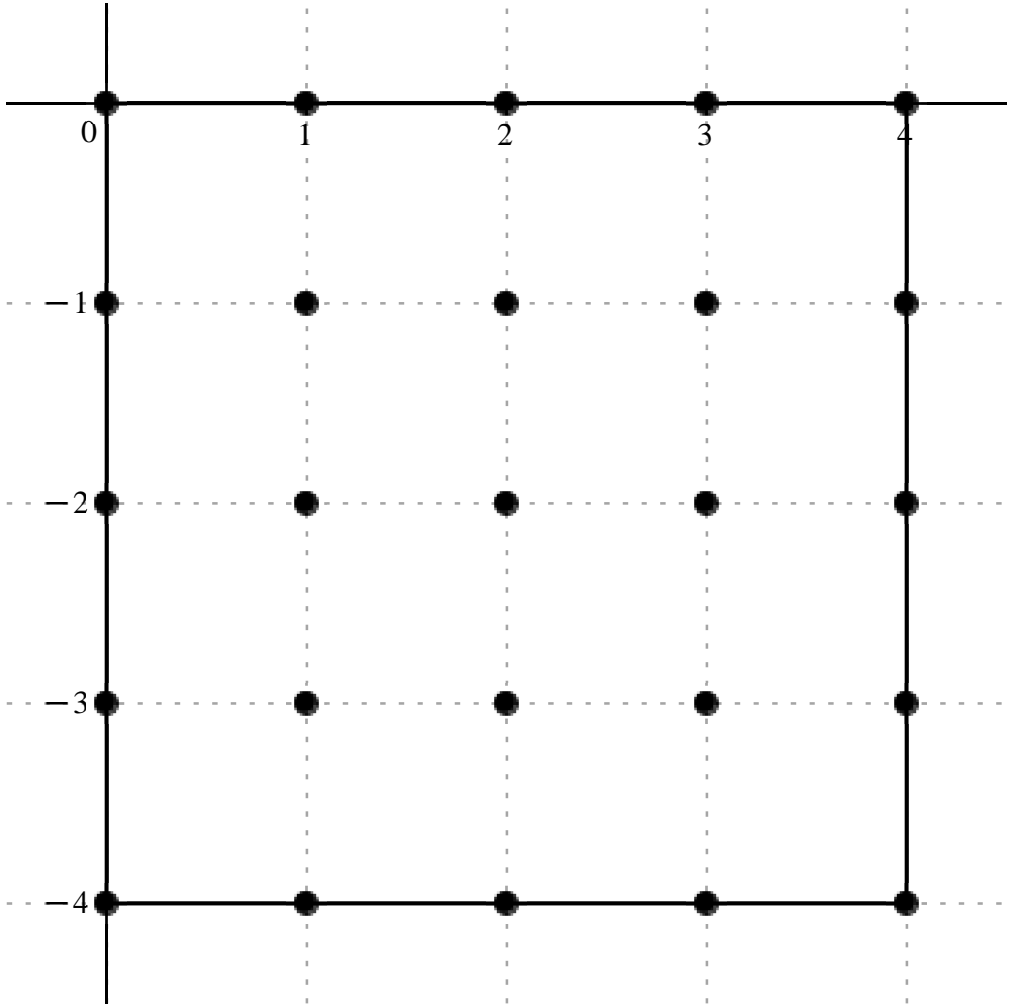
Error order:., 24, Error:., 6.3665240621080123283 × 10<sup>−85</sup>, New Error:., 6.3519822372598872338 × 10<sup>−109</sup>



*Error order:*, 24, *Error:*,  $6.3519822372598872338 \times 10^{-109}$ , *New Error:*,  $6.3505285762095128777 \times 10^{-133}$   
*Error order:*, 24, *Error:*,  $6.3505285762095128777 \times 10^{-133}$ , *New Error:*,  $6.3503832153328114253 \times 10^{-157}$   
*Error order:*, 24, *Error:*,  $6.3503832153328114253 \times 10^{-157}$ , *New Error:*,  $6.3503686792974386128 \times 10^{-181}$

$$x_o \neq h, \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & 4-\mathrm{I} \\ -2\mathrm{I} & 1-2\mathrm{I} & 2-2\mathrm{I} & 3-2\mathrm{I} & 4-2\mathrm{I} \\ -3\mathrm{I} & 1-3\mathrm{I} & 2-3\mathrm{I} & 3-3\mathrm{I} & 4-3\mathrm{I} \\ -4\mathrm{I} & 1-4\mathrm{I} & 2-4\mathrm{I} & 3-4\mathrm{I} & 4-4\mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccc} -\frac{237961}{44200} - \frac{237961\mathrm{I}}{44200} & 48-16\mathrm{I} & -90 & 16+\frac{16\mathrm{I}}{3} & -\frac{1}{4} \\ -16+48\mathrm{I} & 2720+2720\mathrm{I} & 9792+4896\mathrm{I} & 1632+544\mathrm{I} & \frac{208}{17} - \frac{16\mathrm{I}}{17} \\ -90\mathrm{I} & 4896+9792\mathrm{I} & -29835-29835\mathrm{I} & \frac{73440}{13} + \frac{48960\mathrm{I}}{13} & -36-18\mathrm{I} \\ \frac{16}{3} + 16\mathrm{I} & 544+1632\mathrm{I} & \frac{48960}{13} + \frac{73440\mathrm{I}}{13} & \frac{2720}{3} + \frac{2720\mathrm{I}}{3} & \frac{144}{25} + \frac{208\mathrm{I}}{25} \\ -\frac{\mathrm{I}}{4} & -\frac{16}{17} + \frac{208\mathrm{I}}{17} & -18-36\mathrm{I} & \frac{208}{25} + \frac{144\mathrm{I}}{25} & -\frac{1}{8} - \frac{\mathrm{I}}{8} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{1}{132600\, \Delta x_{ol}} \Big( -(713883+713883\,\mathrm{I})\, u_{ol} + (6364800-2121600\,\mathrm{I})\, u_{ol+1} - 11934000\, u_{ol+2} + (2121600+707200\,\mathrm{I})\, u_{ol+3} - 33150\, u_{ol+4} + (-2121600+6364800\,\mathrm{I})\, u_{ol-1} + (360672000+360672000\,\mathrm{I})\, u_{ol+1-1} + (1298419200+649209600\,\mathrm{I})\, u_{ol+2-1} + (216403200+72134400\,\mathrm{I})\, u_{ol+3-1} + (1622400-124800\,\mathrm{I})\, u_{ol+4-1} \\ - 11934000\,\mathrm{I}\, u_{ol-21} + (649209600+1298419200\,\mathrm{I})\, u_{ol+1-21} - (3956121000+3956121000\,\mathrm{I})\, u_{ol+2-21} + (749088000+499392000\,\mathrm{I})\, u_{ol+3-21} - (4773600+2386800\,\mathrm{I})\, u_{ol+4-21} + (707200+2121600\,\mathrm{I})\, u_{ol-31} + (72134400+216403200\,\mathrm{I})\, u_{ol+1-31} + (499392000+749088000\,\mathrm{I})\, u_{ol+2-31} + (120224000+120224000\,\mathrm{I})\, u_{ol+3-31} \\ + (763776+1103232\,\mathrm{I})\, u_{ol+4-31} - 33150\,\mathrm{I}\, u_{ol-41} + (-124800+1622400\,\mathrm{I})\, u_{ol+1-41} - (2386800+4773600\,\mathrm{I})\, u_{ol+2-41} + (1103232+763776\,\mathrm{I})\, u_{ol+3-41} - (16575+16575\,\mathrm{I})\, u_{ol+4-41} \Big),\, O(\, \Delta x_{ol}^{24}\, )$$

Formula:, 154, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 2

Error order:, 23, Error:,  $7.5632502021254215968 \times 10^{-58}$ , New Error:,  $7.5164725129477986064 \times 10^{-81}$

Error order:, 23, Error:,  $7.5164725129477986064 \times 10^{-81}$ , New Error:,  $7.5115970425821298518 \times 10^{-104}$

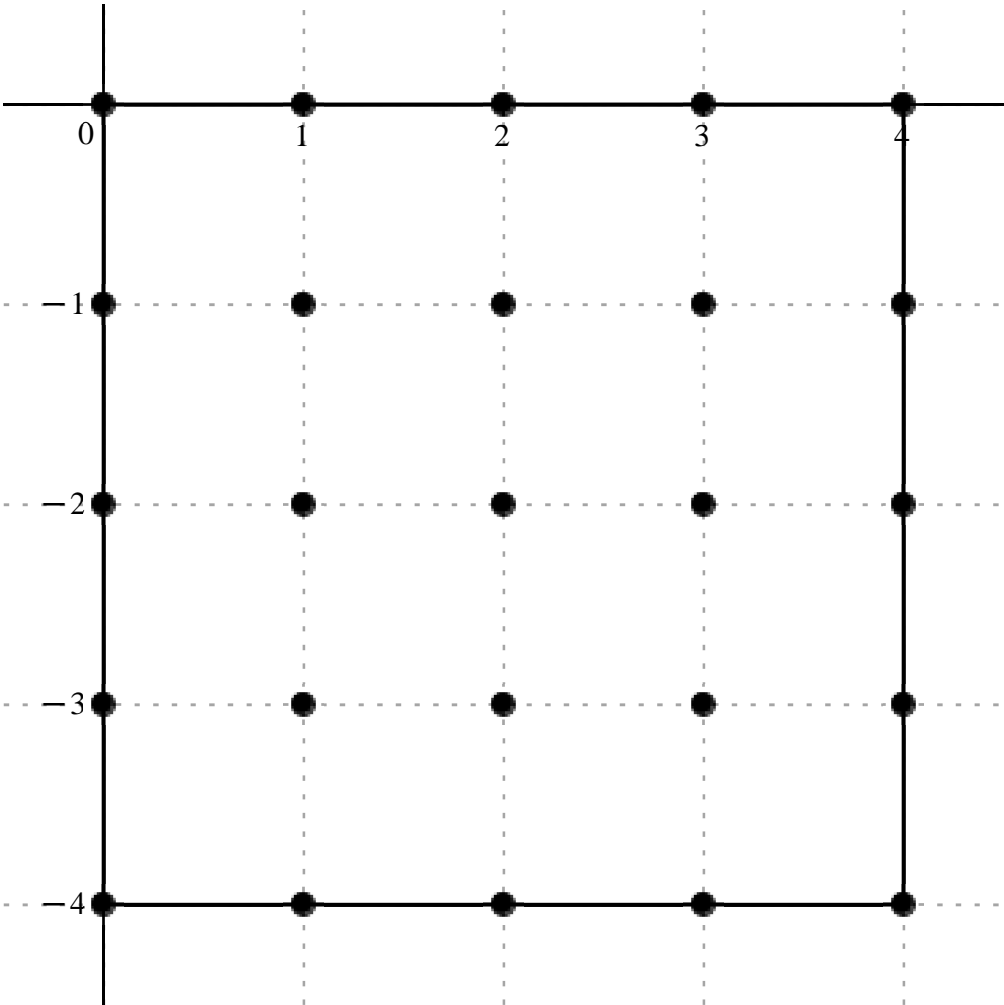
Error order:, 23, Error:,  $7.5115970425821298518 \times 10^{-104}$ , New Error:,  $7.5111075531446731305 \times 10^{-127}$

Error order:, 23, Error:,  $7.5111075531446731305 \times 10^{-127}$ , New Error:,  $7.5110585848113126958 \times 10^{-150}$

Error order:, 23, Error:,  $7.5110585848113126958 \times 10^{-150}$ , New Error:,  $7.5110536877841148769 \times 10^{-173}$

$$x_o + h., \begin{bmatrix} 0 & 1 & 2 & 3 & 4 \\ -I & 1-I & 2-I & 3-I & 4-I \\ -2I & 1-2I & 2-2I & 3-2I & 4-2I \\ -3I & 1-3I & 2-3I & 3-3I & 4-3I \\ -4I & 1-4I & 2-4I & 3-4I & 4-4I \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{112305269 I}{1989000} & -\frac{3276976}{5525} - \frac{2080488 I}{5525} & \frac{1942749}{2210} + \frac{2141649 I}{2210} & -\frac{1726888}{16575} - \frac{11245328 I}{49725} & \frac{226911}{88400} + \frac{237961 I}{88400} \\ \frac{3276976}{5525} - \frac{2080488 I}{5525} & -\frac{3453776 I}{65} & -\frac{15223752}{325} - \frac{48853656 I}{325} & -\frac{3524496}{325} - \frac{7402592 I}{325} & -\frac{751448}{5525} - \frac{666384 I}{5525} \\ -\frac{1942749}{2210} + \frac{2141649 I}{2210} & \frac{15223752}{325} - \frac{48853656 I}{325} & \frac{6126597 I}{10} & -\frac{1223784}{65} - \frac{1272744 I}{13} & \frac{2022309}{11050} + \frac{6265827 I}{11050} \\ \frac{1726888}{16575} - \frac{11245328 I}{49725} & \frac{3524496}{325} - \frac{7402592 I}{325} & \frac{1223784}{65} - \frac{1272744 I}{13} & -\frac{11068528 I}{585} & \frac{757232}{27625} - \frac{4076376 I}{27625} \\ -\frac{226911}{88400} + \frac{237961 I}{88400} & \frac{751448}{5525} - \frac{666384 I}{5525} & -\frac{2022309}{11050} + \frac{6265827 I}{11050} & -\frac{757232}{27625} - \frac{4076376 I}{27625} & \frac{58109 I}{22100} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2}u\big(x_{ol}\big)=\frac{1}{3978000\,\mathcal{A}x_{ol}^2}\Big(224610538\,\mathrm{I}\,u_{ol}-(2359422720+1497951360\,\mathrm{I})\,u_{ol+1}+(3496948200+3854968200\,\mathrm{I})\,u_{ol+2}-(414453120+899626240\,\mathrm{I})\,u_{ol+3}+(10210995+10708245\,\mathrm{I})\,u_{ol+4}+(2359422720-1497951360\,\mathrm{I})\,u_{ol-1}-211371091200\,\mathrm{I}\,u_{ol+1-1}-(186338724480+597968749440\,\mathrm{I})\,u_{ol+2-1}-(43139831040+90607726080\,\mathrm{I})\,u_{ol+3-1}-(541042560+479796480\,\mathrm{I})\,u_{ol+4-1}+(-3496948200+3854968200\,\mathrm{I})\,u_{ol-21}+(186338724480-597968749440\,\mathrm{I})\,u_{ol+1-21}+2437160286600\,\mathrm{I}\,u_{ol+2-21}-(74895580800+389459664000\,\mathrm{I})\,u_{ol+3-21}+(728031240+2255697720\,\mathrm{I})\,u_{ol+4-21}+(414453120-899626240\,\mathrm{I})\,u_{ol-31}+(43139831040-90607726080\,\mathrm{I})\,u_{ol+1-31}+(74895580800-389459664000\,\mathrm{I})\,u_{ol+2-31}-75265990400\,\mathrm{I}\,u_{ol+3-31}+(109041408-586998144\,\mathrm{I})\,u_{ol+4-31}+(-10210995+10708245\,\mathrm{I})\,u_{ol-41}+(541042560-479796480\,\mathrm{I})\,u_{ol+1-41}+(-728031240+2255697720\,\mathrm{I})\,u_{ol+2-41}-(109041408+586998144\,\mathrm{I})\,u_{ol+3-41}+10459620\,\mathrm{I}\,u_{ol+4-41}\Big),$$

$$O(\,\mathcal{A}x_{ol}^{23}\,)$$

Formula:, 155, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 3

Error order:, 22, Error:, 9.1159986103400957312 × 10<sup>−55</sup>, New Error:, 8.9124973457293828212 × 10<sup>−77</sup>

Error order:, 22, Error:, 8.9124973457293828212 × 10<sup>−77</sup>, New Error:, 8.8922177179714859914 × 10<sup>−99</sup>

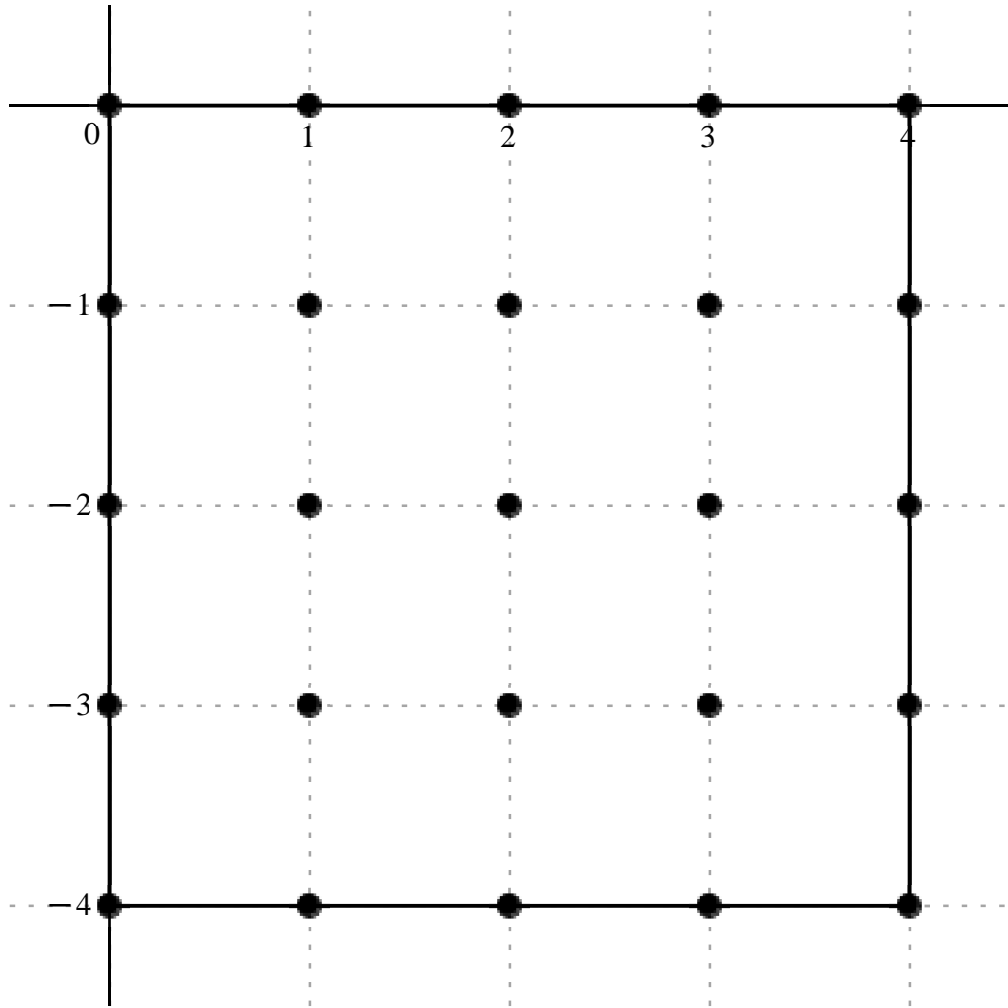
Error order:, 22, Error:, 8.8922177179714859914 × 10<sup>−99</sup>, New Error:, 8.8901904798218859558 × 10<sup>−121</sup>

Error order:, 22, Error:, 8.8901904798218859558 × 10<sup>−121</sup>, New Error:, 8.8899877632725680239 × 10<sup>−143</sup>

Error order:, 22, Error:, 8.8899877632725680239 × 10<sup>−143</sup>, New Error:, 8.8899674916903120059 × 10<sup>−165</sup>

$$x_o+h\, , \left[\begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & 4-\mathrm{I} \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & 3-2\,\mathrm{I} & 4-2\,\mathrm{I} \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & 2-3\,\mathrm{I} & 3-3\,\mathrm{I} & 4-3\,\mathrm{I} \\ -4\,\mathrm{I} & 1-4\,\mathrm{I} & 2-4\,\mathrm{I} & 3-4\,\mathrm{I} & 4-4\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} \frac{22773831179}{79560000}-\frac{22773831179\,\mathrm{I}}{79560000} & \frac{77146618}{82875}+\frac{193403218\,\mathrm{I}}{27625} & \frac{5828247}{4420}-\frac{76197768\,\mathrm{I}}{5525} & -\frac{250513858}{248625}+\frac{617604974\,\mathrm{I}}{248625} & \frac{680733}{353600}-\frac{213902293\,\mathrm{I}}{5304000} \\ -\frac{193403218}{27625}-\frac{77146618\,\mathrm{I}}{82875} & -\frac{371511116}{975}+\frac{371511116\,\mathrm{I}}{975} & -\frac{1292444772}{1625}+\frac{2356533264\,\mathrm{I}}{1625} & -\frac{463490108}{4875}+\frac{410622668\,\mathrm{I}}{1625} & \frac{7019834}{82875}+\frac{162716042\,\mathrm{I}}{82875} \\ \frac{76197768}{5525}-\frac{5828247\,\mathrm{I}}{4420} & -\frac{2356533264}{1625}+\frac{1292444772\,\mathrm{I}}{1625} & \frac{459424233}{100}-\frac{459424233\,\mathrm{I}}{100} & -\frac{196883472}{325}+\frac{286146828\,\mathrm{I}}{325} & \frac{16512609}{5525}-\frac{25206789\,\mathrm{I}}{4420} \\ -\frac{617604974}{248625}+\frac{250513858\,\mathrm{I}}{248625} & -\frac{410622668}{1625}+\frac{463490108\,\mathrm{I}}{4875} & -\frac{286146828}{325}+\frac{196883472\,\mathrm{I}}{325} & -\frac{421549756}{2925}+\frac{421549756\,\mathrm{I}}{2925} & -\frac{556522898}{414375}+\frac{9718926\,\mathrm{I}}{10625} \\ \frac{213902293}{5304000}-\frac{680733\,\mathrm{I}}{353600} & -\frac{162716042}{82875}-\frac{7019834\,\mathrm{I}}{82875} & \frac{25206789}{4420}-\frac{16512609\,\mathrm{I}}{5525} & -\frac{9718926}{10625}+\frac{556522898\,\mathrm{I}}{414375} & \frac{107075459}{5304000}-\frac{107075459\,\mathrm{I}}{5304000} \end{array}\right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{1}{79560000 \Delta x_{ol}^3} \big( (22773831179 - 22773831179 \, \mathrm{I}) \, u_{ol} + (74060753280 + 557001267840 \, \mathrm{I}) \, u_{ol+1} + (104908446000 - 1097247859200 \, \mathrm{I}) \, u_{ol+2} + (-80164434560 + 197633591680 \, \mathrm{I}) \, u_{ol+3} + (153164925 - 3208534395 \, \mathrm{I}) \, u_{ol+4} - (557001267840 + 74060753280 \, \mathrm{I}) \, u_{ol-1} + (-30315307065600 + 30315307065600 \, \mathrm{I}) \, u_{ol+1-1} \\ + (-63278096037120 + 115375868605440 \, \mathrm{I}) \, u_{ol+2-1} + (-7564158562560 + 20104085825280 \, \mathrm{I}) \, u_{ol+3-1} + (6739040640 + 156207400320 \, \mathrm{I}) \, u_{ol+4-1} + (1097247859200 - 104908446000 \, \mathrm{I}) \, u_{ol-21} + (-115375868605440 + 63278096037120 \, \mathrm{I}) \, u_{ol+1-21} + (365517919774800 - 365517919774800 \, \mathrm{I}) \, u_{ol+2-21} + (-48197073945600 \\ + 70048743494400 \, \mathrm{I}) \, u_{ol+3-21} + (237781569600 - 453722202000 \, \mathrm{I}) \, u_{ol+4-21} + (-197633591680 + 80164434560 \, \mathrm{I}) \, u_{ol-31} + (-20104085825280 + 7564158562560 \, \mathrm{I}) \, u_{ol+1-31} + (-70048743494400 + 48197073945600 \, \mathrm{I}) \, u_{ol+2-31} + (-11466153363200 + 11466153363200 \, \mathrm{I}) \, u_{ol+3-31} + (-106852396416 \\ + 72775317888 \, \mathrm{I}) \, u_{ol+4-31} + (3208534395 - 153164925 \, \mathrm{I}) \, u_{ol-41} - (156207400320 + 6739040640 \, \mathrm{I}) \, u_{ol+1-41} + (453722202000 - 237781569600 \, \mathrm{I}) \, u_{ol+2-41} + (-72775317888 + 106852396416 \, \mathrm{I}) \, u_{ol+3-41} + (1606131885 - 1606131885 \, \mathrm{I}) \, u_{ol+4-41} \big), \, O(\Delta x_{ol}^{22})$$

Formula:, 156, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 21, Error:,  $6.6465945757101536333 \times 10^{-52}$ , New Error:,  $6.6056450958563288216 \times 10^{-73}$

Error order:, 21, Error:,  $6.6056450958563288216 \times 10^{-73}$ , New Error:,  $6.6013777684079100906 \times 10^{-94}$

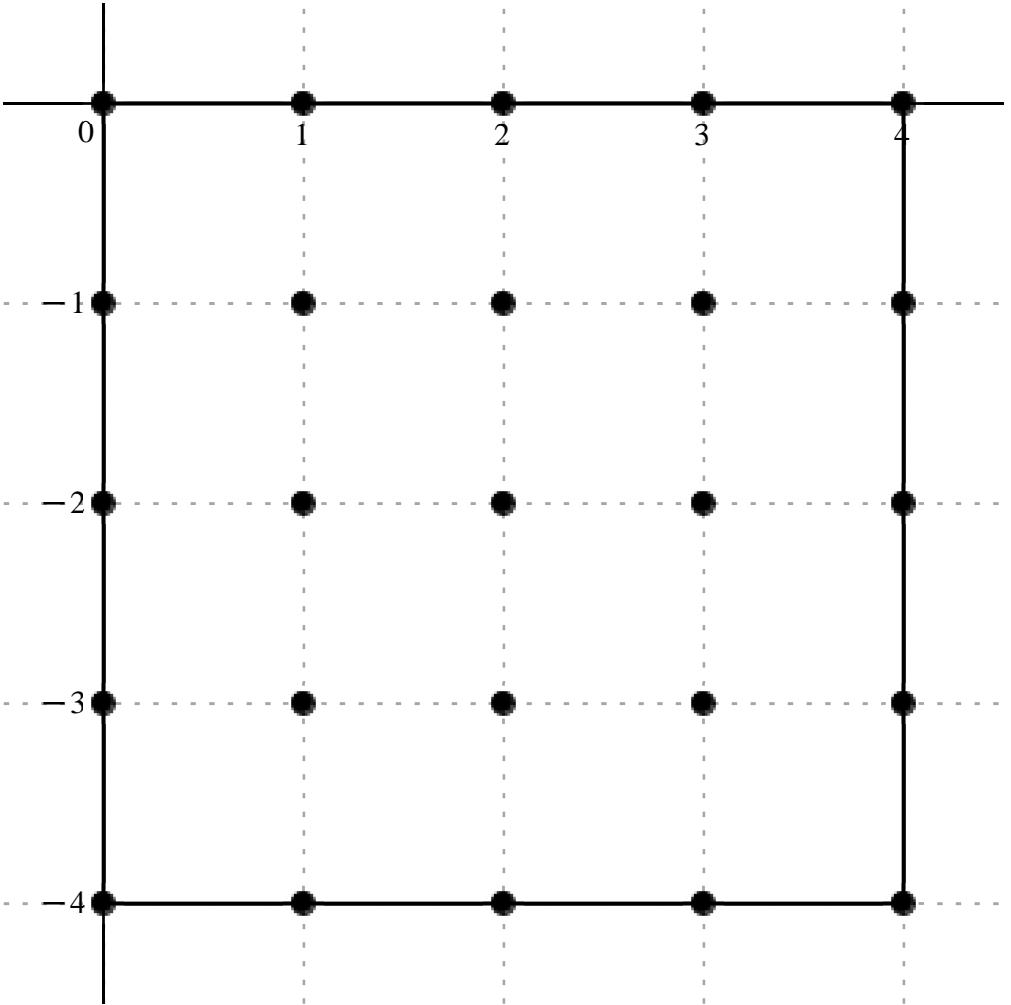
Error order:, 21, Error:,  $6.6013777684079100906 \times 10^{-94}$ , New Error:,  $6.6009493419458760853 \times 10^{-115}$

Error order:, 21, Error:,  $6.6009493419458760853 \times 10^{-115}$ , New Error:,  $6.6009064823923881134 \times 10^{-136}$

Error order:, 21, Error:,  $6.6009064823923881134 \times 10^{-136}$ , New Error:,  $6.6009021962679963388 \times 10^{-157}$

$$x_o \neq h \text{ , } \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & 4-\mathrm{I} \\ -2\mathrm{I} & 1-2\mathrm{I} & 2-2\mathrm{I} & 3-2\mathrm{I} & 4-2\mathrm{I} \\ -3\mathrm{I} & 1-3\mathrm{I} & 2-3\mathrm{I} & 3-3\mathrm{I} & 4-3\mathrm{I} \\ -4\mathrm{I} & 1-4\mathrm{I} & 2-4\mathrm{I} & 3-4\mathrm{I} & 4-4\mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{554759931179}{198900000} & \frac{50176459438}{1243125} - \frac{56282745476 \text{ I}}{1243125} & -\frac{22191006479}{221000} + \frac{16678009739 \text{ I}}{221000} & \frac{9565005284}{414375} - \frac{11065187626 \text{ I}}{1243125} & -\frac{11310333127}{39780000} + \frac{1222831049 \text{ I}}{4972500} \\ \frac{50176459438}{1243125} + \frac{56282745476 \text{ I}}{1243125} & \frac{68804657756}{14625} & \frac{116877295842}{8125} - \frac{31865175334 \text{ I}}{8125} & \frac{166456619464}{73125} - \frac{71702641292 \text{ I}}{73125} & \frac{5200152388}{414375} - \frac{16432976258 \text{ I}}{1243125} \\ -\frac{22191006479}{221000} - \frac{16678009739 \text{ I}}{221000} & \frac{116877295842}{8125} + \frac{31865175334 \text{ I}}{8125} & -\frac{59133008877}{1000} & \frac{629167478}{65} - \frac{2788783966 \text{ I}}{1625} & -\frac{63158797197}{1105000} + \frac{19053482099 \text{ I}}{1105000} \\ \frac{9565005284}{414375} + \frac{11065187626 \text{ I}}{1243125} & \frac{166456619464}{73125} + \frac{71702641292 \text{ I}}{73125} & \frac{629167478}{65} + \frac{2788783966 \text{ I}}{1625} & \frac{27554776532}{14625} & \frac{92133162946}{6215625} + \frac{17850865972 \text{ I}}{6215625} \\ -\frac{11310333127}{39780000} - \frac{1222831049 \text{ I}}{4972500} & \frac{5200152388}{414375} + \frac{16432976258 \text{ I}}{1243125} & -\frac{63158797197}{1105000} - \frac{19053482099 \text{ I}}{1105000} & \frac{92133162946}{6215625} - \frac{17850865972 \text{ I}}{6215625} & -\frac{622579391}{2340000} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{198900000 \, \Delta x_{ol}^4} \, \big( -554759931179 \, u_{ol} + (8028233510080 - 9005239276160 \, \text{I}) \, u_{ol+1} + (-19971905831100 + 15010208765100 \, \text{I}) \, u_{ol+2} + (4591202536320 - 1770430020160 \, \text{I}) \, u_{ol+3} + (-56551665635 + 48913241960 \, \text{I}) \, u_{ol+4} + (8028233510080 + 9005239276160 \, \text{I}) \, u_{ol-1} + 935743345481600 \, u_{ol+1-1} \\ + (2861156202212160 - 780059492176320 \, \text{I}) \, u_{ol+2-1} + (452762004942080 - 195031184314240 \, \text{I}) \, u_{ol+3-1} + (2496073146240 - 2629276201280 \, \text{I}) \, u_{ol+4-1} - (19971905831100 + 15010208765100 \, \text{I}) \, u_{ol-21} + (2861156202212160 + 780059492176320 \, \text{I}) \, u_{ol+1-21} - 11761555465635300 \, u_{ol+2-21} + (1925252482680000 \\ - 341347157438400 \, \text{I}) \, u_{ol+3-21} + (-11368583495460 + 3429626777820 \, \text{I}) \, u_{ol+4-21} + (4591202536320 + 1770430020160 \, \text{I}) \, u_{ol-31} + (452762004942080 + 195031184314240 \, \text{I}) \, u_{ol+1-31} + (1925252482680000 + 341347157438400 \, \text{I}) \, u_{ol+2-31} + 374744960835200 \, u_{ol+3-31} + (2948261214272 + 571227711104 \, \text{I}) \, u_{ol+4-31} \\ - (56551665635 + 48913241960 \, \text{I}) \, u_{ol-41} + (2496073146240 + 2629276201280 \, \text{I}) \, u_{ol+1-41} - (11368583495460 + 3429626777820 \, \text{I}) \, u_{ol+2-41} + (2948261214272 - 571227711104 \, \text{I}) \, u_{ol+3-41} - 52919248235 \, u_{ol+4-41} \big), \, O( \, \Delta x_{ol}^{21} \, )$$

Formula:, 157, Var.:, 1

Variavel .:, x<sub>ol</sub> , Derivada de Ordem .:, 5

Error order:., 20, Error:., 6.2019021339253236241 × 10<sup>-49</sup>, New Error:., 6.0640517500763747769 × 10<sup>-69</sup>

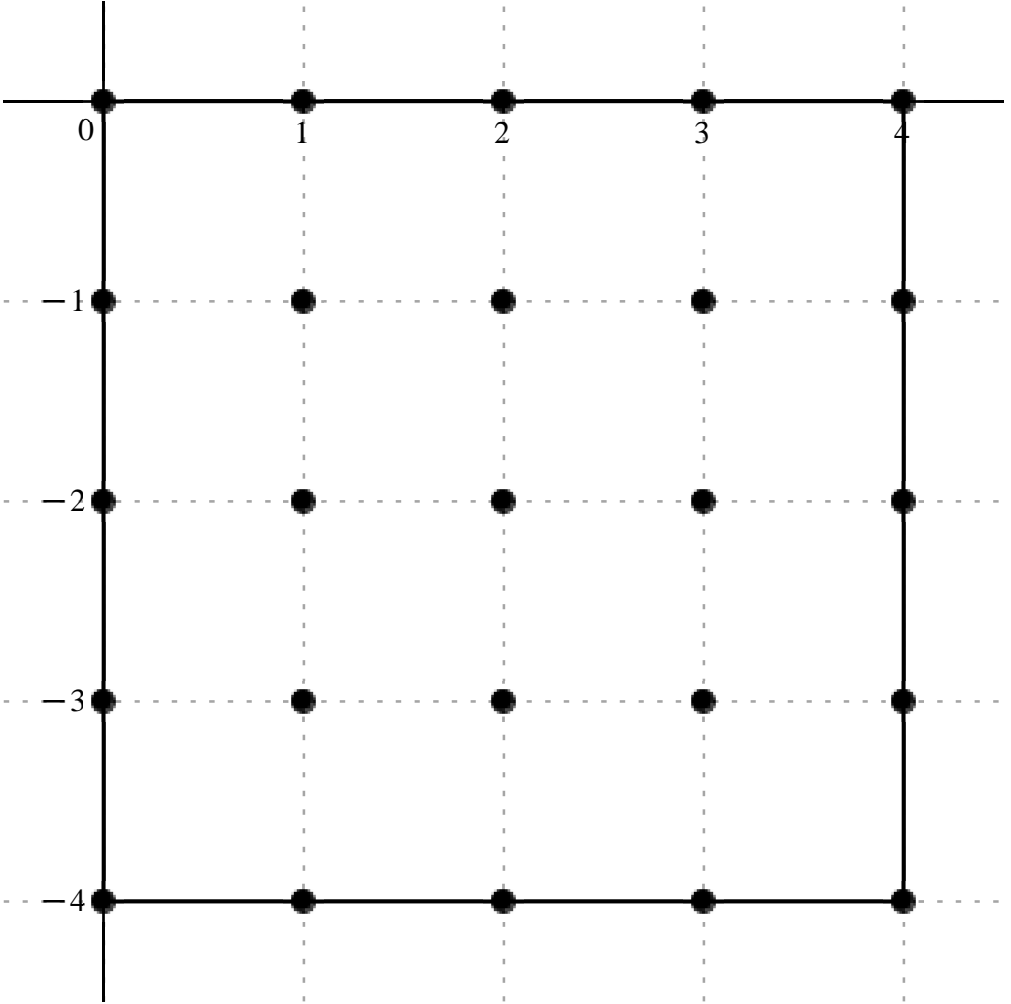
Error order:., 20, Error:., 6.0640517500763747769 × 10<sup>-69</sup>, New Error:., 6.0503142803023214965 × 10<sup>-89</sup>

*Error order:*, 20, *Error:*, 6.0503142803023214965 × 10<sup>−89</sup>, *New Error:*, 6.0489410222110203408 × 10<sup>−109</sup>  
*Error order:*, 20, *Error:*, 6.0489410222110203408 × 10<sup>−109</sup>, *New Error:*, 6.0488037013037777840 × 10<sup>−129</sup>  
*Error order:*, 20, *Error:*, 6.0488037013037777840 × 10<sup>−129</sup>, *New Error:*, 6.0487899692620854132 × 10<sup>−149</sup>

$$x_o \neq h.$$

$$\begin{bmatrix} 0 & 1 & 2 & 3 & 4 \\ -\mathbf{I} & 1-\mathbf{I} & 2-\mathbf{I} & 3-\mathbf{I} & 4-\mathbf{I} \\ -2\mathbf{I} & 1-2\mathbf{I} & 2-2\mathbf{I} & 3-2\mathbf{I} & 4-2\mathbf{I} \\ -3\mathbf{I} & 1-3\mathbf{I} & 2-3\mathbf{I} & 3-3\mathbf{I} & 4-3\mathbf{I} \\ -4\mathbf{I} & 1-4\mathbf{I} & 2-4\mathbf{I} & 3-4\mathbf{I} & 4-4\mathbf{I} \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{574403647}{44200} + \frac{574403647\mathbf{I}}{44200} & -\frac{89424246089}{191250} - \frac{68953193\mathbf{I}}{21250} & \frac{2133677398}{2125} + \frac{16678009739\mathbf{I}}{88400} & -\frac{153036626113}{828750} - \frac{24644881757\mathbf{I}}{276250} & \frac{20758677731}{6630000} + \frac{1222831049\mathbf{I}}{3978000} \\ -\frac{68953193}{21250} - \frac{89424246089\mathbf{I}}{191250} & -\frac{42527587421}{1625} - \frac{42527587421\mathbf{I}}{1625} & -\frac{168780019068}{1625} - \frac{100322597201\mathbf{I}}{1625} & -\frac{275748708739}{14625} - \frac{38605705559\mathbf{I}}{4875} & -\frac{125951589337}{828750} + \frac{349316683\mathbf{I}}{276250} \\ \frac{16678009739}{88400} + \frac{2133677398\mathbf{I}}{2125} & -\frac{100322597201}{1625} - \frac{168780019068\mathbf{I}}{1625} & \frac{42769210911}{125} + \frac{42769210911\mathbf{I}}{125} & -\frac{107727242279}{1625} - \frac{76466134796\mathbf{I}}{1625} & \frac{192829757173}{442000} + \frac{26485404909\mathbf{I}}{110500} \\ -\frac{24644881757}{276250} - \frac{153036626113\mathbf{I}}{828750} & -\frac{38605705559}{4875} - \frac{275748708739\mathbf{I}}{14625} & -\frac{76466134796}{1625} - \frac{107727242279\mathbf{I}}{1625} & -\frac{4152760597}{375} - \frac{4152760597\mathbf{I}}{375} & -\frac{34903034183}{497250} - \frac{17376728533\mathbf{I}}{165750} \\ \frac{1222831049}{3978000} + \frac{20758677731\mathbf{I}}{6630000} & \frac{349316683}{276250} - \frac{125951589337\mathbf{I}}{828750} & \frac{26485404909}{110500} + \frac{192829757173\mathbf{I}}{442000} & -\frac{17376728533}{165750} - \frac{34903034183\mathbf{I}}{497250} & \frac{2613753557}{1657500} + \frac{2613753557\mathbf{I}}{1657500} \end{bmatrix}$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_o l^5} \, u(x_o l) = \frac{1}{19890000 \, \Delta x_o l^5} \, \big( (258481641150 + 258481641150 \, \mathbf{I}) \, u_{o l} - (9300121593256 + 64540188648 \, \mathbf{I}) \, u_{o l + 1} + (19971220445280 + 3752552191275 \, \mathbf{I}) \, u_{o l + 2} - (3672879026712 + 1774431486504 \, \mathbf{I}) \, u_{o l + 3} + (62276033193 + 6114155245 \, \mathbf{I}) \, u_{o l + 4} - (64540188648 + 9300121593256 \, \mathbf{I}) \, u_{o l - 1} - (520537670033040$$

$$+ 520537670033040 \, \mathbf{I}) \, u_{o l + 1 - 1} - (2065867433392320 + 1227948589740240 \, \mathbf{I}) \, u_{o l + 2 - 1} - (375018243885040 + 157511278680720 \, \mathbf{I}) \, u_{o l + 3 - 1} + (-3022838144088 + 25150801176 \, \mathbf{I}) \, u_{o l + 4 - 1} + (3752552191275 + 19971220445280 \, \mathbf{I}) \, u_{o l - 21} - (1227948589740240 + 2065867433392320 \, \mathbf{I}) \, u_{o l + 1 - 21} + (6805436840158320$$

$$+ 6805436840158320 \, \mathbf{I}) \, u_{o l + 2 - 21} - (1318581445494960 + 935945489903040 \, \mathbf{I}) \, u_{o l + 3 - 21} + (8677339072785 + 4767372883620 \, \mathbf{I}) \, u_{o l + 4 - 21} - (1774431486504 + 3672879026712 \, \mathbf{I}) \, u_{o l - 31} - (157511278680720 + 375018243885040 \, \mathbf{I}) \, u_{o l + 1 - 31} - (935945489903040 + 1318581445494960 \, \mathbf{I}) \, u_{o l + 2 - 31} - (220262422064880$$

$$+ 220262422064880 \, \mathbf{I}) \, u_{o l + 3 - 31} - (1396121367320 + 2085207423960 \, \mathbf{I}) \, u_{o l + 4 - 31} + (6114155245 + 62276033193 \, \mathbf{I}) \, u_{o l - 41} + (25150801176 - 3022838144088 \, \mathbf{I}) \, u_{o l + 1 - 41} + (4767372883620 + 8677339072785 \, \mathbf{I}) \, u_{o l + 2 - 41} - (2085207423960 + 1396121367320 \, \mathbf{I}) \, u_{o l + 3 - 41} + (31365042684 + 31365042684 \, \mathbf{I}) \, u_{o l + 4 - 41} \big), \, O( \, \Delta x_o l^{20} \, )$$

Formula:, 158, Var.: 1

Variavel :,  $x_o$ , Derivada de Ordem :, 6

Error order:, 19, Error:,  $3.7406302398409752684 \times 10^{-46}$ , New Error:,  $3.7176903785082558457 \times 10^{-65}$

Error order:, 19, Error:,  $3.7176903785082558457 \times 10^{-65}$ , New Error:,  $3.7153002795685835538 \times 10^{-84}$

Error order:, 19, Error:,  $3.7153002795685835538 \times 10^{-84}$ , New Error:,  $3.7150603252497946171 \times 10^{-103}$

Error order:, 19, Error:,  $3.7150603252497946171 \times 10^{-103}$ , New Error:,  $3.7150363203902655745 \times 10^{-122}$

Error order:, 19, Error:,  $3.7150363203902655745 \times 10^{-122}$ , New Error:,  $3.7150339198100527563 \times 10^{-141}$

$$x_o + h.$$

0

1

2

3

4

$-I$

$1-I$

$2-I$

$3-I$

$4-I$

$-2\ I$

$1-2\ I$

$2-2\ I$

$3-2\ I$

$4-2\ I$

$-3\ I$

$1-3\ I$

$2-3\ I$

$3-3\ I$

$4-3\ I$

$-4\ I$

$1-4\ I$

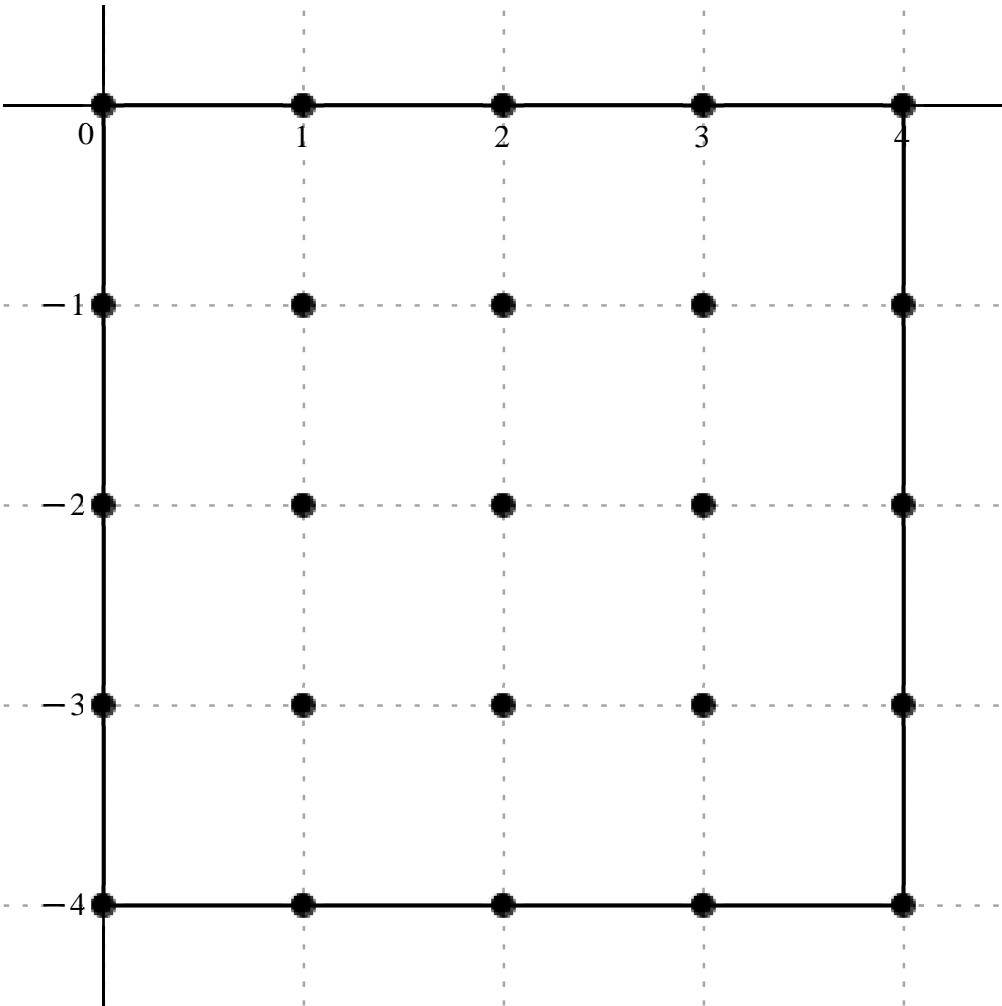
$2-4\ I$

$3-4\ I$

$4-4\ I$

$c = ,$ 

$$\begin{aligned} &-\frac{15294778547\ I}{132600} & \frac{905337930043}{414375} + \frac{341953013673\ I}{138125} & -\frac{221295624681}{55250} - \frac{570321909543\ I}{88400} & \frac{191605562087}{414375} + \frac{205116577043\ I}{138125} & -\frac{65401869319}{4420000} - \frac{50473497181\ I}{2652000} \\ &-\frac{905337930043}{414375} + \frac{341953013673\ I}{138125} & \frac{434118851874\ I}{1625} & \frac{335671009638}{1625} + \frac{1417757560116\ I}{1625} & \frac{90428274644}{1625} + \frac{702501239926\ I}{4875} & \frac{112214177059}{138125} + \frac{114476078827\ I}{138125} \\ &\frac{221295624681}{55250} - \frac{570321909543\ I}{88400} & -\frac{335671009638}{1625} + \frac{1417757560116\ I}{1625} & -\frac{906552119709\ I}{250} & \frac{2461873314}{25} + \frac{987675471948\ I}{1625} & -\frac{17404815459}{17000} - \frac{1618240018413\ I}{442000} \\ &-\frac{191605562087}{414375} + \frac{205116577043\ I}{138125} & -\frac{90428274644}{1625} + \frac{702501239926\ I}{4875} & -\frac{2461873314}{25} + \frac{987675471948\ I}{1625} & \frac{581312600878\ I}{4875} & -\frac{15871688231}{82875} + \frac{26152114629\ I}{27625} \\ &\frac{65401869319}{4420000} - \frac{50473497181\ I}{2652000} & -\frac{112214177059}{138125} + \frac{114476078827\ I}{138125} & \frac{17404815459}{17000} - \frac{1618240018413\ I}{442000} & \frac{15871688231}{82875} + \frac{26152114629\ I}{27625} & -\frac{37852766411\ I}{2210000} \end{aligned}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6}u\big(x_{ol}\big)=\frac{1}{13260000\,\mathcal{A}x_{ol}^6}\big(-1529477854700\,\mathrm{I}\,u_{ol}+(28970813761376+32827489312608\,\mathrm{I})\,u_{ol+1}-(53110949923440+85548286431450\,\mathrm{I})\,u_{ol+2}+(6131377986784+19691191396128\,\mathrm{I})\,u_{ol+3}-(196205607957+252367485905\,\mathrm{I})\,u_{ol+4}+( -28970813761376+32827489312608\,\mathrm{I})\,u_{ol-1}+3542409831291840\,\mathrm{I}\,u_{ol+1-\mathrm{I}}$$

$$+(2739075438646080+11568901690546560\,\mathrm{I})\,u_{ol+2-\mathrm{I}}+(737894721095040+1910803372598720\,\mathrm{I})\,u_{ol+3-\mathrm{I}}+(10772560997664+10989703567392\,\mathrm{I})\,u_{ol+4-\mathrm{I}}+(53110949923440-85548286431450\,\mathrm{I})\,u_{ol-2\mathrm{I}}+( -2739075438646080+11568901690546560\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}-48083524429365360\,\mathrm{I}\,u_{ol+2-2\mathrm{I}}+(1305777605745600$$

$$+8059431851095680\,\mathrm{I})\,u_{ol+3-2\mathrm{I}}-(13575756058020+48547200552390\,\mathrm{I})\,u_{ol+4-2\mathrm{I}}+( -6131377986784+19691191396128\,\mathrm{I})\,u_{ol-3\mathrm{I}}+( -737894721095040+1910803372598720\,\mathrm{I})\,u_{ol+1-3\mathrm{I}}+( -1305777605745600+8059431851095680\,\mathrm{I})\,u_{ol+2-3\mathrm{I}}+1581170274388160\,\mathrm{I}\,u_{ol+3-3\mathrm{I}}+( -2539470116960$$

$$+12553015021920\,\mathrm{I})\,u_{ol+4-3\mathrm{I}}+(196205607957-252367485905\,\mathrm{I})\,u_{ol-4\mathrm{I}}+( -10772560997664+10989703567392\,\mathrm{I})\,u_{ol+1-4\mathrm{I}}+(13575756058020-48547200552390\,\mathrm{I})\,u_{ol+2-4\mathrm{I}}+(2539470116960+12553015021920\,\mathrm{I})\,u_{ol+3-4\mathrm{I}}-227116598466\,\mathrm{I}\,u_{ol+4-4\mathrm{I}}\big),\,O(\,\mathcal{A}x_{ol}^{19}\,)$$

Formula: 159, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 7

Error order.: 18, Error.:  $2.9671490250564902991\times10^{-43}$ , New Error.:  $2.9015434391566104498\times10^{-61}$

Error order.: 18, Error.:  $2.9015434391566104498\times10^{-61}$ , New Error.:  $2.8950054129109934031\times10^{-79}$

Error order.: 18, Error.:  $2.8950054129109934031\times10^{-79}$ , New Error.:  $2.8943518418335510923\times10^{-97}$

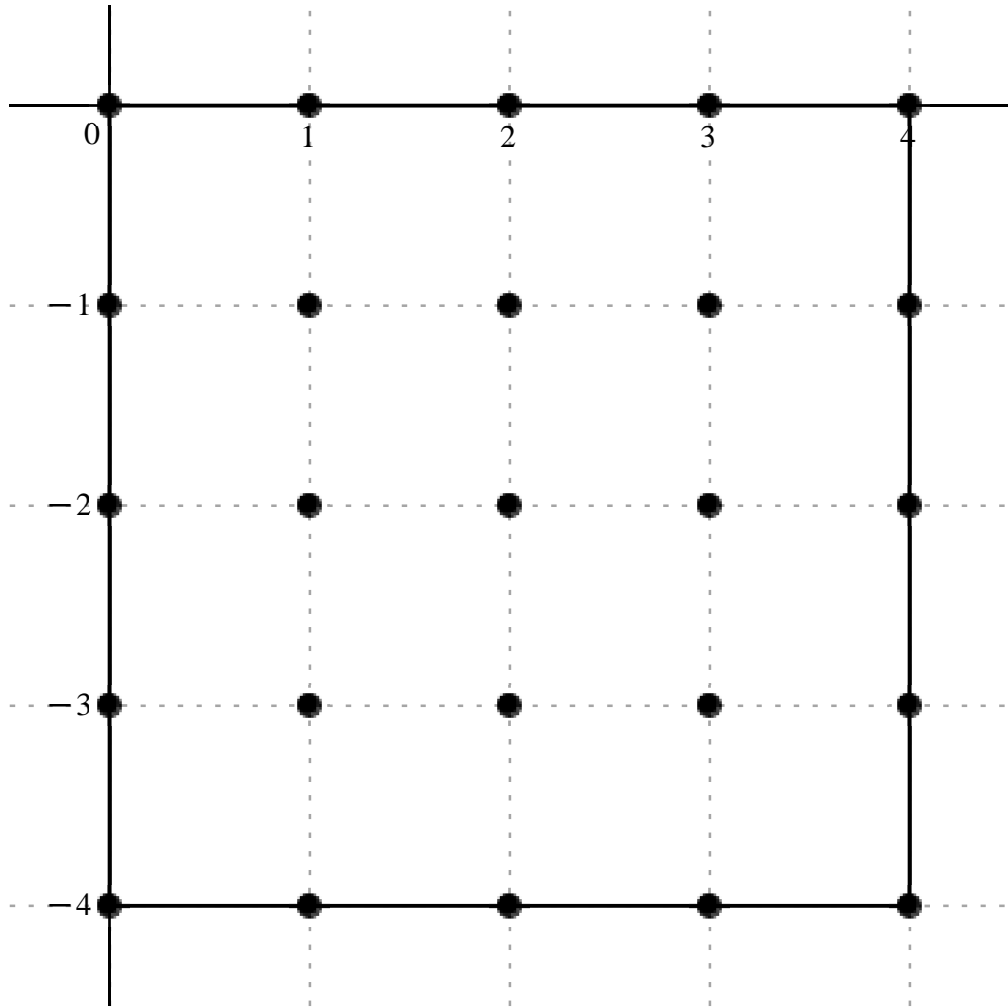
Error order.: 18, Error.:  $2.8943518418335510923\times10^{-97}$ , New Error.:  $2.8942864870474202655\times10^{-115}$

Error order.: 18, Error.:  $2.8942864870474202655\times10^{-115}$ , New Error.:  $2.8942799515920294510\times10^{-133}$

$$x_o\neq h\, ,\, \left[\begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & 4-\mathrm{I} \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & 3-2\,\mathrm{I} & 4-2\,\mathrm{I} \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & 2-3\,\mathrm{I} & 3-3\,\mathrm{I} & 4-3\,\mathrm{I} \\ -4\,\mathrm{I} & 1-4\,\mathrm{I} & 2-4\,\mathrm{I} & 3-4\,\mathrm{I} & 4-4\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} -\frac{5152854524377}{10608000}+\frac{5152854524377\,\mathrm{I}}{10608000} & \frac{328064339617}{138125}-\frac{2959501395739\,\mathrm{I}}{138125} & -\frac{1549069372767}{110500}+\frac{8855360612679\,\mathrm{I}}{176800} & \frac{2231470475353}{414375}-\frac{3917356452149\,\mathrm{I}}{414375} & -\frac{457813085233}{17680000}+\frac{595984838771\,\mathrm{I}}{3536000} \\ \frac{2959501395739}{138125}-\frac{328064339617\,\mathrm{I}}{138125} & \frac{6148097038223}{4875}-\frac{6148097038223\,\mathrm{I}}{4875} & \frac{5378825232564}{1625}-\frac{646765645974\,\mathrm{I}}{125} & \frac{739738752963}{1625}-\frac{1586218336381\,\mathrm{I}}{1625} & \frac{98165925067}{414375}-\frac{3389338473479\,\mathrm{I}}{414375} \\ -\frac{8855360612679}{176800}+\frac{1549069372767\,\mathrm{I}}{110500} & \frac{646765645974}{125}-\frac{5378825232564\,\mathrm{I}}{1625} & -\frac{8871705686781}{500}+\frac{8871705686781\,\mathrm{I}}{500} & \frac{4136236181826}{1625}-\frac{5644278093804\,\mathrm{I}}{1625} & -\frac{911472963009}{68000}+\frac{197409813699\,\mathrm{I}}{8500} \\ \frac{3917356452149}{414375}-\frac{2231470475353\,\mathrm{I}}{414375} & \frac{1586218336381}{1625}-\frac{739738752963\,\mathrm{I}}{1625} & \frac{5644278093804}{1625}-\frac{4136236181826\,\mathrm{I}}{1625} & \frac{2890583626609}{4875}-\frac{2890583626609\,\mathrm{I}}{4875} & \frac{157683439809}{27625}-\frac{20725968823\,\mathrm{I}}{5525} \\ -\frac{595984838771}{3536000}+\frac{457813085233\,\mathrm{I}}{17680000} & \frac{3389338473479}{414375}-\frac{98165925067\,\mathrm{I}}{414375} & -\frac{197409813699}{8500}+\frac{911472963009\,\mathrm{I}}{68000} & \frac{20725968823}{5525}-\frac{157683439809\,\mathrm{I}}{27625} & -\frac{4558264396819}{53040000}+\frac{4558264396819\,\mathrm{I}}{53040000} \end{array}\right]$$





$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}{}^7} \, u(x_{ol}) = \frac{1}{53040000 \, \mathcal{A}x_{ol}{}^7} \, \big( \, ( \, (-3680610374555 + 3680610374555 \, \mathrm{I}) \, u_{ol} + (17996672344704 - 162349790851968 \, \mathrm{I}) \, u_{ol+1} + ( -106221899846880 + 379515454829100 \, \mathrm{I}) \, u_{ol+2} + (40804031549312 - 71631660839296 \, \mathrm{I}) \, u_{ol+3} + ( -196205607957 + 1277110368795 \, \mathrm{I}) \, u_{ol+4} + (162349790851968 - 17996672344704 \, \mathrm{I}) \, u_{ol-1} \\ + (9555899396552320 - 9555899396552320 \, \mathrm{I}) \, u_{ol+1-1} + (25080693655841280 - 39205085557098240 \, \mathrm{I}) \, u_{ol+2-1} + (3449296128101760 - 7396309499925120 \, \mathrm{I}) \, u_{ol+3-1} + (1795034058368 - 61976474943616 \, \mathrm{I}) \, u_{ol+4-1} + ( -379515454829100 + 106221899846880 \, \mathrm{I}) \, u_{ol-21} + (39205085557098240 \\ - 25080693655841280 \, \mathrm{I}) \, u_{ol+1-21} + ( -134444362750532640 + 134444362750532640 \, \mathrm{I}) \, u_{ol+2-21} + (19286678424971520 - 26318462425966080 \, \mathrm{I}) \, u_{ol+3-21} + ( -101564130163860 + 175976748211680 \, \mathrm{I}) \, u_{ol+4-21} + (71631660839296 - 40804031549312 \, \mathrm{I}) \, u_{ol-31} + (7396309499925120 - 3449296128101760 \, \mathrm{I}) \, u_{ol+1-31} \\ + (26318462425966080 - 19286678424971520 \, \mathrm{I}) \, u_{ol+2-31} + (4492792836786560 - 4492792836786560 \, \mathrm{I}) \, u_{ol+3-31} + (43250314919040 - 28424185814400 \, \mathrm{I}) \, u_{ol+4-31} + ( -1277110368795 + 196205607957 \, \mathrm{I}) \, u_{ol-41} + (61976474943616 - 1795034058368 \, \mathrm{I}) \, u_{ol+1-41} + ( -175976748211680 + 101564130163860 \, \mathrm{I}) \, u_{ol+2-41} \\ + (28424185814400 - 43250314919040 \, \mathrm{I}) \, u_{ol+3-41} + ( -651180628117 + 651180628117 \, \mathrm{I}) \, u_{ol+4-41} \big) \big) , \, O( \, \mathcal{A}x_{ol}{}^{18} \, )$$

Formula.: 160, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 8

Error order.: 17, Error.: 1.5406379074933535584 × 10<sup>−40</sup>, New Error.: 1.5312432720885898871 × 10<sup>−57</sup>

Error order.: 17, Error.: 1.5312432720885898871 × 10<sup>−57</sup>, New Error.: 1.5302646723352476748 × 10<sup>−74</sup>

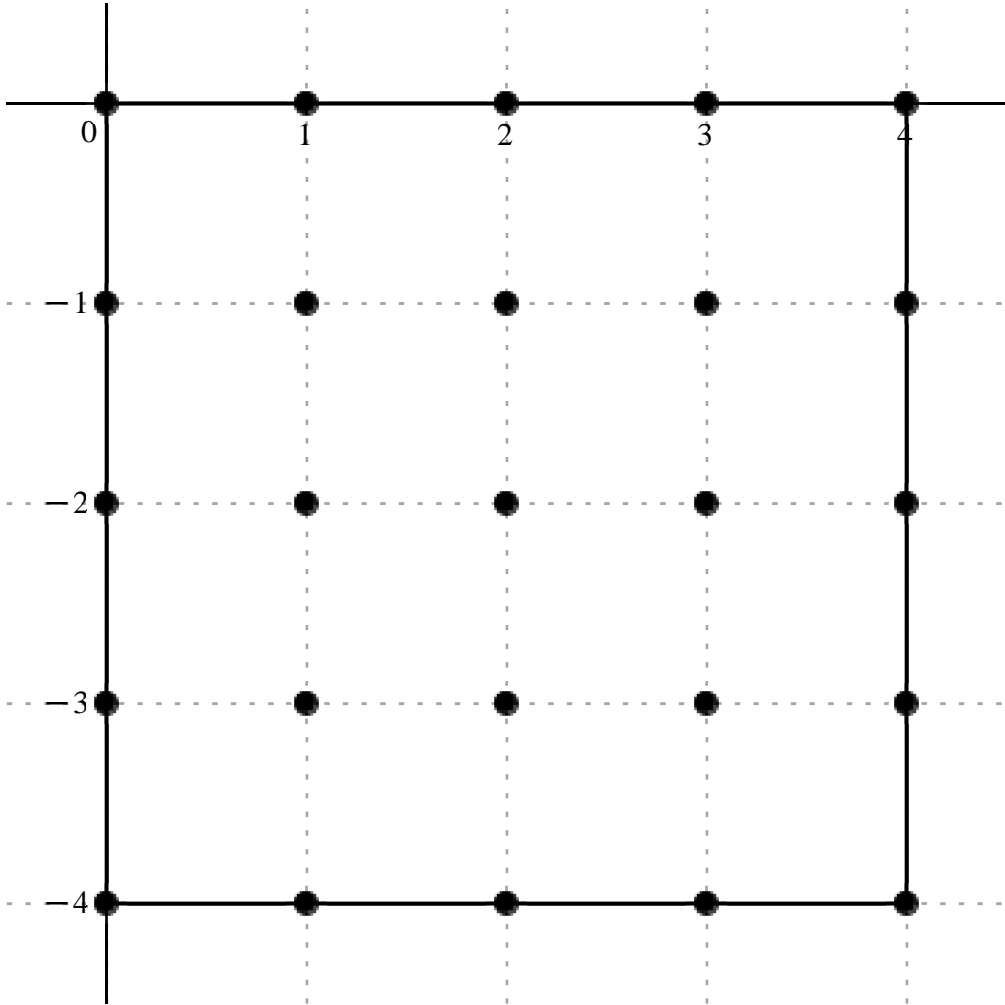
Error order.: 17, Error.: 1.5302646723352476748 × 10<sup>−74</sup>, New Error.: 1.5301664277664601562 × 10<sup>−91</sup>

Error order.: 17, Error.: 1.5301664277664601562 × 10<sup>−91</sup>, New Error.: 1.5301565994703731151 × 10<sup>−108</sup>

Error order.: 17, Error.: 1.5301565994703731151 × 10<sup>−108</sup>, New Error.: 1.5301556166023790501 × 10<sup>−125</sup>

$$x_o \neq h. , \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & 4-\mathrm{I} \\ -2\mathrm{I} & 1-2\mathrm{I} & 2-2\mathrm{I} & 3-2\mathrm{I} & 4-2\mathrm{I} \\ -3\mathrm{I} & 1-3\mathrm{I} & 2-3\mathrm{I} & 3-3\mathrm{I} & 4-3\mathrm{I} \\ -4\mathrm{I} & 1-4\mathrm{I} & 2-4\mathrm{I} & 3-4\mathrm{I} & 4-4\mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{683937714271}{176800} & -\frac{43655001092962}{414375} + \frac{32029056989804 \text{ I}}{414375} & \frac{64900262883519}{221000} - \frac{97105925889 \text{ I}}{650} & -\frac{9467258520524}{138125} + \frac{2243299291842 \text{ I}}{138125} & \frac{12195416683093}{13260000} - \frac{3092738978 \text{ I}}{4875} \\ -\frac{43655001092962}{414375} - \frac{32029056989804 \text{ I}}{414375} & -\frac{53872314181756}{4875} & -\frac{4775878096794}{125} + \frac{12617796645846 \text{ I}}{1625} & -\frac{32089793166368}{4875} + \frac{10966019082676 \text{ I}}{4875} & -\frac{5468926550444}{138125} + \frac{1144915443238 \text{ I}}{31875} \\ \frac{64900262883519}{221000} + \frac{97105925889 \text{ I}}{650} & -\frac{4775878096794}{125} - \frac{12617796645846 \text{ I}}{1625} & \frac{160904808102717}{1000} & -\frac{44873081599374}{1625} + \frac{1312349852142 \text{ I}}{325} & \frac{37529907186807}{221000} - \frac{141413897457 \text{ I}}{3250} \\ -\frac{9467258520524}{138125} - \frac{2243299291842 \text{ I}}{138125} & -\frac{32089793166368}{4875} - \frac{10966019082676 \text{ I}}{4875} & -\frac{44873081599374}{1625} - \frac{1312349852142 \text{ I}}{325} & -\frac{8881380163852}{1625} & -\frac{3630553621534}{82875} - \frac{768267018652 \text{ I}}{82875} \\ \frac{12195416683093}{13260000} + \frac{3092738978 \text{ I}}{4875} & -\frac{5468926550444}{138125} - \frac{1144915443238 \text{ I}}{31875} & \frac{37529907186807}{221000} + \frac{141413897457 \text{ I}}{3250} & -\frac{3630553621534}{82875} + \frac{768267018652 \text{ I}}{82875} & \frac{10603004112533}{13260000} \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{13260000 \, \Delta x_{ol}^8} \, (7 \, (7327904081475 \, u_{ol} + (-199565719282112 + 146418546239104 \, \text{I}) \, u_{ol+1} + (556287967573020 - 282994412590800 \, \text{I}) \, u_{ol+2} + (-129836688281472 + 30765247430976 \, \text{I}) \, u_{ol+3} + (1742202383299 - 1201750002880 \, \text{I}) \, u_{ol+4} - (199565719282112 + 146418546239104 \, \text{I}) \, u_{ol-1} \\ - 20933242082053760 \, u_{ol+1-1} + (-72375021215415360 + 14708745804300480 \, \text{I}) \, u_{ol+2-1} + (-12469176773217280 + 4261081700696960 \, \text{I}) \, u_{ol+3-1} + (-75002421263232 + 68040689198144 \, \text{I}) \, u_{ol+4-1} + (556287967573020 + 282994412590800 \, \text{I}) \, u_{ol-21} - (72375021215415360 + 14708745804300480 \, \text{I}) \, u_{ol+1-21} \\ + 304799679348861060 \, u_{ol+2-21} + (-52309192264413120 + 7649124852484800 \, \text{I}) \, u_{ol+3-21} + (321684918744060 - 82424100232080 \, \text{I}) \, u_{ol+4-21} - (129836688281472 + 30765247430976 \, \text{I}) \, u_{ol-31} - (12469176773217280 + 4261081700696960 \, \text{I}) \, u_{ol+1-31} - (52309192264413120 + 7649124852484800 \, \text{I}) \, u_{ol+2-31} \\ - 10353151733861760 \, u_{ol+3-31} - (82984082777920 + 17560388997760 \, \text{I}) \, u_{ol+4-31} + (1742202383299 + 1201750002880 \, \text{I}) \, u_{ol-41} - (75002421263232 + 68040689198144 \, \text{I}) \, u_{ol+1-41} + (321684918744060 + 82424100232080 \, \text{I}) \, u_{ol+2-41} + (-82984082777920 + 17560388997760 \, \text{I}) \, u_{ol+3-41} + 1514714873219 \, u_{ol+4-41})), \\ O(\, \Delta x_{ol}^{17} \, )$$

Formula:, 161, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 9

Error order:, 16, Error:, 1.0572113471212825818 × 10<sup>−37</sup>, New Error:, 1.0339881318288889794 × 10<sup>−53</sup>

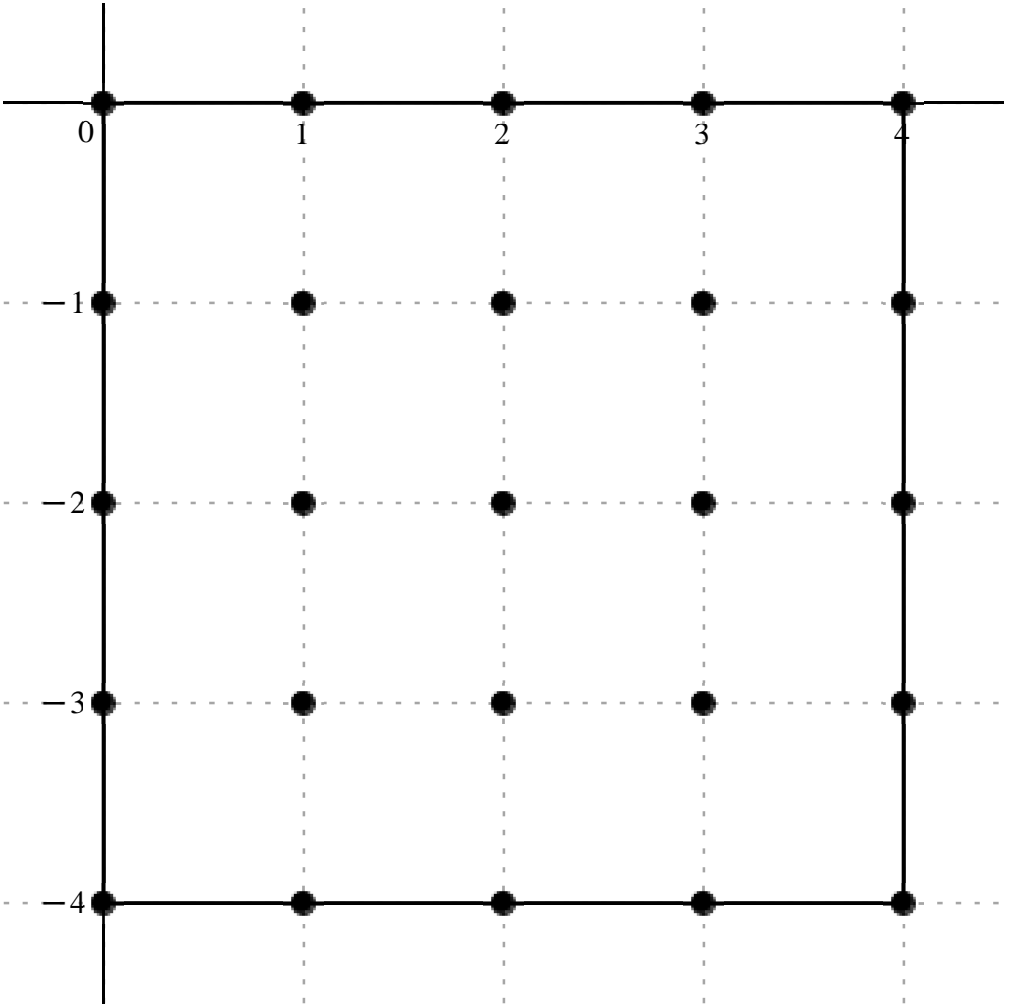
*Error order:*, 16,   *Error:*,  $1.0339881318288889794 \times 10^{-53}$ ,   *New Error:*,  $1.0316737401878368399 \times 10^{-69}$   
*Error order:*, 16,   *Error:*,  $1.0316737401878368399 \times 10^{-69}$ ,   *New Error:*,  $1.0314423825006052689 \times 10^{-85}$   
*Error order:*, 16,   *Error:*,  $1.0314423825006052689 \times 10^{-85}$ ,   *New Error:*,  $1.0314192475488004689 \times 10^{-101}$   
*Error order:*, 16,   *Error:*,  $1.0314192475488004689 \times 10^{-101}$ ,   *New Error:*,  $1.0314169340617913193 \times 10^{-117}$

$$x_o + h,$$

$$\begin{bmatrix} 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} & 4-\text{I} \\ -2\text{I} & 1-2\text{I} & 2-2\text{I} & 3-2\text{I} & 4-2\text{I} \\ -3\text{I} & 1-3\text{I} & 2-3\text{I} & 3-3\text{I} & 4-3\text{I} \\ -4\text{I} & 1-4\text{I} & 2-4\text{I} & 3-4\text{I} & 4-4\text{I} \end{bmatrix}$$

$$c =,$$

$$\begin{bmatrix} -\frac{18863939199}{1300} - \frac{18863939199 \text{ I}}{1300} & \frac{903746382693}{1250} + \frac{173250480669 \text{ I}}{1250} & -\frac{226490810364}{125} - \frac{873953333001 \text{ I}}{1300} & \frac{5710731446343}{16250} + \frac{3809124960081 \text{ I}}{16250} & -\frac{53906128521}{8125} - \frac{4639108467 \text{ I}}{3250} \\ \frac{173250480669}{1250} + \frac{903746382693 \text{ I}}{1250} & \frac{73077514438341}{1625} + \frac{73077514438341 \text{ I}}{1625} & \frac{307766419667028}{1625} + \frac{210663294739821 \text{ I}}{1625} & \frac{60160971852051}{1625} + \frac{31019676366693 \text{ I}}{1625} & \frac{5250697917087}{16250} + \frac{362930639001 \text{ I}}{16250} \\ -\frac{873953333001}{1300} - \frac{226490810364 \text{ I}}{125} & \frac{210663294739821}{1625} + \frac{307766419667028 \text{ I}}{1625} & -\frac{84586823164746}{125} - \frac{84586823164746 \text{ I}}{125} & \frac{217325917255419}{1625} + \frac{164569192619076 \text{ I}}{1625} & -\frac{5905482671151}{6500} - \frac{897275968533 \text{ I}}{1625} \\ \frac{3809124960081}{16250} + \frac{5710731446343 \text{ I}}{16250} & \frac{31019676366693}{1625} + \frac{60160971852051 \text{ I}}{1625} & \frac{164569192619076}{1625} + \frac{217325917255419 \text{ I}}{1625} & \frac{2921019871119}{125} + \frac{2921019871119 \text{ I}}{125} & \frac{479271279291}{3250} + \frac{744271033443 \text{ I}}{3250} \\ -\frac{4639108467}{3250} - \frac{53906128521 \text{ I}}{8125} & \frac{362930639001}{16250} + \frac{5250697917087 \text{ I}}{16250} & -\frac{897275968533}{1625} - \frac{5905482671151 \text{ I}}{6500} & \frac{744271033443}{3250} + \frac{479271279291 \text{ I}}{3250} & -\frac{112203100527}{32500} - \frac{112203100527 \text{ I}}{32500} \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{32500 \, \Delta x_{ol}^9} \, \Big( 21 \, \Big( - (22457070475 + 22457070475 \, \text{I}) \, u_{ol} + (1118924092858 + 214500595114 \, \text{I}) \, u_{ol+1} - (2804171937840 + 1040420634525 \, \text{I}) \, u_{ol+2} + (543879185366 + 362773805722 \, \text{I}) \, u_{ol+3} - (10267834004 + 2209099270 \, \text{I}) \, u_{ol+4} + (214500595114 + 1118924092858 \, \text{I}) \, u_{ol-1} + (69597632798420$$

$$+ 69597632798420 \, \text{I}) \, u_{ol+1-1} + (293110875873360 + 200631709276020 \, \text{I}) \, u_{ol+2-1} + (57296163668620 + 29542548920660 \, \text{I}) \, u_{ol+3-1} + (500066468294 + 34564822762 \, \text{I}) \, u_{ol+4-1} - (1040420634525 + 2804171937840 \, \text{I}) \, u_{ol-21} + (200631709276020 + 293110875873360 \, \text{I}) \, u_{ol+1-21} - (1047265429658760$$

$$+ 1047265429658760 \, \text{I}) \, u_{ol+2-21} + (206977064052780 + 156732564399120 \, \text{I}) \, u_{ol+3-21} - (1406067302655 + 854548541460 \, \text{I}) \, u_{ol+4-21} + (362773805722 + 543879185366 \, \text{I}) \, u_{ol-31} + (29542548920660 + 57296163668620 \, \text{I}) \, u_{ol+1-31} + (156732564399120 + 206977064052780 \, \text{I}) \, u_{ol+2-31} + (36165007928140$$

$$+ 36165007928140 \, \text{I}) \, u_{ol+3-31} + (228224418710 + 354414777830 \, \text{I}) \, u_{ol+4-31} - (2209099270 + 10267834004 \, \text{I}) \, u_{ol-41} + (34564822762 + 500066468294 \, \text{I}) \, u_{ol+1-41} - (854548541460 + 1406067302655 \, \text{I}) \, u_{ol+2-41} + (354414777830 + 228224418710 \, \text{I}) \, u_{ol+3-41} - (5343004787 + 5343004787 \, \text{I}) \, u_{ol+4-41} \Big) \Big), \, O( \, \Delta x_{ol}^{16} \, )$$

Formula:, 162, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 10

Error order:, 15, Error:,  $4.7542122806058770712 \times 10^{-35}$ , New Error:,  $4.7254285066593981538 \times 10^{-50}$

Error order:, 15, Error:,  $4.7254285066593981538 \times 10^{-50}$ , New Error:,  $4.7224310738107960022 \times 10^{-65}$

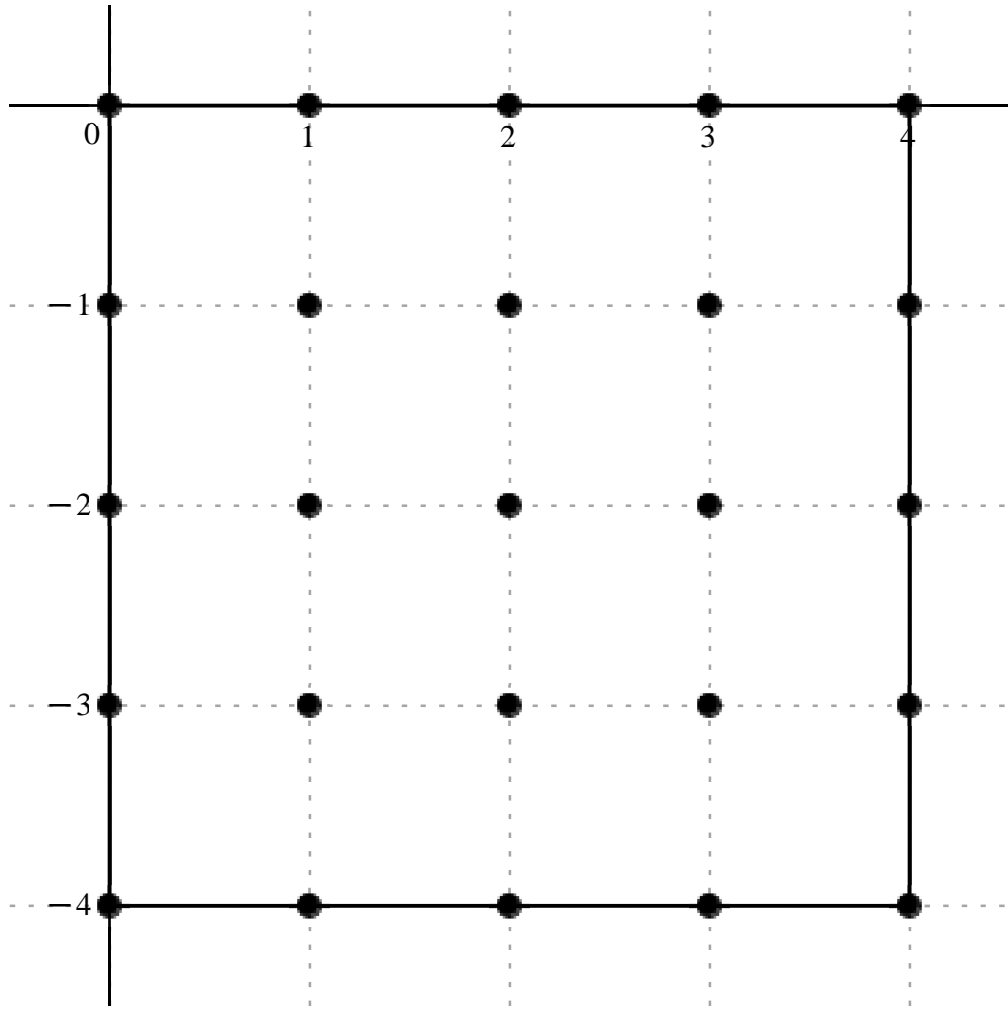
Error order:, 15, Error:,  $4.7224310738107960022 \times 10^{-65}$ , New Error:,  $4.7221301604404862543 \times 10^{-80}$

Error order:, 15, Error:,  $4.7221301604404862543 \times 10^{-80}$ , New Error:,  $4.7221000574229422462 \times 10^{-95}$

Error order:, 15, Error:,  $4.7221000574229422462 \times 10^{-95}$ , New Error:,  $4.7220970470044030438 \times 10^{-110}$

$$x_o + h. , \begin{bmatrix} 0 & 1 & 2 & 3 & 4 \\ -I & 1-I & 2-I & 3-I & 4-I \\ -2\ I & 1-2\ I & 2-2\ I & 3-2\ I & 4-2\ I \\ -3\ I & 1-3\ I & 2-3\ I & 3-3\ I & 4-3\ I \\ -4\ I & 1-4\ I & 2-4\ I & 3-4\ I & 4-4\ I \end{bmatrix}$$

$$c = , \left[ \begin{array}{ccccccccc} \frac{26557160343\ I}{260} & -\frac{3342448384191}{1625} & -\frac{5293319430903\ I}{1625} & \frac{1300005785043}{325} & +\frac{2521555722819\ I}{260} & -\frac{611614744419}{1625} & -\frac{3760675466373\ I}{1625} & \frac{255973965891}{13000} & +\frac{85041479061\ I}{2600} \\ \frac{3342448384191}{1625} & -\frac{5293319430903\ I}{1625} & -\frac{110394544229718\ I}{325} & -\frac{68946797958066}{325} & -\frac{401046643728612\ I}{325} & -\frac{21417266783388}{325} & -\frac{71975829052134\ I}{325} & -\frac{1892892278109}{1625} & -\frac{2268884329677\ I}{1625} \\ -\frac{1300005785043}{325} & +\frac{2521555722819\ I}{260} & \frac{68946797958066}{325} & -\frac{401046643728612\ I}{325} & \frac{131876879143779\ I}{25} & -\frac{7827605321886}{65} & -\frac{301203582319836\ I}{325} & \frac{875568381093}{650} & +\frac{7569789083577\ I}{1300} \\ \frac{611614744419}{1625} & -\frac{3760675466373\ I}{1625} & \frac{21417266783388}{325} & -\frac{71975829052134\ I}{325} & \frac{7827605321886}{65} & -\frac{301203582319836\ I}{325} & -\frac{60201018819102\ I}{325} & \frac{108100091547}{325} & -\frac{487414740939\ I}{325} \\ -\frac{255973965891}{13000} & +\frac{85041479061\ I}{2600} & \frac{1892892278109}{1625} & -\frac{2268884329677\ I}{1625} & -\frac{875568381093}{650} & +\frac{7569789083577\ I}{1300} & -\frac{108100091547}{325} & -\frac{487414740939\ I}{325} & \frac{44924422431\ I}{1625} \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{13000\;\Delta x_{ol}^{10}}\big(21\big(\big(63231334150\;\mathrm{I}\,u_{ol}-(1273313670168+2016502640344\;\mathrm{I})\;u_{ol+1}+(2476201495320+6003704101950\;\mathrm{I})\;u_{ol+2}-(232996093112+1432638272904\;\mathrm{I})\;u_{ol+3}+(12189236471+20247971205\;\mathrm{I})\;u_{ol+4}+(1273313670168-2016502640344\;\mathrm{I})\;u_{ol-1}-210275322342320\;\mathrm{I}\,u_{ol+1-1}-(131327234205840+763898369006880\;\mathrm{I})\;u_{ol+2-1}-(40794793873120+137096817242160\;\mathrm{I})\;u_{ol+3-1}-(721101820232+864336887496\;\mathrm{I})\;u_{ol+4-1}+(-2476201495320+6003704101950\;\mathrm{I})\;u_{ol-21}+(131327234205840-763898369006880\;\mathrm{I})\;u_{ol+1-21}+3265522721655480\;\mathrm{I}\,u_{ol+2-21}-(74548622113200+573721109180640\;\mathrm{I})\;u_{ol+3-21}+(833874648660+3604661468370\;\mathrm{I})\;u_{ol+4-21}+(232996093112-1432638272904\;\mathrm{I})\;u_{ol-31}+(40794793873120-137096817242160\;\mathrm{I})\;u_{ol+1-31}+(74548622113200-573721109180640\;\mathrm{I})\;u_{ol+2-31}-114668607274480\;\mathrm{I}\,u_{ol+3-31}+(205904936280-928409030360\;\mathrm{I})\;u_{ol+4-31}+(-12189236471+20247971205\;\mathrm{I})\;u_{ol-41}+(721101820232-864336887496\;\mathrm{I})\;u_{ol+1-41}+(-833874648660+3604661468370\;\mathrm{I})\;u_{ol+2-41}-(205904936280+928409030360\;\mathrm{I})\;u_{ol+3-41}+17114065688\;\mathrm{I}\,u_{ol+4-41}\big)\big)\big),\;O(\;\Delta x_{ol}^{15}\;)\;$$

Formula:, 163, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 1

Error order:, 24, Error:, 6.2439825700928304338 × 10<sup>−61</sup>, New Error:, 6.3397790911682388390 × 10<sup>−85</sup>

Error order:, 24, Error:, 6.3397790911682388390 × 10<sup>−85</sup>, New Error:, 6.3493087927835451905 × 10<sup>−109</sup>

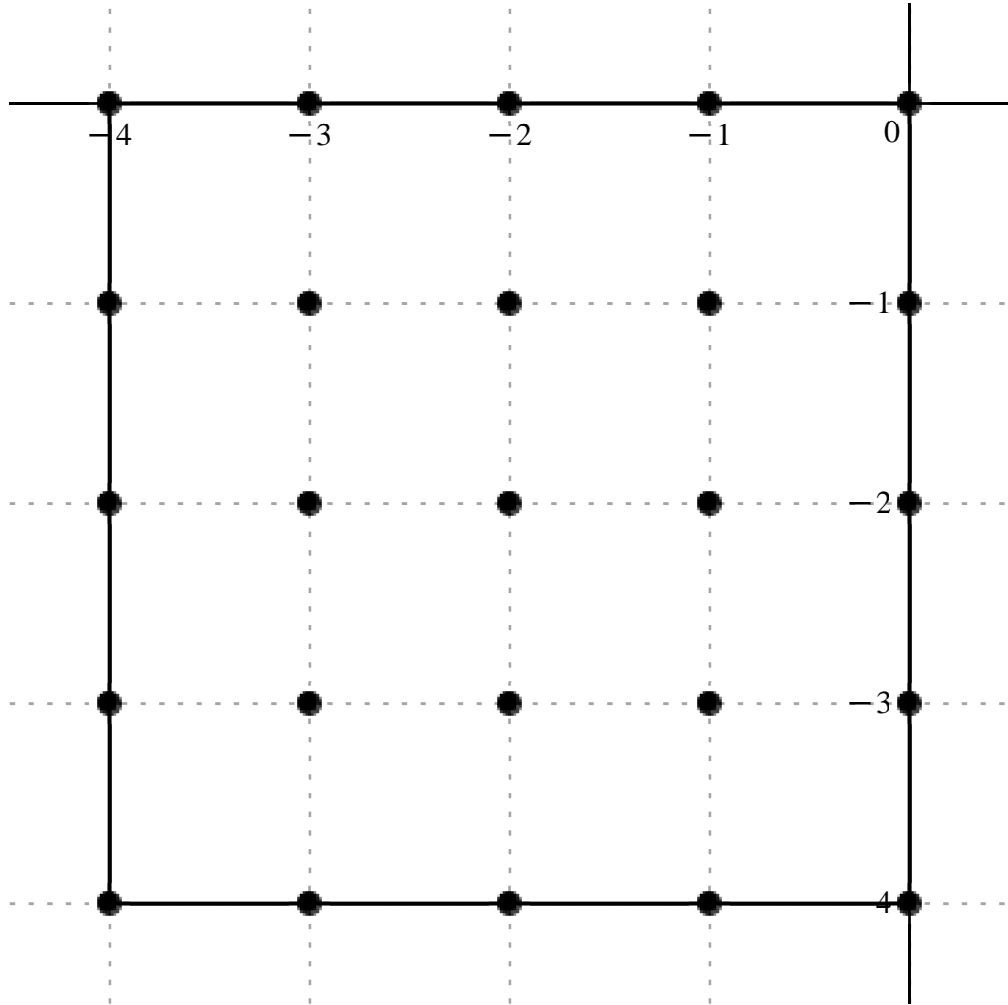
Error order:, 24, Error:, 6.3493087927835451905 × 10<sup>−109</sup>, New Error:, 6.3502612423233845130 × 10<sup>−133</sup>

Error order:, 24, Error:, 6.3502612423233845130 × 10<sup>−133</sup>, New Error:, 6.3503564820498489767 × 10<sup>−157</sup>

Error order:, 24, Error:, 6.3503564820498489767 × 10<sup>−157</sup>, New Error:, 6.3503660059701989071 × 10<sup>−181</sup>

$$x_o\;+h\;, \left[\begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ -4-1\;\mathrm{I} & -3-1\;\mathrm{I} & -2-1\;\mathrm{I} & -1-1\;\mathrm{I} & -1 \\ -4-2\;\mathrm{I} & -3-2\;\mathrm{I} & -2-2\;\mathrm{I} & -1-2\;\mathrm{I} & -2\;\mathrm{I} \\ -4-3\;\mathrm{I} & -3-3\;\mathrm{I} & -2-3\;\mathrm{I} & -1-3\;\mathrm{I} & -3\;\mathrm{I} \\ -4-4\;\mathrm{I} & -3-4\;\mathrm{I} & -2-4\;\mathrm{I} & -1-4\;\mathrm{I} & -4\;\mathrm{I} \end{array}\right]$$

$$c = , \begin{bmatrix} \frac{1}{4} & -16 + \frac{16 \text{ I}}{3} & 90 & -48 - 16 \text{ I} & \frac{237961}{44200} - \frac{237961 \text{ I}}{44200} \\ -\frac{208}{17} - \frac{16 \text{ I}}{17} & -1632 + 544 \text{ I} & -9792 + 4896 \text{ I} & -2720 + 2720 \text{ I} & 16 + 48 \text{ I} \\ 36 - 18 \text{ I} & -\frac{73440}{13} + \frac{48960 \text{ I}}{13} & 29835 - 29835 \text{ I} & -4896 + 9792 \text{ I} & -90 \text{ I} \\ -\frac{144}{25} + \frac{208 \text{ I}}{25} & -\frac{2720}{3} + \frac{2720 \text{ I}}{3} & -\frac{48960}{13} + \frac{73440 \text{ I}}{13} & -544 + 1632 \text{ I} & -\frac{16}{3} + 16 \text{ I} \\ \frac{1}{8} - \frac{\text{I}}{8} & -\frac{208}{25} + \frac{144 \text{ I}}{25} & 18 - 36 \text{ I} & \frac{16}{17} + \frac{208 \text{ I}}{17} & -\frac{\text{I}}{4} \end{bmatrix}$$



$$\frac{\text{d}}{\text{d}x_{ol}} \; u(x_{ol}) = \frac{1}{132600 \; \Delta x_{ol}} \Big( 33150 \; u_{ol-4} + (-2121600 + 707200 \; \text{I}) \; u_{ol-3} + 11934000 \; u_{ol-2} - (6364800 + 2121600 \; \text{I}) \; u_{ol-1} + (713883 - 713883 \; \text{I}) \; u_{ol} - (1622400 + 124800 \; \text{I}) \; u_{ol-4-1} + (-216403200 + 72134400 \; \text{I}) \; u_{ol-3-1} + (-1298419200 + 649209600 \; \text{I}) \; u_{ol-2-1} + (-360672000 + 360672000 \; \text{I}) \; u_{ol-1-1} + (2121600 \\ + 6364800 \; \text{I}) \; u_{ol-1} + (4773600 - 2386800 \; \text{I}) \; u_{ol-4-21} + (-749088000 + 499392000 \; \text{I}) \; u_{ol-3-21} + (3956121000 - 3956121000 \; \text{I}) \; u_{ol-2-21} + (-649209600 + 1298419200 \; \text{I}) \; u_{ol-1-21} - 11934000 \; \text{I} u_{ol-21} + (-763776 + 1103232 \; \text{I}) \; u_{ol-4-31} + (-120224000 + 120224000 \; \text{I}) \; u_{ol-3-31} + (-499392000 + 749088000 \; \text{I}) \; u_{ol-2-31} \\ + (-72134400 + 216403200 \; \text{I}) \; u_{ol-1-31} + (-707200 + 2121600 \; \text{I}) \; u_{ol-31} + (16575 - 16575 \; \text{I}) \; u_{ol-4-41} + (-1103232 + 763776 \; \text{I}) \; u_{ol-3-41} + (2386800 - 4773600 \; \text{I}) \; u_{ol-2-41} + (124800 + 1622400 \; \text{I}) \; u_{ol-1-41} - 33150 \; \text{I} u_{ol-41} \Big), \; O( \; \Delta x_{ol}^{24} \; )$$

Formula:, 164, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 2

Error order:, 23, Error:, 7.2520412910511341177 × 10<sup>−58</sup>, New Error:, 7.4849553703758686643 × 10<sup>−81</sup>

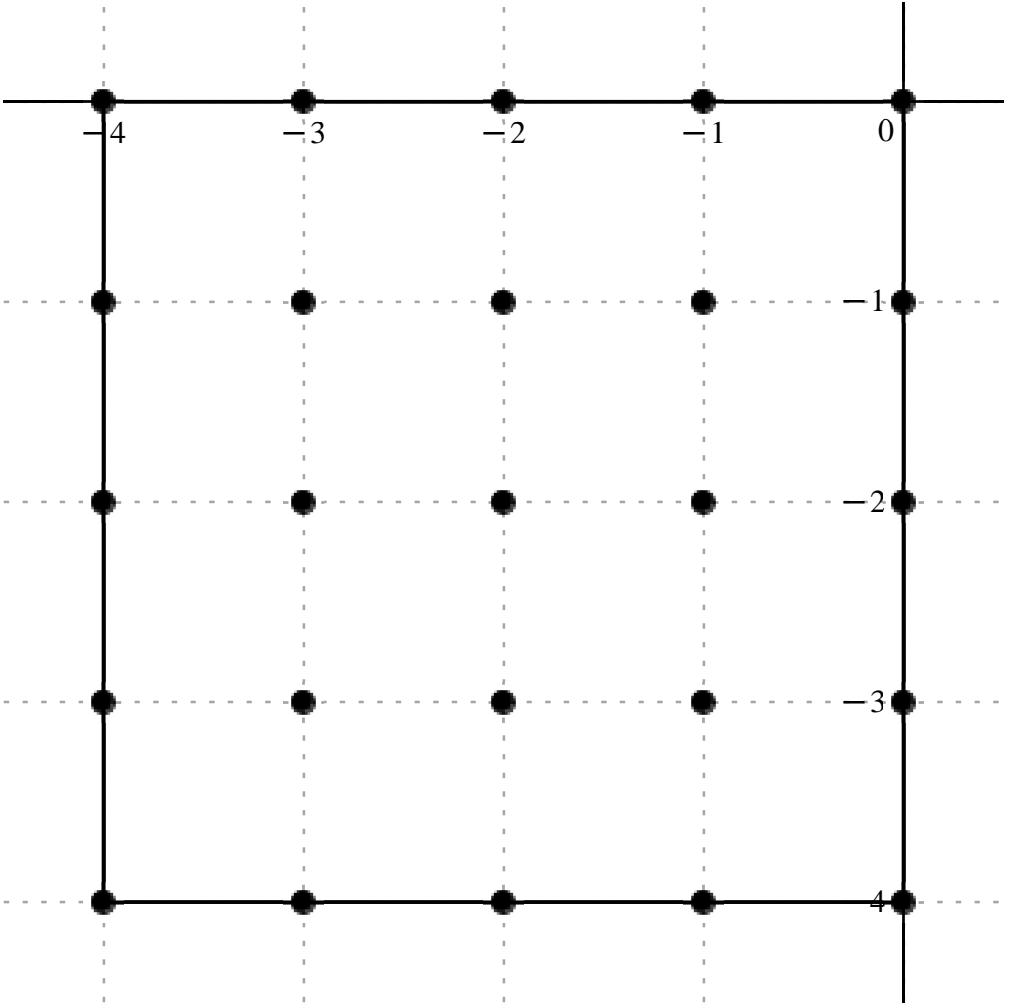
Error order:, 23, Error:, 7.4849553703758686643 × 10<sup>−81</sup>, New Error:, 7.5084414073835589901 × 10<sup>−104</sup>

Error order:, 23, Error:, 7.5084414073835589901 × 10<sup>−104</sup>, New Error:, 7.5107919504569734842 × 10<sup>−127</sup>

Error order:, 23, Error:, 7.5107919504569734842 × 10<sup>−127</sup>, New Error:, 7.5110270241509058768 × 10<sup>−150</sup>

$$c =, \quad x_o + h., \quad \begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ -4 - \mathrm{I} & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -4 - 2 \, \mathrm{I} & -3 - 2 \, \mathrm{I} & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \\ -4 - 3 \, \mathrm{I} & -3 - 3 \, \mathrm{I} & -2 - 3 \, \mathrm{I} & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} \\ -4 - 4 \, \mathrm{I} & -3 - 4 \, \mathrm{I} & -2 - 4 \, \mathrm{I} & -1 - 4 \, \mathrm{I} & -4 \, \mathrm{I} \end{bmatrix}$$

$$\begin{bmatrix} \frac{226911}{88400} - \frac{237961 \, \mathrm{I}}{88400} & -\frac{1726888}{16575} + \frac{11245328 \, \mathrm{I}}{49725} & \frac{1942749}{2210} - \frac{2141649 \, \mathrm{I}}{2210} & -\frac{3276976}{5525} + \frac{2080488 \, \mathrm{I}}{5525} & -\frac{112305269 \, \mathrm{I}}{1989000} \\ -\frac{751448}{5525} + \frac{666384 \, \mathrm{I}}{5525} & -\frac{3524496}{325} + \frac{7402592 \, \mathrm{I}}{325} & -\frac{15223752}{325} + \frac{48853656 \, \mathrm{I}}{325} & \frac{3453776 \, \mathrm{I}}{65} & \frac{3276976}{5525} + \frac{2080488 \, \mathrm{I}}{5525} \\ \frac{2022309}{11050} - \frac{6265827 \, \mathrm{I}}{11050} & -\frac{1223784}{65} + \frac{1272744 \, \mathrm{I}}{13} & -\frac{6126597 \, \mathrm{I}}{10} & \frac{15223752}{325} + \frac{48853656 \, \mathrm{I}}{325} & -\frac{1942749}{2210} - \frac{2141649 \, \mathrm{I}}{2210} \\ \frac{757232}{27625} + \frac{4076376 \, \mathrm{I}}{27625} & \frac{11068528 \, \mathrm{I}}{585} & \frac{1223784}{65} + \frac{1272744 \, \mathrm{I}}{13} & \frac{3524496}{325} + \frac{7402592 \, \mathrm{I}}{325} & \frac{1726888}{16575} + \frac{11245328 \, \mathrm{I}}{49725} \\ -\frac{58109 \, \mathrm{I}}{22100} & -\frac{757232}{27625} + \frac{4076376 \, \mathrm{I}}{27625} & -\frac{2022309}{11050} - \frac{6265827 \, \mathrm{I}}{11050} & \frac{751448}{5525} + \frac{666384 \, \mathrm{I}}{5525} & -\frac{226911}{88400} - \frac{237961 \, \mathrm{I}}{88400} \end{bmatrix}$$



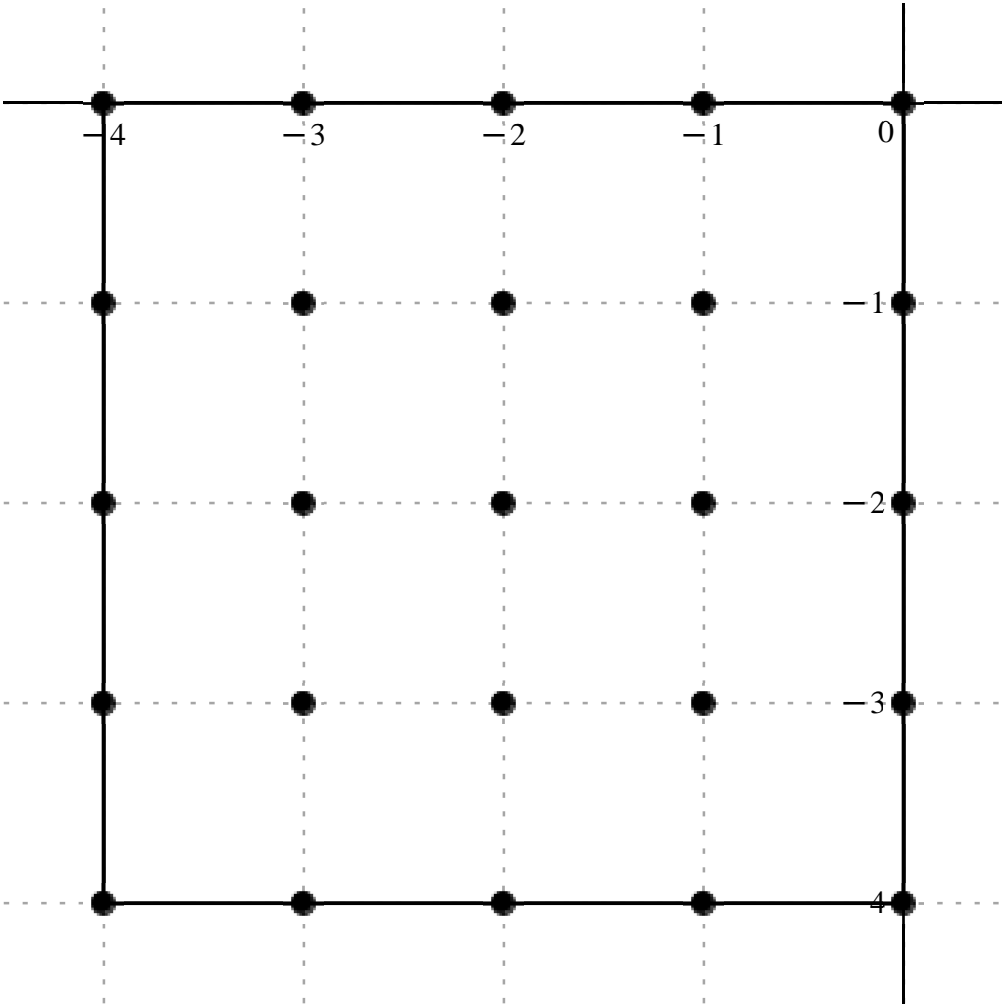
$$\begin{aligned}
 \frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = & \frac{1}{3978000 \, \Delta x_{ol}^2} \Big( (10210995 - 10708245 \, \mathrm{I}) \, u_{ol-4} + (-414453120 + 899626240 \, \mathrm{I}) \, u_{ol-3} + (3496948200 - 3854968200 \, \mathrm{I}) \, u_{ol-2} \\
 & + (-2359422720 + 1497951360 \, \mathrm{I}) \, u_{ol-1} - 224610538 \, \mathrm{I} \, u_{ol} + (-541042560 + 479796480 \, \mathrm{I}) \, u_{ol-4-1} + (-43139831040 + 90607726080 \, \mathrm{I}) \, u_{ol-3-1} \\
 & + (-186338724480 + 597968749440 \, \mathrm{I}) \, u_{ol-2-1} + 211371091200 \, \mathrm{I} \, u_{ol-1-1} + (2359422720 + 1497951360 \, \mathrm{I}) \, u_{ol-1} \\
 & + (728031240 - 2255697720 \, \mathrm{I}) \, u_{ol-4-21} + (-74895580800 + 389459664000 \, \mathrm{I}) \, u_{ol-3-21} - 2437160286600 \, \mathrm{I} \, u_{ol-2-21} + (186338724480 + 597968749440 \, \mathrm{I}) \, u_{ol-1-21} \\
 & - (3496948200 + 3854968200 \, \mathrm{I}) \, u_{ol-21} + (109041408 + 586998144 \, \mathrm{I}) \, u_{ol-4-31} + 75265990400 \, \mathrm{I} \, u_{ol-3-31} \\
 & + (74895580800 + 389459664000 \, \mathrm{I}) \, u_{ol-2-31} + (43139831040 + 90607726080 \, \mathrm{I}) \, u_{ol-1-31} + (414453120 + 899626240 \, \mathrm{I}) \, u_{ol-31} \\
 & - 10459620 \, \mathrm{I} \, u_{ol-4-41} + (-109041408 + 586998144 \, \mathrm{I}) \, u_{ol-3-41} - (728031240 + 2255697720 \, \mathrm{I}) \, u_{ol-2-41} + (541042560 + 479796480 \, \mathrm{I}) \, u_{ol-1-41} \\
 & - (10210995 + 10708245 \, \mathrm{I}) \, u_{ol-41} \Big), \, O( \, \Delta x_{ol}^{23} \, )
 \end{aligned}$$

Formula:, 165, Var.: 1  
Variavel :,  $x_{oi}$ , Derivada de Ordem :, 3

Error order:, 22, Error:,  $8.7416068095328158751 \times 10^{-55}$ , New Error:,  $8.8751995521515573747 \times 10^{-77}$   
Error order:, 22, Error:,  $8.8751995521515573747 \times 10^{-77}$ , New Error:,  $8.8884894014172726196 \times 10^{-99}$   
Error order:, 22, Error:,  $8.8884894014172726196 \times 10^{-99}$ , New Error:,  $8.8898176628434364313 \times 10^{-121}$   
Error order:, 22, Error:,  $8.8898176628434364313 \times 10^{-121}$ , New Error:,  $8.8899504817215417257 \times 10^{-143}$   
Error order:, 22, Error:,  $8.8899504817215417257 \times 10^{-143}$ , New Error:,  $8.8899637635366776115 \times 10^{-165}$

$$x_o + h \cdot , \begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ -4 -I & -3 -I & -2 -I & -1 -I & -I \\ -4 -2 I & -3 -2 I & -2 -2 I & -1 -2 I & -2 I \\ -4 -3 I & -3 -3 I & -2 -3 I & -1 -3 I & -3 I \\ -4 -4 I & -3 -4 I & -2 -4 I & -1 -4 I & -4 I \end{bmatrix}$$

$$c = , \begin{bmatrix} -\frac{680733}{353600} - \frac{213902293 I}{5304000} & \frac{250513858}{248625} + \frac{617604974 I}{248625} & -\frac{5828247}{4420} - \frac{76197768 I}{5525} & -\frac{77146618}{82875} + \frac{193403218 I}{27625} & -\frac{22773831179}{79560000} - \frac{22773831179 I}{79560000} \\ -\frac{7019834}{82875} + \frac{162716042 I}{82875} & \frac{463490108}{4875} + \frac{410622668 I}{1625} & \frac{1292444772}{1625} + \frac{2356533264 I}{1625} & \frac{371511116}{975} + \frac{371511116 I}{975} & \frac{193403218}{27625} - \frac{77146618 I}{82875} \\ -\frac{16512609}{5525} - \frac{25206789 I}{4420} & \frac{196883472}{325} + \frac{286146828 I}{325} & -\frac{459424233}{100} - \frac{459424233 I}{100} & \frac{2356533264}{1625} + \frac{1292444772 I}{1625} & -\frac{76197768}{5525} - \frac{5828247 I}{4420} \\ \frac{556522898}{414375} + \frac{9718926 I}{10625} & \frac{421549756}{2925} + \frac{421549756 I}{2925} & \frac{286146828}{325} + \frac{196883472 I}{325} & \frac{410622668}{1625} + \frac{463490108 I}{4875} & \frac{617604974}{248625} + \frac{250513858 I}{248625} \\ -\frac{107075459}{5304000} - \frac{107075459 I}{5304000} & \frac{9718926}{10625} + \frac{556522898 I}{414375} & -\frac{25206789}{4420} - \frac{16512609 I}{5525} & \frac{162716042}{82875} - \frac{7019834 I}{82875} & -\frac{213902293}{5304000} - \frac{680733 I}{353600} \end{bmatrix}$$





$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{79560000 \, \Delta x_{ol}^3} \big( -(153164925 + 3208534395 \, \mathrm{I}) \, u_{ol-4} + (80164434560 + 197633591680 \, \mathrm{I}) \, u_{ol-3} - (104908446000 + 1097247859200 \, \mathrm{I}) \, u_{ol-2} + (-74060753280 + 557001267840 \, \mathrm{I}) \, u_{ol-1} - (22773831179 + 22773831179 \, \mathrm{I}) \, u_{ol} + (-6739040640 + 156207400320 \, \mathrm{I}) \, u_{ol-4-\mathrm{I}} + (7564158562560 + 20104085825280 \, \mathrm{I}) \, u_{ol-3-\mathrm{I}} + (63278096037120 + 115375868605440 \, \mathrm{I}) \, u_{ol-2-\mathrm{I}} + (30315307065600 + 30315307065600 \, \mathrm{I}) \, u_{ol-1-\mathrm{I}} + (557001267840 - 74060753280 \, \mathrm{I}) \, u_{ol-\mathrm{I}} - (237781569600 + 453722202000 \, \mathrm{I}) \, u_{ol-4-2\mathrm{I}} + (48197073945600 + 70048743494400 \, \mathrm{I}) \, u_{ol-3-2\mathrm{I}} - (365517919774800 + 365517919774800 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (115375868605440 + 63278096037120 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} - (1097247859200 + 104908446000 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (106852396416 + 72775317888 \, \mathrm{I}) \, u_{ol-4-3\mathrm{I}} + (11466153363200 + 11466153363200 \, \mathrm{I}) \, u_{ol-3-3\mathrm{I}} + (70048743494400 + 48197073945600 \, \mathrm{I}) \, u_{ol-2-3\mathrm{I}} + (20104085825280 + 7564158562560 \, \mathrm{I}) \, u_{ol-1-3\mathrm{I}} + (197633591680 + 80164434560 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} - (1606131885 + 1606131885 \, \mathrm{I}) \, u_{ol-4-4\mathrm{I}} + (72775317888 + 106852396416 \, \mathrm{I}) \, u_{ol-3-4\mathrm{I}} - (453722202000 + 237781569600 \, \mathrm{I}) \, u_{ol-2-4\mathrm{I}} + (156207400320 - 6739040640 \, \mathrm{I}) \, u_{ol-1-4\mathrm{I}} - (3208534395 + 153164925 \, \mathrm{I}) \, u_{ol-4\mathrm{I}} \big), \, O(\, \Delta x_{ol}^{22} \, )$$

Formula:, 166, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:., 21, Error:., 6.3741943587539892675 × 10<sup>−52</sup>, New Error:., 6.5780595659373502505 × 10<sup>−73</sup>

Error order:., 21, Error:., 6.5780595659373502505 × 10<sup>−73</sup>, New Error:., 6.5986157964596232105 × 10<sup>−94</sup>

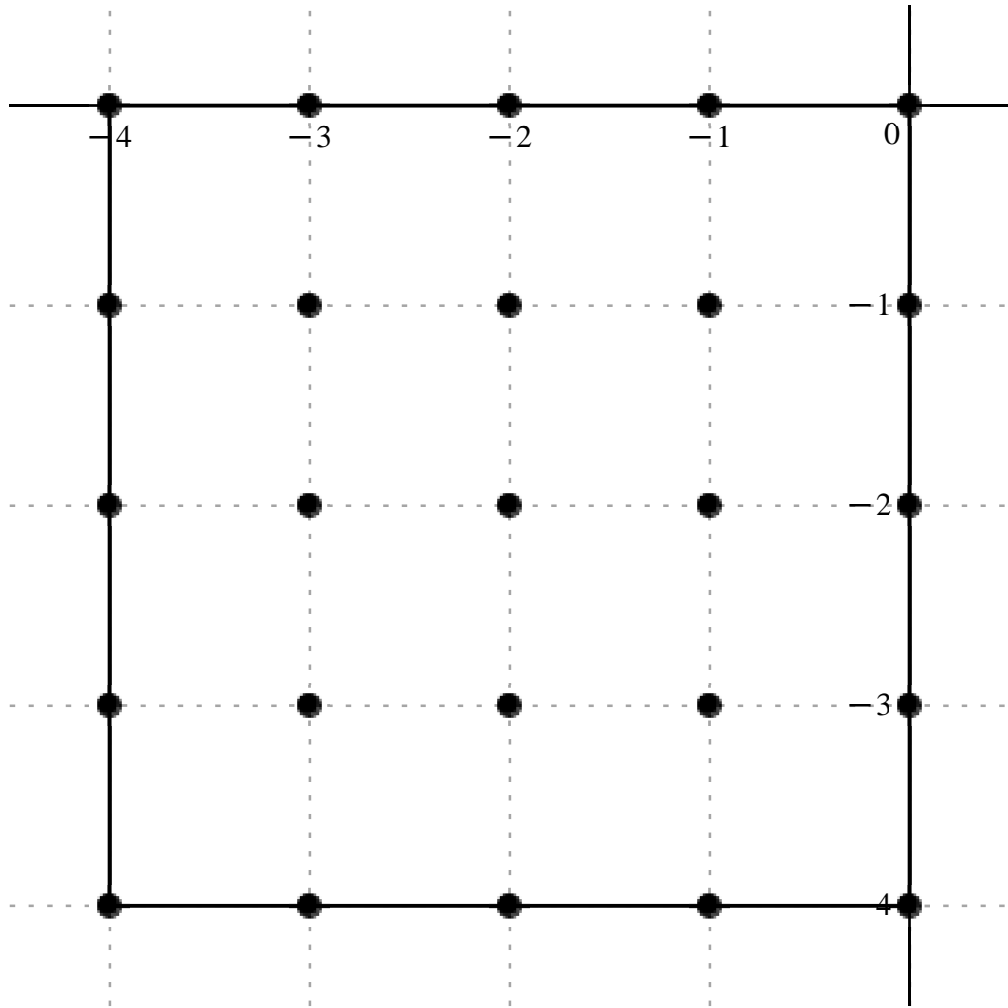
Error order:., 21, Error:., 6.5986157964596232105 × 10<sup>−94</sup>, New Error:., 6.6006731105976075825 × 10<sup>−115</sup>

Error order:., 21, Error:., 6.6006731105976075825 × 10<sup>−115</sup>, New Error:., 6.6008788589160629890 × 10<sup>−136</sup>

Error order:., 21, Error:., 6.6008788589160629890 × 10<sup>−136</sup>, New Error:., 6.6008994339169488798 × 10<sup>−157</sup>

$$x_o + h \, , \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ -4 -\mathrm{I} & -3 -\mathrm{I} & -2 -\mathrm{I} & -1 -\mathrm{I} & -\mathrm{I} \\ -4 -2 \, \mathrm{I} & -3 -2 \, \mathrm{I} & -2 -2 \, \mathrm{I} & -1 -2 \, \mathrm{I} & -2 \, \mathrm{I} \\ -4 -3 \, \mathrm{I} & -3 -3 \, \mathrm{I} & -2 -3 \, \mathrm{I} & -1 -3 \, \mathrm{I} & -3 \, \mathrm{I} \\ -4 -4 \, \mathrm{I} & -3 -4 \, \mathrm{I} & -2 -4 \, \mathrm{I} & -1 -4 \, \mathrm{I} & -4 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} -\frac{11310333127}{39780000} - \frac{1222831049 \, \mathrm{I}}{4972500} & \frac{9565005284}{414375} + \frac{11065187626 \, \mathrm{I}}{1243125} & -\frac{22191006479}{221000} - \frac{16678009739 \, \mathrm{I}}{221000} & \frac{50176459438}{1243125} + \frac{56282745476 \, \mathrm{I}}{1243125} & -\frac{554759931179}{198900000} \\ \frac{5200152388}{414375} + \frac{16432976258 \, \mathrm{I}}{1243125} & \frac{166456619464}{73125} + \frac{71702641292 \, \mathrm{I}}{73125} & \frac{116877295842}{8125} + \frac{31865175334 \, \mathrm{I}}{8125} & \frac{68804657756}{14625} & \frac{50176459438}{1243125} - \frac{56282745476 \, \mathrm{I}}{1243125} \\ -\frac{63158797197}{1105000} - \frac{19053482099 \, \mathrm{I}}{1105000} & \frac{629167478}{65} + \frac{2788783966 \, \mathrm{I}}{1625} & -\frac{59133008877}{1000} & \frac{116877295842}{8125} - \frac{31865175334 \, \mathrm{I}}{8125} & -\frac{22191006479}{221000} + \frac{16678009739 \, \mathrm{I}}{221000} \\ \frac{92133162946}{6215625} - \frac{17850865972 \, \mathrm{I}}{6215625} & \frac{27554776532}{14625} & \frac{629167478}{65} - \frac{2788783966 \, \mathrm{I}}{1625} & \frac{166456619464}{73125} - \frac{71702641292 \, \mathrm{I}}{73125} & \frac{9565005284}{414375} - \frac{11065187626 \, \mathrm{I}}{1243125} \\ -\frac{622579391}{2340000} & \frac{92133162946}{6215625} + \frac{17850865972 \, \mathrm{I}}{6215625} & -\frac{63158797197}{1105000} + \frac{19053482099 \, \mathrm{I}}{1105000} & \frac{5200152388}{414375} - \frac{16432976258 \, \mathrm{I}}{1243125} & -\frac{11310333127}{39780000} + \frac{1222831049 \, \mathrm{I}}{4972500} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{1}{198900000 \Delta x_{ol}^4} \left( -(56551665635 + 48913241960 \operatorname{I}) u_{ol-4} + (4591202536320 + 1770430020160 \operatorname{I}) u_{ol-3} - (19971905831100 + 15010208765100 \operatorname{I}) u_{ol-2} + (8028233510080 + 9005239276160 \operatorname{I}) u_{ol-1} - 554759931179 u_{ol} + (2496073146240 + 2629276201280 \operatorname{I}) u_{ol-4-1} + (452762004942080 \right. \\ \left. + 195031184314240 \operatorname{I}) u_{ol-3-1} + (2861156202212160 + 780059492176320 \operatorname{I}) u_{ol-2-1} + 935743345481600 u_{ol-1-1} + (8028233510080 - 9005239276160 \operatorname{I}) u_{ol-1} - (11368583495460 + 3429626777820 \operatorname{I}) u_{ol-4-21} + (1925252482680000 + 341347157438400 \operatorname{I}) u_{ol-3-21} - 11761555465635300 u_{ol-2-21} + (2861156202212160 \right. \\ \left. - 780059492176320 \operatorname{I}) u_{ol-1-21} + (-19971905831100 + 15010208765100 \operatorname{I}) u_{ol-21} + (2948261214272 - 571227711104 \operatorname{I}) u_{ol-4-31} + 374744960835200 u_{ol-3-31} + (1925252482680000 - 341347157438400 \operatorname{I}) u_{ol-2-31} + (452762004942080 - 195031184314240 \operatorname{I}) u_{ol-1-31} + (4591202536320 - 1770430020160 \operatorname{I}) u_{ol-31} \right. \\ \left. - 52919248235 u_{ol-4-41} + (2948261214272 + 571227711104 \operatorname{I}) u_{ol-3-41} + (-11368583495460 + 3429626777820 \operatorname{I}) u_{ol-2-41} + (2496073146240 - 2629276201280 \operatorname{I}) u_{ol-1-41} + (-56551665635 + 48913241960 \operatorname{I}) u_{ol-41} \right), O(\Delta x_{ol}^{21})$$

Formula:, 167, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:., 20, Error:.,  $5.9482919781215821715 \times 10^{-49}$ , New Error:.,  $6.0387861367988013470 \times 10^{-69}$

Error order:., 20, Error:.,  $6.0387861367988013470 \times 10^{-69}$ , New Error:.,  $6.0477887058921218350 \times 10^{-89}$

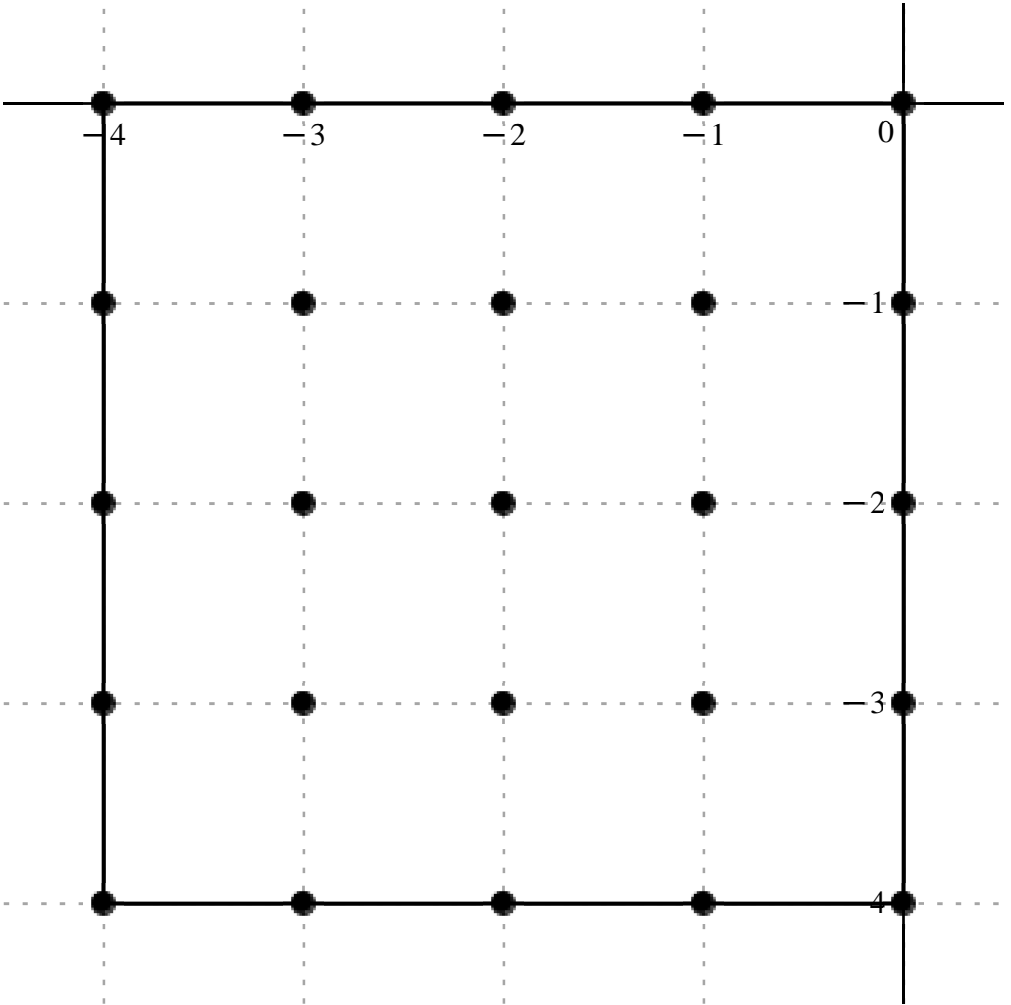
Error order:., 20, Error:.,  $6.0477887058921218350 \times 10^{-89}$ , New Error:.,  $6.0486884746720688658 \times 10^{-109}$

Error order:., 20, Error:.,  $6.0486884746720688658 \times 10^{-109}$ , New Error:.,  $6.0487784466489362144 \times 10^{-129}$

Error order:., 20, Error:.,  $6.0487784466489362144 \times 10^{-129}$ , New Error:.,  $6.0487874437975918249 \times 10^{-149}$

$$x_o + h \cdot, \begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ -4-1 & -3-1 & -2-1 & -1-1 & -1 \\ -4-2 \operatorname{I} & -3-2 \operatorname{I} & -2-2 \operatorname{I} & -1-2 \operatorname{I} & -2 \operatorname{I} \\ -4-3 \operatorname{I} & -3-3 \operatorname{I} & -2-3 \operatorname{I} & -1-3 \operatorname{I} & -3 \operatorname{I} \\ -4-4 \operatorname{I} & -3-4 \operatorname{I} & -2-4 \operatorname{I} & -1-4 \operatorname{I} & -4 \operatorname{I} \end{bmatrix}$$

$$c =, \left[ \begin{array}{ccccc} -\frac{20758677731}{6630000} + \frac{1222831049 \text{ I}}{3978000} & \frac{153036626113}{828750} - \frac{24644881757 \text{ I}}{276250} & -\frac{2133677398}{2125} + \frac{16678009739 \text{ I}}{88400} & \frac{89424246089}{191250} - \frac{68953193 \text{ I}}{21250} & -\frac{574403647}{44200} + \frac{574403647 \text{ I}}{44200} \\ \frac{125951589337}{828750} + \frac{349316683 \text{ I}}{276250} & \frac{275748708739}{14625} - \frac{38605705559 \text{ I}}{4875} & \frac{168780019068}{1625} - \frac{100322597201 \text{ I}}{1625} & \frac{42527587421}{1625} - \frac{42527587421 \text{ I}}{1625} & \frac{68953193}{21250} - \frac{89424246089 \text{ I}}{191250} \\ -\frac{192829757173}{442000} + \frac{26485404909 \text{ I}}{110500} & \frac{107727242279}{1625} - \frac{76466134796 \text{ I}}{1625} & -\frac{42769210911}{125} + \frac{42769210911 \text{ I}}{125} & \frac{100322597201}{1625} - \frac{168780019068 \text{ I}}{1625} & -\frac{16678009739}{88400} + \frac{2133677398 \text{ I}}{2125} \\ \frac{34903034183}{497250} - \frac{17376728533 \text{ I}}{165750} & \frac{4152760597}{375} - \frac{4152760597 \text{ I}}{375} & \frac{76466134796}{1625} - \frac{107727242279 \text{ I}}{1625} & \frac{38605705559}{4875} - \frac{275748708739 \text{ I}}{14625} & \frac{24644881757}{276250} - \frac{153036626113 \text{ I}}{828750} \\ -\frac{2613753557}{1657500} + \frac{2613753557 \text{ I}}{1657500} & \frac{17376728533}{165750} - \frac{34903034183 \text{ I}}{497250} & -\frac{26485404909}{110500} + \frac{192829757173 \text{ I}}{442000} & -\frac{349316683}{276250} - \frac{125951589337 \text{ I}}{828750} & -\frac{1222831049}{3978000} + \frac{20758677731 \text{ I}}{6630000} \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^s} \, u(x_{ol}) = \frac{1}{19890000 \, \mathcal{A}x_{ol}^s} \, ( (-62276033193 + 6114155245 \, \text{I}) \, u_{ol-4} + (3672879026712 - 1774431486504 \, \text{I}) \, u_{ol-3} + ( -19971220445280 + 3752552191275 \, \text{I}) \, u_{ol-2} + (9300121593256 - 64540188648 \, \text{I}) \, u_{ol-1} + ( -258481641150 + 258481641150 \, \text{I}) \, u_{ol} + (3022838144088 + 25150801176 \, \text{I}) \, u_{ol-4-1} + (375018243885040 \\ - 157511278680720 \, \text{I}) \, u_{ol-3-1} + (2065867433392320 - 1227948589740240 \, \text{I}) \, u_{ol-2-1} + (520537670033040 - 520537670033040 \, \text{I}) \, u_{ol-1-1} + (64540188648 - 9300121593256 \, \text{I}) \, u_{ol-1} + ( -8677339072785 + 4767372883620 \, \text{I}) \, u_{ol-4-21} + (1318581445494960 - 935945489903040 \, \text{I}) \, u_{ol-3-21} + ( -6805436840158320 \\ + 6805436840158320 \, \text{I}) \, u_{ol-2-21} + (1227948589740240 - 2065867433392320 \, \text{I}) \, u_{ol-1-21} + ( -3752552191275 + 19971220445280 \, \text{I}) \, u_{ol-21} + (1396121367320 - 2085207423960 \, \text{I}) \, u_{ol-4-31} + (220262422064880 - 220262422064880 \, \text{I}) \, u_{ol-3-31} + (935945489903040 - 1318581445494960 \, \text{I}) \, u_{ol-2-31} + (157511278680720 \\ - 375018243885040 \, \text{I}) \, u_{ol-1-31} + (1774431486504 - 3672879026712 \, \text{I}) \, u_{ol-31} + ( -31365042684 + 31365042684 \, \text{I}) \, u_{ol-4-41} + (2085207423960 - 1396121367320 \, \text{I}) \, u_{ol-3-41} + ( -4767372883620 + 8677339072785 \, \text{I}) \, u_{ol-2-41} - (25150801176 + 3022838144088 \, \text{I}) \, u_{ol-1-41} + ( -6114155245 + 62276033193 \, \text{I}) \, u_{ol-41} ), \, O( \, \mathcal{A}x_{ol}^{20} \, )$$

Formula.: 168, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 6

Error order.: 19, Error.: 3.5880542687582253925 × 10<sup>−46</sup>, New Error.: 3.7022401318778120023 × 10<sup>−65</sup>

Error order.: 19, Error.: 3.7022401318778120023 × 10<sup>−65</sup>, New Error.: 3.7137533484730059456 × 10<sup>−84</sup>

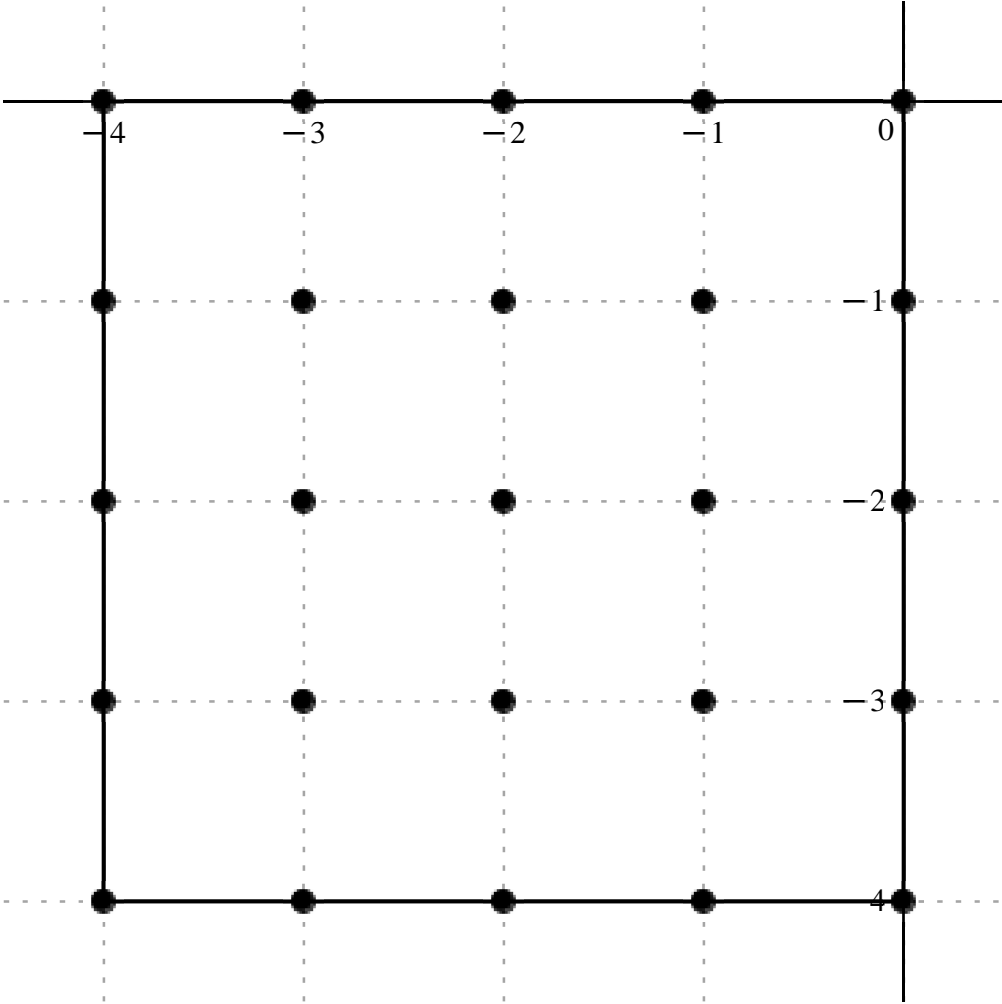
*Error order:*, 19,    *Error:*,  $3.7137533484730059456 \times 10^{-84}$ ,    *New Error:*,  $3.7149056130959732370 \times 10^{-103}$   
*Error order:*, 19,    *Error:*,  $3.7149056130959732370 \times 10^{-103}$ ,    *New Error:*,  $3.7150208489844608620 \times 10^{-122}$   
*Error order:*, 19,    *Error:*,  $3.7150208489844608620 \times 10^{-122}$ ,    *New Error:*,  $3.7150323726675680794 \times 10^{-141}$

$$x_o + h \cdot ,$$

$$\begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ -4 - \mathrm{I} & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -4 - 2 \, \mathrm{I} & -3 - 2 \, \mathrm{I} & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \\ -4 - 3 \, \mathrm{I} & -3 - 3 \, \mathrm{I} & -2 - 3 \, \mathrm{I} & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} \\ -4 - 4 \, \mathrm{I} & -3 - 4 \, \mathrm{I} & -2 - 4 \, \mathrm{I} & -1 - 4 \, \mathrm{I} & -4 \, \mathrm{I} \end{bmatrix}$$

$$c = ,$$

$$\begin{bmatrix} -\frac{65401869319}{4420000} + \frac{50473497181 \, \mathrm{I}}{2652000} & \frac{191605562087}{414375} - \frac{205116577043 \, \mathrm{I}}{138125} & -\frac{221295624681}{55250} + \frac{570321909543 \, \mathrm{I}}{88400} & \frac{905337930043}{414375} - \frac{341953013673 \, \mathrm{I}}{138125} & \frac{15294778547 \, \mathrm{I}}{132600} \\ \frac{112214177059}{138125} - \frac{114476078827 \, \mathrm{I}}{138125} & \frac{90428274644}{1625} - \frac{702501239926 \, \mathrm{I}}{4875} & \frac{335671009638}{1625} - \frac{1417757560116 \, \mathrm{I}}{1625} & -\frac{434118851874 \, \mathrm{I}}{1625} & -\frac{905337930043}{414375} - \frac{341953013673 \, \mathrm{I}}{138125} \\ -\frac{17404815459}{17000} + \frac{1618240018413 \, \mathrm{I}}{442000} & \frac{2461873314}{25} - \frac{987675471948 \, \mathrm{I}}{1625} & \frac{906552119709 \, \mathrm{I}}{250} & -\frac{335671009638}{1625} - \frac{1417757560116 \, \mathrm{I}}{1625} & \frac{221295624681}{55250} + \frac{570321909543 \, \mathrm{I}}{88400} \\ -\frac{15871688231}{82875} - \frac{26152114629 \, \mathrm{I}}{27625} & -\frac{581312600878 \, \mathrm{I}}{4875} & -\frac{2461873314}{25} - \frac{987675471948 \, \mathrm{I}}{1625} & -\frac{90428274644}{1625} - \frac{702501239926 \, \mathrm{I}}{4875} & -\frac{191605562087}{414375} - \frac{205116577043 \, \mathrm{I}}{138125} \\ \frac{37852766411 \, \mathrm{I}}{2210000} & \frac{15871688231}{82875} - \frac{26152114629 \, \mathrm{I}}{27625} & \frac{17404815459}{17000} + \frac{1618240018413 \, \mathrm{I}}{442000} & -\frac{112214177059}{138125} - \frac{114476078827 \, \mathrm{I}}{138125} & \frac{65401869319}{4420000} + \frac{50473497181 \, \mathrm{I}}{2652000} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{13260000 \, \Delta x_{ol}^6} \, ( (-196205607957 + 252367485905 \, \mathrm{I}) \, u_{ol-4} + (6131377986784 - 19691191396128 \, \mathrm{I}) \, u_{ol-3} + (-53110949923440 + 85548286431450 \, \mathrm{I}) \, u_{ol-2} + (28970813761376 - 32827489312608 \, \mathrm{I}) \, u_{ol-1} + 1529477854700 \, \mathrm{I} u_{ol} + (10772560997664 - 10989703567392 \, \mathrm{I}) \, u_{ol-4-1} + (737894721095040$$

$$- 1910803372598720 \, \mathrm{I}) \, u_{ol-3-1} + (2739075438646080 - 11568901690546560 \, \mathrm{I}) \, u_{ol-2-1} - 3542409831291840 \, \mathrm{I} u_{ol-1-1} - (28970813761376 + 32827489312608 \, \mathrm{I}) \, u_{ol-1} + (-13575756058020 + 48547200552390 \, \mathrm{I}) \, u_{ol-4-21} + (1305777605745600 - 8059431851095680 \, \mathrm{I}) \, u_{ol-3-21} + 48083524429365360 \, \mathrm{I} u_{ol-2-21}$$

$$- (2739075438646080 + 11568901690546560 \, \mathrm{I}) \, u_{ol-1-21} + (53110949923440 + 85548286431450 \, \mathrm{I}) \, u_{ol-21} - (2539470116960 + 12553015021920 \, \mathrm{I}) \, u_{ol-4-31} - 1581170274388160 \, \mathrm{I} u_{ol-3-31} - (1305777605745600 + 8059431851095680 \, \mathrm{I}) \, u_{ol-2-31} - (737894721095040 + 1910803372598720 \, \mathrm{I}) \, u_{ol-1-31} - (6131377986784$$

$$+ 19691191396128 \, \mathrm{I}) \, u_{ol-31} + 227116598466 \, \mathrm{I} u_{ol-4-41} + (2539470116960 - 12553015021920 \, \mathrm{I}) \, u_{ol-3-41} + (13575756058020 + 48547200552390 \, \mathrm{I}) \, u_{ol-2-41} - (10772560997664 + 10989703567392 \, \mathrm{I}) \, u_{ol-1-41} + (196205607957 + 252367485905 \, \mathrm{I}) \, u_{ol-41} ), \, O( \, \Delta x_{ol}^{19} \, )$$

Formula:, 169, Var.: 1

Variavel :,  $x_o$  , Derivada de Ordem :, 7

Error order:, 18, Error:,  $2.8464513754140646426 \times 10^{-43}$ , New Error:,  $2.8895188658748229552 \times 10^{-61}$

Error order:, 18, Error:,  $2.8895188658748229552 \times 10^{-61}$ , New Error:,  $2.8938034230100204647 \times 10^{-79}$

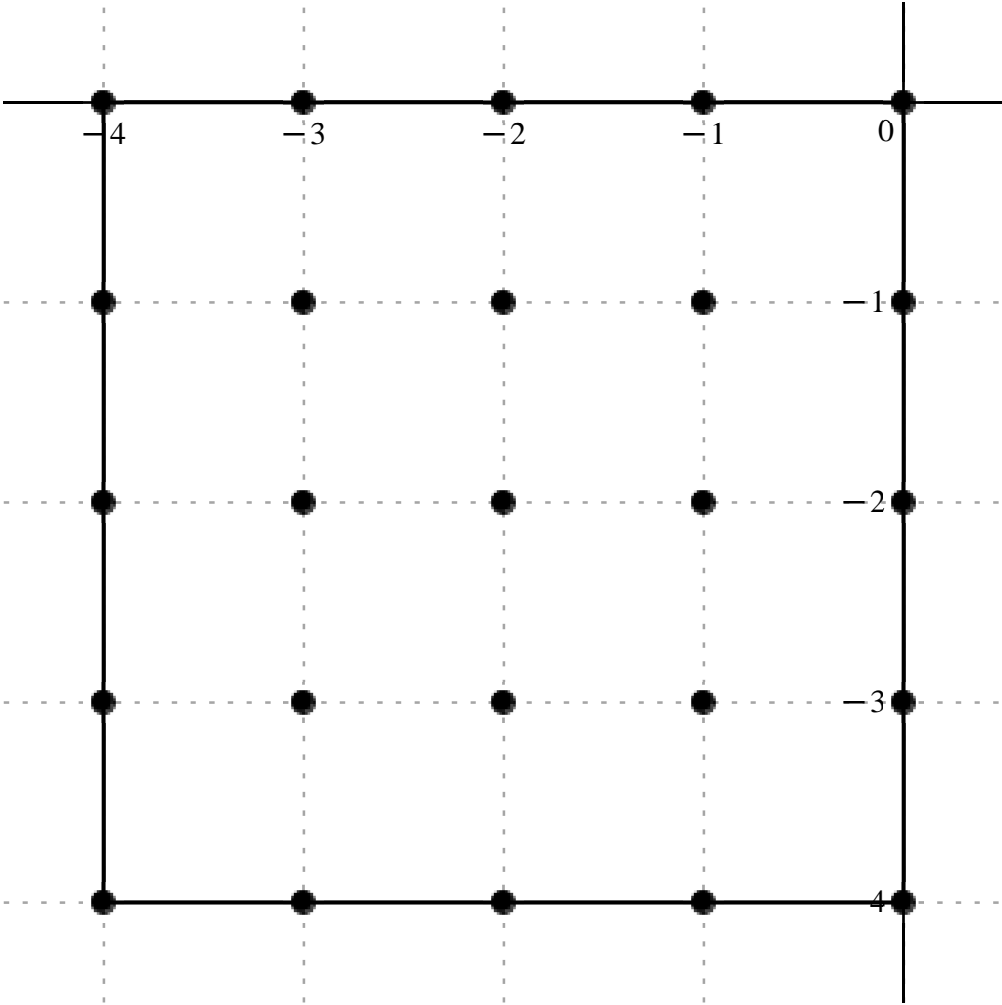
Error order:, 18, Error:,  $2.8938034230100204647 \times 10^{-79}$ , New Error:,  $2.8942316475332354821 \times 10^{-97}$

Error order:, 18, Error:,  $2.8942316475332354821 \times 10^{-97}$ , New Error:,  $2.8942744676643020309 \times 10^{-115}$

Error order:, 18, Error:,  $2.8942744676643020309 \times 10^{-115}$ , New Error:,  $2.8942787496541867763 \times 10^{-133}$

$$x_o + h . , \begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ -4 -I & -3 -I & -2 -I & -1 -I & -I \\ -4 -2 I & -3 -2 I & -2 -2 I & -1 -2 I & -2 I \\ -4 -3 I & -3 -3 I & -2 -3 I & -1 -3 I & -3 I \\ -4 -4 I & -3 -4 I & -2 -4 I & -1 -4 I & -4 I \end{bmatrix}$$

$$c = , \left[ \begin{array}{cc} \frac{457813085233}{17680000} + \frac{595984838771 I}{3536000} & -\frac{2231470475353}{414375} - \frac{3917356452149 I}{414375} & \frac{1549069372767}{110500} + \frac{8855360612679 I}{176800} & -\frac{328064339617}{138125} - \frac{2959501395739 I}{138125} & \frac{5152854524377}{10608000} + \frac{5152854524377 I}{10608000} \\ -\frac{98165925067}{414375} - \frac{3389338473479 I}{414375} & -\frac{739738752963}{1625} - \frac{1586218336381 I}{1625} & -\frac{5378825232564}{1625} - \frac{646765645974 I}{125} & -\frac{6148097038223}{4875} - \frac{6148097038223 I}{4875} & -\frac{2959501395739}{138125} - \frac{328064339617 I}{138125} \\ \frac{911472963009}{68000} + \frac{197409813699 I}{8500} & -\frac{4136236181826}{1625} - \frac{5644278093804 I}{1625} & \frac{8871705686781}{500} + \frac{8871705686781 I}{500} & -\frac{646765645974}{125} - \frac{5378825232564 I}{1625} & \frac{8855360612679}{176800} + \frac{1549069372767 I}{110500} \\ -\frac{157683439809}{27625} - \frac{20725968823 I}{5525} & -\frac{2890583626609}{4875} - \frac{2890583626609 I}{4875} & -\frac{5644278093804}{1625} - \frac{4136236181826 I}{1625} & -\frac{1586218336381}{1625} - \frac{739738752963 I}{1625} & -\frac{3917356452149}{414375} - \frac{2231470475353 I}{414375} \\ \frac{4558264396819}{53040000} + \frac{4558264396819 I}{53040000} & -\frac{20725968823}{5525} - \frac{157683439809 I}{27625} & \frac{197409813699}{8500} + \frac{911472963009 I}{68000} & -\frac{3389338473479}{414375} - \frac{98165925067 I}{414375} & \frac{595984838771}{3536000} + \frac{457813085233 I}{17680000} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u(x_{ol})=\frac{1}{53040000\,\mathcal{A}x_{ol}^7}\big(7\,\big((196205607957+1277110368795\,\mathrm{I})\,u_{ol-4}-(40804031549312+71631660839296\,\mathrm{I})\,u_{ol-3}+(106221899846880+379515454829100\,\mathrm{I})\,u_{ol-2}-(17996672344704+162349790851968\,\mathrm{I})\,u_{ol-1}+(3680610374555+3680610374555\,\mathrm{I})\,u_{ol}-(1795034058368+61976474943616\,\mathrm{I})\,u_{ol-4-1}\\ -(3449296128101760+7396309499925120\,\mathrm{I})\,u_{ol-3-1}-(25080693655841280+39205085557098240\,\mathrm{I})\,u_{ol-2-1}-(9555899396552320+9555899396552320\,\mathrm{I})\,u_{ol-1-1}-(162349790851968+17996672344704\,\mathrm{I})\,u_{ol-1}+(101564130163860+175976748211680\,\mathrm{I})\,u_{ol-4-21}-(19286678424971520\\ +26318462425966080\,\mathrm{I})\,u_{ol-3-21}+(134444362750532640+134444362750532640\,\mathrm{I})\,u_{ol-2-21}-(39205085557098240+25080693655841280\,\mathrm{I})\,u_{ol-1-21}+(379515454829100+106221899846880\,\mathrm{I})\,u_{ol-21}-(43250314919040+28424185814400\,\mathrm{I})\,u_{ol-4-31}-(4492792836786560+4492792836786560\,\mathrm{I})\,u_{ol-3-31}\\ -(26318462425966080+19286678424971520\,\mathrm{I})\,u_{ol-2-31}-(7396309499925120+3449296128101760\,\mathrm{I})\,u_{ol-1-31}-(71631660839296+40804031549312\,\mathrm{I})\,u_{ol-31}+(651180628117+651180628117\,\mathrm{I})\,u_{ol-4-41}-(28424185814400+43250314919040\,\mathrm{I})\,u_{ol-3-41}+(175976748211680+101564130163860\,\mathrm{I})\,u_{ol-2-41}\\ -(61976474943616+1795034058368\,\mathrm{I})\,u_{ol-1-41}+(1277110368795+196205607957\,\mathrm{I})\,u_{ol-41}\big)\big),\,\,O(\,\mathcal{A}x_{ol}^{18}\,)\,\big)$$

Formula.: 170, Var.: 1

Variavel.: x<sub>ol</sub>., Derivada de Ordem.: 8

Error order.: 17, Error.: 1.4781640786054905551 × 10<sup>−40</sup>, New Error.: 1.5249174411651776786 × 10<sup>−57</sup>

Error order.: 17, Error.: 1.5249174411651776786 × 10<sup>−57</sup>, New Error.: 1.5296313128928375369 × 10<sup>−74</sup>

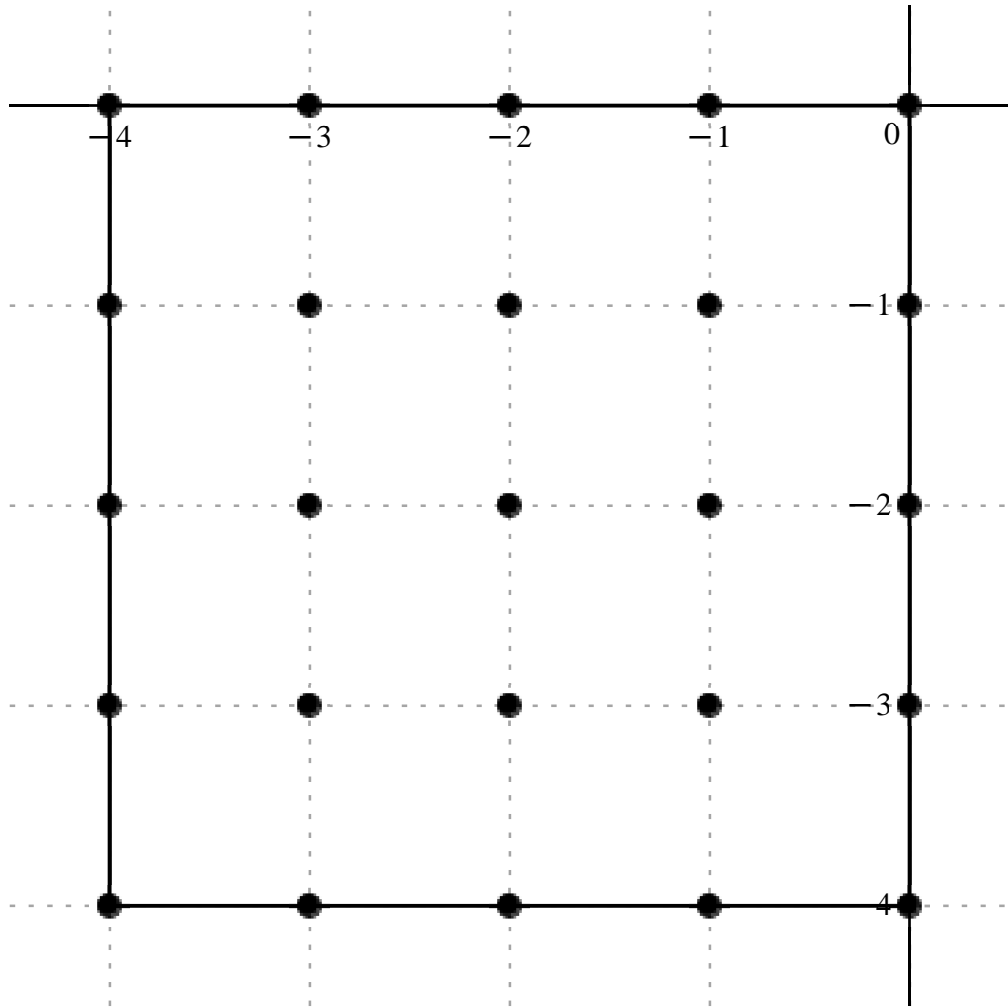
Error order.: 17, Error.: 1.5296313128928375369 × 10<sup>−74</sup>, New Error.: 1.5301030840668483386 × 10<sup>−91</sup>

Error order.: 17, Error.: 1.5301030840668483386 × 10<sup>−91</sup>, New Error.: 1.5301502650228663552 × 10<sup>−108</sup>

Error order.: 17, Error.: 1.5301502650228663552 × 10<sup>−108</sup>, New Error.: 1.5301549831568529265 × 10<sup>−125</sup>

$$x_o\,+\,h\,.\,,\,\left[\begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ -4\,-\,\mathrm{I} & -3\,-\,\mathrm{I} & -2\,-\,\mathrm{I} & -1\,-\,\mathrm{I} & -\mathrm{I} \\ -4\,-\,2\,\mathrm{I} & -3\,-\,2\,\mathrm{I} & -2\,-\,2\,\mathrm{I} & -1\,-\,2\,\mathrm{I} & -2\,\mathrm{I} \\ -4\,-\,3\,\mathrm{I} & -3\,-\,3\,\mathrm{I} & -2\,-\,3\,\mathrm{I} & -1\,-\,3\,\mathrm{I} & -3\,\mathrm{I} \\ -4\,-\,4\,\mathrm{I} & -3\,-\,4\,\mathrm{I} & -2\,-\,4\,\mathrm{I} & -1\,-\,4\,\mathrm{I} & -4\,\mathrm{I} \end{array}\right]$$

$$c\,=\,,\,\left[\begin{array}{ccccccccc} \frac{12195416683093}{13260000}+\frac{3092738978\,\mathrm{I}}{4875} & -\frac{9467258520524}{138125}-\frac{2243299291842\,\mathrm{I}}{138125} & \frac{64900262883519}{221000}+\frac{97105925889\,\mathrm{I}}{650} & -\frac{43655001092962}{414375}-\frac{32029056989804\,\mathrm{I}}{414375} & \frac{683937714271}{176800} \\ -\frac{5468926550444}{138125}-\frac{1144915443238\,\mathrm{I}}{31875} & -\frac{32089793166368}{4875}-\frac{10966019082676\,\mathrm{I}}{4875} & -\frac{4775878096794}{125}-\frac{12617796645846\,\mathrm{I}}{1625} & -\frac{53872314181756}{4875} & -\frac{43655001092962}{414375}+\frac{32029056989804\,\mathrm{I}}{414375} \\ \frac{37529907186807}{221000}+\frac{141413897457\,\mathrm{I}}{3250} & -\frac{44873081599374}{1625}-\frac{1312349852142\,\mathrm{I}}{325} & \frac{160904808102717}{1000} & -\frac{4775878096794}{125}+\frac{12617796645846\,\mathrm{I}}{1625} & \frac{64900262883519}{221000}-\frac{97105925889\,\mathrm{I}}{650} \\ -\frac{3630553621534}{82875}+\frac{768267018652\,\mathrm{I}}{82875} & -\frac{8881380163852}{1625} & -\frac{44873081599374}{1625}+\frac{1312349852142\,\mathrm{I}}{325} & -\frac{32089793166368}{4875}+\frac{10966019082676\,\mathrm{I}}{4875} & -\frac{9467258520524}{138125}+\frac{2243299291842\,\mathrm{I}}{138125} \\ \frac{10603004112533}{13260000} & -\frac{3630553621534}{82875}-\frac{768267018652\,\mathrm{I}}{82875} & \frac{37529907186807}{221000}-\frac{141413897457\,\mathrm{I}}{3250} & -\frac{5468926550444}{138125}+\frac{1144915443238\,\mathrm{I}}{31875} & \frac{12195416683093}{13260000}-\frac{3092738978\,\mathrm{I}}{4875} \end{array}\right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{13260000 \, \Delta x_{ol}^8} \, \big( 7 \, \big( (1742202383299 + 1201750002880 \, \mathrm{I}) \, u_{ol-4} - (129836688281472 + 30765247430976 \, \mathrm{I}) \, u_{ol-3} + (556287967573020 + 282994412590800 \, \mathrm{I}) \, u_{ol-2} - (199565719282112 + 146418546239104 \, \mathrm{I}) \, u_{ol-1} + 7327904081475 \, u_{ol} - (75002421263232 + 68040689198144 \, \mathrm{I}) \, u_{ol-4-1} - (12469176773217280 + 4261081700696960 \, \mathrm{I}) \, u_{ol-3-1} - (72375021215415360 + 14708745804300480 \, \mathrm{I}) \, u_{ol-2-1} - 20933242082053760 \, u_{ol-1-1} + (-199565719282112 + 146418546239104 \, \mathrm{I}) \, u_{ol-1} + (321684918744060 + 82424100232080 \, \mathrm{I}) \, u_{ol-4-21} - (52309192264413120 + 7649124852484800 \, \mathrm{I}) \, u_{ol-3-21} + 304799679348861060 \, u_{ol-2-21} + (-72375021215415360 + 14708745804300480 \, \mathrm{I}) \, u_{ol-1-21} + (556287967573020 - 282994412590800 \, \mathrm{I}) \, u_{ol-21} + (-82984082777920 + 17560388997760 \, \mathrm{I}) \, u_{ol-4-31} - 10353151733861760 \, u_{ol-3-31} + (-52309192264413120 + 7649124852484800 \, \mathrm{I}) \, u_{ol-2-31} + (-12469176773217280 + 4261081700696960 \, \mathrm{I}) \, u_{ol-1-31} + (-129836688281472 + 30765247430976 \, \mathrm{I}) \, u_{ol-31} + 1514714873219 \, u_{ol-4-41} - (82984082777920 + 17560388997760 \, \mathrm{I}) \, u_{ol-3-41} + (321684918744060 - 82424100232080 \, \mathrm{I}) \, u_{ol-2-41} + (-75002421263232 + 68040689198144 \, \mathrm{I}) \, u_{ol-1-41} + (1742202383299 - 1201750002880 \, \mathrm{I}) \, u_{ol-41} \big) \big) \, , \, O( \, \Delta x_{ol}^{17} \, )$$

Formula:, 171, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 9

Error order:, 16, Error:, 1.0144865975770857052 × 10−37, New Error:, 1.0297315619546711163 × 10−53

Error order:, 16, Error:, 1.0297315619546711163 × 10−53, New Error:, 1.0312482476795009627 × 10−69

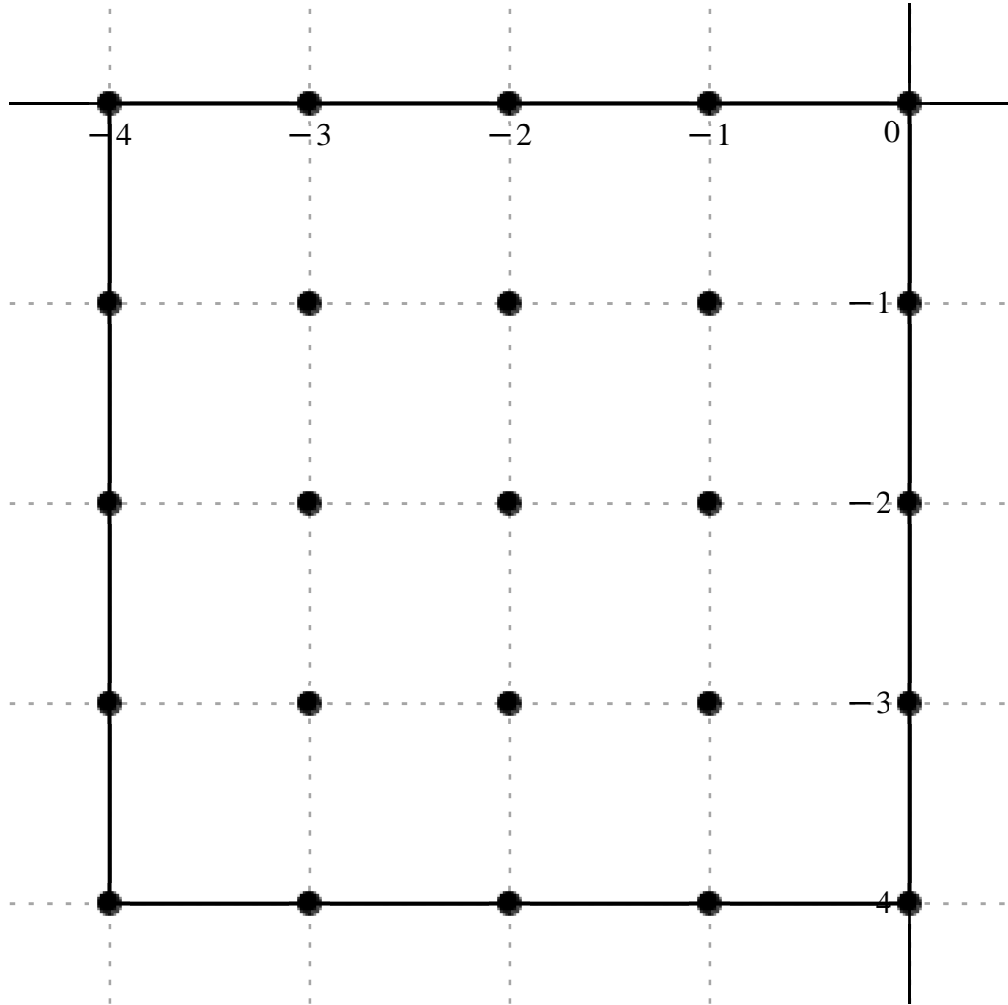
Error order:, 16, Error:, 1.0312482476795009627 × 10−69, New Error:, 1.0313998348999905621 × 10−85

Error order:, 16, Error:, 1.0313998348999905621 × 10−85, New Error:, 1.0314149928052466151 × 10−101

Error order:, 16, Error:, 1.0314149928052466151 × 10−101, New Error:, 1.0314165085876010155 × 10−117

$$x_o \, + h \, . \, , \, \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ -4 \, -1 & -3 \, -1 & -2 \, -1 & -1 \, -1 & -1 \\ -4 \, -2 \, \mathrm{I} & -3 \, -2 \, \mathrm{I} & -2 \, -2 \, \mathrm{I} & -1 \, -2 \, \mathrm{I} & -2 \, \mathrm{I} \\ -4 \, -3 \, \mathrm{I} & -3 \, -3 \, \mathrm{I} & -2 \, -3 \, \mathrm{I} & -1 \, -3 \, \mathrm{I} & -3 \, \mathrm{I} \\ -4 \, -4 \, \mathrm{I} & -3 \, -4 \, \mathrm{I} & -2 \, -4 \, \mathrm{I} & -1 \, -4 \, \mathrm{I} & -4 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{53906128521}{8125} - \frac{4639108467 \text{ I}}{3250} & - \frac{5710731446343}{16250} + \frac{3809124960081 \text{ I}}{16250} & \frac{226490810364}{125} - \frac{873953333001 \text{ I}}{1300} & - \frac{903746382693}{1250} + \frac{173250480669 \text{ I}}{1250} & \frac{18863939199}{1300} - \frac{18863939199 \text{ I}}{1300} \\ - \frac{5250697917087}{16250} + \frac{362930639001 \text{ I}}{16250} & - \frac{60160971852051}{1625} + \frac{31019676366693 \text{ I}}{1625} & - \frac{307766419667028}{1625} + \frac{210663294739821 \text{ I}}{1625} & - \frac{73077514438341}{1625} + \frac{73077514438341 \text{ I}}{1625} & - \frac{173250480669}{1250} + \frac{903746382693 \text{ I}}{1250} \\ \frac{5905482671151}{6500} - \frac{897275968533 \text{ I}}{1625} & - \frac{217325917255419}{1625} + \frac{164569192619076 \text{ I}}{1625} & \frac{84586823164746}{125} - \frac{84586823164746 \text{ I}}{125} & - \frac{210663294739821}{1625} + \frac{307766419667028 \text{ I}}{1625} & \frac{873953333001}{1300} - \frac{226490810364 \text{ I}}{125} \\ - \frac{479271279291}{3250} + \frac{744271033443 \text{ I}}{3250} & - \frac{2921019871119}{125} + \frac{2921019871119 \text{ I}}{125} & - \frac{164569192619076}{1625} + \frac{217325917255419 \text{ I}}{1625} & - \frac{31019676366693}{1625} + \frac{60160971852051 \text{ I}}{1625} & - \frac{3809124960081}{16250} + \frac{5710731446343 \text{ I}}{16250} \\ \frac{112203100527}{32500} - \frac{112203100527 \text{ I}}{32500} & - \frac{744271033443}{3250} + \frac{479271279291 \text{ I}}{3250} & \frac{897275968533}{1625} - \frac{5905482671151 \text{ I}}{6500} & - \frac{362930639001}{16250} + \frac{5250697917087 \text{ I}}{16250} & \frac{4639108467}{3250} - \frac{53906128521 \text{ I}}{8125} \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{32500 \, \Delta x_{ol}^9} \big( 21 \, \big( (10267834004 - 2209099270 \, \text{I}) \, u_{ol-4} + ( -543879185366 + 362773805722 \, \text{I}) \, u_{ol-3} + (2804171937840 - 1040420634525 \, \text{I}) \, u_{ol-2} + ( -1118924092858 + 214500595114 \, \text{I}) \, u_{ol-1} + (22457070475 - 22457070475 \, \text{I}) \, u_{ol} + ( -500066468294 + 34564822762 \, \text{I}) \, u_{ol-4-1} + ( -57296163668620 \\ + 29542548920660 \, \text{I}) \, u_{ol-3-1} + ( -293110875873360 + 200631709276020 \, \text{I}) \, u_{ol-2-1} + ( -69597632798420 + 69597632798420 \, \text{I}) \, u_{ol-1-1} + ( -214500595114 + 1118924092858 \, \text{I}) \, u_{ol-1} + (1406067302655 - 854548541460 \, \text{I}) \, u_{ol-4-21} + ( -206977064052780 + 156732564399120 \, \text{I}) \, u_{ol-3-21} + (1047265429658760 \\ - 1047265429658760 \, \text{I}) \, u_{ol-2-21} + ( -200631709276020 + 293110875873360 \, \text{I}) \, u_{ol-1-21} + (1040420634525 - 2804171937840 \, \text{I}) \, u_{ol-21} + ( -228224418710 + 354414777830 \, \text{I}) \, u_{ol-4-31} + ( -36165007928140 + 36165007928140 \, \text{I}) \, u_{ol-3-31} + ( -156732564399120 + 206977064052780 \, \text{I}) \, u_{ol-2-31} + ( -29542548920660 \\ + 57296163668620 \, \text{I}) \, u_{ol-1-31} + ( -362773805722 + 543879185366 \, \text{I}) \, u_{ol-31} + (5343004787 - 5343004787 \, \text{I}) \, u_{ol-4-41} + ( -354414777830 + 228224418710 \, \text{I}) \, u_{ol-3-41} + (854548541460 - 1406067302655 \, \text{I}) \, u_{ol-2-41} + ( -34564822762 + 500066468294 \, \text{I}) \, u_{ol-1-41} + (2209099270 - 10267834004 \, \text{I}) \, u_{ol-41} \big) \big) , \, O( \, \Delta x_{ol}^{16} \, )$$

Formula.: 172, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 10

Error order.: 15, Error.: 4.5628437117268927491 × 10<sup>−35</sup>, New Error.: 4.7060529934983382279 × 10<sup>−50</sup>

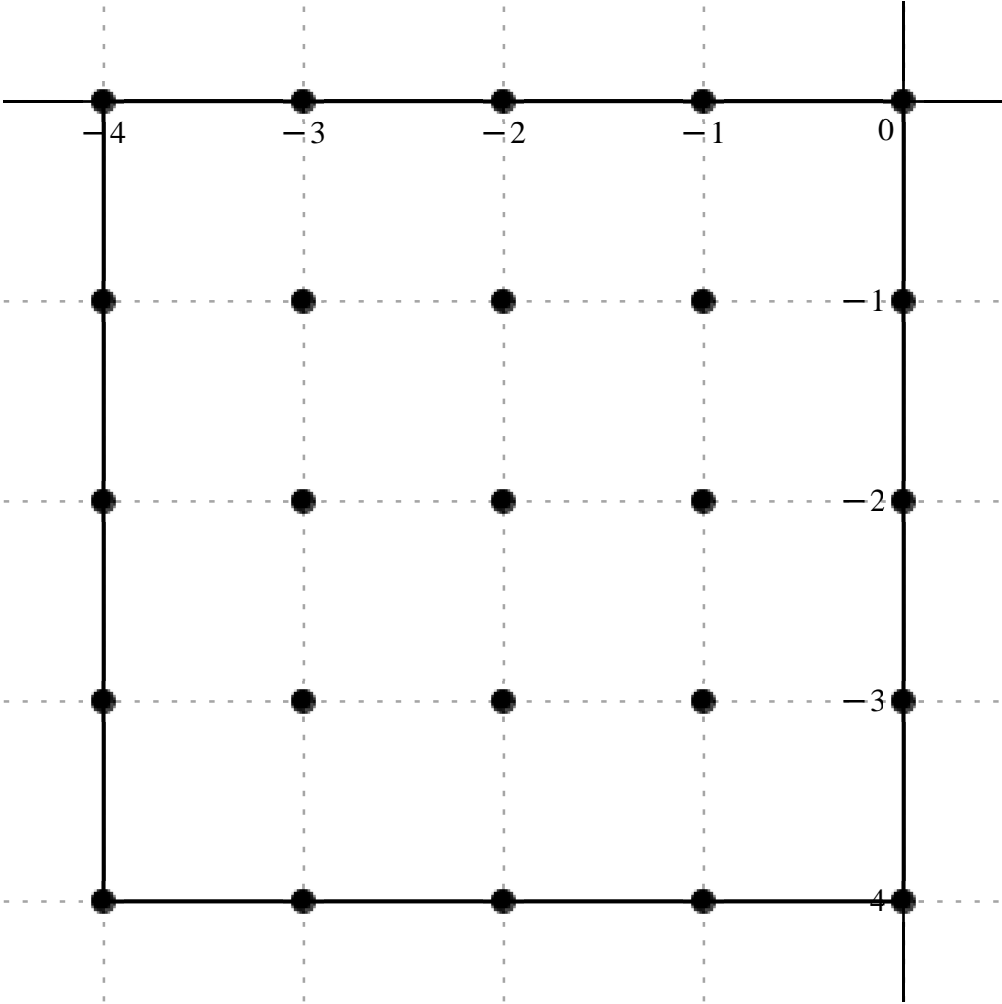
Error order.: 15, Error.: 4.7060529934983382279 × 10<sup>−50</sup>, New Error.: 4.7204911605195704342 × 10<sup>−65</sup>



*Error order:*, 15,    *Error:*,  $4.7204911605195704342 \times 10^{-65}$ ,    *New Error:*,  $4.7219361455161989405 \times 10^{-80}$   
*Error order:*, 15,    *Error:*,  $4.7219361455161989405 \times 10^{-80}$ ,    *New Error:*,  $4.7220806556945864537 \times 10^{-95}$   
*Error order:*, 15,    *Error:*,  $4.7220806556945864537 \times 10^{-95}$ ,    *New Error:*,  $4.7220951068292082185 \times 10^{-110}$

$$x_o + h \cdot,$$
$$\begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ -4 - \mathrm{I} & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -4 - 2 \mathrm{I} & -3 - 2 \mathrm{I} & -2 - 2 \mathrm{I} & -1 - 2 \mathrm{I} & -2 \mathrm{I} \\ -4 - 3 \mathrm{I} & -3 - 3 \mathrm{I} & -2 - 3 \mathrm{I} & -1 - 3 \mathrm{I} & -3 \mathrm{I} \\ -4 - 4 \mathrm{I} & -3 - 4 \mathrm{I} & -2 - 4 \mathrm{I} & -1 - 4 \mathrm{I} & -4 \mathrm{I} \end{bmatrix}$$

$$c =,$$
$$\begin{bmatrix} \frac{255973965891}{13000} - \frac{85041479061 \mathrm{I}}{2600} & -\frac{611614744419}{1625} + \frac{3760675466373 \mathrm{I}}{1625} & \frac{1300005785043}{325} - \frac{2521555722819 \mathrm{I}}{260} & -\frac{3342448384191}{1625} + \frac{5293319430903 \mathrm{I}}{1625} & -\frac{26557160343 \mathrm{I}}{260} \\ -\frac{1892892278109}{1625} + \frac{2268884329677 \mathrm{I}}{1625} & -\frac{21417266783388}{325} + \frac{71975829052134 \mathrm{I}}{325} & -\frac{68946797958066}{325} + \frac{401046643728612 \mathrm{I}}{325} & \frac{110394544229718 \mathrm{I}}{325} & \frac{3342448384191}{1625} + \frac{5293319430903 \mathrm{I}}{1625} \\ \frac{875568381093}{650} - \frac{7569789083577 \mathrm{I}}{1300} & -\frac{7827605321886}{65} + \frac{301203582319836 \mathrm{I}}{325} & -\frac{131876879143779 \mathrm{I}}{25} & \frac{68946797958066}{325} + \frac{401046643728612 \mathrm{I}}{325} & -\frac{1300005785043}{325} - \frac{2521555722819 \mathrm{I}}{260} \\ \frac{108100091547}{325} + \frac{487414740939 \mathrm{I}}{325} & \frac{60201018819102 \mathrm{I}}{325} & \frac{7827605321886}{65} + \frac{301203582319836 \mathrm{I}}{325} & \frac{21417266783388}{325} + \frac{71975829052134 \mathrm{I}}{325} & \frac{611614744419}{1625} + \frac{3760675466373 \mathrm{I}}{1625} \\ -\frac{44924422431 \mathrm{I}}{1625} & -\frac{108100091547}{325} + \frac{487414740939 \mathrm{I}}{325} & -\frac{875568381093}{650} - \frac{7569789083577 \mathrm{I}}{1300} & \frac{1892892278109}{1625} + \frac{2268884329677 \mathrm{I}}{1625} & -\frac{255973965891}{13000} - \frac{85041479061 \mathrm{I}}{2600} \end{bmatrix}$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\; u(x_{ol}) = \frac{1}{13000\; \mathcal{A}_{ol}^{10}}\; \big( 21\; \big( (12189236471 - 20247971205 \mathrm{I})\; u_{ol-4} + (-232996093112 + 1432638272904 \mathrm{I})\; u_{ol-3} + (2476201495320 - 6003704101950 \mathrm{I})\; u_{ol-2} + (-1273313670168 + 2016502640344 \mathrm{I})\; u_{ol-1} - 63231334150 \mathrm{I}\; u_{ol} + (-721101820232 + 864336887496 \mathrm{I})\; u_{ol-4-1} + (-40794793873120$$
  
$$+ 137096817242160 \mathrm{I})\; u_{ol-3-1} + (-131327234205840 + 763898369006880 \mathrm{I})\; u_{ol-2-1} + 210275322342320 \mathrm{I}\; u_{ol-1-1} + (1273313670168 + 2016502640344 \mathrm{I})\; u_{ol-1} + (833874648660 - 3604661468370 \mathrm{I})\; u_{ol-4-21} + (-74548622113200 + 573721109180640 \mathrm{I})\; u_{ol-3-21} - 3265522721655480 \mathrm{I}\; u_{ol-2-21} + (131327234205840$$
  
$$+ 763898369006880 \mathrm{I})\; u_{ol-1-21} - (2476201495320 + 6003704101950 \mathrm{I})\; u_{ol-21} + (205904936280 + 928409030360 \mathrm{I})\; u_{ol-4-31} + 114668607274480 \mathrm{I}\; u_{ol-3-31} + (74548622113200 + 573721109180640 \mathrm{I})\; u_{ol-2-31} + (40794793873120 + 137096817242160 \mathrm{I})\; u_{ol-1-31} + (232996093112 + 1432638272904 \mathrm{I})\; u_{ol-31}$$
  
$$- 17114065688 \mathrm{I}\; u_{ol-4-41} + (-205904936280 + 928409030360 \mathrm{I})\; u_{ol-3-41} - (833874648660 + 3604661468370 \mathrm{I})\; u_{ol-2-41} + (721101820232 + 864336887496 \mathrm{I})\; u_{ol-1-41} - (12189236471 + 20247971205 \mathrm{I})\; u_{ol-41} \big) \big),\; O(\; \mathcal{A}_{ol}^{15} \; )$$

Formula:, 173, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 1

Error order:, 14, Error:,  $3.2304066747643331390 \times 10^{-36}$ , New Error:,  $3.2007242634771626173 \times 10^{-50}$

Error order:, 14, Error:,  $3.2007242634771626173 \times 10^{-50}$ , New Error:,  $3.1977698681070147116 \times 10^{-64}$

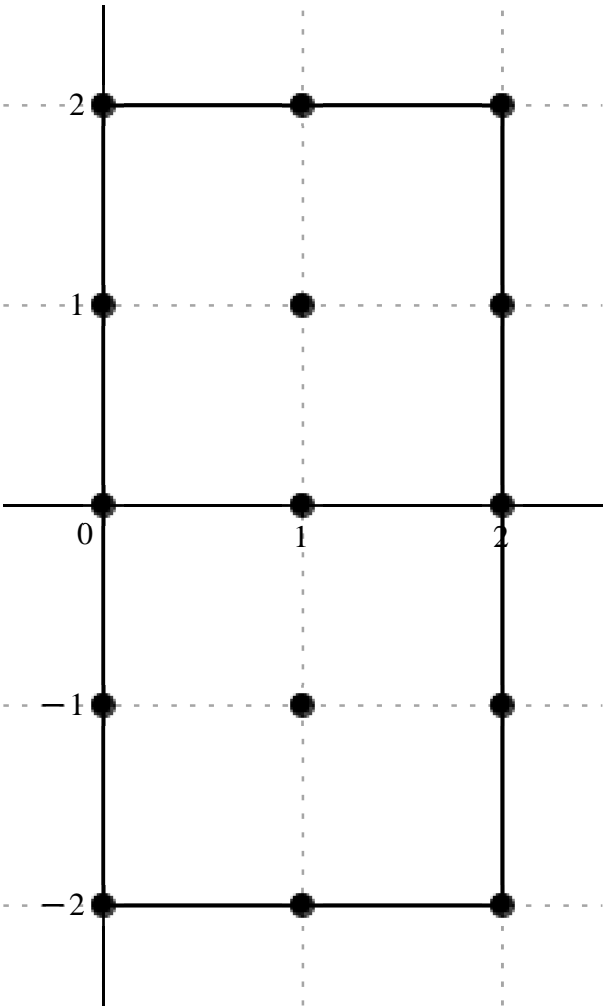
Error order:, 14, Error:,  $3.1977698681070147116 \times 10^{-64}$ , New Error:,  $3.1974745666380793026 \times 10^{-78}$

Error order:, 14, Error:,  $3.1974745666380793026 \times 10^{-78}$ , New Error:,  $3.1974450378714777428 \times 10^{-92}$

Error order:, 14, Error:,  $3.1974450378714777428 \times 10^{-92}$ , New Error:,  $3.1974420850086201178 \times 10^{-106}$

$$x_o + h., \begin{bmatrix} 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ \text{ I} & 1+\text{ I} & 2+\text{ I} \\ 0 & 1 & 2 \\ -\text{ I} & 1-\text{ I} & 2-\text{ I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{7}{884} + \frac{\text{ I}}{2652} & \frac{4}{255} - \frac{8\text{ I}}{255} & \frac{5}{1326} + \frac{11\text{ I}}{2652} \\ -\frac{4}{13} + \frac{8\text{ I}}{39} & -\frac{4}{3} + \frac{4\text{ I}}{3} & -\frac{4}{195} + \frac{32\text{ I}}{195} \\ -\frac{21}{5} & 8 & -\frac{1}{2} \\ -\frac{4}{13} - \frac{8\text{ I}}{39} & -\frac{4}{3} - \frac{4\text{ I}}{3} & -\frac{4}{195} - \frac{32\text{ I}}{195} \\ -\frac{7}{884} - \frac{\text{ I}}{2652} & \frac{4}{255} + \frac{8\text{ I}}{255} & \frac{5}{1326} - \frac{11\text{ I}}{2652} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u\big(x_{ol}\big)=\frac{1}{13260\,\mathcal{A}_{ol}}\Big((\,-105+5\,\mathrm{I}\,)\,u_{\,ol+2\mathrm{I}}+(208-416\,\mathrm{I})\,u_{\,ol+1+2\mathrm{I}}+(50+55\,\mathrm{I})\,u_{\,ol+2+2\mathrm{I}}+(\,-4080+2720\,\mathrm{I}\,)\,u_{\,ol+1}+(\,-17680+17680\,\mathrm{I}\,)\,u_{\,ol+1+\mathrm{I}}+(\,-272+2176\,\mathrm{I}\,)\,u_{\,ol+2+\mathrm{I}}-55692\,u_{\,ol}+106080\,u_{\,ol+1}-6630\,u_{\,ol+2}-(4080+2720\,\mathrm{I})\,u_{\,ol-1}-(17680+17680\,\mathrm{I})\,u_{\,ol+1-\mathrm{I}}-(272+2176\,\mathrm{I})\,u_{\,ol+2-\mathrm{I}}-(105+5\,\mathrm{I})\,u_{\,ol-2\mathrm{I}}+(208+416\,\mathrm{I})\,u_{\,ol+1-2\mathrm{I}}+(50-55\,\mathrm{I})\,u_{\,ol+2-2\mathrm{I}}\Big),\,\,O(\,\,\mathcal{A}_{ol}^{14}\,\,)$$

Formula:, 174, Var.:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 2

Error order:., 13, Error:., 2.4664544565047299173 × 10<sup>−33</sup>, New Error:., 2.4441496299637094010 × 10<sup>−46</sup>

Error order:., 13, Error:., 2.4441496299637094010 × 10<sup>−46</sup>, New Error:., 2.4419293765254750715 × 10<sup>−59</sup>

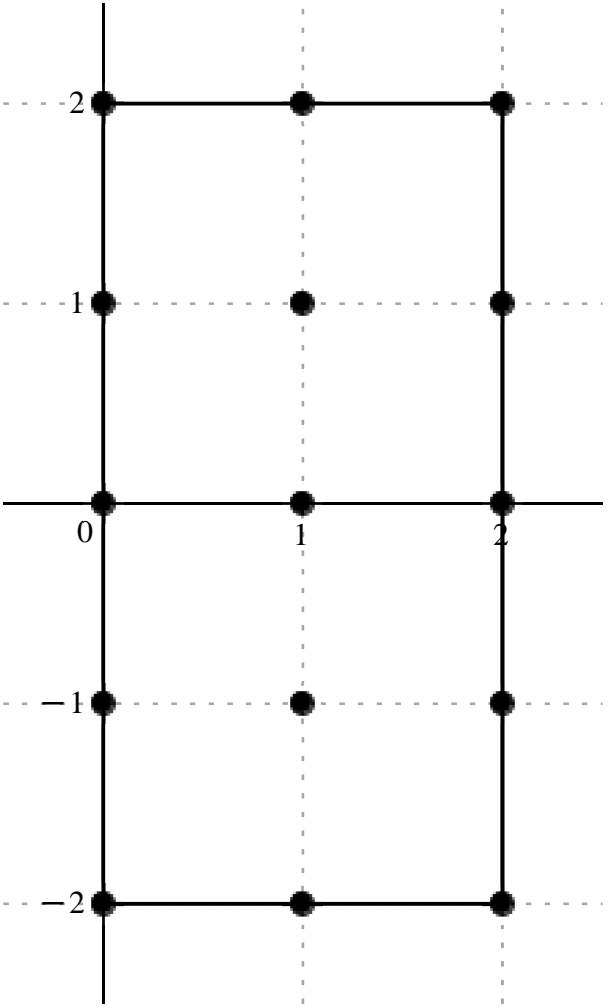
Error order:., 13, Error:., 2.4419293765254750715 × 10<sup>−59</sup>, New Error:., 2.4417074531916589854 × 10<sup>−72</sup>

Error order:., 13, Error:., 2.4417074531916589854 × 10<sup>−72</sup>, New Error:., 2.4416852618780957878 × 10<sup>−85</sup>

Error order:., 13, Error:., 2.4416852618780957878 × 10<sup>−85</sup>, New Error:., 2.4416830427569373705 × 10<sup>−98</sup>

$$x_o\neq h\,.,\left[\begin{array}{ccc}2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}\\ 0&1&2\\ -\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}\\ -2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{ccc}\frac{887}{13260}+\frac{21\,\mathrm{I}}{4420}&-\frac{64}{425}+\frac{304\,\mathrm{I}}{1275}&-\frac{49}{1768}-\frac{919\,\mathrm{I}}{26520}\\\frac{584}{195}-\frac{72\,\mathrm{I}}{65}&\frac{56}{5}-\frac{128\,\mathrm{I}}{15}&\frac{72}{325}-\frac{1208\,\mathrm{I}}{975}\\\frac{1889}{100}&-\frac{256}{5}&\frac{37}{10}\\\frac{584}{195}+\frac{72\,\mathrm{I}}{65}&\frac{56}{5}+\frac{128\,\mathrm{I}}{15}&\frac{72}{325}+\frac{1208\,\mathrm{I}}{975}\\\frac{887}{13260}-\frac{21\,\mathrm{I}}{4420}&-\frac{64}{425}-\frac{304\,\mathrm{I}}{1275}&-\frac{49}{1768}+\frac{919\,\mathrm{I}}{26520}\end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{132600 \, \Delta x_{ol}^2} \, \big( (8870 + 630 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (-19968 + 31616 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} - (3675 + 4595 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (397120 - 146880 \, \mathrm{I}) \, u_{ol+1} + (1485120 - 1131520 \, \mathrm{I}) \, u_{ol+1+1} + (29376 - 164288 \, \mathrm{I}) \, u_{ol+2+1} + 2504814 \, u_{ol} - 6789120 \, u_{ol+1} + 490620 \, u_{ol+2} + (397120 + 146880 \, \mathrm{I}) \, u_{ol-1} + (1485120 + 1131520 \, \mathrm{I}) \, u_{ol+1-1} + (29376$$
  
$$+ 164288 \, \mathrm{I}) \, u_{ol+2-1} + (8870 - 630 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} - (19968 + 31616 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (-3675 + 4595 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} \big), \, O( \, \Delta x_{ol}^{13} \, )$$

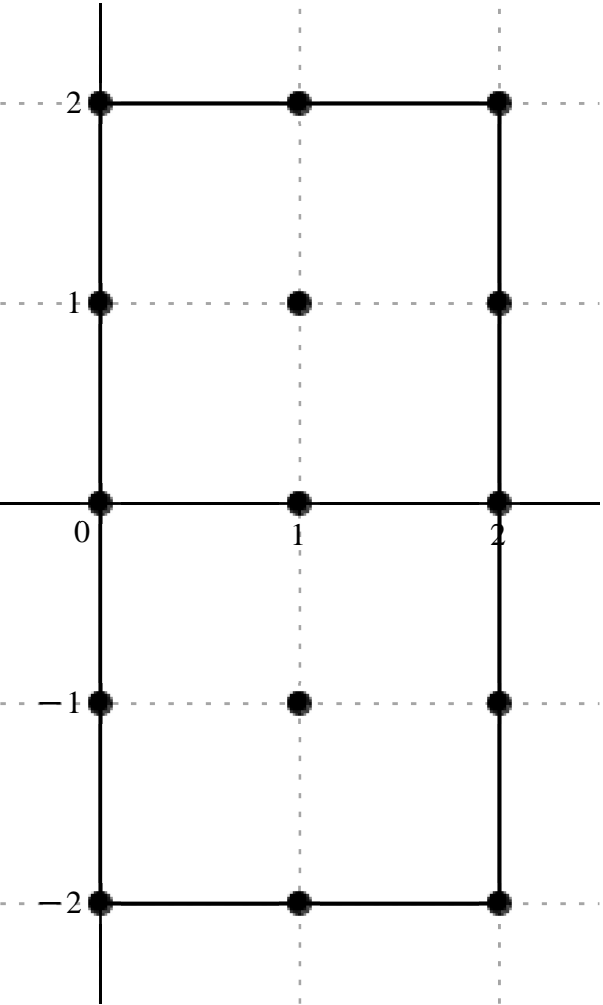
Formula:, 175, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 12, Error:,  $1.5124917355407436033 \times 10^{-30}$ , New Error:,  $1.4990043534080292981 \times 10^{-42}$   
Error order:, 12, Error:,  $1.4990043534080292981 \times 10^{-42}$ , New Error:,  $1.4976617121690410965 \times 10^{-54}$   
Error order:, 12, Error:,  $1.4976617121690410965 \times 10^{-54}$ , New Error:,  $1.4975275088494051718 \times 10^{-66}$   
Error order:, 12, Error:,  $1.4975275088494051718 \times 10^{-66}$ , New Error:,  $1.4975140891253190089 \times 10^{-78}$   
Error order:, 12, Error:,  $1.4975140891253190089 \times 10^{-78}$ , New Error:,  $1.4975127471589890017 \times 10^{-90}$

$$x_o \neq h \, , \, \left[ \begin{array}{ccc} 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & 2 + 2 \, \mathrm{I} \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} \\ 0 & 1 & 2 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & 2 - 2 \, \mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} -\frac{3003}{6800} - \frac{537 \text{ I}}{6800} & \frac{461}{425} - \frac{618 \text{ I}}{425} & \frac{227}{1360} + \frac{1563 \text{ I}}{6800} \\ -\frac{519}{25} + \frac{66 \text{ I}}{25} & -\frac{1789}{25} + \frac{1149 \text{ I}}{25} & -\frac{41}{25} + \frac{192 \text{ I}}{25} \\ -\frac{3627}{40} & \frac{7494}{25} & -\frac{4557}{200} \\ -\frac{519}{25} - \frac{66 \text{ I}}{25} & -\frac{1789}{25} - \frac{1149 \text{ I}}{25} & -\frac{41}{25} - \frac{192 \text{ I}}{25} \\ -\frac{3003}{6800} + \frac{537 \text{ I}}{6800} & \frac{461}{425} + \frac{618 \text{ I}}{425} & \frac{227}{1360} - \frac{1563 \text{ I}}{6800} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{6800 \, \Delta x_{ol}^3} \big( -(3003 + 537 \, \text{I}) \, u_{ol+2\text{I}} + (7376 - 9888 \, \text{I}) \, u_{ol+1+2\text{I}} + (1135 + 1563 \, \text{I}) \, u_{ol+2+2\text{I}} + (-141168 + 17952 \, \text{I}) \, u_{ol+1} + (-486608 + 312528 \, \text{I}) \, u_{ol+1+1} + (-11152 + 52224 \, \text{I}) \, u_{ol+2+1} - 616590 \, u_{ol} + 2038368 \, u_{ol+1} - 154938 \, u_{ol+2} - (141168 + 17952 \, \text{I}) \, u_{ol-1} - (486608 + 312528 \, \text{I}) \, u_{ol+1-1} - (11152 + 52224 \, \text{I}) \, u_{ol+2-1} + (-3003 + 537 \, \text{I}) \, u_{ol-2\text{I}} + (7376 + 9888 \, \text{I}) \, u_{ol+1-2\text{I}} + (1135 - 1563 \, \text{I}) \, u_{ol+2-2\text{I}} \big), \, O( \, \Delta x_{ol}^{12} \, )$$

Formula:, 176, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 4

Error order:, 11, Error:, 8.7991586485633695637 × 10<sup>−28</sup>, New Error:, 8.7216608719453251051 × 10<sup>−39</sup>

Error order:, 11, Error:, 8.7216608719453251051 × 10<sup>−39</sup>, New Error:, 8.7139456988391412377 × 10<sup>−50</sup>

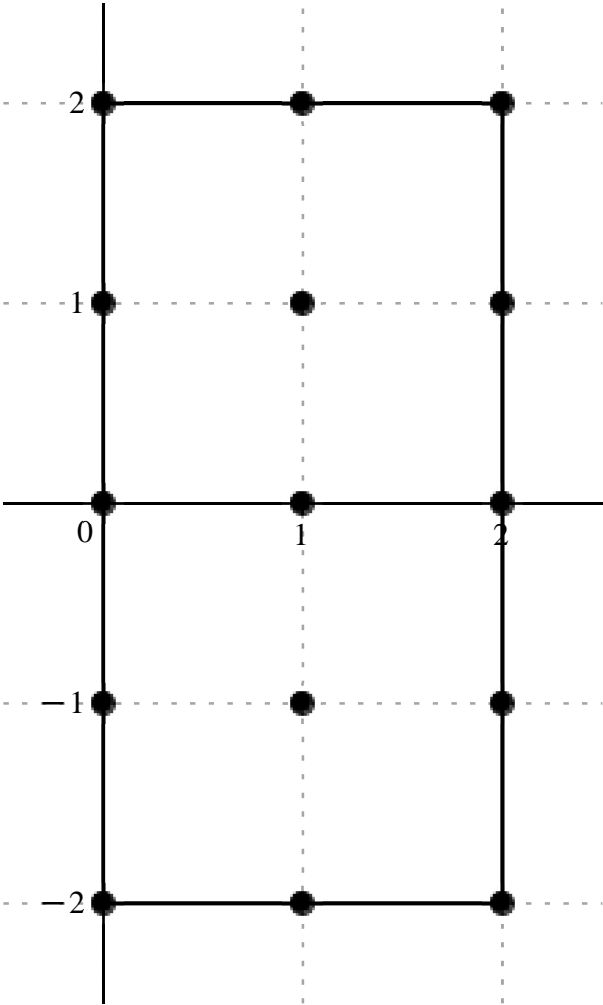
Error order:, 11, Error:, 8.7139456988391412377 × 10<sup>−50</sup>, New Error:, 8.7131745266473254191 × 10<sup>−61</sup>

Error order:, 11, Error:, 8.7131745266473254191 × 10<sup>−61</sup>, New Error:, 8.7130974128784066527 × 10<sup>−72</sup>

Error order:, 11, Error:, 8.7130974128784066527 × 10<sup>−72</sup>, New Error:, 8.7130897015360164791 × 10<sup>−83</sup>

$$x_o \neq h., \left[ \begin{array}{ccc} 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & 2 + 2 \, \mathrm{I} \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} \\ 0 & 1 & 2 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & 2 - 2 \, \mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} \frac{2307}{850} + \frac{1269 \, \mathrm{I}}{1700} & -\frac{3038}{425} + \frac{212 \, \mathrm{I}}{25} & -\frac{3301}{3400} - \frac{4901 \, \mathrm{I}}{3400} \\ \frac{3054}{25} + \frac{216 \, \mathrm{I}}{25} & \frac{2162}{5} - \frac{6214 \, \mathrm{I}}{25} & \frac{274}{25} - \frac{1148 \, \mathrm{I}}{25} \\ \frac{8931}{20} & -\frac{42564}{25} & \frac{6789}{50} \\ \frac{3054}{25} - \frac{216 \, \mathrm{I}}{25} & \frac{2162}{5} + \frac{6214 \, \mathrm{I}}{25} & \frac{274}{25} + \frac{1148 \, \mathrm{I}}{25} \\ \frac{2307}{850} - \frac{1269 \, \mathrm{I}}{1700} & -\frac{3038}{425} - \frac{212 \, \mathrm{I}}{25} & -\frac{3301}{3400} + \frac{4901 \, \mathrm{I}}{3400} \end{array} \right]$$



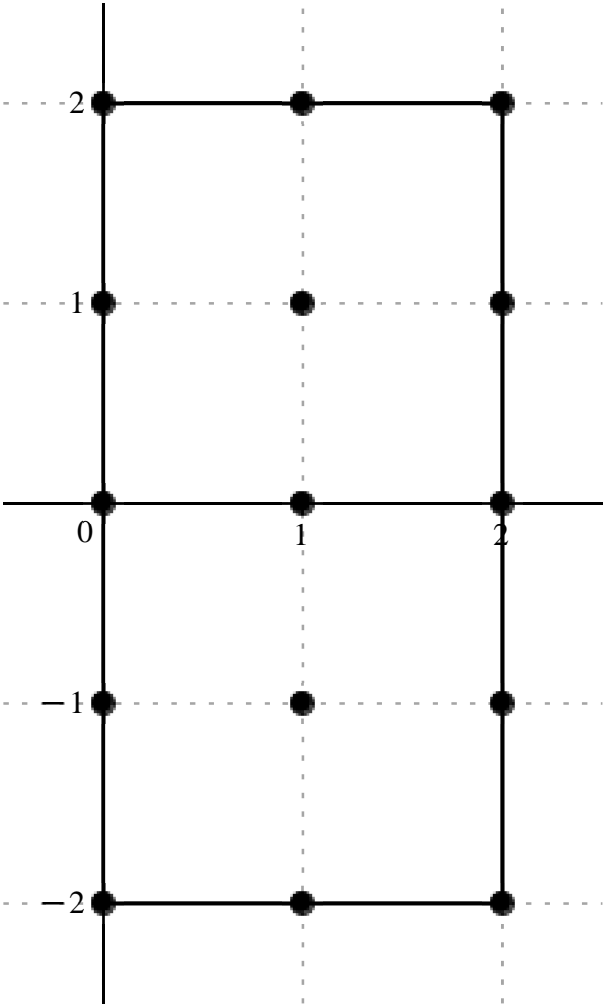
$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{3400 \, \Delta x_{ol}^4} \Big( (9228 + 2538 \, \mathrm{I}) \, u_{ol+21} + (-24304 + 28832 \, \mathrm{I}) \, u_{ol+1+21} - (3301 + 4901 \, \mathrm{I}) \, u_{ol+2+21} + (415344 + 29376 \, \mathrm{I}) \, u_{ol+1} + (1470160 - 845104 \, \mathrm{I}) \, u_{ol+1+1} + (37264 - 156128 \, \mathrm{I}) \, u_{ol+2+1} + 1518270 \, u_{ol} - 5788704 \, u_{ol+1} + 461652 \, u_{ol+2} + (415344 - 29376 \, \mathrm{I}) \, u_{ol-1} + (1470160 + 845104 \, \mathrm{I}) \, u_{ol+1-1} + (37264 + 156128 \, \mathrm{I}) \, u_{ol+2-1} + (9228 - 2538 \, \mathrm{I}) \, u_{ol-21} - (24304 + 28832 \, \mathrm{I}) \, u_{ol+1-21} + (-3301 + 4901 \, \mathrm{I}) \, u_{ol+2-21} \Big), \, O( \, \Delta x_{ol}^{11} \, )$$

$$Variavel \, :, x_{ol} \, , \quad Derivada \, de \, Ordem \, :, 5$$

*Error order*., 10, *Error*.,  $4.9236301868156703508 \times 10^{-25}$ , *New Error*.,  $4.8808278562209975543 \times 10^{-35}$   
*Error order*., 10, *Error*.,  $4.8808278562209975543 \times 10^{-35}$ , *New Error*.,  $4.8765664931180149672 \times 10^{-45}$   
*Error order*., 10, *Error*.,  $4.8765664931180149672 \times 10^{-45}$ , *New Error*.,  $4.8761405450088202483 \times 10^{-55}$   
*Error order*., 10, *Error*.,  $4.8761405450088202483 \times 10^{-55}$ , *New Error*.,  $4.8760979520794141656 \times 10^{-65}$   
*Error order*., 10, *Error*.,  $4.8760979520794141656 \times 10^{-65}$ , *New Error*.,  $4.8760936928052881936 \times 10^{-75}$

$$x_o \neq h. , \quad \begin{bmatrix} 2 \, \mathbf{I} & 1 + 2 \, \mathbf{I} & 2 + 2 \, \mathbf{I} \\ \mathbf{I} & 1 + \mathbf{I} & 2 + \mathbf{I} \\ 0 & 1 & 2 \\ -\mathbf{I} & 1 - \mathbf{I} & 2 - \mathbf{I} \\ -2 \, \mathbf{I} & 1 - 2 \, \mathbf{I} & 2 - 2 \, \mathbf{I} \end{bmatrix}$$

$$c = , \quad \begin{bmatrix} -\frac{21507}{1360} - \frac{8083 \, \mathbf{I}}{1360} & \frac{3811}{85} - \frac{4018 \, \mathbf{I}}{85} & \frac{7349}{1360} + \frac{2359 \, \mathbf{I}}{272} \\ -\frac{3219}{5} - \frac{764 \, \mathbf{I}}{5} & -\frac{12587}{5} + \frac{6373 \, \mathbf{I}}{5} & -\frac{349}{5} + \frac{1318 \, \mathbf{I}}{5} \\ -\frac{17433}{8} & \frac{46746}{5} & -\frac{31077}{40} \\ -\frac{3219}{5} + \frac{764 \, \mathbf{I}}{5} & -\frac{12587}{5} - \frac{6373 \, \mathbf{I}}{5} & -\frac{349}{5} - \frac{1318 \, \mathbf{I}}{5} \\ -\frac{21507}{1360} + \frac{8083 \, \mathbf{I}}{1360} & \frac{3811}{85} + \frac{4018 \, \mathbf{I}}{85} & \frac{7349}{1360} - \frac{2359 \, \mathbf{I}}{272} \end{bmatrix}$$



$$\begin{aligned}
 \frac{\mathrm{d}s}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = & \frac{1}{1360 \, \Delta x_{ol}^5} \big( -(21507 + 8083 \, \mathbf{I}) \, u_{ol+21} + (60976 - 64288 \, \mathbf{I}) \, u_{ol+1+21} + (7349 + 11795 \, \mathbf{I}) \, u_{ol+2+21} \\
 & - (875568 + 207808 \, \mathbf{I}) \, u_{ol+1} + (-3423664 + 1733456 \, \mathbf{I}) \, u_{ol+1+1} + (-94928 + 358496 \, \mathbf{I}) \, u_{ol+2+1} \\
 & - 2963610 \, u_{ol} + 12714912 \, u_{ol+1} - 1056618 \, u_{ol+2} + (-875568 + 207808 \, \mathbf{I}) \, u_{ol-1} - (3423664 + 1733456 \, \mathbf{I}) \, u_{ol+1-1} - (94928 \\
 & + 358496 \, \mathbf{I}) \, u_{ol+2-1} + (-21507 + 8083 \, \mathbf{I}) \, u_{ol-21} + (60976 + 64288 \, \mathbf{I}) \, u_{ol+1-21} + (7349 - 11795 \, \mathbf{I}) \, u_{ol+2-21} \big) \cdot O( \, \Delta x_{ol}^{10} \, )
 \end{aligned}$$

Formula.: 178, Var.: 1

Variavel .:,  $x_{ol}$  , Derivada de Ordem .:, 6

Error order.: 9, Error.:  $2.6207343417474468819 \times 10^{-22}$ , New Error.:  $2.5982910173419130595 \times 10^{-31}$

Error order.: 9, Error.:  $2.5982910173419130595 \times 10^{-31}$ , New Error.:  $2.5960564376497165116 \times 10^{-40}$

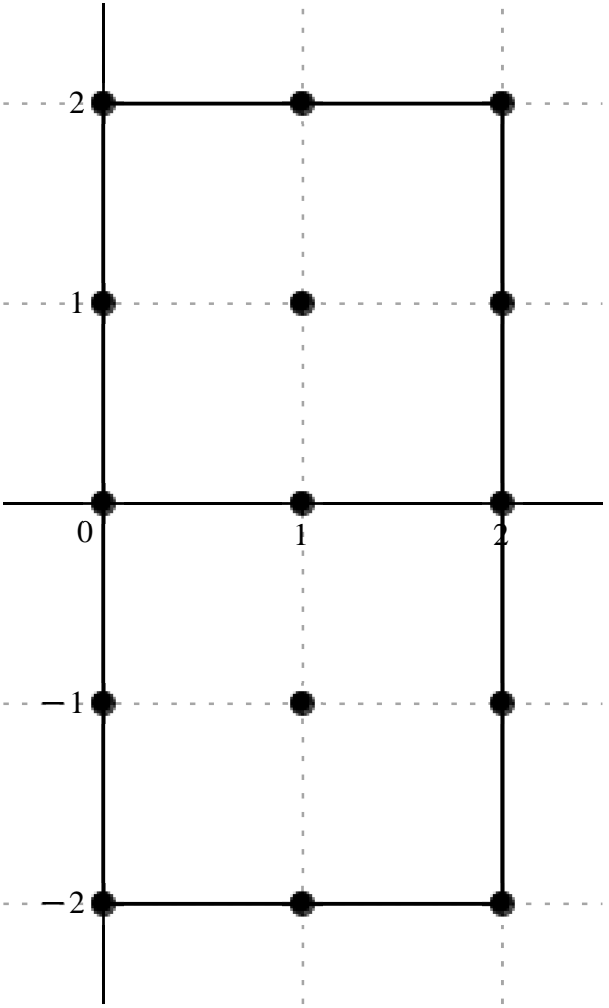
Error order.: 9, Error.:  $2.5960564376497165116 \times 10^{-40}$ , New Error.:  $2.5958330769542787891 \times 10^{-49}$

Error order.: 9, Error.:  $2.5958330769542787891 \times 10^{-49}$ , New Error.:  $2.5958107418572195410 \times 10^{-58}$

Error order.: 9, Error.:  $2.5958107418572195410 \times 10^{-58}$ , New Error.:  $2.5958085083572382082 \times 10^{-67}$

$$x_o+h., \begin{bmatrix} 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ \text{ I} & 1+\text{ I} & 2+\text{ I} \\ 0 & 1 & 2 \\ -\text{ I} & 1-\text{ I} & 2-\text{ I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \end{bmatrix}$$
$$c=, \begin{bmatrix} \frac{29139}{340}+\frac{7227\text{ I}}{170} & -\frac{22503}{85}+\frac{20898\text{ I}}{85} & -\frac{19167}{680}-\frac{33543\text{ I}}{680} \\ \frac{15531}{5}+\frac{5904\text{ I}}{5} & \frac{68523}{5}-6057\text{ I} & 417-\frac{7146\text{ I}}{5} \\ \frac{205101}{20} & -\frac{242514}{5} & \frac{21033}{5} \\ \frac{15531}{5}-\frac{5904\text{ I}}{5} & \frac{68523}{5}+6057\text{ I} & 417+\frac{7146\text{ I}}{5} \\ \frac{29139}{340}-\frac{7227\text{ I}}{170} & -\frac{22503}{85}-\frac{20898\text{ I}}{85} & -\frac{19167}{680}+\frac{33543\text{ I}}{680} \end{bmatrix}$$





$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{680 \, \Delta x_{ol}^6} \big( 3 \, \big( (19426 + 9636 \, \mathrm{I}) \, u_{ol+21} + (-60008 + 55728 \, \mathrm{I}) \, u_{ol+1+21} - (6389 + 11181 \, \mathrm{I}) \, u_{ol+2+21} + (704072 + 267648 \, \mathrm{I}) \, u_{ol+1} + (3106376 - 1372920 \, \mathrm{I}) \, u_{ol+1+1} + (94520 - 323952 \, \mathrm{I}) \, u_{ol+2+1} + 2324478 \, u_{ol} - 10993968 \, u_{ol+1} + 953496 \, u_{ol+2} + (704072 - 267648 \, \mathrm{I}) \, u_{ol-1} + (3106376 + 1372920 \, \mathrm{I}) \, u_{ol+1-1} + (94520 + 323952 \, \mathrm{I}) \, u_{ol+2-1} + (19426 - 9636 \, \mathrm{I}) \, u_{ol-21} - (60008 + 55728 \, \mathrm{I}) \, u_{ol+1-21} + (-6389 + 11181 \, \mathrm{I}) \, u_{ol+2-21} \big) \big), \, O( \, \Delta x_{ol}^9 \, )$$

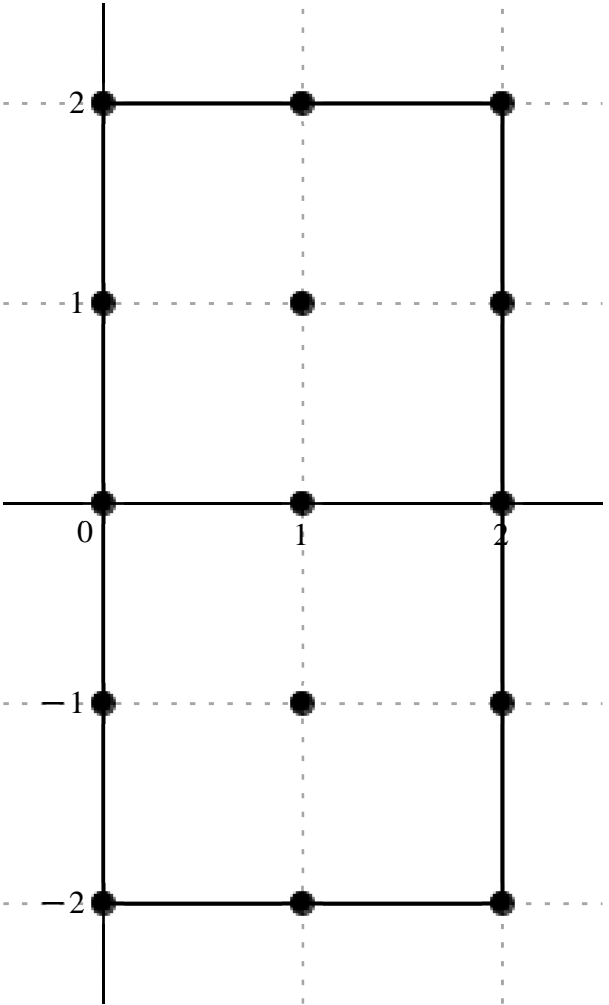
Formula.: 179, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 7

Error order.: 8, Error.:  $1.3078515262619933965 \times 10^{-19}$ , New Error.:  $1.2968510514936927578 \times 10^{-27}$   
Error order.: 8, Error.:  $1.2968510514936927578 \times 10^{-27}$ , New Error.:  $1.2957557043141348427 \times 10^{-35}$   
Error order.: 8, Error.:  $1.2957557043141348427 \times 10^{-35}$ , New Error.:  $1.2956462164790153550 \times 10^{-43}$   
Error order.: 8, Error.:  $1.2956462164790153550 \times 10^{-43}$ , New Error.:  $1.2956352681642118209 \times 10^{-51}$   
Error order.: 8, Error.:  $1.2956352681642118209 \times 10^{-51}$ , New Error.:  $1.2956341733374184317 \times 10^{-59}$

$$x_o \neq h. , \left[ \begin{array}{ccc} 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & 2 + 2 \, \mathrm{I} \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} \\ 0 & 1 & 2 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & 2 - 2 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccc} -\frac{570717}{1360} - \frac{371133 \text{ I}}{1360} & \frac{122724}{85} - \frac{99162 \text{ I}}{85} & \frac{36729}{272} + \frac{354627 \text{ I}}{1360} \\ -\frac{69111}{5} - \frac{35091 \text{ I}}{5} & -\frac{344736}{5} + \frac{132741 \text{ I}}{5} & -\frac{11529}{5} + \frac{35973 \text{ I}}{5} \\ -\frac{366093}{8} & \frac{1173816}{5} & -\frac{846783}{40} \\ -\frac{69111}{5} + \frac{35091 \text{ I}}{5} & -\frac{344736}{5} - \frac{132741 \text{ I}}{5} & -\frac{11529}{5} - \frac{35973 \text{ I}}{5} \\ -\frac{570717}{1360} + \frac{371133 \text{ I}}{1360} & \frac{122724}{85} + \frac{99162 \text{ I}}{85} & \frac{36729}{272} - \frac{354627 \text{ I}}{1360} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \; u(x_{ol}) = \frac{1}{1360 \; \Delta x_{ol}^7} \Big( 63 \; \big( -(9059 + 5891 \text{ I}) \; u_{ol+2\text{I}} + (31168 - 25184 \text{ I}) \; u_{ol+1+2\text{I}} + (2915 + 5629 \text{ I}) \; u_{ol+2+2\text{I}} - (298384 + 151504 \text{ I}) \; u_{ol+1} + (-1488384 + 573104 \text{ I}) \; u_{ol+1+\text{I}} + (-49776 + 155312 \text{ I}) \; u_{ol+2+\text{I}} - 987870 \; u_{ol} + 5067904 \; u_{ol+1} - 456994 \; u_{ol+2} + (-298384 + 151504 \text{ I}) \; u_{ol-1} - (1488384 + 573104 \text{ I}) \; u_{ol+1-1} - (49776 + 155312 \text{ I}) \; u_{ol+2-1} + (-9059 + 5891 \text{ I}) \; u_{ol-2\text{I}} + (31168 + 25184 \text{ I}) \; u_{ol+1-2\text{I}} + (2915 - 5629 \text{ I}) \; u_{ol+2-2\text{I}} \big) \Big) \; , \; O(\; \Delta x_{ol}^8 \; )$$

Formula: , 180, Var.: 1

Variavel : , x<sub>ol</sub> , Derivada de Ordem : , 8

Error order: , 7, Error: , 6.0622549768400226646 × 10<sup>−17</sup>, New Error: , 6.0123505027848144752 × 10<sup>−24</sup>

Error order: , 7, Error: , 6.0123505027848144752 × 10<sup>−24</sup>, New Error: , 6.0073809682291009749 × 10<sup>−31</sup>

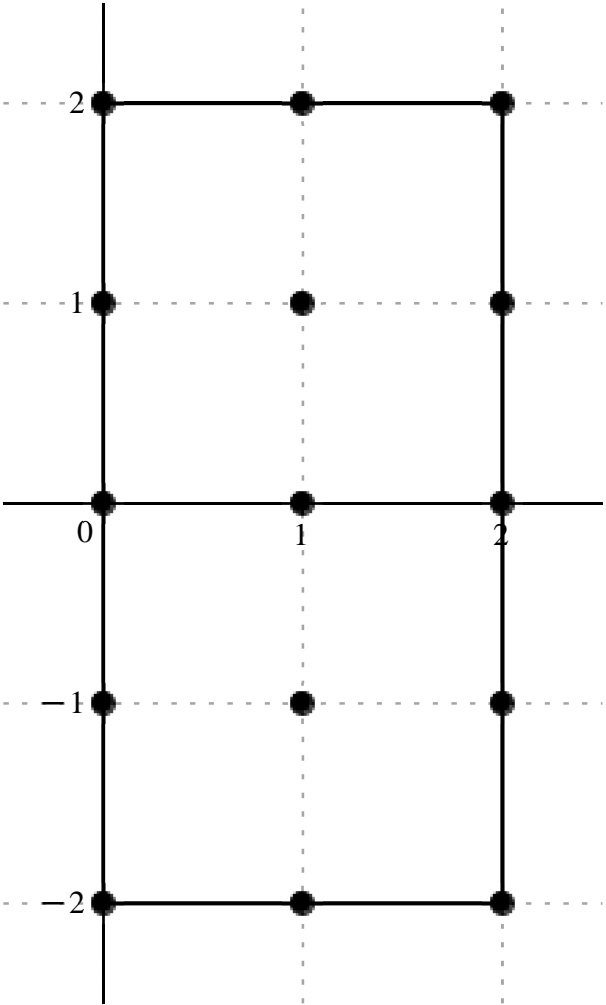
Error order: , 7, Error: , 6.0073809682291009749 × 10<sup>−31</sup>, New Error: , 6.0068842233779114917 × 10<sup>−38</sup>

Error order: , 7, Error: , 6.0068842233779114917 × 10<sup>−38</sup>, New Error: , 6.0068345509783130457 × 10<sup>−45</sup>

Error order: , 7, Error: , 6.0068345509783130457 × 10<sup>−45</sup>, New Error: , 6.0068295837592078828 × 10<sup>−52</sup>

$$x_o \neq h., \left[ \begin{array}{ccc} 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ 0 & 1 & 2 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} \end{array} \right]$$

$$c=, \left[ \begin{array}{ccc} \frac{307251}{170}+\frac{261891 \, \mathrm{I}}{170} & -\frac{609084}{85}+\frac{424872 \, \mathrm{I}}{85} & -\frac{100107}{170}-\frac{215397 \, \mathrm{I}}{170} \\ \frac{282492}{5}+\frac{177408 \, \mathrm{I}}{5} & 318528-\frac{530712 \, \mathrm{I}}{5} & \frac{58212}{5}-\frac{166824 \, \mathrm{I}}{5} \\ 190827 & -\frac{5253192}{5} & \frac{491841}{5} \\ \frac{282492}{5}-\frac{177408 \, \mathrm{I}}{5} & 318528+\frac{530712 \, \mathrm{I}}{5} & \frac{58212}{5}+\frac{166824 \, \mathrm{I}}{5} \\ \frac{307251}{170}-\frac{261891 \, \mathrm{I}}{170} & -\frac{609084}{85}-\frac{424872 \, \mathrm{I}}{85} & -\frac{100107}{170}+\frac{215397 \, \mathrm{I}}{170} \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_o^8} \, u(x_o)=\frac{1}{170 \, \Delta x_o^8} \, \big( 63 \, \big( (4877+4157 \, \mathrm{I}) \, u_{oI+21} + ( -19336+13488 \, \mathrm{I}) \, u_{oI+1+21} - (1589+3419 \, \mathrm{I}) \, u_{oI+2+21} + (152456+95744 \, \mathrm{I}) \, u_{oI+1} + (859520-286416 \, \mathrm{I}) \, u_{oI+1+1} + (31416-90032 \, \mathrm{I}) \, u_{oI+2+1} + 514930 \, u_{oI} - 2835056 \, u_{oI+1} + 265438 \, u_{oI+2} + (152456-95744 \, \mathrm{I}) \, u_{oI-1} + (859520+286416 \, \mathrm{I}) \, u_{oI+1-1} + (31416+90032 \, \mathrm{I}) \, u_{oI+2-1} + (4877-4157 \, \mathrm{I}) \, u_{oI-21} - (19336+13488 \, \mathrm{I}) \, u_{oI+1-21} + ( -1589+3419 \, \mathrm{I}) \, u_{oI+2-21} \big) \big), \, O( \, \Delta x_o^7 \, )$$

$$Variavel \, :, x_{ol} \, , \quad Derivada \, de \, Ordem \, :, 9$$

$$Error \, order.: 6, \quad Error.: 2.5848100720245578151 \times 10^{-14}, \quad New \, Error.: 2.5640832564951725639 \times 10^{-20}$$

$$Error \, order.: 6, \quad Error.: 2.5640832564951725639 \times 10^{-20}, \quad New \, Error.: 2.5620190661635545986 \times 10^{-26}$$

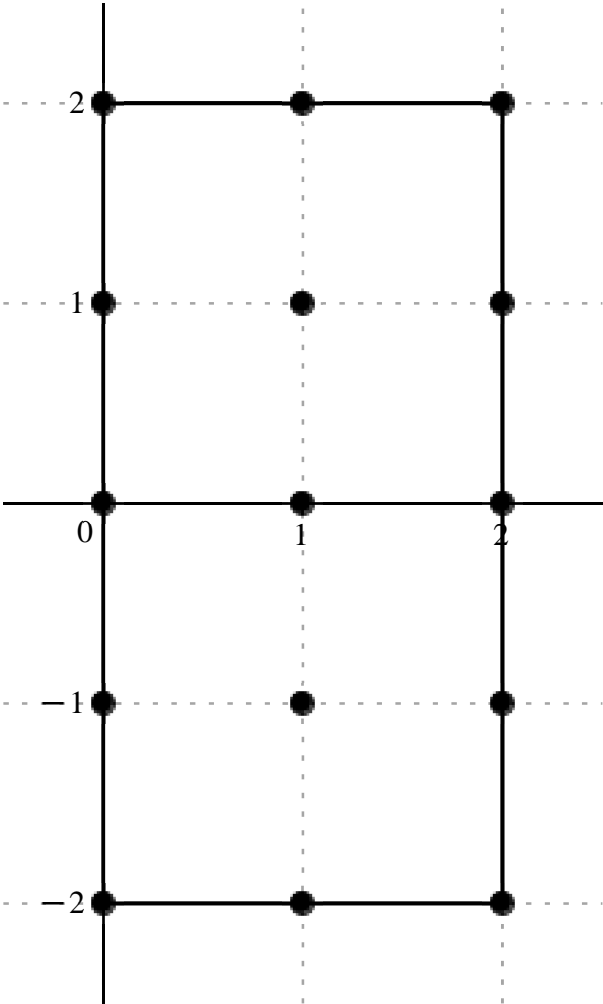
$$Error \, order.: 6, \quad Error.: 2.5620190661635545986 \times 10^{-26}, \quad New \, Error.: 2.5618127318344585962 \times 10^{-32}$$

$$Error \, order.: 6, \quad Error.: 2.5618127318344585962 \times 10^{-32}, \quad New \, Error.: 2.5617920992483818152 \times 10^{-38}$$

$$Error \, order.: 6, \quad Error.: 2.5617920992483818152 \times 10^{-38}, \quad New \, Error.: 2.5617900359982422574 \times 10^{-44}$$

$$x_o \, + h \, . \, , \quad \begin{bmatrix} 2 \, I & 1 + 2 \, I & 2 + 2 \, I \\ I & 1 + I & 2 + I \\ 0 & 1 & 2 \\ -I & 1 - I & 2 - I \\ -2 \, I & 1 - 2 \, I & 2 - 2 \, I \end{bmatrix}$$

$$c = , \quad \begin{bmatrix} -\frac{1133433}{170} - \frac{1272537 \, I}{170} & \frac{2723112}{85} - \frac{1622376 \, I}{85} & \frac{391041}{170} + \frac{190323 \, I}{34} \\ -\frac{1045548}{5} - \frac{780948 \, I}{5} & -\frac{6670944}{5} + \frac{1894536 \, I}{5} & -\frac{266868}{5} + \frac{703836 \, I}{5} \\ -729729 & \frac{21418992}{5} & -\frac{2080323}{5} \\ -\frac{1045548}{5} + \frac{780948 \, I}{5} & -\frac{6670944}{5} - \frac{1894536 \, I}{5} & -\frac{266868}{5} - \frac{703836 \, I}{5} \\ -\frac{1133433}{170} + \frac{1272537 \, I}{170} & \frac{2723112}{85} + \frac{1622376 \, I}{85} & \frac{391041}{170} - \frac{190323 \, I}{34} \end{bmatrix}$$



$$\frac{d^9}{dx_{ol}^9} \, u(x_{ol}) = \frac{1}{170 \, \Delta x_{ol}^9} \, (189 \, (-(5997 + 6733 \, I) \, u_{ol+21} + (28816 - 17168 \, I) \, u_{ol+1+21} + (2069 + 5035 \, I) \, u_{ol+2+21} - (188088 + 140488 \, I) \, u_{ol+1} + (-1200064 + 340816 \, I) \, u_{ol+1+1} + (-48008 + 126616 \, I) \, u_{ol+2+1} - 656370 \, u_{ol} + 3853152 \, u_{ol+1} - 374238 \, u_{ol+2} + (-188088 + 140488 \, I) \, u_{ol-1} - (1200064 + 340816 \, I) \, u_{ol+1-1} - (48008 + 126616 \, I) \, u_{ol+2-1} + (-5997 + 6733 \, I) \, u_{ol-21} + (28816 + 17168 \, I) \, u_{ol+1-21} + (2069 - 5035 \, I) \, u_{ol+2-21})), \, O(\, \Delta x_{ol}^6 \, )$$

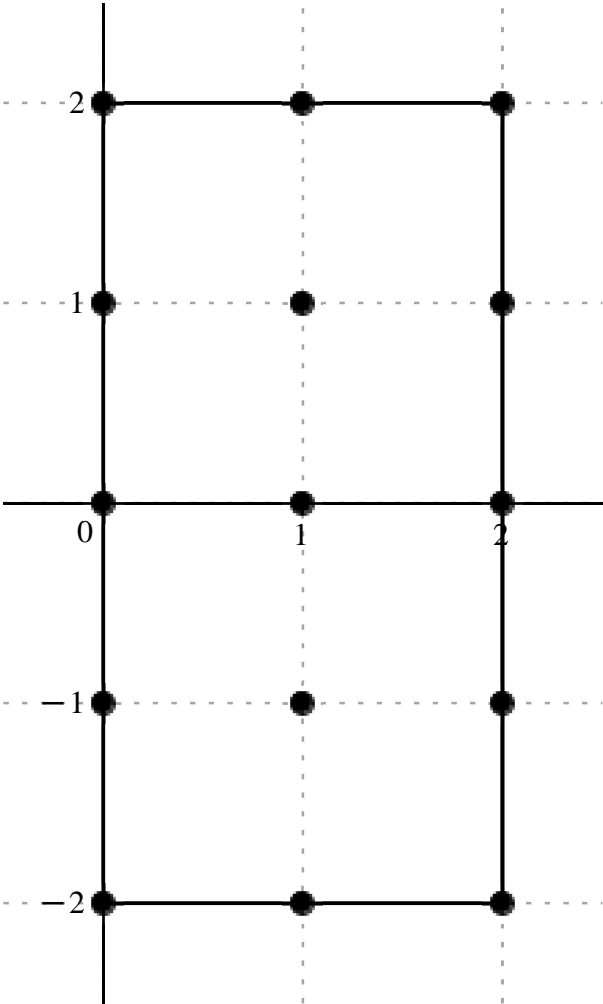
Formula:, 182, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 10

Error order:, 5, Error:,  $9.9812778148341239902 \times 10^{-12}$ , New Error:,  $9.9038895194601286948 \times 10^{-17}$   
Error order:, 5, Error:,  $9.9038895194601286948 \times 10^{-17}$ , New Error:,  $9.8961815315715887571 \times 10^{-22}$   
Error order:, 5, Error:,  $9.8961815315715887571 \times 10^{-22}$ , New Error:,  $9.8954110404626455038 \times 10^{-27}$   
Error order:, 5, Error:,  $9.8954110404626455038 \times 10^{-27}$ , New Error:,  $9.8953339944278147646 \times 10^{-32}$   
Error order:, 5, Error:,  $9.8953339944278147646 \times 10^{-32}$ , New Error:,  $9.8953262898550915911 \times 10^{-37}$

$$x_o + h \cdot \begin{bmatrix} 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ \text{ I} & 1+\text{ I} & 2+\text{ I} \\ 0 & 1 & 2 \\ -\text{ I} & 1-\text{ I} & 2-\text{ I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{346059}{17} + \frac{519939\text{ I}}{17} & -\frac{2154600}{17} + \frac{1064448\text{ I}}{17} & -\frac{132111}{17} - \frac{374409\text{ I}}{17} \\ 683424 + 594216\text{ I} & 4953312 - 1164240\text{ I} & 217728 - 527688\text{ I} \\ 2491398 & -15540336 & 1568322 \\ 683424 - 594216\text{ I} & 4953312 + 1164240\text{ I} & 217728 + 527688\text{ I} \\ \frac{346059}{17} - \frac{519939\text{ I}}{17} & -\frac{2154600}{17} - \frac{1064448\text{ I}}{17} & -\frac{132111}{17} + \frac{374409\text{ I}}{17} \end{bmatrix}$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{17\,\mathcal{A}_{ol}^{10}}\Big(189\left((1831+2751\,\mathrm{I})\,u_{ol+21}+(−11400+5632\,\mathrm{I})\,u_{ol+1+21}−(699+1981\,\mathrm{I})\,u_{ol+2+21}+(61472+53448\,\mathrm{I})\,u_{ol+1}+(445536−104720\,\mathrm{I})\,u_{ol+1+1}+(19584−47464\,\mathrm{I})\,u_{ol+2+1}+224094\,u_{ol}−1397808\,u_{ol+1}+141066\,u_{ol+2}+(61472−53448\,\mathrm{I})\,u_{ol−1}+(445536+104720\,\mathrm{I})\,u_{ol+1−1}+(19584+47464\,\mathrm{I})\,u_{ol+2−1}\right.\\ \left.+(1831−2751\,\mathrm{I})\,u_{ol−21}−(11400+5632\,\mathrm{I})\,u_{ol+1−21}+(−699+1981\,\mathrm{I})\,u_{ol+2−21}\right)\Big),\;O(\,\mathcal{A}_{ol}^5\,)$$

Formula:, 183, Var:., 1

Variavel :, x\_{ol}, Derivada de Ordem :, 11

Error order:., 4, Error:., 3.4064101185277552001 × 10−9, New Error:., 3.3811948497543180486 × 10−13

Error order:., 4, Error:., 3.3811948497543180486 × 10−13, New Error:., 3.3786830205383622642 × 10−17

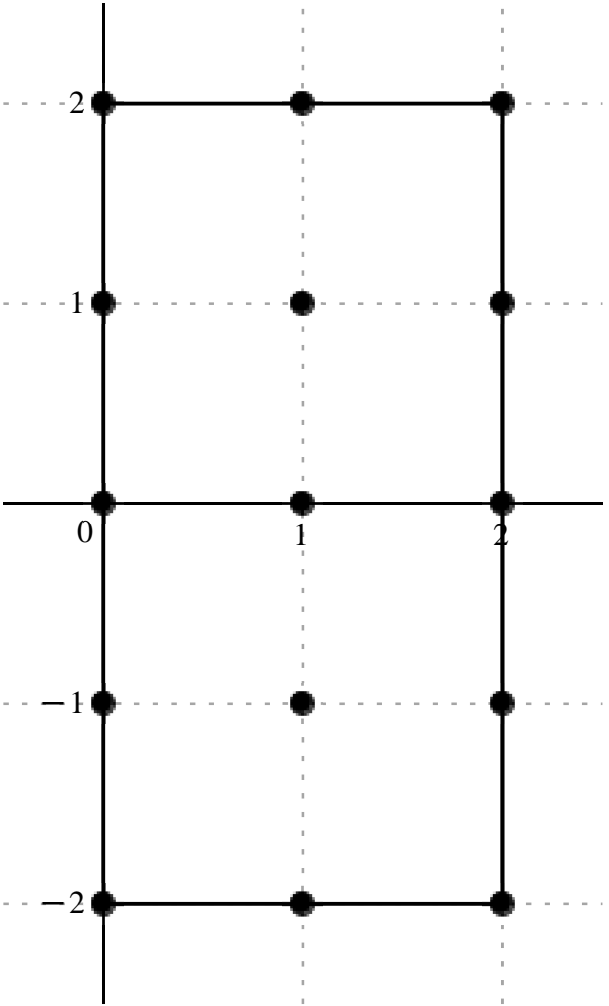
Error order:., 4, Error:., 3.3786830205383622642 × 10−17, New Error:., 3.3784319343691555087 × 10−21

Error order:., 4, Error:., 3.3784319343691555087 × 10−21, New Error:., 3.3784068267195348050 × 10−25

Error order:., 4, Error:., 3.3784068267195348050 × 10−25, New Error:., 3.3784043159642455104 × 10−29

$$x_o\;+\;h\;.\;,\;\left[\begin{array}{rrr}2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I}\\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I}\\ 0 & 1 & 2\\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I}\\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{rrr} -\frac{829521}{17}-\frac{1727649\,\mathrm{I}}{17} & \frac{7251552}{17}-\frac{2794176\,\mathrm{I}}{17} & \frac{363825}{17}+\frac{1266111\,\mathrm{I}}{17}\\ -1896048-1896048\,\mathrm{I} & -15700608+2893968\,\mathrm{I} & -765072+1696464\,\mathrm{I}\\ -7297290 & 48299328 & -5076918\\ -1896048+1896048\,\mathrm{I} & -15700608-2893968\,\mathrm{I} & -765072-1696464\,\mathrm{I}\\ -\frac{829521}{17}+\frac{1727649\,\mathrm{I}}{17} & \frac{7251552}{17}+\frac{2794176\,\mathrm{I}}{17} & \frac{363825}{17}-\frac{1266111\,\mathrm{I}}{17}\end{array}\right]$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d}x_{ol}^{11}}\;u(x_{ol})=\frac{1}{17\,\Delta x_{ol}^{11}}\Big(2079\left(-(399+831\,\mathrm{I})\,u_{ol+21}+(3488-1344\,\mathrm{I})\,u_{ol+1+21}+(175+609\,\mathrm{I})\,u_{ol+2+21}-(15504+15504\,\mathrm{I})\,u_{ol+1}+(-128384+23664\,\mathrm{I})\,u_{ol+1+1}+(-6256+13872\,\mathrm{I})\,u_{ol+2+1}-59670\,u_{ol}+394944\,u_{ol+1}-41514\,u_{ol+2}+(-15504+15504\,\mathrm{I})\,u_{ol-1}-(128384+23664\,\mathrm{I})\,u_{ol+1-1}-(6256+13872\,\mathrm{I})\,u_{ol+2-1}\right.\\ \left.+(-399+831\,\mathrm{I})\,u_{ol-21}+(3488+1344\,\mathrm{I})\,u_{ol+1-21}+(175-609\,\mathrm{I})\,u_{ol+2-21}\right)\Big),\;O(\;\Delta x_{ol}^4\;)$$

Formula: 184, Var: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 12

Error order: 3, Error: 9.8893127396122606717 × 10<sup>-7</sup>, New Error: 9.8210973532321266132 × 10<sup>-10</sup>

Error order: 3, Error: 9.8210973532321266132 × 10<sup>-10</sup>, New Error: 9.8143007799835861302 × 10<sup>-13</sup>

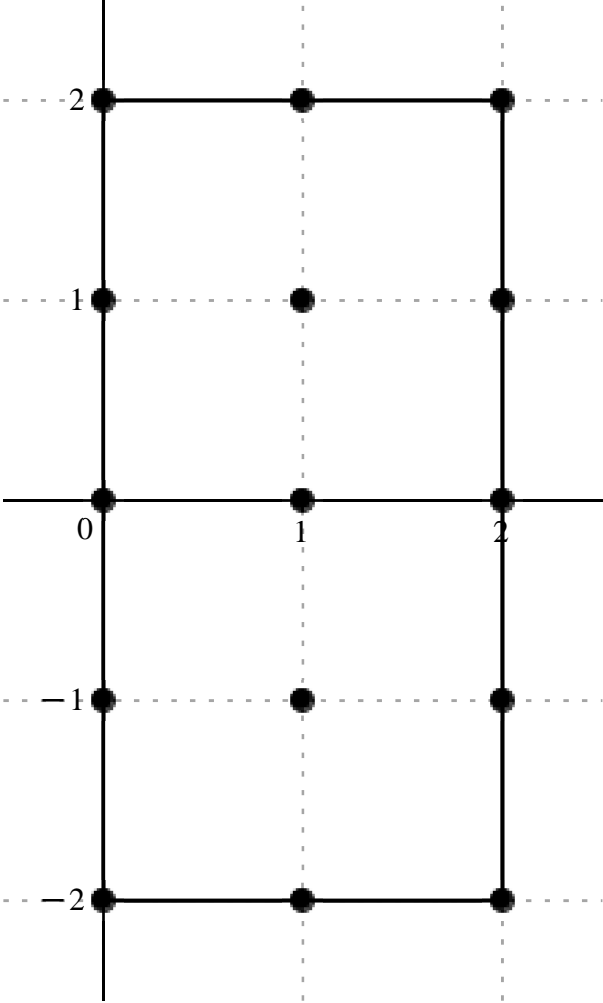
Error order: 3, Error: 9.8143007799835861302 × 10<sup>-13</sup>, New Error: 9.8136213717597246150 × 10<sup>-16</sup>

Error order: 3, Error: 9.8136213717597246150 × 10<sup>-16</sup>, New Error: 9.8135534334277962065 × 10<sup>-19</sup>

Error order: 3, Error: 9.8135534334277962065 × 10<sup>-19</sup>, New Error: 9.8135466396195073910 × 10<sup>-22</sup>

$$x_o+h\;,\;\left[\begin{array}{ccc}2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ 0 & 1 & 2 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} \end{array}\right]$$

$$c = , \left[ \begin{array}{ccc} \frac{1422036}{17} + \frac{4415796 \text{ I}}{17} & -\frac{19359648}{17} + \frac{5189184 \text{ I}}{17} & -\frac{723492}{17} - \frac{3467772 \text{ I}}{17} \\ 4191264 + 4790016 \text{ I} & 39916800 - 5189184 \text{ I} & 2195424 - 4390848 \text{ I} \\ 17214120 & -120947904 & 13322232 \\ 4191264 - 4790016 \text{ I} & 39916800 + 5189184 \text{ I} & 2195424 + 4390848 \text{ I} \\ \frac{1422036}{17} - \frac{4415796 \text{ I}}{17} & -\frac{19359648}{17} - \frac{5189184 \text{ I}}{17} & -\frac{723492}{17} + \frac{3467772 \text{ I}}{17} \end{array} \right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d} x_{o l}^{12}} \; u(x_{o l}) = \frac{1}{17 \, \Delta x_{o l}^{12}} \Big( 24948 \, \big( (57 + 177 \, \text{I}) \, u_{o l + 2 \text{I}} + ( - 776 + 208 \, \text{I}) \, u_{o l + 1 + 2 \text{I}} - (29 + 139 \, \text{I}) \, u_{o l + 2 + 2 \text{I}} + (2856 + 3264 \, \text{I}) \, u_{o l + 1} + (27200 - 3536 \, \text{I}) \, u_{o l + 1 + 1} + (1496 - 2992 \, \text{I}) \, u_{o l + 2 + 1} + 11730 \, u_{o l} - 82416 \, u_{o l + 1} + 9078 \, u_{o l + 2} + (2856 - 3264 \, \text{I}) \, u_{o l - 1} + (27200 + 3536 \, \text{I}) \, u_{o l + 1 - 1} + (1496 + 2992 \, \text{I}) \, u_{o l + 2 - 1} + (57 - 177 \, \text{I}) \, u_{o l - 2 \text{I}} - (776 + 208 \, \text{I}) \, u_{o l + 1 - 2 \text{I}} + ( - 29 + 139 \, \text{I}) \, u_{o l + 2 - 2 \text{I}} \big) \Big) , \; O( \, \Delta x_{o l}^3 \, )$$

Formula:, 185, Var.:, 1

Variavel :, x\_{o l}, Derivada de Ordem :, 13

Error order:., 2, Error:., 0.00022954286410931304281, New Error:., 2.2814613118316728632 × 10−6

Error order:., 2, Error:., 2.2814613118316728632 × 10−6, New Error:., 2.2800693139027232580 × 10−8

Error order:., 2, Error:., 2.2800693139027232580 × 10−8, New Error:., 2.2799301613612716393 × 10−10

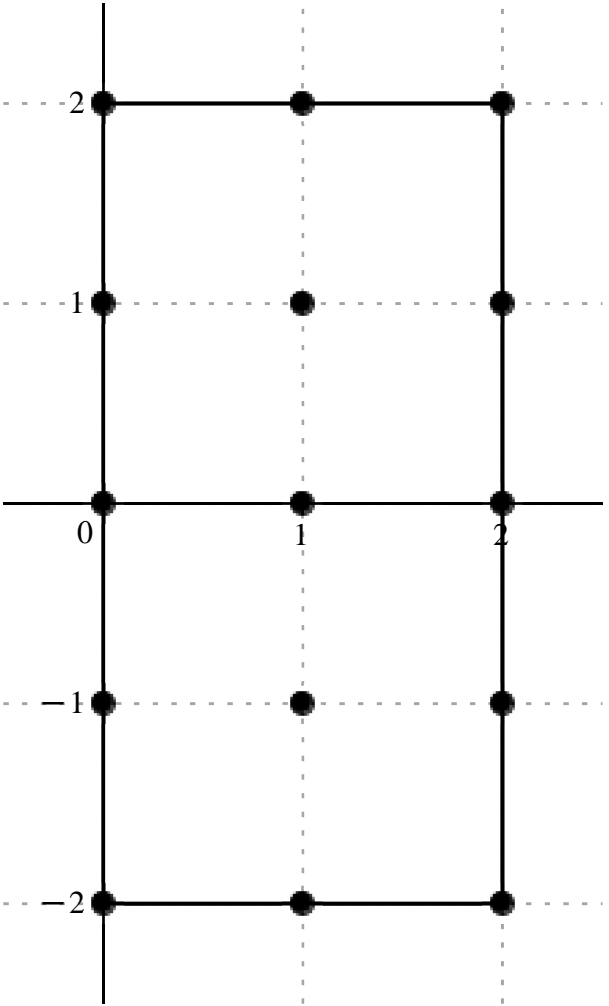
Error order:., 2, Error:., 2.2799301613612716393 × 10−10, New Error:., 2.2799162465795425005 × 10−12

Error order:., 2, Error:., 2.2799162465795425005 × 10−12, New Error:., 2.2799148551060936484 × 10−14



$$x_o \neq h., \begin{bmatrix} 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} \\ 0 & 1 & 2 \\ -\text{I} & 1-\text{I} & 2-\text{I} \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} \end{bmatrix}$$

$$c =, \left[ \begin{array}{ccc} -\frac{1422036}{17} - \frac{7808724 \text{ I}}{17} & \frac{36324288}{17} - \frac{5189184 \text{ I}}{17} & \frac{723492}{17} + \frac{6860700 \text{ I}}{17} \\ -6586272 - 8582112 \text{ I} & -72648576 + 5189184 \text{ I} & -4590432 + 8182944 \text{ I} \\ -29189160 & 217945728 & -25297272 \\ -6586272 + 8582112 \text{ I} & -72648576 - 5189184 \text{ I} & -4590432 - 8182944 \text{ I} \\ -\frac{1422036}{17} + \frac{7808724 \text{ I}}{17} & \frac{36324288}{17} + \frac{5189184 \text{ I}}{17} & \frac{723492}{17} - \frac{6860700 \text{ I}}{17} \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d} x_{o l}^{13}} \; u(x_{o l}) = \frac{1}{17 \Delta x_{o l}^{13}} \big( 24948 \big( -(57 + 313 \text{ I}) \; u_{o l + 2 \text{ I}} + (1456 - 208 \text{ I}) \; u_{o l + 1 + 2 \text{ I}} + (29 + 275 \text{ I}) \; u_{o l + 2 + 2 \text{ I}} - (4488 + 5848 \text{ I}) \; u_{o l + 1} + (-49504 + 3536 \text{ I}) \; u_{o l + 1 + 1} + (-3128 + 5576 \text{ I}) \; u_{o l + 2 + 1} - 19890 \; u_{o l} + 148512 \; u_{o l + 1} - 17238 \; u_{o l + 2} + (-4488 + 5848 \text{ I}) \; u_{o l - 1} - (49504 + 3536 \text{ I}) \; u_{o l + 1 - 1} - (3128 + 5576 \text{ I}) \; u_{o l + 2 - 1} + (-57 + 313 \text{ I}) \; u_{o l - 2 \text{ I}} + (1456 + 208 \text{ I}) \; u_{o l + 1 - 2 \text{ I}} + (29 - 275 \text{ I}) \; u_{o l + 2 - 2 \text{ I}} \big) \big), \; O( \Delta x_{o l}^2 \; )$$

Formula.: 186, Var.: 1

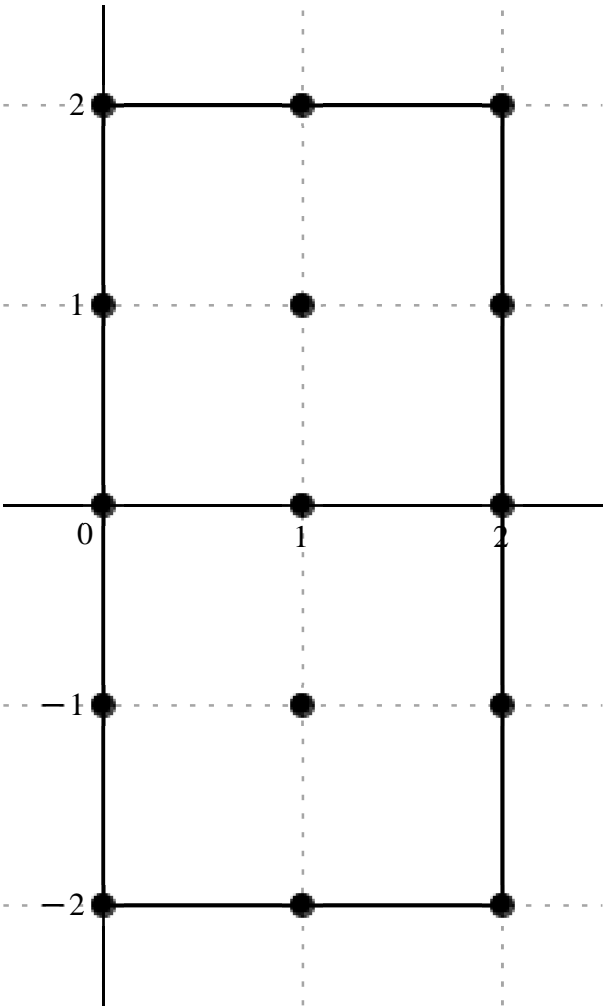
Variavel .:, x\_o l , Derivada de Ordem .:, 14

Error order.: 1, Error.: 0.038038823774526282337, New Error.: 0.0037867378961169366812

Error order.: 1, Error.: 0.0037867378961169366812, New Error.: 0.00037850285085053789487

*Error order*., 1, *Error*., 0.00037850285085053789487, *New Error*., 0.000037848576202544164224  
*Error order*., 1, *Error*., 0.000037848576202544164224, *New Error*.,  $3.7848405319343271741 \times 10^{-6}$   
*Error order*., 1, *Error*.,  $3.7848405319343271741 \times 10^{-6}$ , *New Error*.,  $3.7848388231073682244 \times 10^{-7}$

$$\begin{aligned}
 &x_o \neq h. , \begin{bmatrix} 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & 2 + 2 \, \mathrm{I} \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} \\ 0 & 1 & 2 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & 2 - 2 \, \mathrm{I} \end{bmatrix} \\
 &c = , \begin{bmatrix} \frac{349272}{17} + \frac{7334712 \, \mathrm{I}}{17} & -\frac{36324288}{17} & \frac{349272}{17} - \frac{7334712 \, \mathrm{I}}{17} \\ 5588352 + 8382528 \, \mathrm{I} & 72648576 & 5588352 - 8382528 \, \mathrm{I} \\ 27243216 & -217945728 & 27243216 \\ 5588352 - 8382528 \, \mathrm{I} & 72648576 & 5588352 + 8382528 \, \mathrm{I} \\ \frac{349272}{17} - \frac{7334712 \, \mathrm{I}}{17} & -\frac{36324288}{17} & \frac{349272}{17} + \frac{7334712 \, \mathrm{I}}{17} \end{bmatrix}
 \end{aligned}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d} x_{ol}^{14}} \; u(x_{ol}) = \frac{349272 \left( (1 + 21 \, \mathrm{I}) \, u_{ol + 21} - 104 \, u_{ol + 1 + 21} + (1 - 21 \, \mathrm{I}) \, u_{ol + 2 + 21} + (272 + 408 \, \mathrm{I}) \, u_{ol + 1} + 3536 \, u_{ol + 1 + 1} + (272 - 408 \, \mathrm{I}) \, u_{ol + 2 + 1} + 1326 \, u_{ol} - 10608 \, u_{ol + 1} + 1326 \, u_{ol + 2} + (272 - 408 \, \mathrm{I}) \, u_{ol - 1} + 3536 \, u_{ol + 1 - 1} + (272 + 408 \, \mathrm{I}) \, u_{ol + 2 - 1} + (1 - 21 \, \mathrm{I}) \, u_{ol - 21} - 104 \, u_{ol + 1 - 21} + (1 + 21 \, \mathrm{I}) \, u_{ol + 2 - 21} \right)}{17 \, \Delta x_{ol}^{14}}, \; O(\Delta x_{ol})$$

$$Variavel \; ; x_{ol} \; , \; Derivada \; de \; Ordem \; ; 1$$

$$Error \; order.; 14, \; Error.; 3.1647866607726459253 \times 10^{-36}, \; New \; Error.; 3.1941623485503400837 \times 10^{-50}$$

$$Error \; order.; 14, \; Error.; 3.1941623485503400837 \times 10^{-50}, \; New \; Error.; 3.1971136767008046521 \times 10^{-64}$$

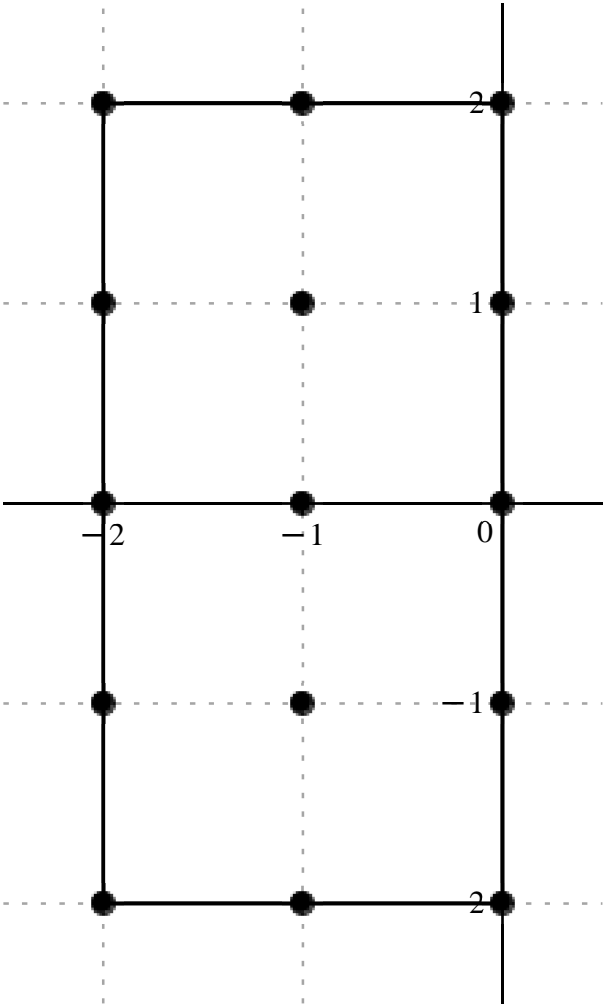
$$Error \; order.; 14, \; Error.; 3.1971136767008046521 \times 10^{-64}, \; New \; Error.; 3.1974089474975447688 \times 10^{-78}$$

$$Error \; order.; 14, \; Error.; 3.1974089474975447688 \times 10^{-78}, \; New \; Error.; 3.1974384759574243759 \times 10^{-92}$$

$$Error \; order.; 14, \; Error.; 3.1974384759574243759 \times 10^{-92}, \; New \; Error.; 3.1974414288172147812 \times 10^{-106}$$

$$x_o \; + h \; . \; , \; \left[ \begin{array}{ccc} -2 + 2 \; \text{I} & -1 + 2 \; \text{I} & 2 \; \text{I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} \\ -2 & -1 & 0 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} \\ -2 - 2 \; \text{I} & -1 - 2 \; \text{I} & -2 \; \text{I} \end{array} \right]$$

$$c = , \; \left[ \begin{array}{ccc} -\frac{5}{1326} + \frac{11 \; \text{I}}{2652} & -\frac{4}{255} - \frac{8 \; \text{I}}{255} & \frac{7}{884} + \frac{\text{I}}{2652} \\ \frac{4}{195} + \frac{32 \; \text{I}}{195} & \frac{4}{3} + \frac{4 \; \text{I}}{3} & \frac{4}{13} + \frac{8 \; \text{I}}{39} \\ \frac{1}{2} & -8 & \frac{21}{5} \\ \frac{4}{195} - \frac{32 \; \text{I}}{195} & \frac{4}{3} - \frac{4 \; \text{I}}{3} & \frac{4}{13} - \frac{8 \; \text{I}}{39} \\ -\frac{5}{1326} - \frac{11 \; \text{I}}{2652} & -\frac{4}{255} + \frac{8 \; \text{I}}{255} & \frac{7}{884} - \frac{\text{I}}{2652} \end{array} \right]$$



$$\frac{\text{d}}{\text{d}x_{ol}} \; u(x_{ol}) = \frac{1}{13260 \; \Delta x_{ol}} \; \big( (-50 + 55 \; \text{I}) \; u_{ol - 2 + 21} - (208 + 416 \; \text{I}) \; u_{ol - 1 + 21} + (105 + 5 \; \text{I}) \; u_{ol + 21} + (272 + 2176 \; \text{I}) \; u_{ol - 2 + 1} + (17680 + 17680 \; \text{I}) \; u_{ol - 1 + 1} + (4080 + 2720 \; \text{I}) \; u_{ol + 1} + 6630 \; u_{ol - 2} - 106080 \; u_{ol - 1} + 55692 \; u_{ol} + (272 - 2176 \; \text{I}) \; u_{ol - 2 - 1} + (17680 - 17680 \; \text{I}) \; u_{ol - 1 - 1} + (4080 - 2720 \; \text{I}) \; u_{ol - 1} - (50 + 55 \; \text{I}) \; u_{ol - 2 - 21} + (-208$$

$$+ 416 \; \text{I}) \; u_{ol - 1 - 21} + (105 - 5 \; \text{I}) \; u_{ol - 21} \big), \; O( \; \Delta x_{ol}^{14} \; )$$

Formula:, 188, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 13, Error:,  $2.4171400454133212392 \times 10^{-33}$ , New Error:,  $2.4392182514969146759 \times 10^{-46}$

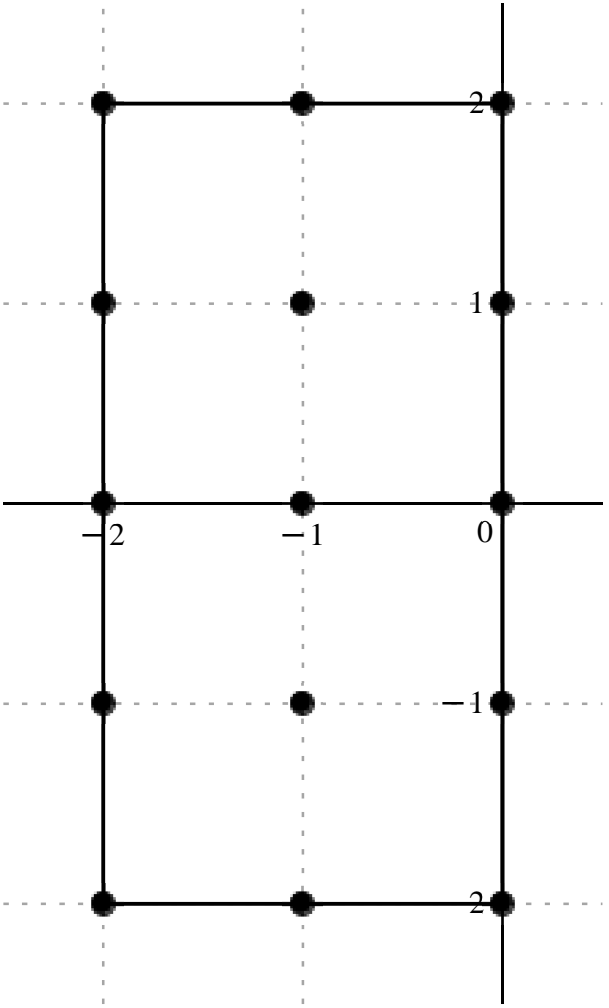
Error order:, 13, Error:,  $2.4392182514969146759 \times 10^{-46}$ , New Error:,  $2.4414362387414378441 \times 10^{-59}$

Error order:, 13, Error:,  $2.4414362387414378441 \times 10^{-59}$ , New Error:,  $2.4416581394133179049 \times 10^{-72}$

Error order:, 13, Error:,  $2.4416581394133179049 \times 10^{-72}$ , New Error:,  $2.4416803305002617424 \times 10^{-85}$

Error order:, 13, Error:,  $2.4416803305002617424 \times 10^{-85}$ , New Error:,  $2.4416825496191539661 \times 10^{-98}$

$$x_o + h., \begin{bmatrix} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} \\ -2 & -1 & 0 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \end{bmatrix}$$
$$c =, \begin{bmatrix} -\frac{49}{1768} + \frac{919 \text{ I}}{26520} & -\frac{64}{425} - \frac{304 \text{ I}}{1275} & \frac{887}{13260} - \frac{21 \text{ I}}{4420} \\ \frac{72}{325} + \frac{1208 \text{ I}}{975} & \frac{56}{5} + \frac{128 \text{ I}}{15} & \frac{584}{195} + \frac{72 \text{ I}}{65} \\ \frac{37}{10} & -\frac{256}{5} & \frac{1889}{100} \\ \frac{72}{325} - \frac{1208 \text{ I}}{975} & \frac{56}{5} - \frac{128 \text{ I}}{15} & \frac{584}{195} - \frac{72 \text{ I}}{65} \\ -\frac{49}{1768} - \frac{919 \text{ I}}{26520} & -\frac{64}{425} + \frac{304 \text{ I}}{1275} & \frac{887}{13260} + \frac{21 \text{ I}}{4420} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{132600 \, \Delta x_{ol}^2} \, \big( (-3675 + 4595 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} - (19968 + 31616 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (8870 - 630 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (29376 + 164288 \, \mathrm{I}) \, u_{ol-2+1} + (1485120 + 1131520 \, \mathrm{I}) \, u_{ol-1+1} + (397120 + 146880 \, \mathrm{I}) \, u_{ol+1} + 490620 \, u_{ol-2} - 6789120 \, u_{ol-1} + 2504814 \, u_{ol} + (29376 - 164288 \, \mathrm{I}) \, u_{ol-2-1} + (1485120 - 1131520 \, \mathrm{I}) \, u_{ol-1-1} + (397120 - 146880 \, \mathrm{I}) \, u_{ol-1} - (3675 + 4595 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (-19968 + 31616 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + (8870 + 630 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} \big), \, O( \, \Delta x_{ol}^{13} \, )$$

Formula:, 189, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 12, Error:,  $1.4826699054296773641 \times 10^{-30}$ , New Error:,  $1.4960222071377811632 \times 10^{-42}$

Error order:, 12, Error:,  $1.4960222071377811632 \times 10^{-42}$ , New Error:,  $1.4973634975787570863 \times 10^{-54}$

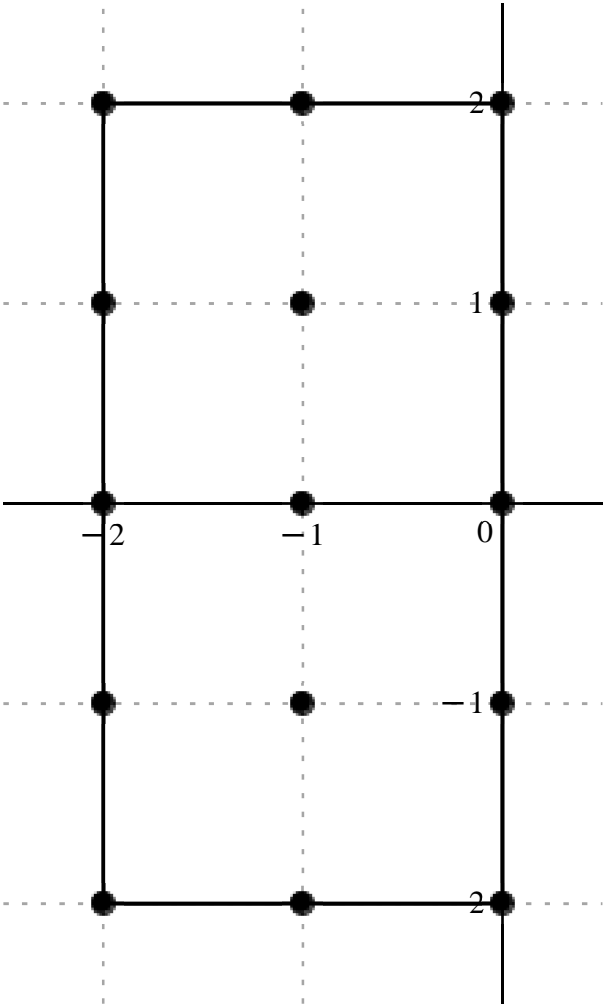
Error order:, 12, Error:,  $1.4973634975787570863 \times 10^{-54}$ , New Error:,  $1.4974976873904135116 \times 10^{-66}$

Error order:, 12, Error:,  $1.4974976873904135116 \times 10^{-66}$ , New Error:,  $1.4975111069794198796 \times 10^{-78}$

Error order:, 12, Error:,  $1.4975111069794198796 \times 10^{-78}$ , New Error:,  $1.4975124489443990888 \times 10^{-90}$

$$x_o + h \, , \, \left[ \begin{array}{ccc} -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} -\frac{227}{1360} + \frac{1563 \text{ I}}{6800} & -\frac{461}{425} - \frac{618 \text{ I}}{425} & \frac{3003}{6800} - \frac{537 \text{ I}}{6800} \\ \frac{41}{25} + \frac{192 \text{ I}}{25} & \frac{1789}{25} + \frac{1149 \text{ I}}{25} & \frac{519}{25} + \frac{66 \text{ I}}{25} \\ \frac{4557}{200} & -\frac{7494}{25} & \frac{3627}{40} \\ \frac{41}{25} - \frac{192 \text{ I}}{25} & \frac{1789}{25} - \frac{1149 \text{ I}}{25} & \frac{519}{25} - \frac{66 \text{ I}}{25} \\ -\frac{227}{1360} - \frac{1563 \text{ I}}{6800} & -\frac{461}{425} + \frac{618 \text{ I}}{425} & \frac{3003}{6800} + \frac{537 \text{ I}}{6800} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \; u(x_{ol}) = \frac{1}{6800 \, \Delta x_{ol}^3} \big( (-1135 + 1563 \, \text{I}) \, u_{ol-2+2\text{I}} - (7376 + 9888 \, \text{I}) \, u_{ol-1+2\text{I}} + (3003 - 537 \, \text{I}) \, u_{ol+2\text{I}} + (11152 + 52224 \, \text{I}) \, u_{ol-2+1} + (486608 + 312528 \, \text{I}) \, u_{ol-1+1} + (141168 + 17952 \, \text{I}) \, u_{ol+1} + 154938 \, u_{ol-2} - 2038368 \, u_{ol-1} + 616590 \, u_{ol} + (11152 - 52224 \, \text{I}) \, u_{ol-2-1} + (486608 - 312528 \, \text{I}) \, u_{ol-1-1} + (141168 - 17952 \, \text{I}) \, u_{ol-1} - (1135 + 1563 \, \text{I}) \, u_{ol-2-2\text{I}} + (-7376 + 9888 \, \text{I}) \, u_{ol-1-2\text{I}} + (3003 + 537 \, \text{I}) \, u_{ol-2\text{I}} \big), \; O(\, \Delta x_{ol}^{12} \, )$$

Formula:, 190, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 4

Error order:, 11, Error:, 8.6277934910390860861 × 10<sup>−28</sup>, New Error:, 8.7045245619631487528 × 10<sup>−39</sup>

Error order:, 11, Error:, 8.7045245619631487528 × 10<sup>−39</sup>, New Error:, 8.7122320680466935634 × 10<sup>−50</sup>

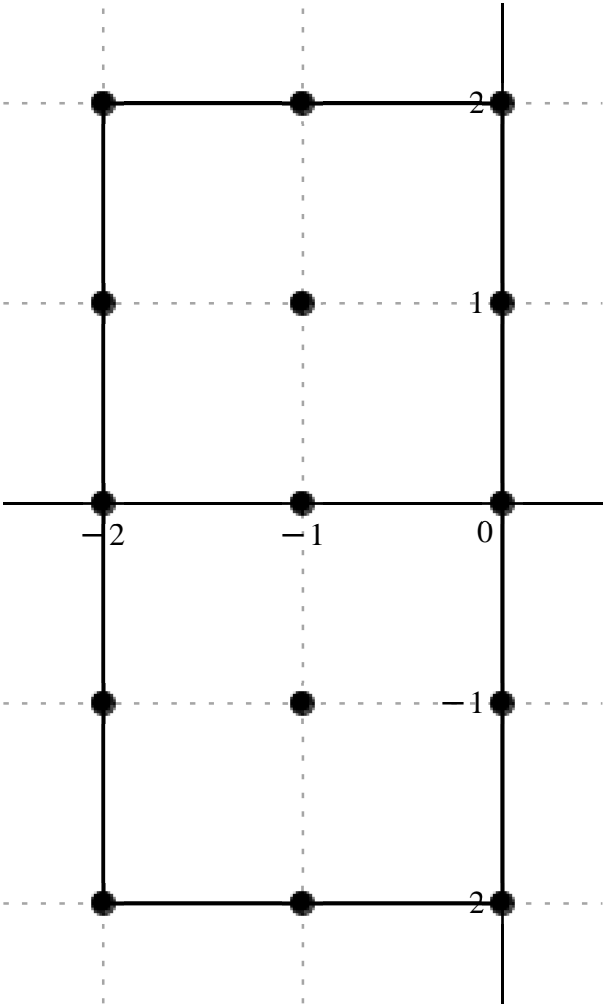
Error order:, 11, Error:, 8.7122320680466935634 × 10<sup>−50</sup>, New Error:, 8.7130031635682864216 × 10<sup>−61</sup>

Error order:, 11, Error:, 8.7130031635682864216 × 10<sup>−61</sup>, New Error:, 8.7130802765705029587 × 10<sup>−72</sup>

Error order:, 11, Error:, 8.7130802765705029587 × 10<sup>−72</sup>, New Error:, 8.7130879879052261099 × 10<sup>−83</sup>

$$x_o \neq h., \left[ \begin{array}{ccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \end{array} \right]$$

$$c=,\left[\begin{array}{ccc} -\frac{3301}{3400}+\frac{4901\,\mathrm{I}}{3400} & -\frac{3038}{425}-\frac{212\,\mathrm{I}}{25} & \frac{2307}{850}-\frac{1269\,\mathrm{I}}{1700} \\ \frac{274}{25}+\frac{1148\,\mathrm{I}}{25} & \frac{2162}{5}+\frac{6214\,\mathrm{I}}{25} & \frac{3054}{25}-\frac{216\,\mathrm{I}}{25} \\ \frac{6789}{50} & -\frac{42564}{25} & \frac{8931}{20} \\ \frac{274}{25}-\frac{1148\,\mathrm{I}}{25} & \frac{2162}{5}-\frac{6214\,\mathrm{I}}{25} & \frac{3054}{25}+\frac{216\,\mathrm{I}}{25} \\ -\frac{3301}{3400}-\frac{4901\,\mathrm{I}}{3400} & -\frac{3038}{425}+\frac{212\,\mathrm{I}}{25} & \frac{2307}{850}+\frac{1269\,\mathrm{I}}{1700} \end{array}\right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{3400 \, \Delta x_{ol}^4} \Big( (-3301 + 4901 \, \mathrm{I}) \, u_{ol-2+21} - (24304 + 28832 \, \mathrm{I}) \, u_{ol-1+21} + (9228 - 2538 \, \mathrm{I}) \, u_{ol+21} + (37264 + 156128 \, \mathrm{I}) \, u_{ol-2+1} + (1470160 + 845104 \, \mathrm{I}) \, u_{ol-1+1} + (415344 - 29376 \, \mathrm{I}) \, u_{ol+1} + 461652 \, u_{ol-2} - 5788704 \, u_{ol-1} + 1518270 \, u_{ol} + (37264 - 156128 \, \mathrm{I}) \, u_{ol-2-1} + (1470160 - 845104 \, \mathrm{I}) \, u_{ol-1-1} + (415344 + 29376 \, \mathrm{I}) \, u_{ol-1} - (3301 + 4901 \, \mathrm{I}) \, u_{ol-2-21} + (-24304 + 28832 \, \mathrm{I}) \, u_{ol-1-21} + (9228 + 2538 \, \mathrm{I}) \, u_{ol-21} \Big), \, O( \, \Delta x_{ol}^{11} \, )$$

$$Variavel \, :, x_{ol}, \, Derivada de Ordem \, :, 5$$

$$Error\,order:, 10, \, Error:, 4.8289785791714041311 \times 10^{-25}, \, New\,Error:, 4.8713628061353375185 \times 10^{-35}$$

$$Error\,order:, 10, \, Error:, 4.8713628061353375185 \times 10^{-35}, \, New\,Error:, 4.8756199882201275833 \times 10^{-45}$$

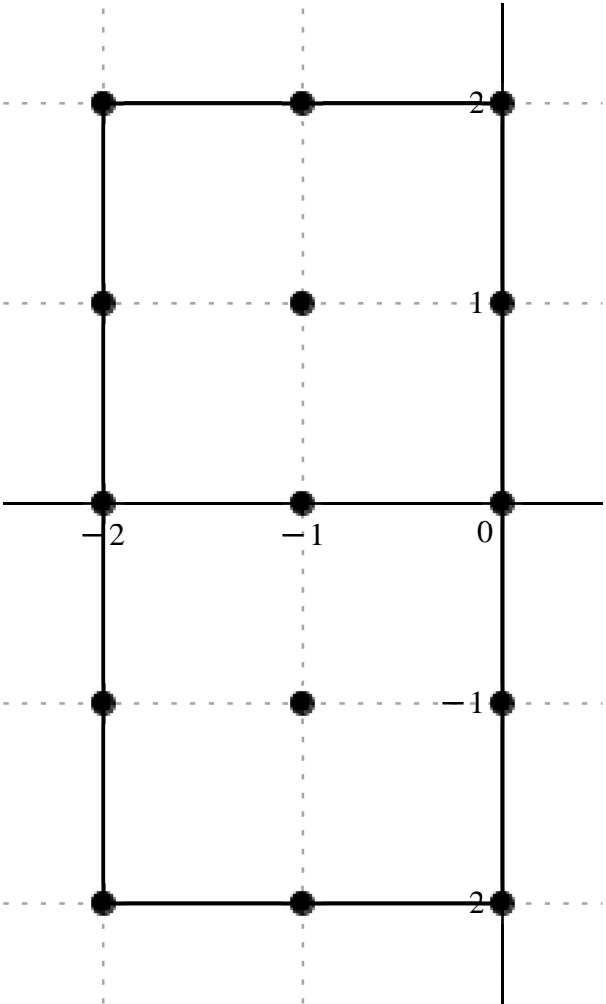
$$Error\,order:, 10, \, Error:, 4.8756199882201275833 \times 10^{-45}, \, New\,Error:, 4.8760458945191421885 \times 10^{-55}$$

$$Error\,order:, 10, \, Error:, 4.8760458945191421885 \times 10^{-55}, \, New\,Error:, 4.8760884870304464703 \times 10^{-65}$$

$$Error\,order:, 10, \, Error:, 4.8760884870304464703 \times 10^{-65}, \, New\,Error:, 4.8760927463003914242 \times 10^{-75}$$

$$x_o+h., \begin{bmatrix} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \end{bmatrix}$$

$$c=, \begin{bmatrix} -\frac{7349}{1360}+\frac{2359\,\mathrm{I}}{272} & -\frac{3811}{85}-\frac{4018\,\mathrm{I}}{85} & \frac{21507}{1360}-\frac{8083\,\mathrm{I}}{1360} \\ \frac{349}{5}+\frac{1318\,\mathrm{I}}{5} & \frac{12587}{5}+\frac{6373\,\mathrm{I}}{5} & \frac{3219}{5}-\frac{764\,\mathrm{I}}{5} \\ \frac{31077}{40} & -\frac{46746}{5} & \frac{17433}{8} \\ \frac{349}{5}-\frac{1318\,\mathrm{I}}{5} & \frac{12587}{5}-\frac{6373\,\mathrm{I}}{5} & \frac{3219}{5}+\frac{764\,\mathrm{I}}{5} \\ -\frac{7349}{1360}-\frac{2359\,\mathrm{I}}{272} & -\frac{3811}{85}+\frac{4018\,\mathrm{I}}{85} & \frac{21507}{1360}+\frac{8083\,\mathrm{I}}{1360} \end{bmatrix}$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{1360 \, \Delta x_{ol}^5} \, \big( (-7349+11795\,\mathrm{I}) \, u_{ol-2+21} - (60976+64288\,\mathrm{I}) \, u_{ol-1+21} + (21507-8083\,\mathrm{I}) \, u_{ol+21} + (94928+358496\,\mathrm{I}) \, u_{ol-2+1} + (3423664+1733456\,\mathrm{I}) \, u_{ol-1+1} + (875568-207808\,\mathrm{I}) \, u_{ol+1} + 1056618 \, u_{ol-2} - 12714912 \, u_{ol-1} + 2963610 \, u_{ol} + (94928-358496\,\mathrm{I}) \, u_{ol-2-1} + (3423664-1733456\,\mathrm{I}) \, u_{ol-1-1} + (875568+207808\,\mathrm{I}) \, u_{ol-1} - (7349+11795\,\mathrm{I}) \, u_{ol-2-21} + (-60976+64288\,\mathrm{I}) \, u_{ol-1-21} + (21507+8083\,\mathrm{I}) \, u_{ol-21} \big), \, O( \, \Delta x_{ol}^{10} \, )$$



Formula:, 192, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order:, 9, Error:,  $2.5711004638080205660 \times 10^{-22}$ , New Error:,  $2.5933276858821583555 \times 10^{-31}$

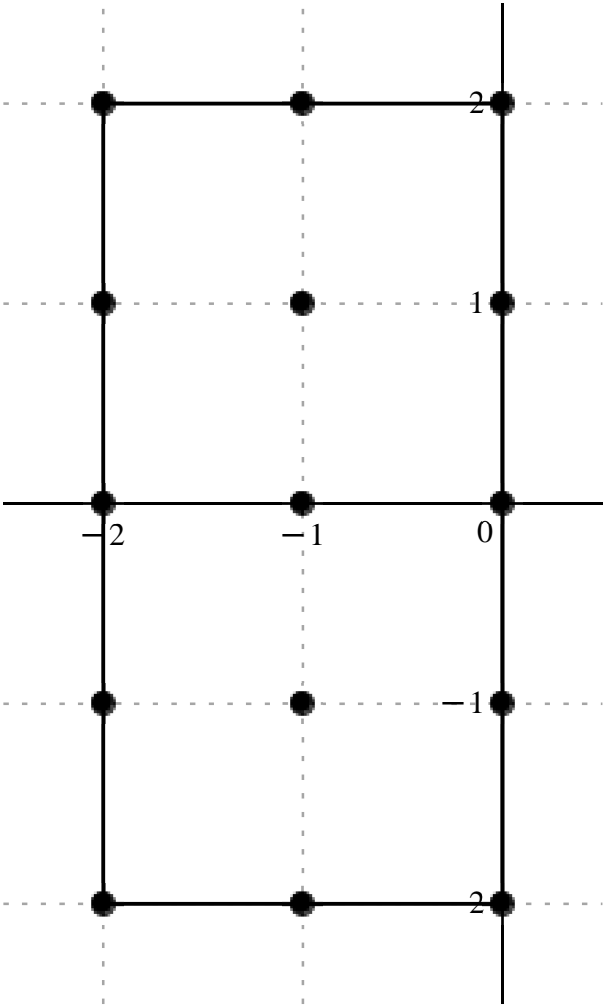
Error order:, 9, Error:,  $2.5933276858821583555 \times 10^{-31}$ , New Error:,  $2.5955601045600751595 \times 10^{-40}$

Error order:, 9, Error:,  $2.5955601045600751595 \times 10^{-40}$ , New Error:,  $2.5957834436453709880 \times 10^{-49}$

Error order:, 9, Error:,  $2.5957834436453709880 \times 10^{-49}$ , New Error:,  $2.5958057785263288172 \times 10^{-58}$

Error order:, 9, Error:,  $2.5958057785263288172 \times 10^{-58}$ , New Error:,  $2.5958080120241491358 \times 10^{-67}$

$$x_o + h., \begin{bmatrix} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} \\ -2 & -1 & 0 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \end{bmatrix}$$
$$c =, \begin{bmatrix} -\frac{19167}{680} + \frac{33543 \text{ I}}{680} & -\frac{22503}{85} - \frac{20898 \text{ I}}{85} & \frac{29139}{340} - \frac{7227 \text{ I}}{170} \\ 417 + \frac{7146 \text{ I}}{5} & \frac{68523}{5} + 6057 \text{ I} & \frac{15531}{5} - \frac{5904 \text{ I}}{5} \\ \frac{21033}{5} & -\frac{242514}{5} & \frac{205101}{20} \\ 417 - \frac{7146 \text{ I}}{5} & \frac{68523}{5} - 6057 \text{ I} & \frac{15531}{5} + \frac{5904 \text{ I}}{5} \\ -\frac{19167}{680} - \frac{33543 \text{ I}}{680} & -\frac{22503}{85} + \frac{20898 \text{ I}}{85} & \frac{29139}{340} + \frac{7227 \text{ I}}{170} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{680 \, \Delta x_{ol}^6} \Big( 3 \, \Big( ( \, -6389 + 11181 \, \mathrm{I} \, ) \, u_{ol-2+2\mathrm{I}} - ( 60008 + 55728 \, \mathrm{I} \, ) \, u_{ol-1+2\mathrm{I}} + ( 19426 - 9636 \, \mathrm{I} \, ) \, u_{ol+2\mathrm{I}} + ( 94520 + 323952 \, \mathrm{I} \, ) \, u_{ol-2+1} + ( 3106376 + 1372920 \, \mathrm{I} \, ) \, u_{ol-1+1} + ( 704072 - 267648 \, \mathrm{I} \, ) \, u_{ol+1} + 953496 \, u_{ol-2} - 10993968 \, u_{ol-1} + 2324478 \, u_{ol} + ( 94520 - 323952 \, \mathrm{I} \, ) \, u_{ol-2-1} + ( 3106376 - 1372920 \, \mathrm{I} \, ) \, u_{ol-1-1} + ( 704072 + 267648 \, \mathrm{I} \, ) \, u_{ol-1} - ( 6389 + 11181 \, \mathrm{I} \, ) \, u_{ol-2-2\mathrm{I}} + ( -60008 + 55728 \, \mathrm{I} \, ) \, u_{ol-1-2\mathrm{I}} + ( 19426 + 9636 \, \mathrm{I} \, ) \, u_{ol-2\mathrm{I}} \Big) \Big) \, O( \, \Delta x_{ol}^9 \, )$$

Formula:, 193, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order:, 8, Error:,  $1.2835217840699230434 \times 10^{-19}$ , New Error:,  $1.2944181039517441722 \times 10^{-27}$

Error order:, 8, Error:,  $1.2944181039517441722 \times 10^{-27}$ , New Error:,  $1.2955124095866172123 \times 10^{-35}$

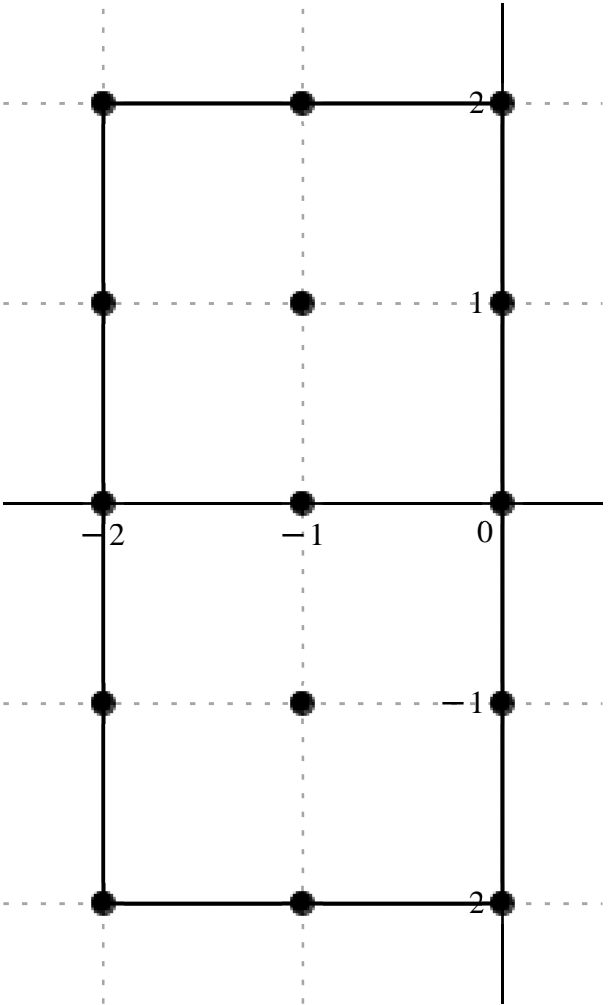
Error order:, 8, Error:,  $1.2955124095866172123 \times 10^{-35}$ , New Error:,  $1.2956218870062902692 \times 10^{-43}$

Error order:, 8, Error:,  $1.2956218870062902692 \times 10^{-43}$ , New Error:,  $1.2956328352169393390 \times 10^{-51}$

Error order:, 8, Error:,  $1.2956328352169393390 \times 10^{-51}$ , New Error:,  $1.2956339300426911836 \times 10^{-59}$

$$x_o + h \cdot , \left[ \begin{array}{ccc} -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccc} -\frac{36729}{272} + \frac{354627 \text{ I}}{1360} & -\frac{122724}{85} - \frac{99162 \text{ I}}{85} & \frac{570717}{1360} - \frac{371133 \text{ I}}{1360} \\ \frac{11529}{5} + \frac{35973 \text{ I}}{5} & \frac{344736}{5} + \frac{132741 \text{ I}}{5} & \frac{69111}{5} - \frac{35091 \text{ I}}{5} \\ \frac{846783}{40} & -\frac{1173816}{5} & \frac{366093}{8} \\ \frac{11529}{5} - \frac{35973 \text{ I}}{5} & \frac{344736}{5} - \frac{132741 \text{ I}}{5} & \frac{69111}{5} + \frac{35091 \text{ I}}{5} \\ -\frac{36729}{272} - \frac{354627 \text{ I}}{1360} & -\frac{122724}{85} + \frac{99162 \text{ I}}{85} & \frac{570717}{1360} + \frac{371133 \text{ I}}{1360} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{1360 \, \Delta x_{ol}^7} \left( 63 \left( (-2915 + 5629 \text{ I}) \, u_{ol-2+21} - (31168 + 25184 \text{ I}) \, u_{ol-1+21} + (9059 - 5891 \text{ I}) \, u_{ol+21} + (49776 + 155312 \text{ I}) \, u_{ol-2+1} + (1488384 + 573104 \text{ I}) \, u_{ol-1+1} + (298384 - 151504 \text{ I}) \, u_{ol+1} + 456994 \, u_{ol-2} - 5067904 \, u_{ol-1} + 987870 \, u_{ol} + (49776 - 155312 \text{ I}) \, u_{ol-2-1} + (1488384 - 573104 \text{ I}) \, u_{ol-1-1} + (298384 + 151504 \text{ I}) \, u_{ol-1} - (2915 + 5629 \text{ I}) \, u_{ol-2-21} + (-31168 + 25184 \text{ I}) \, u_{ol-1-21} + (9059 + 5891 \text{ I}) \, u_{ol-21} \right) \right), \, O( \, \Delta x_{ol}^8 \, )$$

Formula:, 194, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 8

Error order:., 7, Error:., 5.9518712059018525954 × 10<sup>−17</sup>, New Error:., 6.0013122420803174764 × 10<sup>−24</sup>

Error order:., 7, Error:., 6.0013122420803174764 × 10<sup>−24</sup>, New Error:., 6.0062771422750404752 × 10<sup>−31</sup>

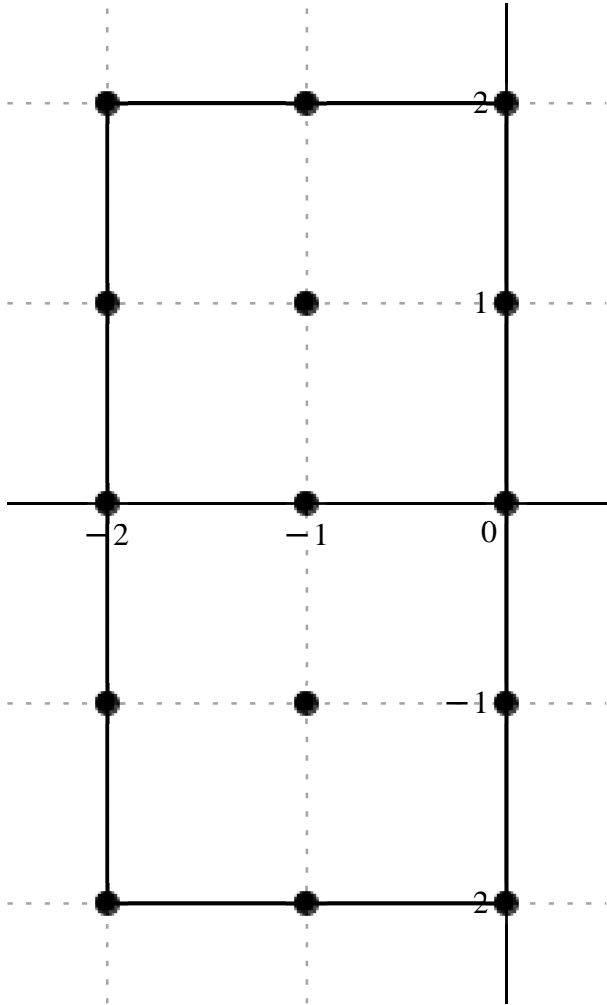
Error order:., 7, Error:., 6.0062771422750404752 × 10<sup>−31</sup>, New Error:., 6.0067738407826218310 × 10<sup>−38</sup>

Error order:., 7, Error:., 6.0067738407826218310 × 10<sup>−38</sup>, New Error:., 6.0068235127187841960 × 10<sup>−45</sup>

Error order:., 7, Error:., 6.0068235127187841960 × 10<sup>−45</sup>, New Error:., 6.0068284799332549980 × 10<sup>−52</sup>

$$x_o \neq h., \left[ \begin{array}{ccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \end{array} \right]$$

$$c=, \left[ \begin{array}{ccc} -\frac{100107}{170}+\frac{215397\,\mathrm{I}}{170} & -\frac{609084}{85}-\frac{424872\,\mathrm{I}}{85} & \frac{307251}{170}-\frac{261891\,\mathrm{I}}{170} \\ \frac{58212}{5}+\frac{166824\,\mathrm{I}}{5} & 318528+\frac{530712\,\mathrm{I}}{5} & \frac{282492}{5}-\frac{177408\,\mathrm{I}}{5} \\ \frac{491841}{5} & -\frac{5253192}{5} & 190827 \\ \frac{58212}{5}-\frac{166824\,\mathrm{I}}{5} & 318528-\frac{530712\,\mathrm{I}}{5} & \frac{282492}{5}+\frac{177408\,\mathrm{I}}{5} \\ -\frac{100107}{170}-\frac{215397\,\mathrm{I}}{170} & -\frac{609084}{85}+\frac{424872\,\mathrm{I}}{85} & \frac{307251}{170}+\frac{261891\,\mathrm{I}}{170} \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{170 \, \mathcal{A}_{ol}^8} \, \big( 63 \, \big( (-1589 + 3419 \, \mathrm{I}) \, u_{ol-2+21} - (19336 + 13488 \, \mathrm{I}) \, u_{ol-1+21} + (4877 - 4157 \, \mathrm{I}) \, u_{ol+21} + (31416 + 90032 \, \mathrm{I}) \, u_{ol-2+1} + (859520 + 286416 \, \mathrm{I}) \, u_{ol-1+1} + (152456 - 95744 \, \mathrm{I}) \, u_{ol+1} + 265438 \, u_{ol-2} - 2835056 \, u_{ol-1} + 514930 \, u_{ol} + (31416 - 90032 \, \mathrm{I}) \, u_{ol-2-1} + (859520 - 286416 \, \mathrm{I}) \, u_{ol-1-1} + (152456 + 95744 \, \mathrm{I}) \, u_{ol-1} - (1589 + 3419 \, \mathrm{I}) \, u_{ol-2-21} + (-19336 + 13488 \, \mathrm{I}) \, u_{ol-1-21} + (4877 + 4157 \, \mathrm{I}) \, u_{ol-21} \big) \big), \, O(\, \mathcal{A}_{ol}^7 \, )$$

$$Variavel \, :, x_{ol} \, , \quad Derivada \, de \, Ordem \, :, 9$$

$$Error \, order.: 6, \quad Error.: 2.5389596229126960924 \times 10^{-14}, \quad New \, Error.: 2.5594982578090140042 \times 10^{-20}$$

$$Error \, order.: 6, \quad Error.: 2.5594982578090140042 \times 10^{-20}, \quad New \, Error.: 2.5615605663411637278 \times 10^{-26}$$

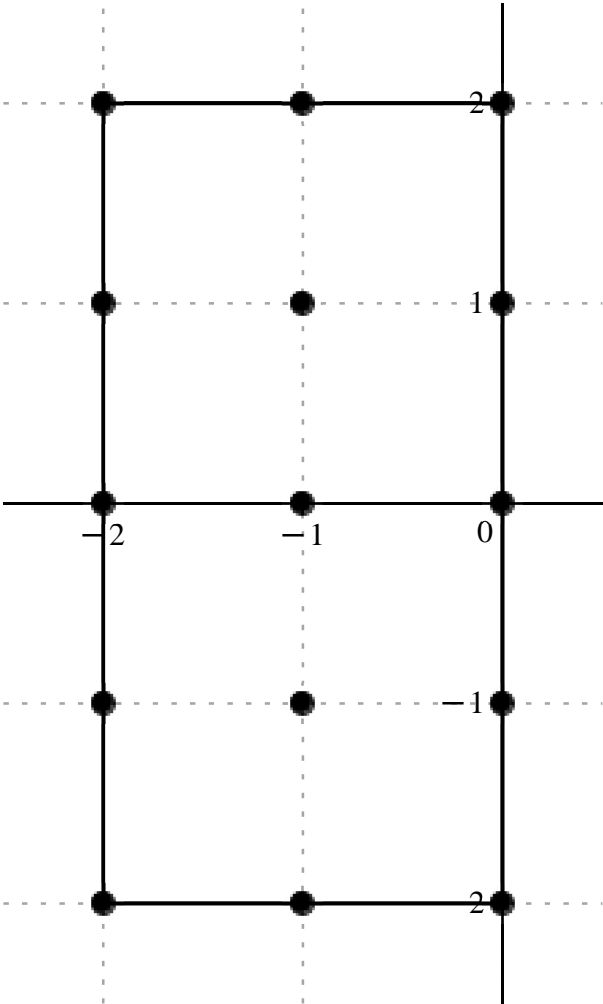
$$Error \, order.: 6, \quad Error.: 2.5615605663411637278 \times 10^{-26}, \quad New \, Error.: 2.5617668818522657341 \times 10^{-32}$$

$$Error \, order.: 6, \quad Error.: 2.5617668818522657341 \times 10^{-32}, \quad New \, Error.: 2.5617875142501625752 \times 10^{-38}$$

$$Error \, order.: 6, \quad Error.: 2.5617875142501625752 \times 10^{-38}, \quad New \, Error.: 2.5617895774984203335 \times 10^{-44}$$

$$x_o \, + h \, . \, , \quad \begin{bmatrix} -2 + 2 \, \text{I} & -1 + 2 \, \text{I} & 2 \, \text{I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} \\ -2 & -1 & 0 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} \\ -2 - 2 \, \text{I} & -1 - 2 \, \text{I} & -2 \, \text{I} \end{bmatrix}$$

$$c = , \quad \begin{bmatrix} -\frac{391041}{170} + \frac{190323 \, \text{I}}{34} & -\frac{2723112}{85} - \frac{1622376 \, \text{I}}{85} & \frac{1133433}{170} - \frac{1272537 \, \text{I}}{170} \\ \frac{266868}{5} + \frac{703836 \, \text{I}}{5} & \frac{6670944}{5} + \frac{1894536 \, \text{I}}{5} & \frac{1045548}{5} - \frac{780948 \, \text{I}}{5} \\ \frac{2080323}{5} & -\frac{21418992}{5} & 729729 \\ \frac{266868}{5} - \frac{703836 \, \text{I}}{5} & \frac{6670944}{5} - \frac{1894536 \, \text{I}}{5} & \frac{1045548}{5} + \frac{780948 \, \text{I}}{5} \\ -\frac{391041}{170} - \frac{190323 \, \text{I}}{34} & -\frac{2723112}{85} + \frac{1622376 \, \text{I}}{85} & \frac{1133433}{170} + \frac{1272537 \, \text{I}}{170} \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^{\,9}} \, \, u(x_{ol}) = \frac{1}{170 \, \Delta x_{ol}^{\,9}} \, \big( 189 \, \big( (-2069 + 5035 \, \text{I}) \, u_{ol-2+21} - (28816 + 17168 \, \text{I}) \, u_{ol-1+21} + (5997 - 6733 \, \text{I}) \, u_{ol+21} + (48008 + 126616 \, \text{I}) \, u_{ol-2+1} + (1200064 + 340816 \, \text{I}) \, u_{ol-1+1} + (188088 - 140488 \, \text{I}) \, u_{ol+1} + 374238 \, u_{ol-2} - 3853152 \, u_{ol-1} + 656370 \, u_{ol} + (48008 - 126616 \, \text{I}) \, u_{ol-2-1} + (1200064 - 340816 \, \text{I}) \, u_{ol-1-1} + (188088 + 140488 \, \text{I}) \, u_{ol-1} - (2069 + 5035 \, \text{I}) \, u_{ol-2-21} + (-28816 + 17168 \, \text{I}) \, u_{ol-1-21} + (5997 + 6733 \, \text{I}) \, u_{ol-21} \big) \big) \cdot \, O(\, \Delta x_{ol}^{\,6} \, )$$

Formula:, 196, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 10

Error order:, 5, Error:,  $9.8100635112106742115 \times 10^{-12}$ , New Error:,  $9.8867682526845935250 \times 10^{-17}$

Error order:, 5, Error:,  $9.8867682526845935250 \times 10^{-17}$ , New Error:,  $9.8944694050576219199 \times 10^{-22}$

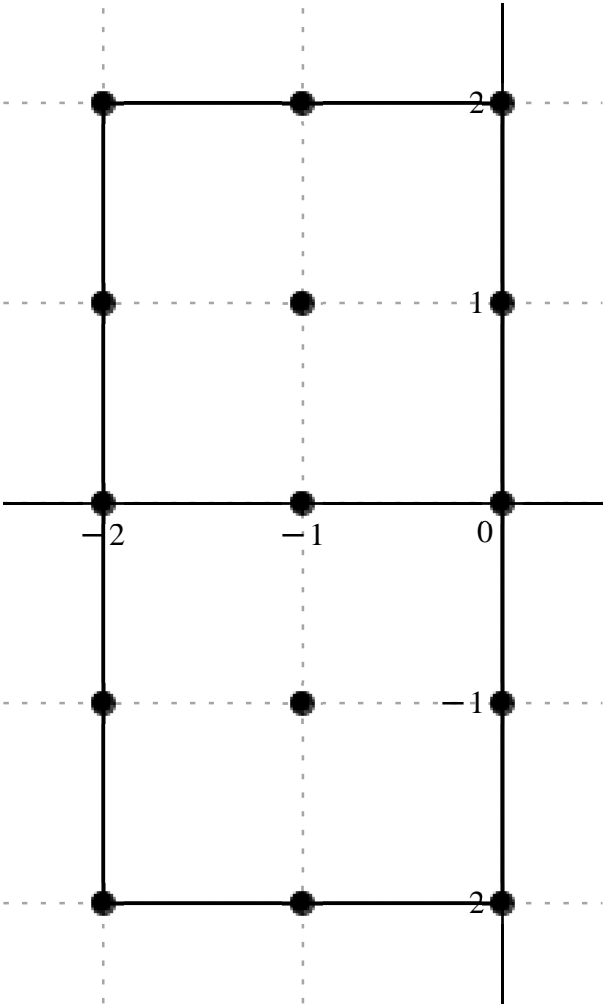
Error order:, 5, Error:,  $9.8944694050576219199 \times 10^{-22}$ , New Error:,  $9.8952398278114124067 \times 10^{-27}$

Error order:, 5, Error:,  $9.8952398278114124067 \times 10^{-27}$ , New Error:,  $9.8953168731626916185 \times 10^{-32}$

Error order:, 5, Error:,  $9.8953168731626916185 \times 10^{-32}$ , New Error:,  $9.8953245777285792767 \times 10^{-37}$

$$x_o + h., \begin{bmatrix} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} \\ -2 & -1 & 0 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{132111}{17} + \frac{374409 \text{ I}}{17} & -\frac{2154600}{17} - \frac{1064448 \text{ I}}{17} & \frac{346059}{17} - \frac{519939 \text{ I}}{17} \\ 217728 + 527688 \text{ I} & 4953312 + 1164240 \text{ I} & 683424 - 594216 \text{ I} \\ 1568322 & -15540336 & 2491398 \\ 217728 - 527688 \text{ I} & 4953312 - 1164240 \text{ I} & 683424 + 594216 \text{ I} \\ -\frac{132111}{17} - \frac{374409 \text{ I}}{17} & -\frac{2154600}{17} + \frac{1064448 \text{ I}}{17} & \frac{346059}{17} + \frac{519939 \text{ I}}{17} \end{bmatrix}$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{17\,\mathcal{A}_{ol}^{10}}\Big(189\left((\,-699+1981\,\mathrm{I}\,)\,u_{ol-2+21}-(11400+5632\,\mathrm{I}\,)\,u_{ol-1+21}+(1831-2751\,\mathrm{I}\,)\,u_{ol+21}+(19584+47464\,\mathrm{I}\,)\,u_{ol-2+1}+(445536+104720\,\mathrm{I}\,)\,u_{ol-1+1}+(61472-53448\,\mathrm{I}\,)\,u_{ol+1}+141066\,u_{ol-2}-1397808\,u_{ol-1}+224094\,u_{ol}+(19584-47464\,\mathrm{I}\,)\,u_{ol-2-1}+(445536-104720\,\mathrm{I}\,)\,u_{ol-1-1}+(61472+53448\,\mathrm{I}\,)\,u_{ol-1}\right.\\ \left.-(699+1981\,\mathrm{I}\,)\,u_{ol-2-21}+(-11400+5632\,\mathrm{I}\,)\,u_{ol-1-21}+(1831+2751\,\mathrm{I}\,)\,u_{ol-21}\right)\Big),\;\;O(\,\mathcal{A}_{ol}^{\;5}\,)$$

Formula:, 197, Var:; 1

Variavel :; x\_{ol}, Derivada de Ordem :; 11

Error order:; 4, Error:; 3.3506150773820074421 × 10<sup>−9</sup>, New Error:; 3.3756153954411754106 × 10<sup>−13</sup>

Error order:; 4, Error:; 3.3756153954411754106 × 10<sup>−13</sup>, New Error:; 3.3781250751568494001 × 10<sup>−17</sup>

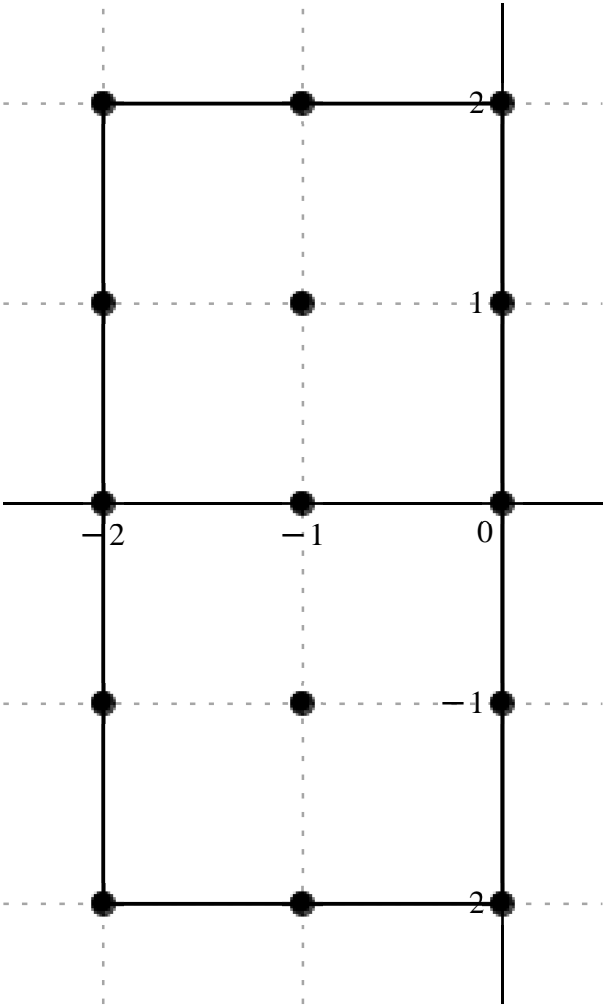
Error order:; 4, Error:; 3.3781250751568494001 × 10<sup>−17</sup>, New Error:; 3.3783761398310540237 × 10<sup>−21</sup>

Error order:; 4, Error:; 3.3783761398310540237 × 10<sup>−21</sup>, New Error:; 3.3784012472657247063 × 10<sup>−25</sup>

Error order:; 4, Error:; 3.3784012472657247063 × 10<sup>−25</sup>, New Error:; 3.3784037580188645006 × 10<sup>−29</sup>

$$x_o\;+h\;, \left[\begin{array}{ccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{ccc} -\frac{363825}{17}+\frac{1266111\,\mathrm{I}}{17} & -\frac{7251552}{17}-\frac{2794176\,\mathrm{I}}{17} & \frac{829521}{17}-\frac{1727649\,\mathrm{I}}{17} \\ 765072+1696464\,\mathrm{I} & 15700608+2893968\,\mathrm{I} & 1896048-1896048\,\mathrm{I} \\ 5076918 & -48299328 & 7297290 \\ 765072-1696464\,\mathrm{I} & 15700608-2893968\,\mathrm{I} & 1896048+1896048\,\mathrm{I} \\ -\frac{363825}{17}-\frac{1266111\,\mathrm{I}}{17} & -\frac{7251552}{17}+\frac{2794176\,\mathrm{I}}{17} & \frac{829521}{17}+\frac{1727649\,\mathrm{I}}{17} \end{array}\right]$$



$$\frac{d^{11}}{dx_{ol}^{11}}\;u(x_{ol})=\frac{1}{17\,\Delta x_{ol}^{11}}\left(2079\left((\,-175+609\,\mathrm{I}\,)u_{ol-2+21}-(3488+1344\,\mathrm{I})u_{ol-1+21}+(399-831\,\mathrm{I})u_{ol+21}+(6256+13872\,\mathrm{I})u_{ol-2+1}+(128384+23664\,\mathrm{I})u_{ol-1+1}+(15504-15504\,\mathrm{I})u_{ol+1}+41514u_{ol-2}-394944u_{ol-1}+59670u_{ol}+(6256-13872\,\mathrm{I})u_{ol-2-1}+(128384-23664\,\mathrm{I})u_{ol-1-1}+(15504+15504\,\mathrm{I})u_{ol-1}-(175+609\,\mathrm{I})u_{ol-2-21}+(-3488+1344\,\mathrm{I})u_{ol-1-21}+(399+831\,\mathrm{I})u_{ol-21}\right)\right),\;O(\;\Delta x_{ol}^4\;)$$

Formula: 198, Var.: 1

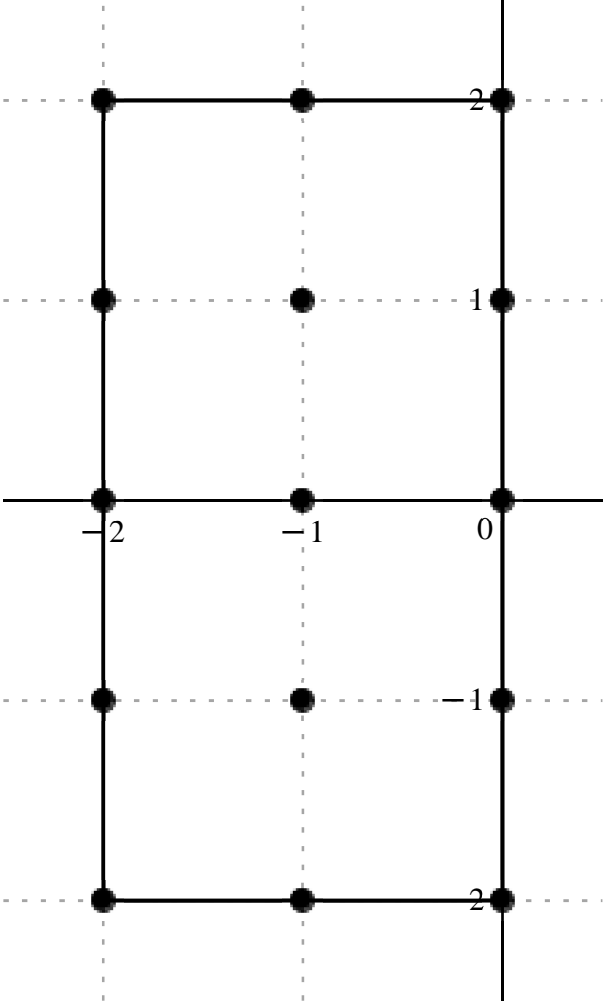
Variavel :  $x_{ol}$ , Derivada de Ordem : 12

Error order: 3, Error:  $9.7383380430461645203 \times 10^{-7}$ , New Error:  $9.8060000063878039283 \times 10^{-10}$   
Error order: 3, Error:  $9.8060000063878039283 \times 10^{-10}$ , New Error:  $9.8127910454219660907 \times 10^{-13}$   
Error order: 3, Error:  $9.8127910454219660907 \times 10^{-13}$ , New Error:  $9.8134703983036854233 \times 10^{-16}$   
Error order: 3, Error:  $9.8134703983036854233 \times 10^{-16}$ , New Error:  $9.8135383360821924102 \times 10^{-19}$   
Error order: 3, Error:  $9.8135383360821924102 \times 10^{-19}$ , New Error:  $9.8135451298849470115 \times 10^{-22}$

$$x_o+h\cdot,\left[\begin{array}{ccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \end{array}\right]$$



$$c =, \begin{bmatrix} -\frac{723492}{17} + \frac{3467772 \text{ I}}{17} & -\frac{19359648}{17} - \frac{5189184 \text{ I}}{17} & \frac{1422036}{17} - \frac{4415796 \text{ I}}{17} \\ 2195424 + 4390848 \text{ I} & 39916800 + 5189184 \text{ I} & 4191264 - 4790016 \text{ I} \\ 13322232 & -120947904 & 17214120 \\ 2195424 - 4390848 \text{ I} & 39916800 - 5189184 \text{ I} & 4191264 + 4790016 \text{ I} \\ -\frac{723492}{17} - \frac{3467772 \text{ I}}{17} & -\frac{19359648}{17} + \frac{5189184 \text{ I}}{17} & \frac{1422036}{17} + \frac{4415796 \text{ I}}{17} \end{bmatrix}$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}} \; u(x_{ol}) = \frac{1}{17 \, \Delta x_{ol}^{12}} \Big( 24948 \, \Big( ( \, -29 + 139 \, \mathrm{I} \, ) \, u_{ol-2+21} - ( 776 + 208 \, \mathrm{I} \, ) \, u_{ol-1+21} + ( 57 - 177 \, \mathrm{I} \, ) \, u_{ol+21} + ( 1496 + 2992 \, \mathrm{I} \, ) \, u_{ol-2+1} + ( 27200 + 3536 \, \mathrm{I} \, ) \, u_{ol-1+1} + ( 2856 - 3264 \, \mathrm{I} \, ) \, u_{ol+1} + 9078 \, u_{ol-2} - 82416 \, u_{ol-1} + 11730 \, u_{ol} + ( 1496 - 2992 \, \mathrm{I} \, ) \, u_{ol-2-1} + ( 27200 - 3536 \, \mathrm{I} \, ) \, u_{ol-1-1} + ( 2856 + 3264 \, \mathrm{I} \, ) \, u_{ol-1} - ( 29 + 139 \, \mathrm{I} \, ) \, u_{ol-2-21} \\ + ( -776 + 208 \, \mathrm{I} \, ) \, u_{ol-1-21} + ( 57 + 177 \, \mathrm{I} \, ) \, u_{ol-21} \Big) \Big), \; O( \, \Delta x_{ol}^3 \, )$$

Formula:, 199, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 13

Error order:., 2, Error:., 0.00022645067994702643226, New Error:., 2.2783691495573437649 × 10<sup>−6</sup>

Error order:., 2, Error:., 2.2783691495573437649 × 10<sup>−6</sup>, New Error:., 2.2797600976971783006 × 10<sup>−8</sup>

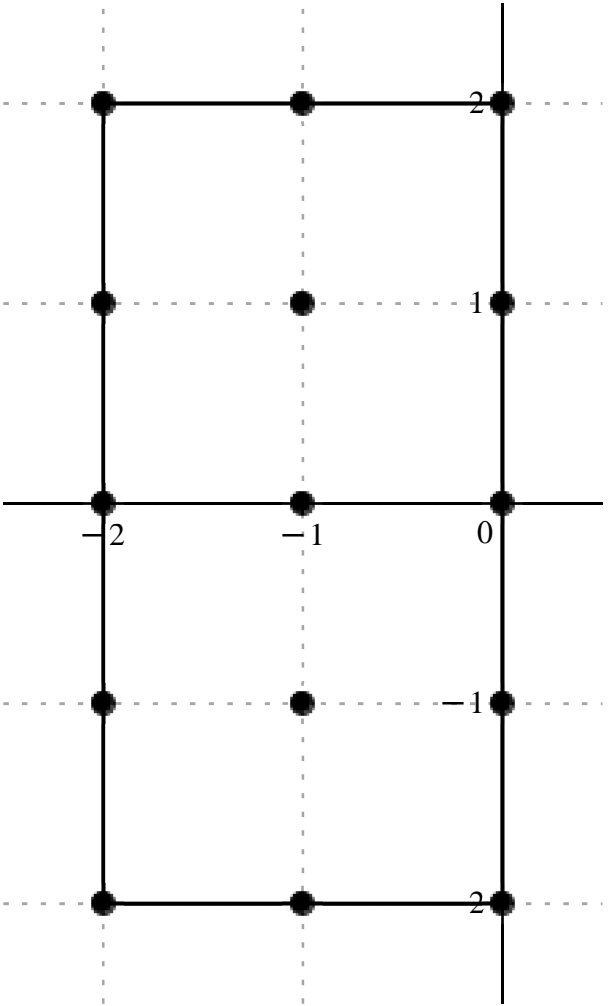
Error order:., 2, Error:., 2.2797600976971783006 × 10<sup>−8</sup>, New Error:., 2.2798992397407390315 × 10<sup>−10</sup>

Error order:., 2, Error:., 2.2798992397407390315 × 10<sup>−10</sup>, New Error:., 2.2799131544174892616 × 10<sup>−12</sup>

Error order:., 2, Error:., 2.2799131544174892616 × 10<sup>−12</sup>, New Error:., 2.2799145458898883245 × 10<sup>−14</sup>

$$x_o \neq h., \begin{bmatrix} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} \\ -2 & -1 & 0 \\ -2-\text{ I} & -1-\text{ I} & -\text{ I} \\ -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{723492}{17} + \frac{6860700\text{ I}}{17} & -\frac{36324288}{17} - \frac{5189184\text{ I}}{17} & \frac{1422036}{17} - \frac{7808724\text{ I}}{17} \\ 4590432 + 8182944\text{ I} & 72648576 + 5189184\text{ I} & 6586272 - 8582112\text{ I} \\ 25297272 & -217945728 & 29189160 \\ 4590432 - 8182944\text{ I} & 72648576 - 5189184\text{ I} & 6586272 + 8582112\text{ I} \\ -\frac{723492}{17} - \frac{6860700\text{ I}}{17} & -\frac{36324288}{17} + \frac{5189184\text{ I}}{17} & \frac{1422036}{17} + \frac{7808724\text{ I}}{17} \end{bmatrix}$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d} x_{o l}^{13}} \; u(x_{o l}) = \frac{1}{17 \, \Delta x_{o l}^{13}} \Big( 24948 \, \Big( ( \, -29 + 275 \, \mathrm{I} \, ) \, u_{o l - 2 + 2 \mathrm{I}} - ( 1456 + 208 \, \mathrm{I} ) \, u_{o l - 1 + 2 \mathrm{I}} + ( 57 - 313 \, \mathrm{I} ) \, u_{o l + 2 \mathrm{I}} + ( 3128 + 5576 \, \mathrm{I} ) \, u_{o l - 2 + 1} + ( 49504 + 3536 \, \mathrm{I} ) \, u_{o l - 1 + 1} + ( 4488 - 5848 \, \mathrm{I} ) \, u_{o l + 1} + 17238 \, u_{o l - 2} - 148512 \, u_{o l - 1} + 19890 \, u_{o l} + ( 3128 - 5576 \, \mathrm{I} ) \, u_{o l - 2 - 1} + ( 49504 - 3536 \, \mathrm{I} ) \, u_{o l - 1 - 1} + ( 4488 + 5848 \, \mathrm{I} ) \, u_{o l - 1} - ( 29 + 275 \, \mathrm{I} ) \, u_{o l - 2 - 2 \mathrm{I}} \\ + ( -1456 + 208 \, \mathrm{I} ) \, u_{o l - 1 - 2 \mathrm{I}} + ( 57 + 313 \, \mathrm{I} ) \, u_{o l - 2 \mathrm{I}} \Big) \Big) , \; O( \, \Delta x_{o l}^{\; 2} \, )$$

Formula.: 200, Var.: 1

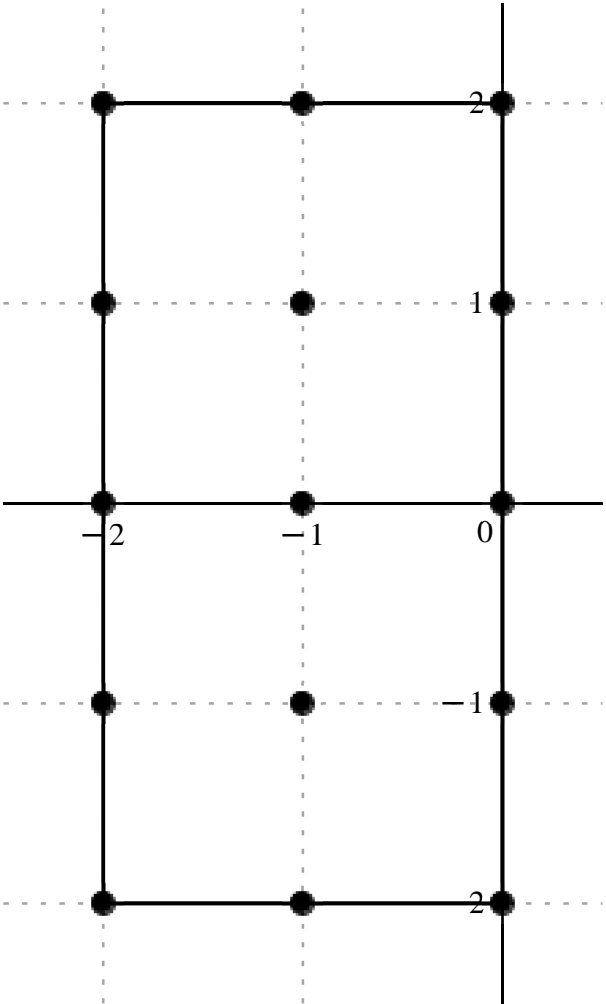
Variavel .:, x\_o l , Derivada de Ordem .:, 14

Error order.: 1, Error.: 0.037659082442297207127, New Error.: 0.0037829405039084604158

Error order.: 1, Error.: 0.0037829405039084604158, New Error.: 0.00037846487693056451394

*Error order:*, 1, *Error:*, 0.00037846487693056451394, *New Error:*, 0.000037848196463344641553  
*Error order:*, 1, *Error:*, 0.000037848196463344641553, *New Error:*,  $3.7848367345423319685 \times 10^{-6}$   
*Error order:*, 1, *Error:*,  $3.7848367345423319685 \times 10^{-6}$ , *New Error:*,  $3.7848384433681687039 \times 10^{-7}$

$$\begin{aligned}
 &x_o \neq h \text{ , } \begin{bmatrix} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} \\ -2 & -1 & 0 \\ -2-\text{ I} & -1-\text{ I} & -\text{ I} \\ -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} \end{bmatrix} \\
 &c =, \begin{bmatrix} \frac{349272}{17} + \frac{7334712\text{ I}}{17} & -\frac{36324288}{17} & \frac{349272}{17} - \frac{7334712\text{ I}}{17} \\ 5588352 + 8382528\text{ I} & 72648576 & 5588352 - 8382528\text{ I} \\ 27243216 & -217945728 & 27243216 \\ 5588352 - 8382528\text{ I} & 72648576 & 5588352 + 8382528\text{ I} \\ \frac{349272}{17} - \frac{7334712\text{ I}}{17} & -\frac{36324288}{17} & \frac{349272}{17} + \frac{7334712\text{ I}}{17} \end{bmatrix}
 \end{aligned}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}}\; u(x_{ol}) = \frac{349272 \left( (1+21\text{ I})\, u_{ol-2+21} - 104\, u_{ol-1+21} + (1-21\text{ I})\, u_{ol+21} + (272+408\text{ I})\, u_{ol-2+1} + 3536\, u_{ol-1+1} + (272-408\text{ I})\, u_{ol+1} + 1326\, u_{ol-2} - 10608\, u_{ol-1} + 1326\, u_{ol} + (272-408\text{ I})\, u_{ol-2-1} + 3536\, u_{ol-1-1} + (272+408\text{ I})\, u_{ol-1} + (1-21\text{ I})\, u_{ol-2-21} - 104\, u_{ol-1-21} + (1+21\text{ I})\, u_{ol-21} \right)}{17\, \Delta x_{ol}^{14}},\; O(\Delta x_{ol})$$

$$Variavel \, :, x_{ol}, \, Derivada \, de \, Ordem \, :, 1$$

$$Error \, order:, 14, \, Error:, 3.1904521205503481306 \times 10^{-36}, \, New \, Error:, 3.1967567260989919440 \times 10^{-50}$$

$$Error \, order:, 14, \, Error:, 3.1967567260989919440 \times 10^{-50}, \, New \, Error:, 3.1973733932415657709 \times 10^{-64}$$

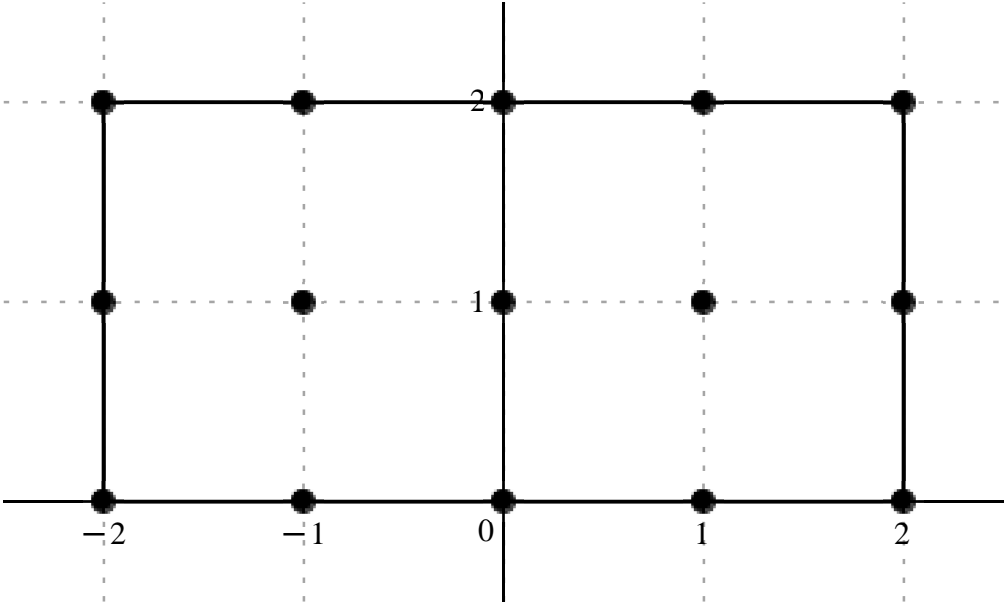
$$Error \, order:, 14, \, Error:, 3.1973733932415657709 \times 10^{-64}, \, New \, Error:, 3.1974349219399500265 \times 10^{-78}$$

$$Error \, order:, 14, \, Error:, 3.1974349219399500265 \times 10^{-78}, \, New \, Error:, 3.1974410734295486633 \times 10^{-92}$$

$$Error \, order:, 14, \, Error:, 3.1974410734295486633 \times 10^{-92}, \, New \, Error:, 3.1974416885647060481 \times 10^{-106}$$

$$x_o \neq h., \left[ \begin{array}{ccccc} -2+2 \, \mathbf{I} & -1+2 \, \mathbf{I} & 2 \, \mathbf{I} & 1+2 \, \mathbf{I} & 2+2 \, \mathbf{I} \\ -2+\mathbf{I} & -1+\mathbf{I} & \mathbf{I} & 1+\mathbf{I} & 2+\mathbf{I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

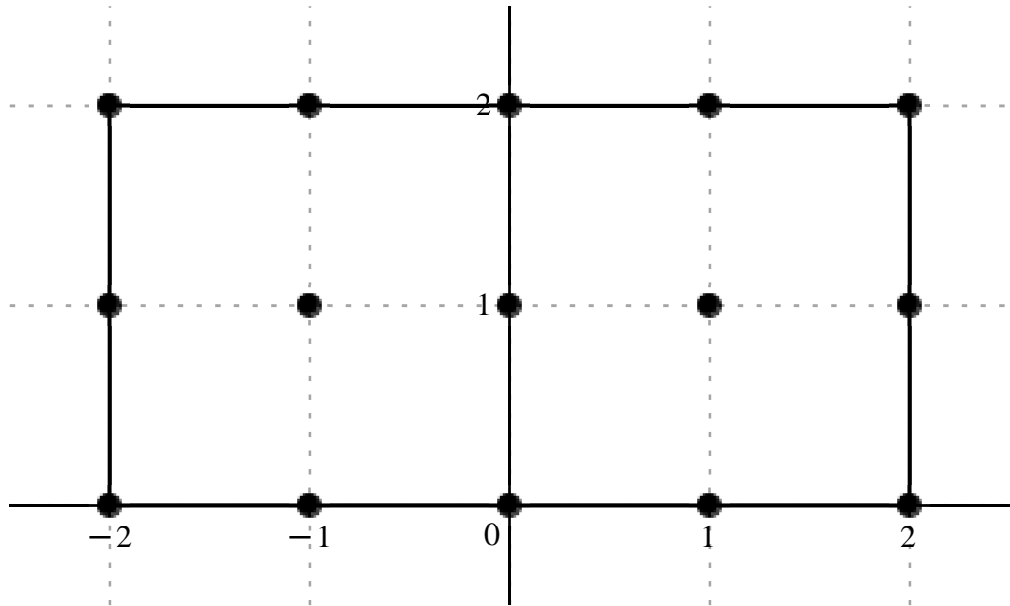
$$c=, \left[ \begin{array}{ccccc} \frac{11}{2652}-\frac{5 \, \mathbf{I}}{1326} & \frac{32}{195}+\frac{4 \, \mathbf{I}}{195} & \frac{\mathbf{I}}{2} & -\frac{32}{195}+\frac{4 \, \mathbf{I}}{195} & -\frac{11}{2652}-\frac{5 \, \mathbf{I}}{1326} \\ -\frac{8}{255}-\frac{4 \, \mathbf{I}}{255} & \frac{4}{3}+\frac{4 \, \mathbf{I}}{3} & -8 \, \mathbf{I} & -\frac{4}{3}+\frac{4 \, \mathbf{I}}{3} & \frac{8}{255}-\frac{4 \, \mathbf{I}}{255} \\ \frac{1}{2652}+\frac{7 \, \mathbf{I}}{884} & \frac{8}{39}+\frac{4 \, \mathbf{I}}{13} & \frac{21 \, \mathbf{I}}{5} & -\frac{8}{39}+\frac{4 \, \mathbf{I}}{13} & -\frac{1}{2652}+\frac{7 \, \mathbf{I}}{884} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d} x_{ol}} \, u(x_{ol})=\frac{1}{13260 \, \mathcal{A}_{ol}} \Big( (55-50 \, \mathbf{I}) \, u_{ol-2+2 \mathbf{I}}+(2176+272 \, \mathbf{I}) \, u_{ol-1+2 \mathbf{I}}+6630 \, \mathbf{I} u_{ol+2 \mathbf{I}}+(-2176+272 \, \mathbf{I}) \, u_{ol+1+2 \mathbf{I}}-(55+50 \, \mathbf{I}) \, u_{ol+2+2 \mathbf{I}}-(416+208 \, \mathbf{I}) \, u_{ol-2+1}+(17680+17680 \, \mathbf{I}) \, u_{ol-1+1}-106080 \, \mathbf{I} u_{ol+1}+(-17680+17680 \, \mathbf{I}) \, u_{ol+1+1}+(416-208 \, \mathbf{I}) \, u_{ol+2+1}+(5+105 \, \mathbf{I}) \, u_{ol-2}+(2720+4080 \, \mathbf{I}) \, u_{ol-1}+55692 \, \mathbf{I} u_{ol}+(-2720+4080 \, \mathbf{I}) \, u_{ol+1}+(-5+105 \, \mathbf{I}) \, u_{ol+2} \Big), \, O( \, \mathcal{A}_{ol}^{14} \, )$$

Error order.; 13, Error.;  $2.4364319391045020812 \times 10^{-33}$ , New Error.;  $2.4411680047801355484 \times 10^{-46}$   
Error order.; 13, Error.;  $2.4411680047801355484 \times 10^{-46}$ , New Error.;  $2.4416314200495141914 \times 10^{-59}$   
Error order.; 13, Error.;  $2.4416314200495141914 \times 10^{-59}$ , New Error.;  $2.4416776596042636951 \times 10^{-72}$   
Error order.; 13, Error.;  $2.4416776596042636951 \times 10^{-72}$ , New Error.;  $2.4416822825399580436 \times 10^{-85}$   
Error order.; 13, Error.;  $2.4416822825399580436 \times 10^{-85}$ , New Error.;  $2.4416827448233296137 \times 10^{-98}$

$$x_o \neq h. , \left[ \begin{array}{ccccc} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$
$$c = , \left[ \begin{array}{cc} \frac{49}{1768} + \frac{919\text{ I}}{26520} & -\frac{72}{325} + \frac{1208\text{ I}}{975} & -\frac{37}{10} & -\frac{72}{325} - \frac{1208\text{ I}}{975} & \frac{49}{1768} - \frac{919\text{ I}}{26520} \\ \frac{64}{425} - \frac{304\text{ I}}{1275} & -\frac{56}{5} + \frac{128\text{ I}}{15} & \frac{256}{5} & -\frac{56}{5} - \frac{128\text{ I}}{15} & \frac{64}{425} + \frac{304\text{ I}}{1275} \\ -\frac{887}{13260} - \frac{21\text{ I}}{4420} & -\frac{584}{195} + \frac{72\text{ I}}{65} & -\frac{1889}{100} & -\frac{584}{195} - \frac{72\text{ I}}{65} & -\frac{887}{13260} + \frac{21\text{ I}}{4420} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{132600 \, \Delta x_{ol}^2} \big( (3675 + 4595 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (-29376 + 164288 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 490620 \, u_{ol+2\mathrm{I}} - (29376 + 164288 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (3675 - 4595 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (19968 - 31616 \, \mathrm{I}) \, u_{ol-2+1} + (-1485120 + 1131520 \, \mathrm{I}) \, u_{ol-1+1} + 6789120 \, u_{ol+1} - (1485120 + 1131520 \, \mathrm{I}) \, u_{ol+1+1} + (19968 + 31616 \, \mathrm{I}) \, u_{ol+2+1} - (8870 + 630 \, \mathrm{I}) \, u_{ol-2} \\ + (-397120 + 146880 \, \mathrm{I}) \, u_{ol-1} - 2504814 \, u_{ol} - (397120 + 146880 \, \mathrm{I}) \, u_{ol+1} + (-8870 + 630 \, \mathrm{I}) \, u_{ol+2} \big), \, O( \, \Delta x_{ol}^{13} \, )$$

Formula:, 203, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 3

Error order:, 12, Error:,  $1.4943382442906049190 \times 10^{-30}$ , New Error:,  $1.4972012988079259087 \times 10^{-42}$

Error order:, 12, Error:,  $1.4972012988079259087 \times 10^{-42}$ , New Error:,  $1.4974815295233878510 \times 10^{-54}$

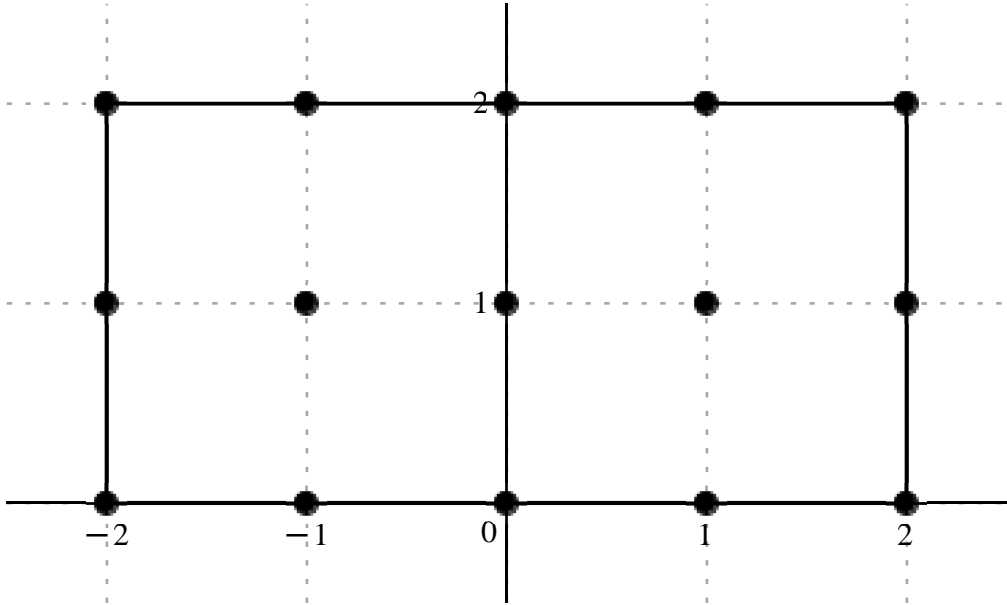
Error order:, 12, Error:,  $1.4974815295233878510 \times 10^{-54}$ , New Error:,  $1.4975094918128525265 \times 10^{-66}$

Error order:, 12, Error:,  $1.4975094918128525265 \times 10^{-66}$ , New Error:,  $1.4975122874339437403 \times 10^{-78}$

Error order:, 12, Error:,  $1.4975122874339437403 \times 10^{-78}$ , New Error:,  $1.4975125669899742747 \times 10^{-90}$

$$x_o \neq h., \left[ \begin{array}{ccccc} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

$$c=, \left[ \begin{array}{ccccc} -\frac{1563}{6800}+\frac{227\text{ I}}{1360} & -\frac{192}{25}-\frac{41\text{ I}}{25} & -\frac{4557\text{ I}}{200} & \frac{192}{25}-\frac{41\text{ I}}{25} & \frac{1563}{6800}+\frac{227\text{ I}}{1360} \\ \frac{618}{425}+\frac{461\text{ I}}{425} & -\frac{1149}{25}-\frac{1789\text{ I}}{25} & \frac{7494\text{ I}}{25} & \frac{1149}{25}-\frac{1789\text{ I}}{25} & -\frac{618}{425}+\frac{461\text{ I}}{425} \\ \frac{537}{6800}-\frac{3003\text{ I}}{6800} & -\frac{66}{25}-\frac{519\text{ I}}{25} & -\frac{3627\text{ I}}{40} & \frac{66}{25}-\frac{519\text{ I}}{25} & -\frac{537}{6800}-\frac{3003\text{ I}}{6800} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{6800 \, \Delta x_{ol}^3} \Big( (-1563 + 1135 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} - (52224 + 11152 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 154938 \, \mathrm{I} u_{ol+2\mathrm{I}} + (52224 - 11152 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (1563 + 1135 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (9888 + 7376 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} - (312528 + 486608 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} + 2038368 \, \mathrm{I} u_{ol+\mathrm{I}} + (312528 - 486608 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} + (-9888 + 7376 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} + (537 - 3003 \, \mathrm{I}) \, u_{ol-2} - (17952$$

$$+ 141168 \, \mathrm{I}) \, u_{ol-1} - 616590 \, \mathrm{I} u_{ol} + (17952 - 141168 \, \mathrm{I}) \, u_{ol+1} - (537 + 3003 \, \mathrm{I}) \, u_{ol+2} \Big), \, O(\, \Delta x_{ol}^{12} \, )$$

Formula:, 204, Var.:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 4

Error order:., 11, Error:.,  $8.6948528483609784440 \times 10^{-28}$ , New Error:.,  $8.7113000735801281222 \times 10^{-39}$

Error order:., 11, Error:.,  $8.7113000735801281222 \times 10^{-39}$ , New Error:.,  $8.7129103160861003446 \times 10^{-50}$

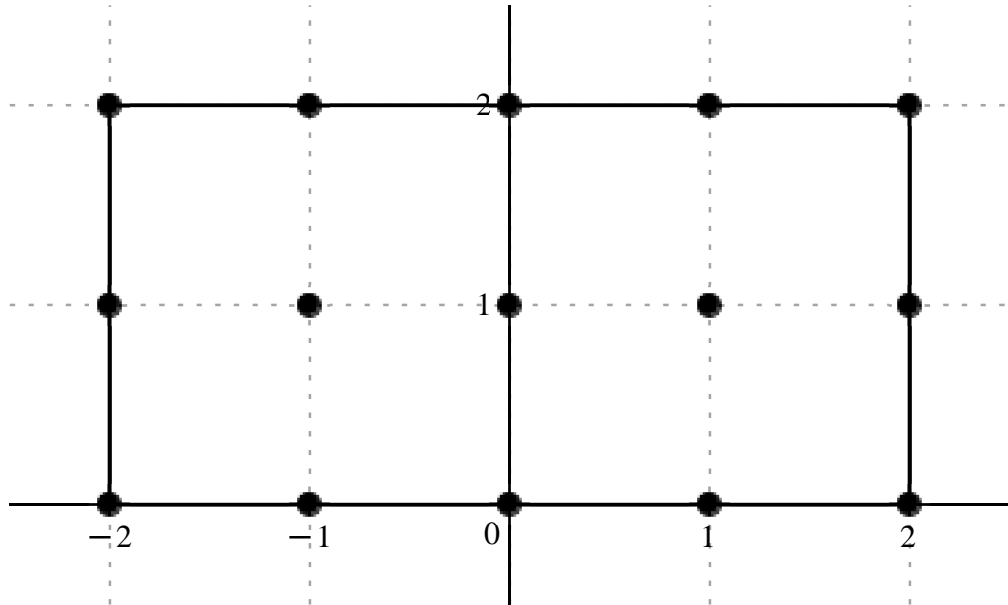
Error order:., 11, Error:.,  $8.7129103160861003446 \times 10^{-50}$ , New Error:.,  $8.7130709953421230479 \times 10^{-61}$

Error order:., 11, Error:.,  $8.7130709953421230479 \times 10^{-61}$ , New Error:.,  $8.7130870598175866997 \times 10^{-72}$

Error order:., 11, Error:.,  $8.7130870598175866997 \times 10^{-72}$ , New Error:.,  $8.7130886662306314859 \times 10^{-83}$

$$x_o \neq h., \left[ \begin{array}{ccccc} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

$$c=, \left[ \begin{array}{cccccc} -\frac{3301}{3400}-\frac{4901\text{ I}}{3400} & \frac{274}{25}-\frac{1148\text{ I}}{25} & \frac{6789}{50} & \frac{274}{25}+\frac{1148\text{ I}}{25} & -\frac{3301}{3400}+\frac{4901\text{ I}}{3400} \\ -\frac{3038}{425}+\frac{212\text{ I}}{25} & \frac{2162}{5}-\frac{6214\text{ I}}{25} & -\frac{42564}{25} & \frac{2162}{5}+\frac{6214\text{ I}}{25} & -\frac{3038}{425}-\frac{212\text{ I}}{25} \\ \frac{2307}{850}+\frac{1269\text{ I}}{1700} & \frac{3054}{25}+\frac{216\text{ I}}{25} & \frac{8931}{20} & \frac{3054}{25}-\frac{216\text{ I}}{25} & \frac{2307}{850}-\frac{1269\text{ I}}{1700} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{3400 \, \Delta x_{ol}^4} \Big( -(3301+4901\text{ I}) \, u_{ol-2+2\text{ I}} + (37264-156128\text{ I}) \, u_{ol-1+2\text{ I}} + 461652 \, u_{ol+2\text{ I}} + (37264+156128\text{ I}) \, u_{ol+1+2\text{ I}} + (-3301+4901\text{ I}) \, u_{ol+2+2\text{ I}} + (-24304+28832\text{ I}) \, u_{ol-2+1} + (1470160-845104\text{ I}) \, u_{ol-1+1} - 5788704 \, u_{ol+1} + (1470160+845104\text{ I}) \, u_{ol+1+1} - (24304+28832\text{ I}) \, u_{ol+2+1} + (9228+2538\text{ I}) \, u_{ol-2}$$

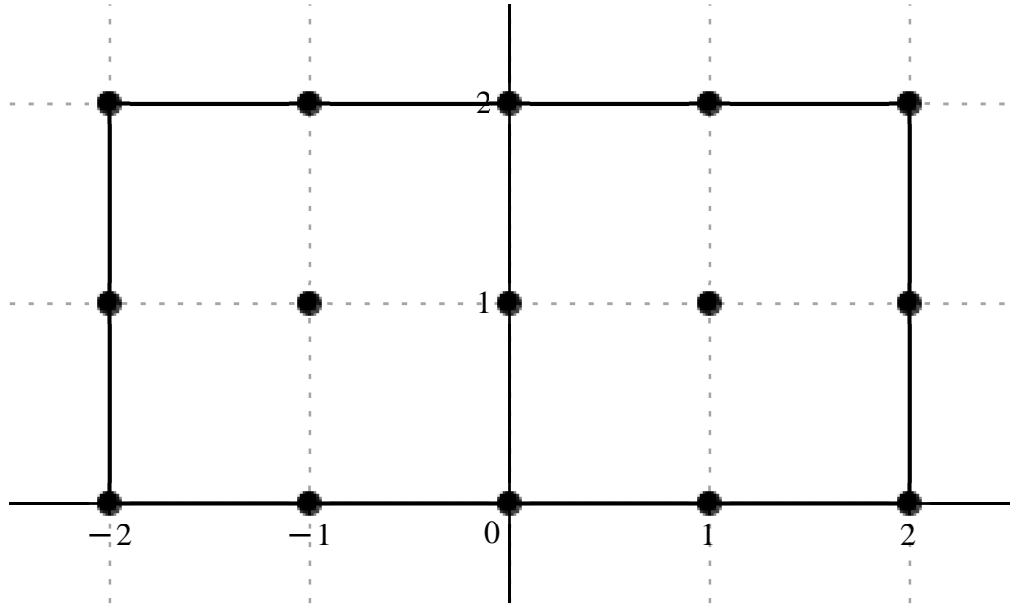
$$+ (415344+29376\text{ I}) \, u_{ol-1} + 1518270 \, u_{ol} + (415344-29376\text{ I}) \, u_{ol+1} + (9228-2538\text{ I}) \, u_{ol+2} \Big), \, O(\, \Delta x_{ol}^{11} \, )$$

Formula:, 205, Var.: 1  
Variavel :,  $x_{ol}$  , Derivada de Ordem :, 5

Error order:, 10, Error:,  $4.8660234827126636243 \times 10^{-25}$ , New Error:,  $4.8751052388765637175 \times 10^{-35}$   
Error order:, 10, Error:,  $4.8751052388765637175 \times 10^{-35}$ , New Error:,  $4.8759946115199290516 \times 10^{-45}$   
Error order:, 10, Error:,  $4.8759946115199290516 \times 10^{-45}$ , New Error:,  $4.8760833606499809311 \times 10^{-55}$   
Error order:, 10, Error:,  $4.8760833606499809311 \times 10^{-55}$ , New Error:,  $4.8760922336815395323 \times 10^{-65}$   
Error order:, 10, Error:,  $4.8760922336815395323 \times 10^{-65}$ , New Error:,  $4.8760931209658808229 \times 10^{-75}$

$$x_o \neq h. , \left[ \begin{array}{ccccc} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

$$c= , \left[ \begin{array}{ccccc} \frac{2359}{272}-\frac{7349\text{ I}}{1360} & \frac{1318}{5}+\frac{349\text{ I}}{5} & \frac{31077\text{ I}}{40} & -\frac{1318}{5}+\frac{349\text{ I}}{5} & -\frac{2359}{272}-\frac{7349\text{ I}}{1360} \\ -\frac{4018}{85}-\frac{3811\text{ I}}{85} & \frac{6373}{5}+\frac{12587\text{ I}}{5} & -\frac{46746\text{ I}}{5} & -\frac{6373}{5}+\frac{12587\text{ I}}{5} & \frac{4018}{85}-\frac{3811\text{ I}}{85} \\ -\frac{8083}{1360}+\frac{21507\text{ I}}{1360} & -\frac{764}{5}+\frac{3219\text{ I}}{5} & \frac{17433\text{ I}}{8} & \frac{764}{5}+\frac{3219\text{ I}}{5} & \frac{8083}{1360}+\frac{21507\text{ I}}{1360} \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{1360 \, \Delta x_{ol}^5} \Big( (11795-7349\text{ I}) \, u_{ol-2+2\text{ I}} + (358496+94928\text{ I}) \, u_{ol-1+2\text{ I}} + 1056618\text{ I} u_{ol+2\text{ I}} + (-358496+94928\text{ I}) \, u_{ol+1+2\text{ I}} - (11795+7349\text{ I}) \, u_{ol+2+2\text{ I}} - (64288+60976\text{ I}) \, u_{ol-2+1} + (1733456+3423664\text{ I}) \, u_{ol-1+1} - 12714912\text{ I} u_{ol+1} + (-1733456+3423664\text{ I}) \, u_{ol+1+1} + (64288-60976\text{ I}) \, u_{ol+2+1} + (-8083$$

$$+21507\text{ I}) \, u_{ol-2} + (-207808+875568\text{ I}) \, u_{ol-1} + 2963610\text{ I} u_{ol} + (207808+875568\text{ I}) \, u_{ol+1} + (8083+21507\text{ I}) \, u_{ol+2} \Big), \, O( \, \Delta x_{ol}^{10} \, )$$



Formula:, 206, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order:, 9, Error:,  $2.5905294265145184760 \times 10^{-22}$ , New Error:,  $2.5952901937015529736 \times 10^{-31}$

Error order:, 9, Error:,  $2.5952901937015529736 \times 10^{-31}$ , New Error:,  $2.5957565517638151792 \times 10^{-40}$

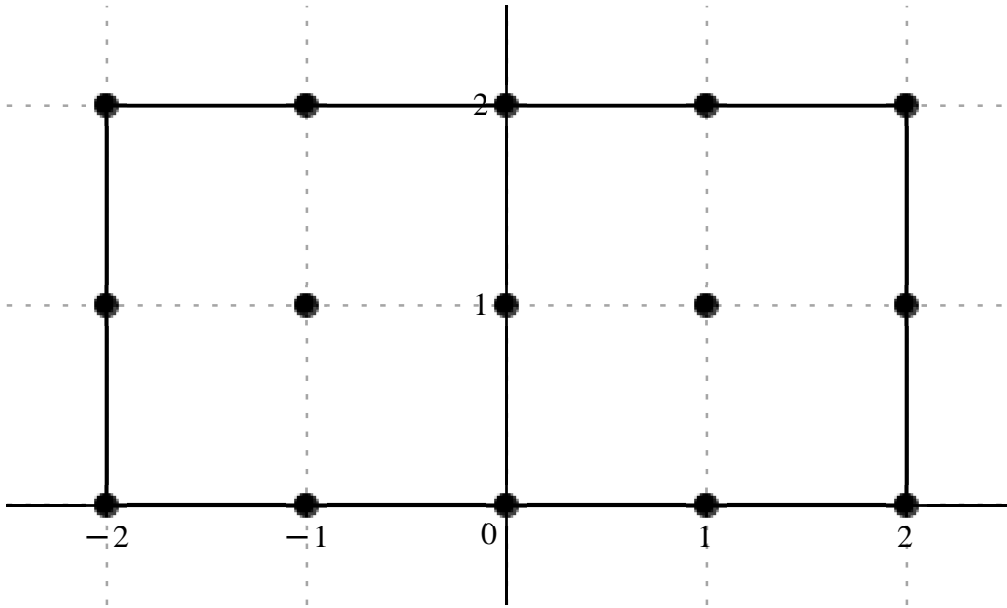
Error order:, 9, Error:,  $2.5957565517638151792 \times 10^{-40}$ , New Error:,  $2.5958030903302693084 \times 10^{-49}$

Error order:, 9, Error:,  $2.5958030903302693084 \times 10^{-49}$ , New Error:,  $2.5958077432144641987 \times 10^{-58}$

Error order:, 9, Error:,  $2.5958077432144641987 \times 10^{-58}$ , New Error:,  $2.5958082084931591298 \times 10^{-67}$

$$x_o \neq h., \left[ \begin{array}{ccccc} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccc} \frac{19167}{680} + \frac{33543\text{ I}}{680} & -417 + \frac{7146\text{ I}}{5} & -\frac{21033}{5} & -417 - \frac{7146\text{ I}}{5} & \frac{19167}{680} - \frac{33543\text{ I}}{680} \\ \frac{22503}{85} - \frac{20898\text{ I}}{85} & -\frac{68523}{5} + 6057\text{ I} & \frac{242514}{5} & -\frac{68523}{5} - 6057\text{ I} & \frac{22503}{85} + \frac{20898\text{ I}}{85} \\ -\frac{29139}{340} - \frac{7227\text{ I}}{170} & -\frac{15531}{5} - \frac{5904\text{ I}}{5} & -\frac{205101}{20} & -\frac{15531}{5} + \frac{5904\text{ I}}{5} & -\frac{29139}{340} + \frac{7227\text{ I}}{170} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} u(x_{ol}) = \frac{1}{680 \Delta x_{ol}^6} \big( 3 \big( (6389 + 11181\text{ I}) u_{ol-2+2\text{ I}} + (-94520 + 323952\text{ I}) u_{ol-1+2\text{ I}} - 953496 u_{ol+2\text{ I}} - (94520 + 323952\text{ I}) u_{ol+1+2\text{ I}} + (6389 - 11181\text{ I}) u_{ol+2+2\text{ I}} + (60008 - 55728\text{ I}) u_{ol-2+1} + (-3106376 + 1372920\text{ I}) u_{ol-1+1} + 10993968 u_{ol+1} - (3106376 + 1372920\text{ I}) u_{ol+1+1} + (60008 + 55728\text{ I}) u_{ol+2+1} - (19426$$

$$+ 9636\text{ I}) u_{ol-2} - (704072 + 267648\text{ I}) u_{ol-1} - 2324478 u_{ol} + (-704072 + 267648\text{ I}) u_{ol+1} + (-19426 + 9636\text{ I}) u_{ol+2} \big) \big), O(\Delta x_{ol}^9)$$

Formula:, 207, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 7

Error order:, 8, Error:,  $1.2930473453850781615 \times 10^{-19}$ , New Error:,  $1.2953801125536231668 \times 10^{-27}$

Error order:, 8, Error:,  $1.2953801125536231668 \times 10^{-27}$ , New Error:,  $1.2956087051165644316 \times 10^{-35}$

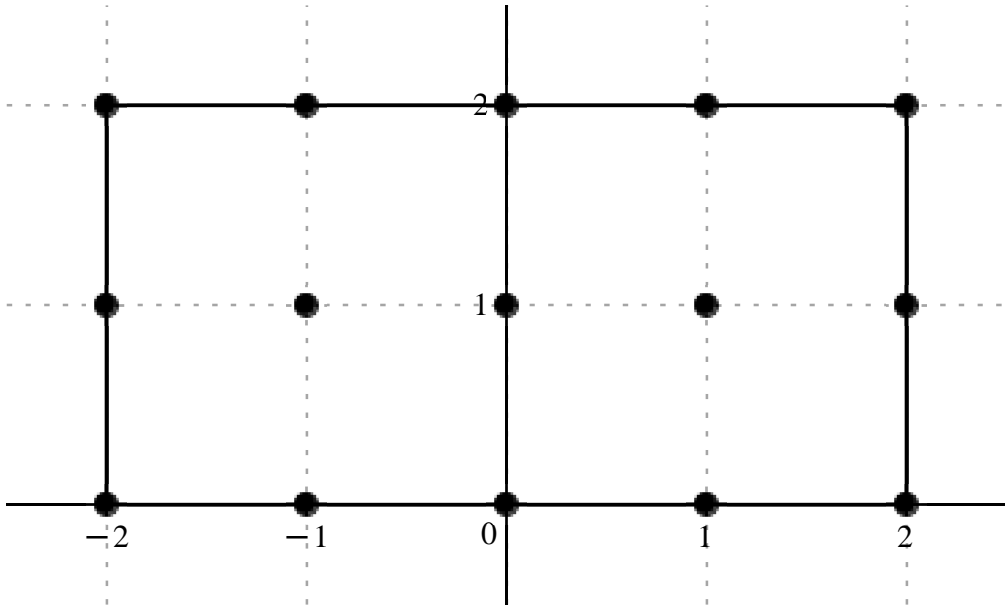
Error order:, 8, Error:,  $1.2956087051165644316 \times 10^{-35}$ , New Error:,  $1.2956315175061276399 \times 10^{-43}$

Error order:, 8, Error:,  $1.2956315175061276399 \times 10^{-43}$ , New Error:,  $1.2956337982763916476 \times 10^{-51}$

Error order:, 8, Error:,  $1.2956337982763916476 \times 10^{-51}$ , New Error:,  $1.2956340263487311003 \times 10^{-59}$

$$c =, \left[ \begin{array}{cccccc} -\frac{354627}{1360} + \frac{36729 \text{ I}}{272} & -\frac{35973}{5} - \frac{11529 \text{ I}}{5} & -\frac{846783 \text{ I}}{40} & \frac{35973}{5} - \frac{11529 \text{ I}}{5} & \frac{354627}{1360} + \frac{36729 \text{ I}}{272} \\ \frac{99162}{85} + \frac{122724 \text{ I}}{85} & -\frac{132741}{5} - \frac{344736 \text{ I}}{5} & \frac{1173816 \text{ I}}{5} & \frac{132741}{5} - \frac{344736 \text{ I}}{5} & -\frac{99162}{85} + \frac{122724 \text{ I}}{85} \\ \frac{371133}{1360} - \frac{570717 \text{ I}}{1360} & \frac{35091}{5} - \frac{69111 \text{ I}}{5} & -\frac{366093 \text{ I}}{8} & -\frac{35091}{5} - \frac{69111 \text{ I}}{5} & -\frac{371133}{1360} - \frac{570717 \text{ I}}{1360} \end{array} \right]$$

$x_o + h.$ ,  $\begin{bmatrix} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ -2 + \text{ I} & -1 + \text{ I} & \text{ I} & 1 + \text{ I} & 2 + \text{ I} \\ -2 & -1 & 0 & 1 & 2 \end{bmatrix}$

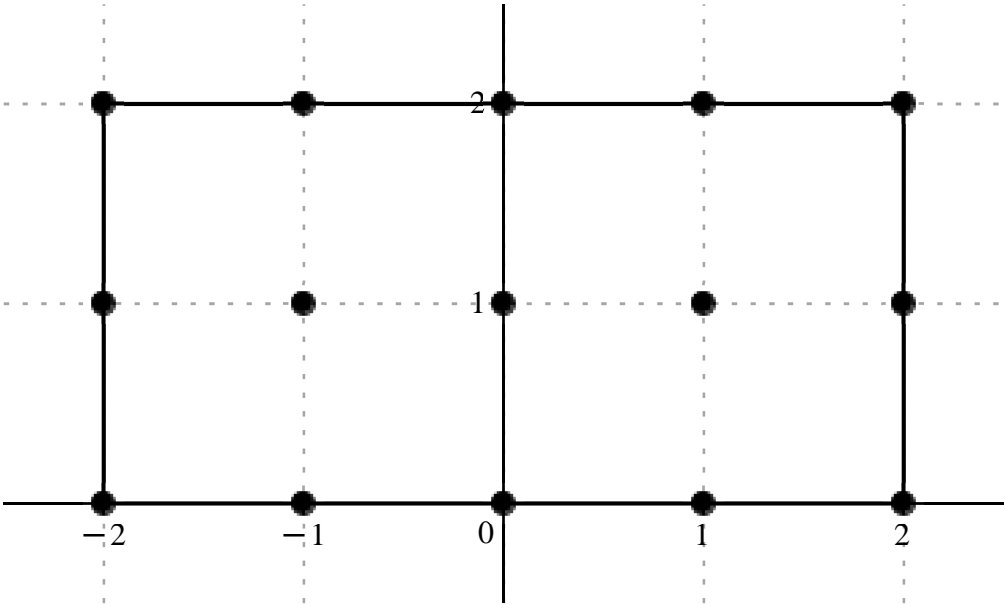


$$\frac{\mathrm{d}^7}{\mathrm{d}x_{oi}^7} u(x_{oi}) = \frac{1}{1360 \Delta x_{oi}^7} \left( 63 \left( (-5629 + 2915 \text{ I}) u_{oi-2+2\text{I}} - (155312 + 49776 \text{ I}) u_{oi-1+2\text{I}} - 456994 \text{ I} u_{oi+2\text{I}} + (155312 - 49776 \text{ I}) u_{oi+1+2\text{I}} + (5629 + 2915 \text{ I}) u_{oi+2+2\text{I}} + (25184 + 31168 \text{ I}) u_{oi-2+1} - (573104 + 1488384 \text{ I}) u_{oi-1+1} + 5067904 \text{ I} u_{oi+1} + (573104 - 1488384 \text{ I}) u_{oi+1+1} + (-25184 + 31168 \text{ I}) u_{oi+2+1} + (5891 - 9059 \text{ I}) u_{oi-2} + (151504 - 298384 \text{ I}) u_{oi-1} - 987870 \text{ I} u_{oi} - (151504 + 298384 \text{ I}) u_{oi+1} - (5891 + 9059 \text{ I}) u_{oi+2} \right) \right), O(\Delta x_{oi}^8)$$

Formula:, 208, Var:, 1  
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 7, Error:,  $5.9950977659502438571 \times 10^{-17}$ , New Error:,  $6.0056769583203638410 \times 10^{-24}$   
Error order:, 7, Error:,  $6.0056769583203638410 \times 10^{-24}$ , New Error:,  $6.0067140351342558067 \times 10^{-31}$   
Error order:, 7, Error:,  $6.0067140351342558067 \times 10^{-31}$ , New Error:,  $6.0068175342815283292 \times 10^{-38}$   
Error order:, 7, Error:,  $6.0068175342815283292 \times 10^{-38}$ , New Error:,  $6.0068278821108053283 \times 10^{-45}$   
Error order:, 7, Error:,  $6.0068278821108053283 \times 10^{-45}$ , New Error:,  $6.0068289168728784167 \times 10^{-52}$

$$c =, \left[ \begin{array}{cccccc} x_o + h., & \left[ \begin{array}{ccccc} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right] \\ \\ -\frac{100107}{170} - \frac{215397 \text{ I}}{170} & \frac{58212}{5} - \frac{166824 \text{ I}}{5} & \frac{491841}{5} & \frac{58212}{5} + \frac{166824 \text{ I}}{5} & -\frac{100107}{170} + \frac{215397 \text{ I}}{170} \\ -\frac{609084}{85} + \frac{424872 \text{ I}}{85} & 318528 - \frac{530712 \text{ I}}{5} & -\frac{5253192}{5} & 318528 + \frac{530712 \text{ I}}{5} & -\frac{609084}{85} - \frac{424872 \text{ I}}{85} \\ \frac{307251}{170} + \frac{261891 \text{ I}}{170} & \frac{282492}{5} + \frac{177408 \text{ I}}{5} & 190827 & \frac{282492}{5} - \frac{177408 \text{ I}}{5} & \frac{307251}{170} - \frac{261891 \text{ I}}{170} \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{170 \, \mathcal{A}x_{ol}^8} \big( 63 \, \big( -(1589 + 3419 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (31416 - 90032 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + 265438 \, u_{ol+2\mathrm{I}} + (31416 + 90032 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (-1589 + 3419 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (-19336 + 13488 \, \mathrm{I}) \, u_{ol-2+1} + (859520 - 286416 \, \mathrm{I}) \, u_{ol-1+1} - 2835056 \, u_{ol+1} + (859520 + 286416 \, \mathrm{I}) \, u_{ol+1+1} - (19336 + 13488 \, \mathrm{I}) \, u_{ol+2+1} + (4877 + 4157 \, \mathrm{I}) \, u_{ol-2} \\ + (152456 + 95744 \, \mathrm{I}) \, u_{ol-1} + 514930 \, u_{ol} + (152456 - 95744 \, \mathrm{I}) \, u_{ol+1} + (4877 - 4157 \, \mathrm{I}) \, u_{ol+2} \big) \big), \, O(\, \mathcal{A}x_{ol}^7 \, )$$

Formula:, 209, Var:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 9

Error order:, 6, Error:,  $2.5569191312639974366 \times 10^{-14}$ , New Error:,  $2.5613112879841537319 \times 10^{-20}$

Error order:, 6, Error:,  $2.5613112879841537319 \times 10^{-20}$ , New Error:,  $2.5617420404034230935 \times 10^{-26}$

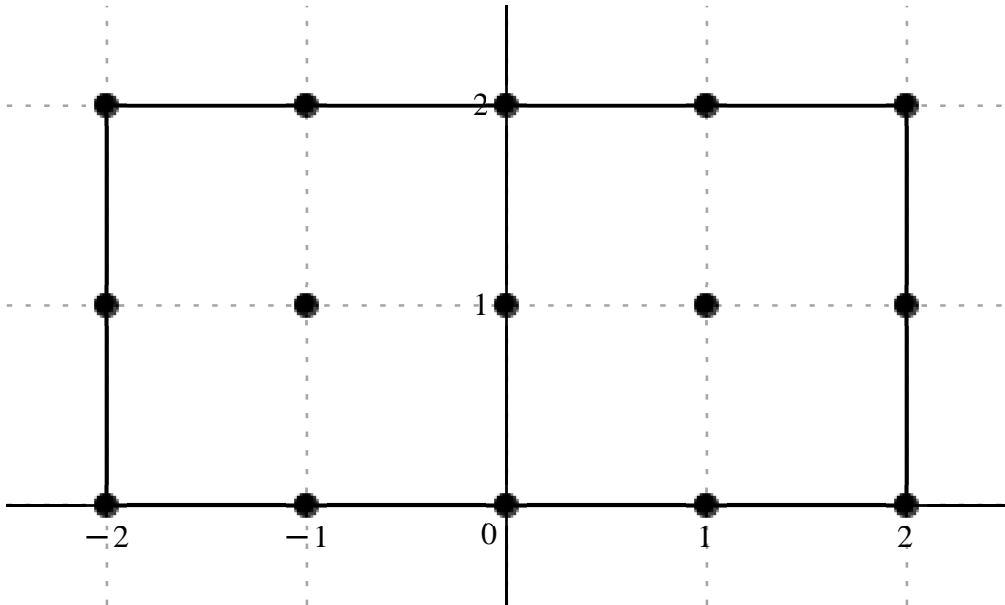
Error order:, 6, Error:,  $2.5617420404034230935 \times 10^{-26}$ , New Error:,  $2.5617850309691904697 \times 10^{-32}$

Error order:, 6, Error:,  $2.5617850309691904697 \times 10^{-32}$ , New Error:,  $2.5617893291789622881 \times 10^{-38}$

Error order:, 6, Error:,  $2.5617893291789622881 \times 10^{-38}$ , New Error:,  $2.5617897589914713774 \times 10^{-44}$

$$c =, \left[ \begin{array}{cccccc} \frac{190323}{34} - \frac{391041 \text{ I}}{170} & \frac{703836}{5} + \frac{266868 \text{ I}}{5} & \frac{2080323 \text{ I}}{5} & -\frac{703836}{5} + \frac{266868 \text{ I}}{5} & -\frac{190323}{34} - \frac{391041 \text{ I}}{170} \\ -\frac{1622376}{85} - \frac{2723112 \text{ I}}{85} & \frac{1894536}{5} + \frac{6670944 \text{ I}}{5} & -\frac{21418992 \text{ I}}{5} & -\frac{1894536}{5} + \frac{6670944 \text{ I}}{5} & \frac{1622376}{85} - \frac{2723112 \text{ I}}{85} \\ -\frac{1272537}{170} + \frac{1133433 \text{ I}}{170} & -\frac{780948}{5} + \frac{1045548 \text{ I}}{5} & 729729 \text{ I} & \frac{780948}{5} + \frac{1045548 \text{ I}}{5} & \frac{1272537}{170} + \frac{1133433 \text{ I}}{170} \end{array} \right]$$

$x_o \neq h., \left[ \begin{array}{ccccc} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ -2 + \text{ I} & -1 + \text{ I} & \text{ I} & 1 + \text{ I} & 2 + \text{ I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$



$$\frac{d^9}{dx_{ol}^9} u(x_{ol}) = \frac{1}{170 \Delta x_{ol}^9} \left( 189 \left( (5035 - 2069 \text{ I}) u_{ol-2+21} + (126616 + 48008 \text{ I}) u_{ol-1+21} + 374238 \text{ I} u_{ol+21} + (-126616 + 48008 \text{ I}) u_{ol+1+21} - (5035 + 2069 \text{ I}) u_{ol+2+21} - (17168 + 28816 \text{ I}) u_{ol-2+1} + (340816 + 1200064 \text{ I}) u_{ol-1+1} - 3853152 \text{ I} u_{ol+1} + (-340816 + 1200064 \text{ I}) u_{ol+1+1} + (17168 - 28816 \text{ I}) u_{ol+2+1} + (-6733 \right.$$

$$+5997\,\text{I})\,u_{oI-2}+(\,-140488+188088\,\text{I})\,u_{oI-1}+656370\,\text{I}u_{oI}+(140488+188088\,\text{I})\,u_{oI+1}+(6733+5997\,\text{I})\,u_{oI+2}))\,O(\,\Delta x_{oI}^6\,)$$

Formula.: 210, Var.: 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 10

Error order.: 5, Error.:  $9.8771470562047689653 \times 10^{-12}$ , New Error.:  $9.8935386493995496476 \times 10^{-17}$

Error order.: 5, Error.:  $9.8935386493995496476 \times 10^{-17}$ , New Error.:  $9.8951470660407646623 \times 10^{-22}$

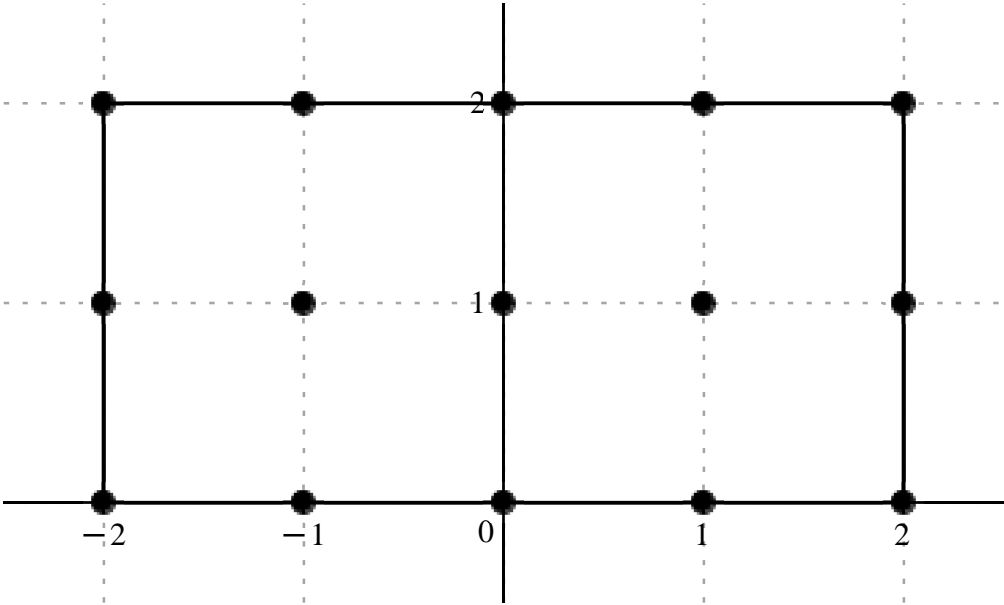
Error order.: 5, Error.:  $9.8951470660407646623 \times 10^{-22}$ , New Error.:  $9.8953076001237326434 \times 10^{-27}$

Error order.: 5, Error.:  $9.8953076001237326434 \times 10^{-27}$ , New Error.:  $9.8953236504560645912 \times 10^{-32}$

Error order.: 5, Error.:  $9.8953236504560645912 \times 10^{-32}$ , New Error.:  $9.8953252554585379843 \times 10^{-37}$

$$x_o \neq h. , \left[ \begin{array}{ccccc} -2+2\,\text{I} & -1+2\,\text{I} & 2\,\text{I} & 1+2\,\text{I} & 2+2\,\text{I} \\ -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} \frac{132111}{17} + \frac{374409\,\text{I}}{17} & -217728 + 527688\,\text{I} & -1568322 & -217728 - 527688\,\text{I} & \frac{132111}{17} - \frac{374409\,\text{I}}{17} \\ \frac{2154600}{17} - \frac{1064448\,\text{I}}{17} & -4953312 + 1164240\,\text{I} & 15540336 & -4953312 - 1164240\,\text{I} & \frac{2154600}{17} + \frac{1064448\,\text{I}}{17} \\ -\frac{346059}{17} - \frac{519939\,\text{I}}{17} & -683424 - 594216\,\text{I} & -2491398 & -683424 + 594216\,\text{I} & -\frac{346059}{17} + \frac{519939\,\text{I}}{17} \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{17\,\Delta x_{ol}^{10}}\Big(189\left((699+1981\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(-19584+47464\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}-141066\,u_{ol+2\mathrm{I}}-(19584+47464\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+(699-1981\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}+(11400-5632\,\mathrm{I})\,u_{ol-2+\mathrm{I}}+(-445536+104720\,\mathrm{I})\,u_{ol-1+\mathrm{I}}+1397808\,u_{ol+\mathrm{I}}-(445536+104720\,\mathrm{I})\,u_{ol+1+\mathrm{I}}+(11400+5632\,\mathrm{I})\,u_{ol+2+\mathrm{I}}-(1831+2751\,\mathrm{I})\,u_{ol-2}-(61472+53448\,\mathrm{I})\,u_{ol-1}-224094\,u_{ol}+(-61472+53448\,\mathrm{I})\,u_{ol+1}+(-1831+2751\,\mathrm{I})\,u_{ol+2}\right)\Big),\;O(\;\Delta x_{ol}^5\;)$$

Formula:, 211, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 11

Error order:, 4, Error:, 3.3724840309398022158 × 10−9, New Error:, 3.3778218016200054074 × 10−13

Error order:, 4, Error:, 3.3778218016200054074 × 10−13, New Error:, 3.3783459111537546672 × 10−17

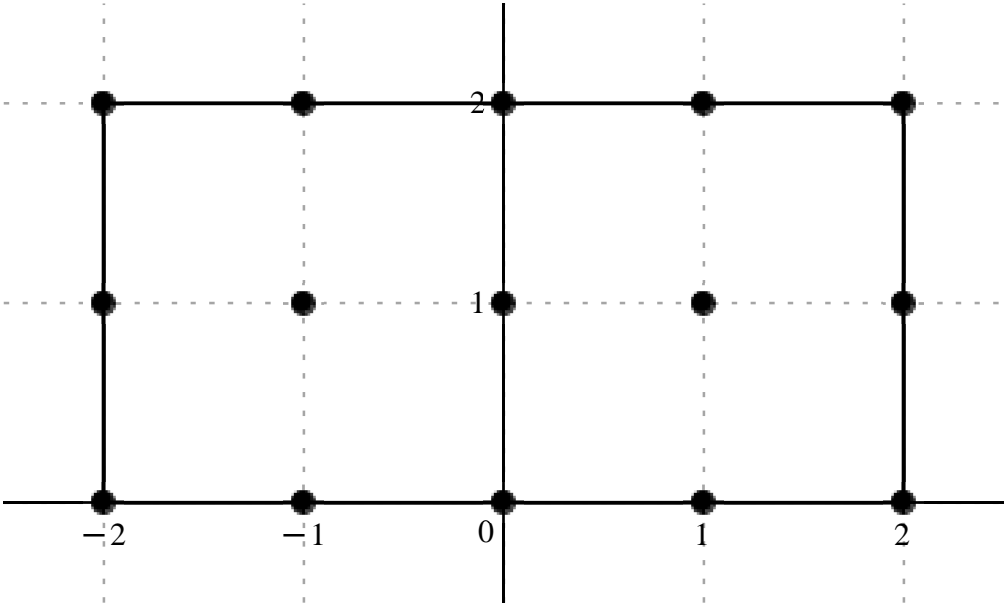
Error order:, 4, Error:, 3.3783459111537546672 × 10−17, New Error:, 3.3783982253848055647 × 10−21

Error order:, 4, Error:, 3.3783982253848055647 × 10−21, New Error:, 3.3784034558406407413 × 10−25

Error order:, 4, Error:, 3.3784034558406407413 × 10−25, New Error:, 3.3784039788765515132 × 10−29

$$x_o\;+h\;.,\;\left[\begin{array}{ccccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \end{array}\right]$$

$$c=,\;\left[\begin{array}{ccccc} -\frac{1266111}{17}+\frac{363825\,\mathrm{I}}{17} & -1696464-765072\,\mathrm{I} & -5076918\,\mathrm{I} & 1696464-765072\,\mathrm{I} & \frac{1266111}{17}+\frac{363825\,\mathrm{I}}{17} \\ \frac{2794176}{17}+\frac{7251552\,\mathrm{I}}{17} & -2893968-15700608\,\mathrm{I} & 48299328\,\mathrm{I} & 2893968-15700608\,\mathrm{I} & -\frac{2794176}{17}+\frac{7251552\,\mathrm{I}}{17} \\ \frac{1727649}{17}-\frac{829521\,\mathrm{I}}{17} & 1896048-1896048\,\mathrm{I} & -7297290\,\mathrm{I} & -1896048-1896048\,\mathrm{I} & -\frac{1727649}{17}-\frac{829521\,\mathrm{I}}{17} \end{array}\right]$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d}x_{ol}^{11}}\;u(x_{ol})=\frac{1}{17\,\mathcal{A}_{ol}^{11}}\Big(2079\,\Big((\,-609+175\,\mathrm{I}\,)\,u_{ol-2+2\mathrm{I}}-(13872+6256\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}-41514\,\mathrm{I}u_{ol+2\mathrm{I}}+(13872-6256\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+(609+175\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}+(1344+3488\,\mathrm{I})\,u_{ol-2+\mathrm{I}}-(23664+128384\,\mathrm{I})\,u_{ol-1+\mathrm{I}}+394944\,\mathrm{I}u_{ol+\mathrm{I}}+(23664-128384\,\mathrm{I})\,u_{ol+1+\mathrm{I}}+(-1344+3488\,\mathrm{I})\,u_{ol+2+\mathrm{I}}+(831-399\,\mathrm{I})\,u_{ol-2}+(15504-15504\,\mathrm{I})\,u_{ol-1}-59670\,\mathrm{I}u_{ol}-(15504+15504\,\mathrm{I})\,u_{ol+1}-(831+399\,\mathrm{I})\,u_{ol+2}\Big)\Big),\;O(\,\mathcal{A}_{ol}^4\,)\;$$

Formula:, 212, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 12

Error order:, 3, Error:, 9.7975412786400614624 × 10<sup>-7</sup>, New Error:, 9.8119705667874014329 × 10<sup>-10</sup>

Error order:, 3, Error:, 9.8119705667874014329 × 10<sup>-10</sup>, New Error:, 9.8133886044981110697 × 10<sup>-13</sup>

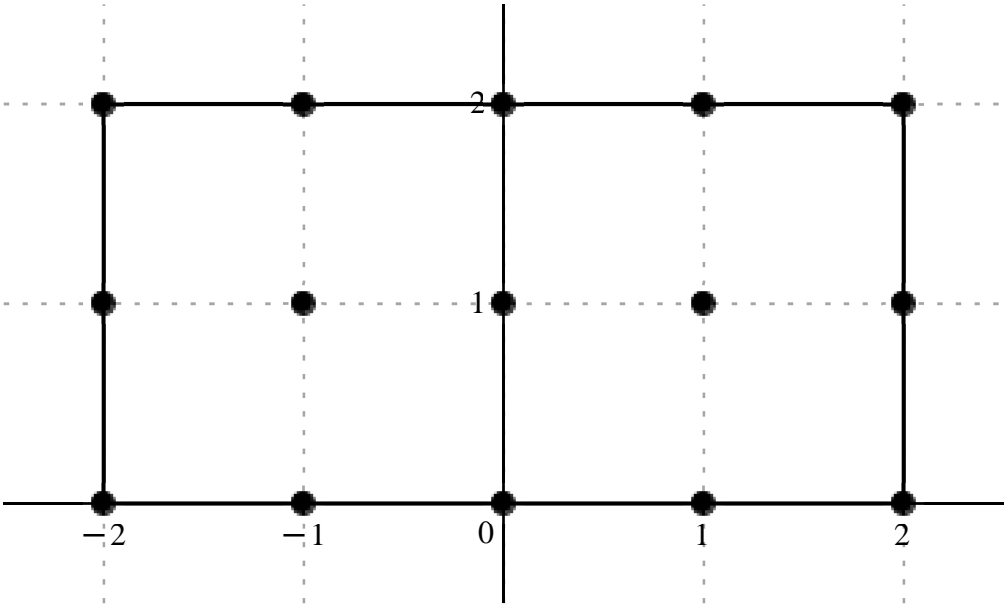
Error order:, 3, Error:, 9.8133886044981110697 × 10<sup>-13</sup>, New Error:, 9.8135301592423295564 × 10<sup>-16</sup>

Error order:, 3, Error:, 9.8135301592423295564 × 10<sup>-16</sup>, New Error:, 9.8135443122263677876 × 10<sup>-19</sup>

Error order:, 3, Error:, 9.8135443122263677876 × 10<sup>-19</sup>, New Error:, 9.8135457274998676595 × 10<sup>-22</sup>

$$x_o\neq h\;.,\;\left[\begin{array}{ccccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \end{array}\right]$$

$$c=,\;\left[\begin{array}{ccccc} -\frac{723492}{17}-\frac{3467772\,\mathrm{I}}{17} & 2195424-4390848\,\mathrm{I} & 13322232 & 2195424+4390848\,\mathrm{I} & -\frac{723492}{17}+\frac{3467772\,\mathrm{I}}{17} \\ -\frac{19359648}{17}+\frac{5189184\,\mathrm{I}}{17} & 39916800-5189184\,\mathrm{I} & -120947904 & 39916800+5189184\,\mathrm{I} & -\frac{19359648}{17}-\frac{5189184\,\mathrm{I}}{17} \\ \frac{1422036}{17}+\frac{4415796\,\mathrm{I}}{17} & 4191264+4790016\,\mathrm{I} & 17214120 & 4191264-4790016\,\mathrm{I} & \frac{1422036}{17}-\frac{4415796\,\mathrm{I}}{17} \end{array}\right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\;u(x_{ol})=\frac{1}{17\,\Delta x_{ol}^{12}}\Big(24948\left(-(29+139\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(1496-2992\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+9078\,u_{ol+2\mathrm{I}}+(1496+2992\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+(\,-29+139\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}+(\,-776+208\,\mathrm{I})\,u_{ol-2+\mathrm{I}}+(27200-3536\,\mathrm{I})\,u_{ol-1+\mathrm{I}}-82416\,u_{ol+\mathrm{I}}+(27200+3536\,\mathrm{I})\,u_{ol+1+\mathrm{I}}-(776+208\,\mathrm{I})\,u_{ol+2+\mathrm{I}}+(57+177\,\mathrm{I})\,u_{ol-2}+(2856+3264\,\mathrm{I})\,u_{ol-1}+11730\,u_{ol}+(2856-3264\,\mathrm{I})\,u_{ol+1}+(57-177\,\mathrm{I})\,u_{ol+2}\right)\Big),\;O(\,\Delta x_{ol}^3\,)$$

Formula:, 213, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 13

Error order:, 2, Error:, 0.00022766409417706625487, New Error:, 2.2795920941007484278 × 10<sup>−6</sup>

Error order:, 2, Error:, 2.2795920941007484278 × 10<sup>−6</sup>, New Error:, 2.2798824875736666488 × 10<sup>−8</sup>

Error order:, 2, Error:, 2.2798824875736666488 × 10<sup>−8</sup>, New Error:, 2.2799114796827283594 × 10<sup>−10</sup>

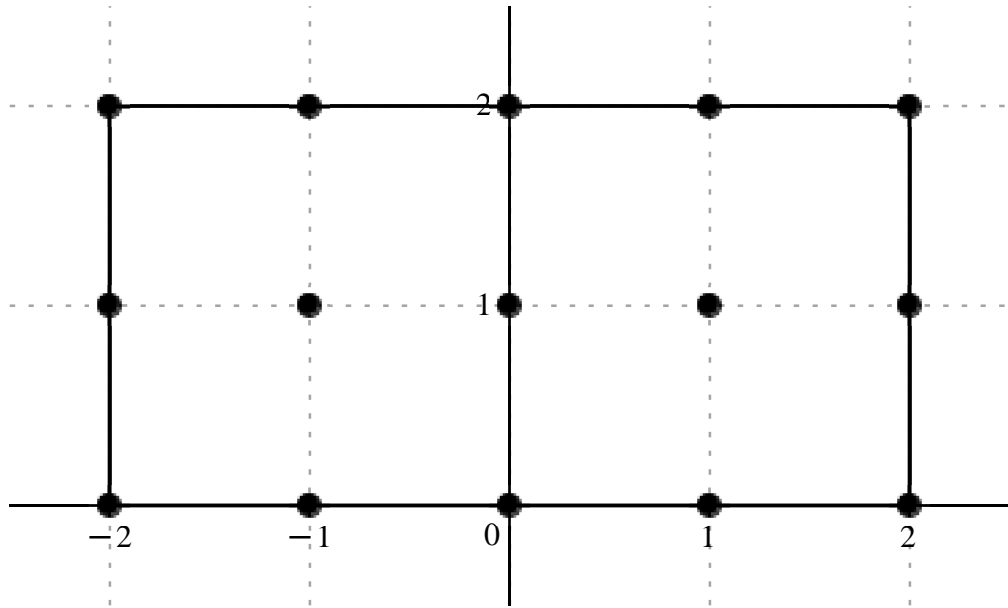
Error order:, 2, Error:, 2.2799114796827283594 × 10<sup>−10</sup>, New Error:, 2.2799143784212317183 × 10<sup>−12</sup>

Error order:, 2, Error:, 2.2799143784212317183 × 10<sup>−12</sup>, New Error:, 2.2799146682903580056 × 10<sup>−14</sup>

$$x_o\neq h\;, \left[\begin{array}{ccccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \end{array}\right]$$

$$c=\left[\begin{array}{ccccc} \frac{6860700}{17}-\frac{723492\,\mathrm{I}}{17} & 8182944+4590432\,\mathrm{I} & 25297272\,\mathrm{I} & -8182944+4590432\,\mathrm{I} & -\frac{6860700}{17}-\frac{723492\,\mathrm{I}}{17} \\ -\frac{5189184}{17}-\frac{36324288\,\mathrm{I}}{17} & 5189184+72648576\,\mathrm{I} & -217945728\,\mathrm{I} & -5189184+72648576\,\mathrm{I} & \frac{5189184}{17}-\frac{36324288\,\mathrm{I}}{17} \\ -\frac{7808724}{17}+\frac{1422036\,\mathrm{I}}{17} & -8582112+6586272\,\mathrm{I} & 29189160\,\mathrm{I} & 8582112+6586272\,\mathrm{I} & \frac{7808724}{17}+\frac{1422036\,\mathrm{I}}{17} \end{array}\right]$$





$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\;u(x_{ol})=\frac{1}{17\,\mathcal{A}_{ol}^{13}}\Big(24948\left((275-29\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(5576+3128\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+17238\,\mathrm{I}u_{ol+2\mathrm{I}}+(-5576+3128\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}-(275+29\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}-(208+1456\,\mathrm{I})\,u_{ol-2+\mathrm{I}}+(3536+49504\,\mathrm{I})\,u_{ol-1+\mathrm{I}}-148512\,\mathrm{I}u_{ol+\mathrm{I}}+(-3536+49504\,\mathrm{I})\,u_{ol+1+\mathrm{I}}+(208-1456\,\mathrm{I})\,u_{ol+2+\mathrm{I}}+(-313+57\,\mathrm{I})\,u_{ol-2}+(-5848+4488\,\mathrm{I})\,u_{ol-1}\right.\\ \left.+19890\,\mathrm{I}u_{ol}+(5848+4488\,\mathrm{I})\,u_{ol+1}+(313+57\,\mathrm{I})\,u_{ol+2}\right)\Big),\;O(\;\mathcal{A}_{ol}^2\;)$$

Formula: 214, Var.: 1

Variavel : x<sub>ol</sub>, Derivada de Ordem : 14

Error order: 1, Error: 0.037808266560240138732, New Error: 0.0037844425342804338149

Error order: 1, Error: 0.0037844425342804338149, New Error: 0.00037847990743495728169

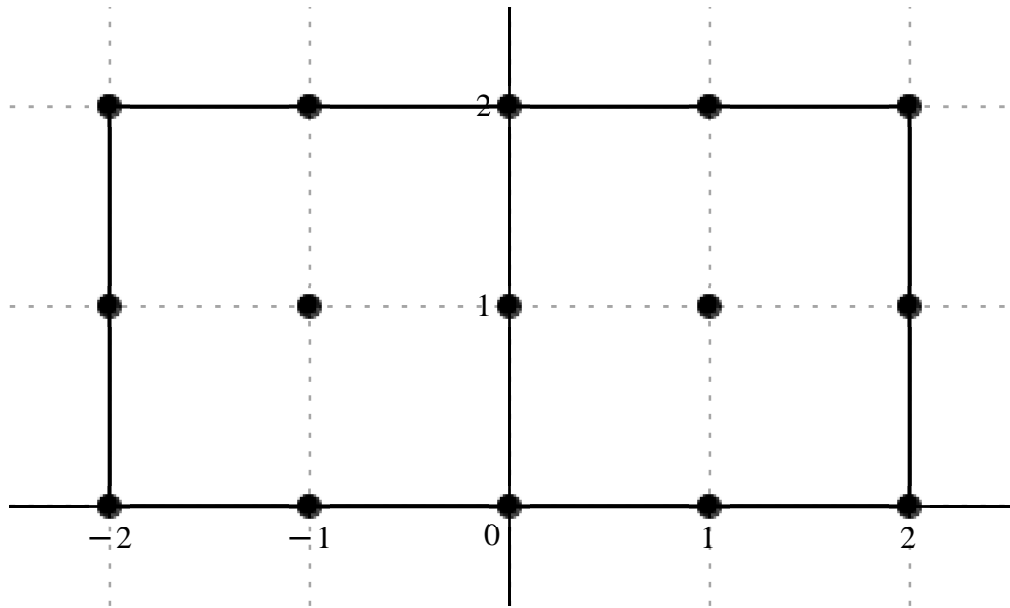
Error order: 1, Error: 0.00037847990743495728169, New Error: 0.000037848346778590390313

Error order: 1, Error: 0.000037848346778590390313, New Error: 3.7848382377049913920 × 10<sup>-6</sup>

Error order: 1, Error: 3.7848382377049913920 × 10<sup>-6</sup>, New Error: 3.7848385936845366657 × 10<sup>-7</sup>

$$x_o \neq h \; , \; \left[ \begin{array}{ccccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

$$c=,\left[\begin{array}{ccccc} -\frac{349272}{17}+\frac{7334712\,\mathrm{I}}{17} & -5588352+8382528\,\mathrm{I} & -27243216 & -5588352-8382528\,\mathrm{I} & -\frac{349272}{17}-\frac{7334712\,\mathrm{I}}{17} \\ \frac{36324288}{17} & -72648576 & 217945728 & -72648576 & \frac{36324288}{17} \\ -\frac{349272}{17}-\frac{7334712\,\mathrm{I}}{17} & -5588352-8382528\,\mathrm{I} & -27243216 & -5588352+8382528\,\mathrm{I} & -\frac{349272}{17}+\frac{7334712\,\mathrm{I}}{17} \end{array}\right]$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}} u(x_{ol}) = \frac{349272 \left( (-1 + 21 \text{ I}) u_{ol-2+2\text{I}} + (-272 + 408 \text{ I}) u_{ol-1+2\text{I}} - 1326 u_{ol+2\text{I}} - (272 + 408 \text{ I}) u_{ol+1+2\text{I}} - (1 + 21 \text{ I}) u_{ol+2+2\text{I}} + 104 u_{ol-2+1} - 3536 u_{ol-1+1} + 10608 u_{ol+1} - 3536 u_{ol+1+1} + 104 u_{ol+2+1} - (1 + 21 \text{ I}) u_{ol-2} - (272 + 408 \text{ I}) u_{ol-1} - 1326 u_{ol} + (-272 + 408 \text{ I}) u_{ol+1} + (-1 + 21 \text{ I}) u_{ol+2} \right)}{17 \Delta x_{ol}^{14}}, \quad O(\Delta x_{ol})$$

Formula:, 215, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 14, Error:,  $3.2041215746780118224 \times 10^{-36}$ , New Error:,  $3.1981236895254245623 \times 10^{-50}$

Error order:, 14, Error:,  $3.1981236895254245623 \times 10^{-50}$ , New Error:,  $3.1975100896022227307 \times 10^{-64}$

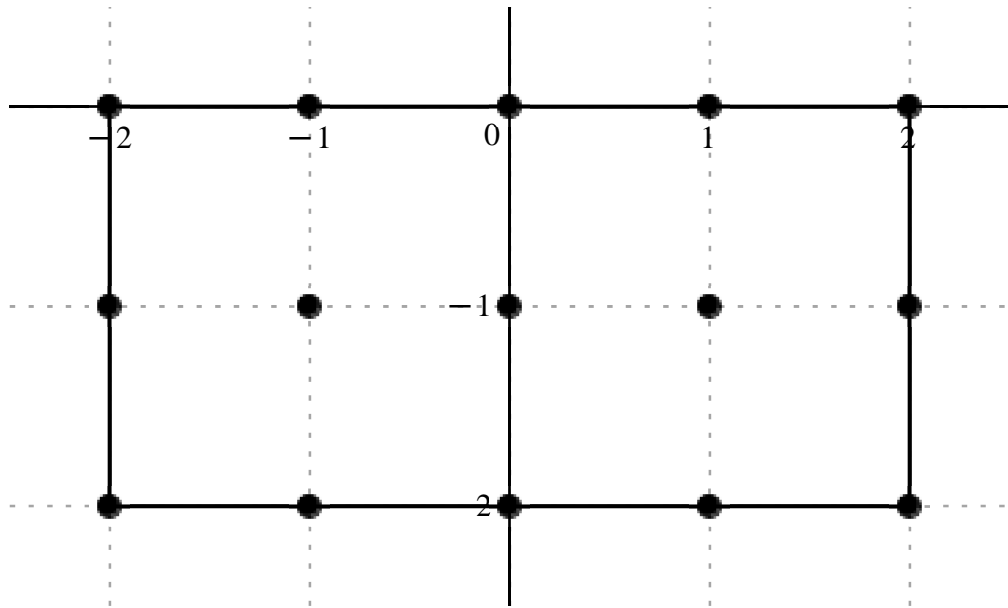
Error order:, 14, Error:,  $3.1975100896022227307 \times 10^{-64}$ , New Error:,  $3.1974485915760337362 \times 10^{-78}$

Error order:, 14, Error:,  $3.1974485915760337362 \times 10^{-78}$ , New Error:,  $3.1974424403931570523 \times 10^{-92}$

Error order:, 14, Error:,  $3.1974424403931570523 \times 10^{-92}$ , New Error:,  $3.1974418252610668870 \times 10^{-106}$

$$x_o + h \cdot, \begin{bmatrix} -2 & -1 & 0 & 1 & 2 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{1}{2652} - \frac{7 \text{ I}}{884} & \frac{8}{39} - \frac{4 \text{ I}}{13} & -\frac{21 \text{ I}}{5} & -\frac{8}{39} - \frac{4 \text{ I}}{13} & -\frac{1}{2652} - \frac{7 \text{ I}}{884} \\ -\frac{8}{255} + \frac{4 \text{ I}}{255} & \frac{4}{3} - \frac{4 \text{ I}}{3} & 8 \text{ I} & -\frac{4}{3} - \frac{4 \text{ I}}{3} & \frac{8}{255} + \frac{4 \text{ I}}{255} \\ \frac{11}{2652} + \frac{5 \text{ I}}{1326} & \frac{32}{195} - \frac{4 \text{ I}}{195} & -\frac{1}{2} & -\frac{32}{195} - \frac{4 \text{ I}}{195} & -\frac{11}{2652} + \frac{5 \text{ I}}{1326} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\; u(x_{ol}) = \frac{1}{13260\,\Delta x_{ol}}\left( (5-105\,\mathrm{I})\; u_{ol-2} + (2720-4080\,\mathrm{I})\; u_{ol-1} - 55692\,\mathrm{I}\, u_{ol} - (2720+4080\,\mathrm{I})\; u_{ol+1} - (5+105\,\mathrm{I})\; u_{ol+2} + (-416+208\,\mathrm{I})\; u_{ol-2-1} + (17680-17680\,\mathrm{I})\; u_{ol-1-1} + 106080\,\mathrm{I}\, u_{ol-1} - (17680+17680\,\mathrm{I})\; u_{ol+1-1} + (416+208\,\mathrm{I})\; u_{ol+2-1} + (55+50\,\mathrm{I})\; u_{ol-2-21} + (2176-272\,\mathrm{I})\; u_{ol-1-21} - 6630\,\mathrm{I}\, u_{ol-21} - (2176+272\,\mathrm{I})\; u_{ol+1-21} + (-55+50\,\mathrm{I})\; u_{ol+2-21} \right),\; O(\;\Delta x_{ol}^{14}\;)$$

Formula:, 216, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 2

Error order:, 13, Error:, 2.4467047459243712890 × 10−33, New Error:, 2.4421952985115967449 × 10−46

Error order:, 13, Error:, 2.4421952985115967449 × 10−46, New Error:, 2.4417341494357098064 × 10−59

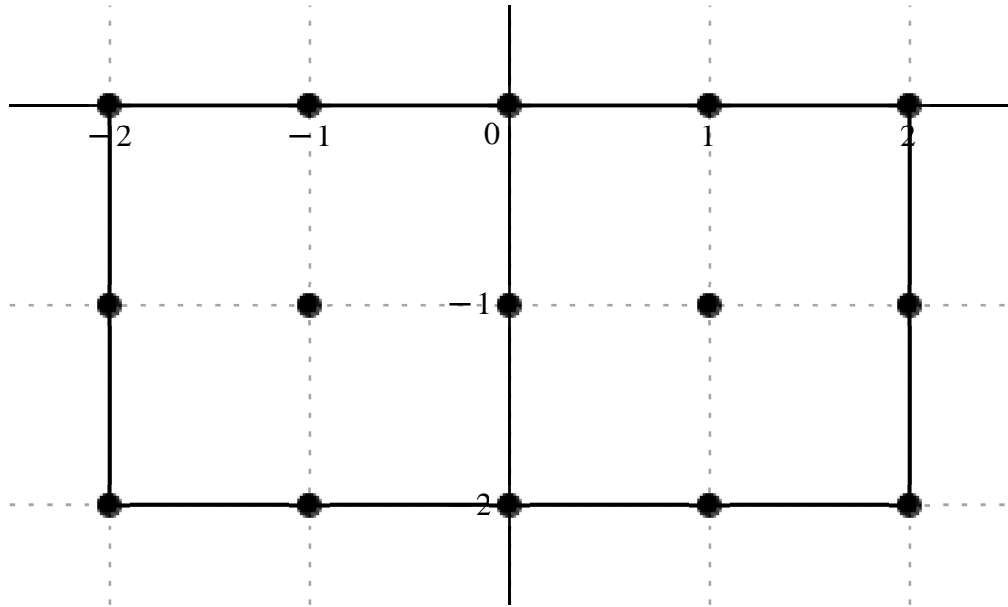
Error order:, 13, Error:, 2.4417341494357098064 × 10−59, New Error:, 2.4416879325428963061 × 10−72

Error order:, 13, Error:, 2.4416879325428963061 × 10−72, New Error:, 2.4416833098338213177 × 10−85

Error order:, 13, Error:, 2.4416833098338213177 × 10−85, New Error:, 2.4416828475527159412 × 10−98

$$x_o+h\;, \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2-1 & -1-1 & -1 & 1-1 & 2-1 \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} \end{array} \right]$$

$$c=,\left[ \begin{array}{ccccc} -\frac{887}{13260}+\frac{21\,\mathrm{I}}{4420} & -\frac{584}{195}-\frac{72\,\mathrm{I}}{65} & -\frac{1889}{100} & -\frac{584}{195}+\frac{72\,\mathrm{I}}{65} & -\frac{887}{13260}-\frac{21\,\mathrm{I}}{4420} \\ \frac{64}{425}+\frac{304\,\mathrm{I}}{1275} & -\frac{56}{5}-\frac{128\,\mathrm{I}}{15} & \frac{256}{5} & -\frac{56}{5}+\frac{128\,\mathrm{I}}{15} & \frac{64}{425}-\frac{304\,\mathrm{I}}{1275} \\ \frac{49}{1768}-\frac{919\,\mathrm{I}}{26520} & -\frac{72}{325}-\frac{1208\,\mathrm{I}}{975} & -\frac{37}{10} & -\frac{72}{325}+\frac{1208\,\mathrm{I}}{975} & \frac{49}{1768}+\frac{919\,\mathrm{I}}{26520} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{132600 \, \Delta x_{ol}^2} \big( (-8870 + 630 \, \mathrm{I}) \, u_{ol-2} - (397120 + 146880 \, \mathrm{I}) \, u_{ol-1} - 2504814 \, u_{ol} + (-397120 + 146880 \, \mathrm{I}) \, u_{ol+1} - (8870 + 630 \, \mathrm{I}) \, u_{ol+2} + (19968 + 31616 \, \mathrm{I}) \, u_{ol-2-1} - (1485120 + 1131520 \, \mathrm{I}) \, u_{ol-1-1} + 6789120 \, u_{ol-1} + (-1485120 + 1131520 \, \mathrm{I}) \, u_{ol+1-1} + (19968 - 31616 \, \mathrm{I}) \, u_{ol+2-1} + (3675 - 4595 \, \mathrm{I}) \, u_{ol-2-21} - (29376$$

$$+ 164288 \, \mathrm{I}) \, u_{ol-1-21} - 490620 \, u_{ol-21} + (-29376 + 164288 \, \mathrm{I}) \, u_{ol+1-21} + (3675 + 4595 \, \mathrm{I}) \, u_{ol+2-21} \big), \, O( \, \Delta x_{ol}^{13} \, )$$

Formula:, 217, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 3

Error order:, 12, Error:, 1.5005505082052083364 × 10−30, New Error:, 1.4978225328531384708 × 10−42

Error order:, 12, Error:, 1.4978225328531384708 × 10−42, New Error:, 1.4975436529355628710 × 10−54

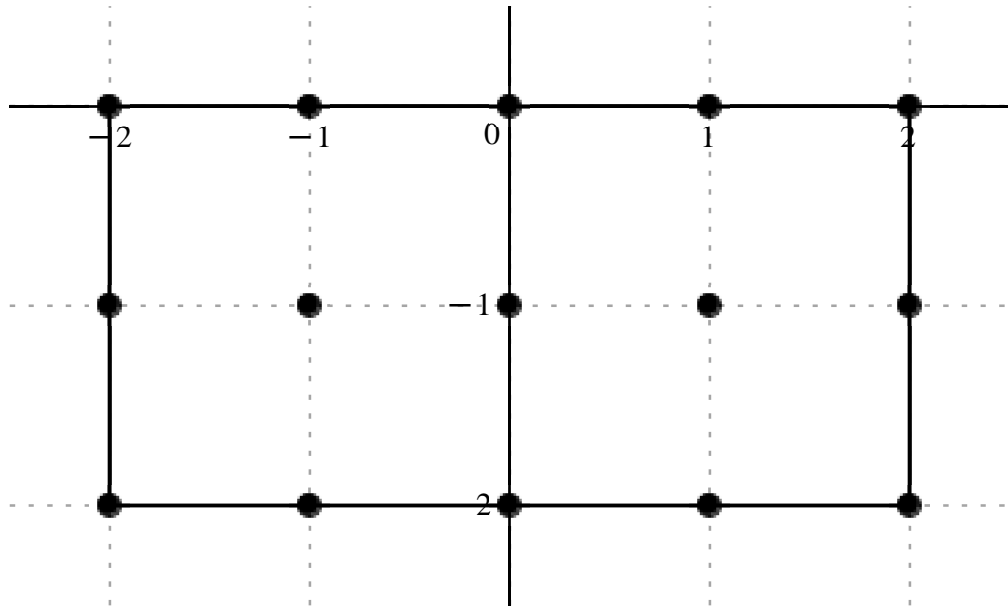
Error order:, 12, Error:, 1.4975436529355628710 × 10−54, New Error:, 1.4975157041540776823 × 10−66

Error order:, 12, Error:, 1.4975157041540776823 × 10−66, New Error:, 1.4975129086680662635 × 10−78

Error order:, 12, Error:, 1.4975129086680662635 × 10−78, New Error:, 1.4975126291133865270 × 10−90

$$x_o+h., \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2-1 & -1-1 & -1 & 1-1 & 2-1 \\ -2-2\,1 & -1-2\,1 & -2\,1 & 1-2\,1 & 2-2\,1 \end{array} \right]$$

$$c=,\left[ \begin{array}{ccccc} \frac{537}{6800}+\frac{3003\,1}{6800} & -\frac{66}{25}+\frac{519\,1}{25} & \frac{3627\,1}{40} & \frac{66}{25}+\frac{519\,1}{25} & -\frac{537}{6800}+\frac{3003\,1}{6800} \\ \frac{618}{425}-\frac{461\,1}{425} & -\frac{1149}{25}+\frac{1789\,1}{25} & -\frac{7494\,1}{25} & \frac{1149}{25}+\frac{1789\,1}{25} & -\frac{618}{425}-\frac{461\,1}{425} \\ -\frac{1563}{6800}-\frac{227\,1}{1360} & -\frac{192}{25}+\frac{41\,1}{25} & \frac{4557\,1}{200} & \frac{192}{25}+\frac{41\,1}{25} & \frac{1563}{6800}-\frac{227\,1}{1360} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{6800 \, \Delta x_{ol}^3} \Big( (537 + 3003 \, \mathrm{I}) \, u_{ol-2} + (-17952 + 141168 \, \mathrm{I}) \, u_{ol-1} + 616590 \, \mathrm{I} \, u_{ol} + (17952 + 141168 \, \mathrm{I}) \, u_{ol+1} + (-537 + 3003 \, \mathrm{I}) \, u_{ol+2} + (9888 - 7376 \, \mathrm{I}) \, u_{ol-2-1} + (-312528 + 486608 \, \mathrm{I}) \, u_{ol-1-1} - 2038368 \, \mathrm{I} \, u_{ol-1} + (312528 + 486608 \, \mathrm{I}) \, u_{ol+1-1} - (9888 + 7376 \, \mathrm{I}) \, u_{ol+2-1} - (1563 + 1135 \, \mathrm{I}) \, u_{ol-2-21} + (-52224 + 11152 \, \mathrm{I}) \, u_{ol-1-21} + 154938 \, \mathrm{I} \, u_{ol-21} + (52224 + 11152 \, \mathrm{I}) \, u_{ol+1-21} + (1563 - 1135 \, \mathrm{I}) \, u_{ol+2-21} \Big), \, O( \, \Delta x_{ol}^{12} \, )$$

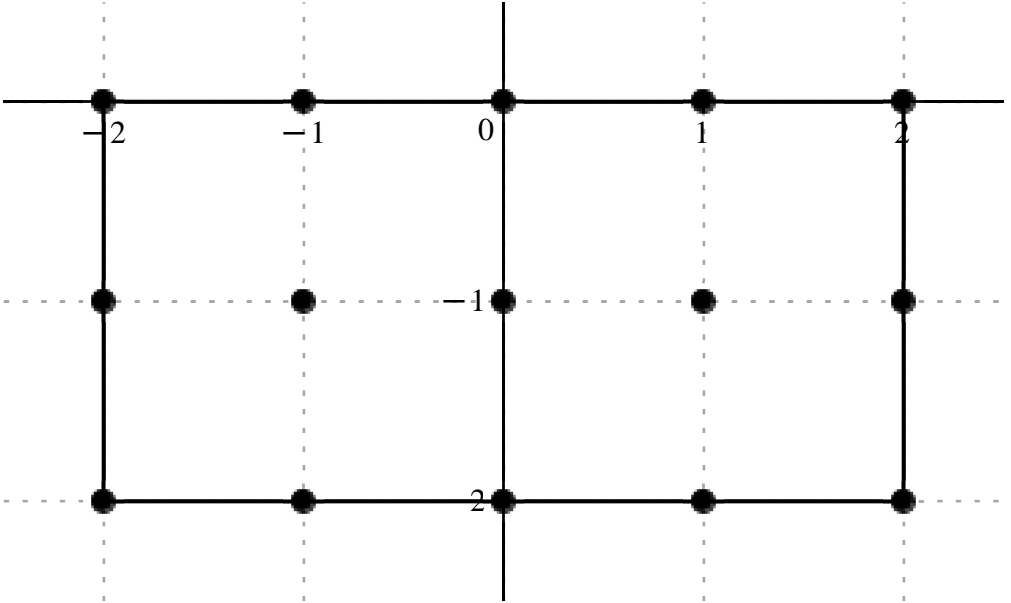
Formula:, 218, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 11, Error:,  $8.7305503978490390763 \times 10^{-28}$ , New Error:,  $8.7148698713944213231 \times 10^{-39}$   
Error order:, 11, Error:,  $8.7148698713944213231 \times 10^{-39}$ , New Error:,  $8.7132672959103952124 \times 10^{-50}$   
Error order:, 11, Error:,  $8.7132672959103952124 \times 10^{-50}$ , New Error:,  $8.7131066933245954003 \times 10^{-61}$   
Error order:, 11, Error:,  $8.7131066933245954003 \times 10^{-61}$ , New Error:,  $8.7130906296158339778 \times 10^{-72}$   
Error order:, 11, Error:,  $8.7130906296158339778 \times 10^{-72}$ , New Error:,  $8.7130890232104562138 \times 10^{-83}$

$$x_o + h \, . \, , \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} \\ -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & 2 - 2 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{2307}{850} - \frac{1269 \text{ I}}{1700} & \frac{3054}{25} - \frac{216 \text{ I}}{25} & \frac{8931}{20} & \frac{3054}{25} + \frac{216 \text{ I}}{25} & \frac{2307}{850} + \frac{1269 \text{ I}}{1700} \\ -\frac{3038}{425} - \frac{212 \text{ I}}{25} & \frac{2162}{5} + \frac{6214 \text{ I}}{25} & -\frac{42564}{25} & \frac{2162}{5} - \frac{6214 \text{ I}}{25} & -\frac{3038}{425} + \frac{212 \text{ I}}{25} \\ -\frac{3301}{3400} + \frac{4901 \text{ I}}{3400} & \frac{274}{25} + \frac{1148 \text{ I}}{25} & \frac{6789}{50} & \frac{274}{25} - \frac{1148 \text{ I}}{25} & -\frac{3301}{3400} - \frac{4901 \text{ I}}{3400} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{3400 \, \Delta x_{ol}^4} \Big( (9228 - 2538 \, \text{I}) \, u_{ol-2} + (415344 - 29376 \, \text{I}) \, u_{ol-1} + 1518270 \, u_{ol} + (415344 + 29376 \, \text{I}) \, u_{ol+1} + (9228 + 2538 \, \text{I}) \, u_{ol+2} - (24304 + 28832 \, \text{I}) \, u_{ol-2-1} + (1470160 + 845104 \, \text{I}) \, u_{ol-1-1} - 5788704 \, u_{ol-1} + (1470160 - 845104 \, \text{I}) \, u_{ol+1-1} + (-24304 + 28832 \, \text{I}) \, u_{ol+2-1} + (-3301 + 4901 \, \text{I}) \, u_{ol-2-21} + (37264 + 156128 \, \text{I}) \, u_{ol-1-21} + 461652 \, u_{ol-21} + (37264 - 156128 \, \text{I}) \, u_{ol+1-21} - (3301 + 4901 \, \text{I}) \, u_{ol+2-21} \Big), \, O(\, \Delta x_{ol}^{11} \, )$$

Formula.: 219, Var.: 1

Variavel .: x\_{ol}, Derivada de Ordem .: 5

Error order.: 10, Error.: 4.8857406331714747147 × 10<sup>-25</sup>, New Error.: 4.8770769769787419742 × 10<sup>-35</sup>

Error order.: 10, Error.: 4.8770769769787419742 × 10<sup>-35</sup>, New Error.: 4.8761917853532032051 × 10<sup>-45</sup>

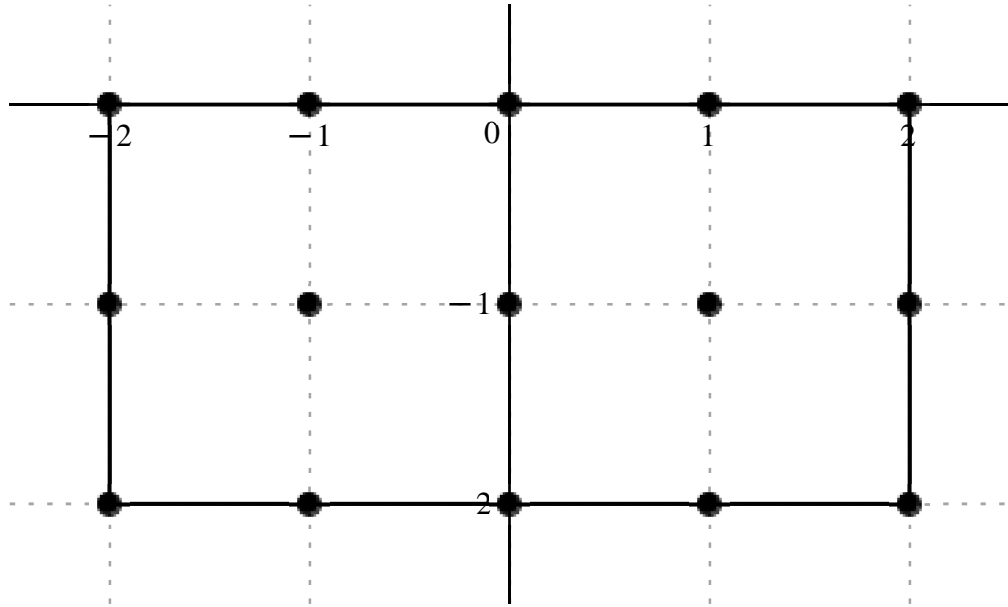
Error order.: 10, Error.: 4.8761917853532032051 × 10<sup>-45</sup>, New Error.: 4.8761030780333314028 × 10<sup>-55</sup>

Error order.: 10, Error.: 4.8761030780333314028 × 10<sup>-55</sup>, New Error.: 4.8760942054198746025 × 10<sup>-65</sup>

Error order.: 10, Error.: 4.8760942054198746025 × 10<sup>-65</sup>, New Error.: 4.8760933181397143299 × 10<sup>-75</sup>

$$x_o \neq h., \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2 - \mathbf{I} & -1 - \mathbf{I} & -\mathbf{I} & 1 - \mathbf{I} & 2 - \mathbf{I} \\ -2 - 2 \mathbf{I} & -1 - 2 \mathbf{I} & -2 \mathbf{I} & 1 - 2 \mathbf{I} & 2 - 2 \mathbf{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cc} -\frac{8083}{1360} - \frac{21507 \mathbf{I}}{1360} & -\frac{764}{5} - \frac{3219 \mathbf{I}}{5} & -\frac{17433 \mathbf{I}}{8} & \frac{764}{5} - \frac{3219 \mathbf{I}}{5} & \frac{8083}{1360} - \frac{21507 \mathbf{I}}{1360} \\ -\frac{4018}{85} + \frac{3811 \mathbf{I}}{85} & \frac{6373}{5} - \frac{12587 \mathbf{I}}{5} & \frac{46746 \mathbf{I}}{5} & -\frac{6373}{5} - \frac{12587 \mathbf{I}}{5} & \frac{4018}{85} + \frac{3811 \mathbf{I}}{85} \\ \frac{2359}{272} + \frac{7349 \mathbf{I}}{1360} & \frac{1318}{5} - \frac{349 \mathbf{I}}{5} & -\frac{31077 \mathbf{I}}{40} & -\frac{1318}{5} - \frac{349 \mathbf{I}}{5} & -\frac{2359}{272} + \frac{7349 \mathbf{I}}{1360} \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_o} \, u(x_o) = \frac{1}{1360 \, \Delta x_o^5} \Big( -(8083 + 21507 \, \mathbf{I}) \, u_{oI-2} - (207808 + 875568 \, \mathbf{I}) \, u_{oI-1} - 2963610 \, \mathbf{I} u_{oI} + (207808 - 875568 \, \mathbf{I}) \, u_{oI+1} + (8083 - 21507 \, \mathbf{I}) \, u_{oI+2} + (-64288 + 60976 \, \mathbf{I}) \, u_{oI-2-\mathbf{I}} + (1733456 - 3423664 \, \mathbf{I}) \, u_{oI-1-\mathbf{I}} + 12714912 \, \mathbf{I} u_{oI-1} - (1733456 + 3423664 \, \mathbf{I}) \, u_{oI+1-\mathbf{I}} + (64288 + 60976 \, \mathbf{I}) \, u_{oI+2-\mathbf{I}} + (11795 + 7349 \, \mathbf{I}) \, u_{oI-2-2\mathbf{I}} + (358496 - 94928 \, \mathbf{I}) \, u_{oI-1-2\mathbf{I}} - 1056618 \, \mathbf{I} u_{oI-2\mathbf{I}} - (358496 + 94928 \, \mathbf{I}) \, u_{oI+1-2\mathbf{I}} + (-11795 + 7349 \, \mathbf{I}) \, u_{oI+2-2\mathbf{I}} \Big), \, O( \, \Delta x_o^{10} \, )$$

Formula:; 220, Var:; 1

Variavel :; x\_oI, Derivada de Ordem :; 6

Error order:; 9, Error:; 2.6008688105180230160 × 10<sup>-22</sup>, New Error:; 2.5963241438372891703 × 10<sup>-31</sup>

Error order:; 9, Error:; 2.5963241438372891703 × 10<sup>-31</sup>, New Error:; 2.5958599467891241991 × 10<sup>-40</sup>

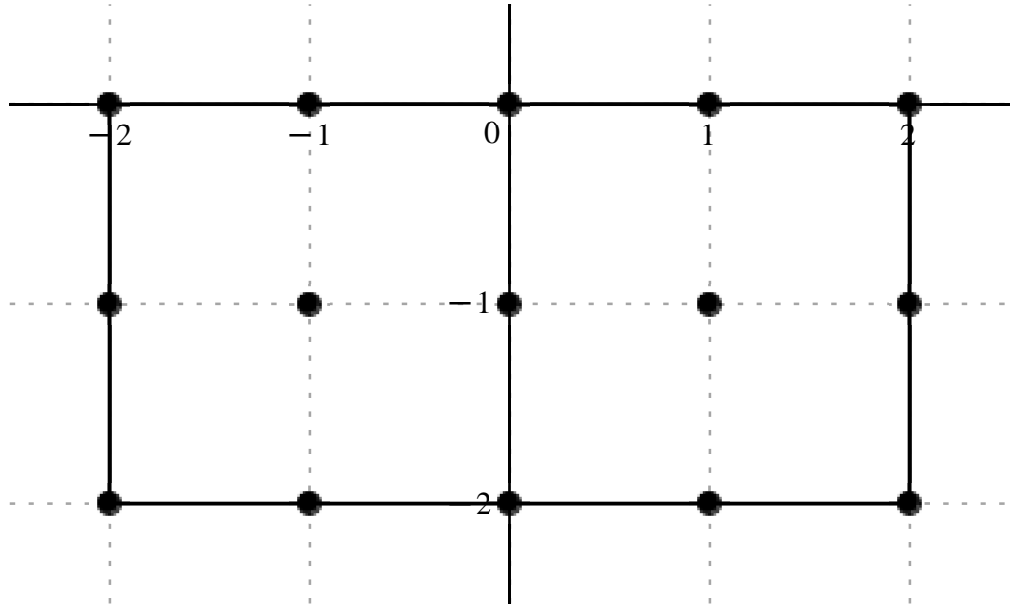
Error order:; 9, Error:; 2.5958599467891241991 × 10<sup>-40</sup>, New Error:; 2.5958134298328119457 × 10<sup>-49</sup>

Error order:; 9, Error:; 2.5958134298328119457 × 10<sup>-49</sup>, New Error:; 2.5958087771647184742 × 10<sup>-58</sup>

Error order:; 9, Error:; 2.5958087771647184742 × 10<sup>-58</sup>, New Error:; 2.5958083118881845573 × 10<sup>-67</sup>

$$x_o \neq h., \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccc} -\frac{29139}{340} + \frac{7227 \text{ I}}{170} & -\frac{15531}{5} + \frac{5904 \text{ I}}{5} & -\frac{205101}{20} & -\frac{15531}{5} - \frac{5904 \text{ I}}{5} & -\frac{29139}{340} - \frac{7227 \text{ I}}{170} \\ \frac{22503}{85} + \frac{20898 \text{ I}}{85} & -\frac{68523}{5} - 6057 \text{ I} & \frac{242514}{5} & -\frac{68523}{5} + 6057 \text{ I} & \frac{22503}{85} - \frac{20898 \text{ I}}{85} \\ \frac{19167}{680} - \frac{33543 \text{ I}}{680} & -417 - \frac{7146 \text{ I}}{5} & -\frac{21033}{5} & -417 + \frac{7146 \text{ I}}{5} & \frac{19167}{680} + \frac{33543 \text{ I}}{680} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{680 \, \Delta x_{ol}^6} \Big( 3 \, \Big( (-19426 + 9636 \, \text{I}) \, u_{ol-2} + (-704072 + 267648 \, \text{I}) \, u_{ol-1} - 2324478 \, u_{ol} - (704072 + 267648 \, \text{I}) \, u_{ol+1} - (19426 + 9636 \, \text{I}) \, u_{ol+2} + (60008 + 55728 \, \text{I}) \, u_{ol-2-1} - (3106376 + 1372920 \, \text{I}) \, u_{ol-1-1} + 10993968 \, u_{ol-1} + (-3106376 + 1372920 \, \text{I}) \, u_{ol+1-1} + (60008 - 55728 \, \text{I}) \, u_{ol+2-1} + (6389 - 11181 \, \text{I}) \, u_{ol-2-21} \\ - (94520 + 323952 \, \text{I}) \, u_{ol-1-21} - 953496 \, u_{ol-21} + (-94520 + 323952 \, \text{I}) \, u_{ol+1-21} + (6389 + 11181 \, \text{I}) \, u_{ol+2-21} \Big) \Big), \, O( \, \Delta x_{ol}^9 \, )$$

Formula:, 221, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 7

Error order:, 8, Error:, 1.2981155518877169524 × 10<sup>−19</sup>, New Error:, 1.2958869387612225438 × 10<sup>−27</sup>

Error order:, 8, Error:, 1.2958869387612225438 × 10<sup>−27</sup>, New Error:, 1.2956593877428817111 × 10<sup>−35</sup>

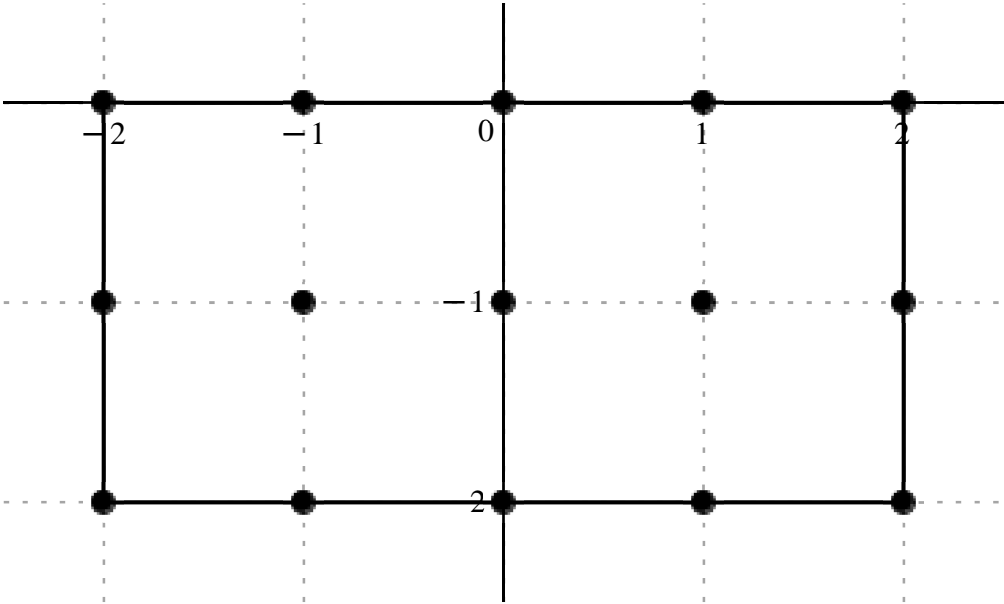
Error order:, 8, Error:, 1.2956593877428817111 × 10<sup>−35</sup>, New Error:, 1.2956365857687649252 × 10<sup>−43</sup>

Error order:, 8, Error:, 1.2956365857687649252 × 10<sup>−43</sup>, New Error:, 1.2956343051026553817 × 10<sup>−51</sup>



Error order: 8,
 Error: 1.2956343051026553817 × 10<sup>−31</sup>,
 New Error: 1.2956340770313574737 × 10<sup>−59</sup>

$$c = \begin{bmatrix} \frac{371133}{1360} + \frac{570717 \, \text{I}}{1360} & \frac{35091}{5} + \frac{69111 \, \text{I}}{5} & \frac{366093 \, \text{I}}{8} & -\frac{35091}{5} + \frac{69111 \, \text{I}}{5} & -\frac{371133}{1360} + \frac{570717 \, \text{I}}{1360} \\ \frac{99162}{85} - \frac{122724 \, \text{I}}{85} & -\frac{132741}{5} + \frac{344736 \, \text{I}}{5} & -\frac{1173816 \, \text{I}}{5} & \frac{132741}{5} + \frac{344736 \, \text{I}}{5} & -\frac{99162}{85} - \frac{122724 \, \text{I}}{85} \\ -\frac{354627}{1360} - \frac{36729 \, \text{I}}{272} & -\frac{35973}{5} + \frac{11529 \, \text{I}}{5} & \frac{846783 \, \text{I}}{40} & \frac{35973}{5} + \frac{11529 \, \text{I}}{5} & \frac{354627}{1360} - \frac{36729 \, \text{I}}{272} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{1360 \, \Delta x_{ol}^7} \Big( 63 \, \Big( (5891 + 9059 \, \text{I}) \, u_{ol-2} + (151504 + 298384 \, \text{I}) \, u_{ol-1} + 987870 \, \text{I} \, u_{ol} + (-151504 + 298384 \, \text{I}) \, u_{ol+1} + (-5891 + 9059 \, \text{I}) \, u_{ol+2} + (25184 - 31168 \, \text{I}) \, u_{ol-2-1} + (-573104 + 1488384 \, \text{I}) \, u_{ol-1-1} - 5067904 \, \text{I} \, u_{ol-1} + (573104 + 1488384 \, \text{I}) \, u_{ol+1-1} - (25184 + 31168 \, \text{I}) \, u_{ol+2-1} - (5629 + 2915 \, \text{I}) \, u_{ol-2-21} \\ + (-155312 + 49776 \, \text{I}) \, u_{ol-1-21} + 456994 \, \text{I} \, u_{ol-21} + (155312 + 49776 \, \text{I}) \, u_{ol+1-21} + (5629 - 2915 \, \text{I}) \, u_{ol+2-21} \Big) \Big), \, O( \, \Delta x_{ol}^8 \, )$$

Formula: 222,
 Var: 1

Variavel :, x<sub>ol</sub>,
 Derivada de Ordem :, 8

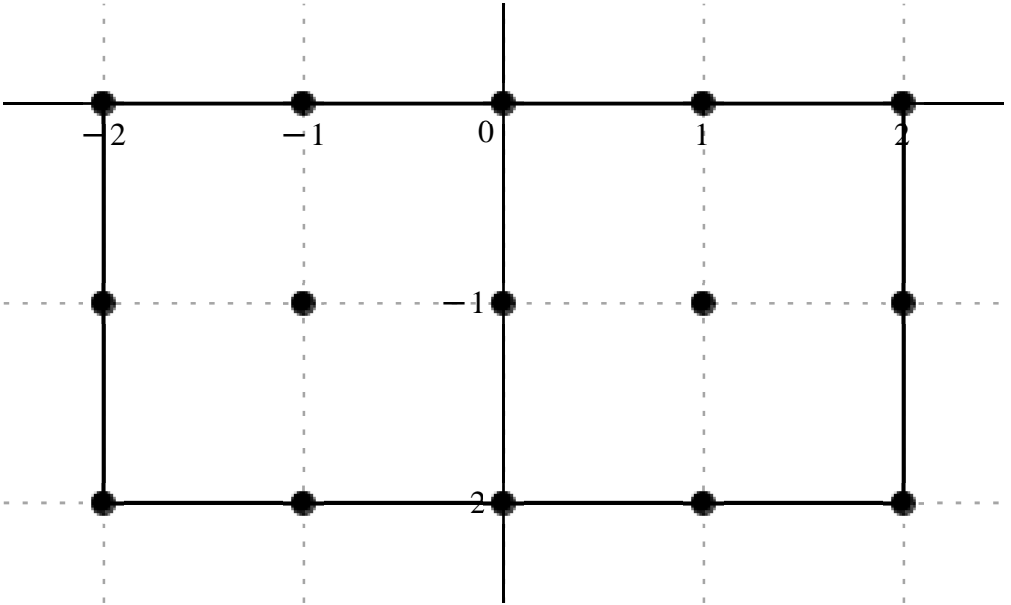
Error order: 7,
 Error: 6.0180921822843745347 × 10<sup>−17</sup>,
 New Error: 6.0079764241996955117 × 10<sup>−24</sup>

Error order: 7,
 Error: 6.0079764241996955117 × 10<sup>−24</sup>,
 New Error: 6.0069439817464349173 × 10<sup>−31</sup>

Error order: 7,
 Error: 6.0069439817464349173 × 10<sup>−31</sup>,
 New Error: 6.0068405289427704862 × 10<sup>−38</sup>

*Error order:*, 7, *Error:*,  $6.0068405289427704862 \times 10^{-38}$ , *New Error:*,  $6.0068301815769295682 \times 10^{-45}$   
*Error order:*, 7, *Error:*,  $6.0068301815769295682 \times 10^{-45}$ , *New Error:*,  $6.0068291468194908407 \times 10^{-52}$

$$c =, \left[ \begin{array}{cccccc} \frac{307251}{170} - \frac{261891 \text{ I}}{170} & \frac{282492}{5} - \frac{177408 \text{ I}}{5} & 190827 & \frac{282492}{5} + \frac{177408 \text{ I}}{5} & \frac{307251}{170} + \frac{261891 \text{ I}}{170} \\ -\frac{609084}{85} - \frac{424872 \text{ I}}{85} & 318528 + \frac{530712 \text{ I}}{5} & -\frac{5253192}{5} & 318528 - \frac{530712 \text{ I}}{5} & -\frac{609084}{85} + \frac{424872 \text{ I}}{85} \\ -\frac{100107}{170} + \frac{215397 \text{ I}}{170} & \frac{58212}{5} + \frac{166824 \text{ I}}{5} & \frac{491841}{5} & \frac{58212}{5} - \frac{166824 \text{ I}}{5} & -\frac{100107}{170} - \frac{215397 \text{ I}}{170} \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{170 \, \Delta x_{ol}^8} \, \big( 63 \, \big( (4877 - 4157 \, \text{I}) \, u_{ol-2} + (152456 - 95744 \, \text{I}) \, u_{ol-1} + 514930 \, u_{ol} + (152456 + 95744 \, \text{I}) \, u_{ol+1} + (4877 + 4157 \, \text{I}) \, u_{ol+2} - (19336 + 13488 \, \text{I}) \, u_{ol-2-1} + (859520 + 286416 \, \text{I}) \, u_{ol-1-1} - 2835056 \, u_{ol-1} + (859520 - 286416 \, \text{I}) \, u_{ol+1-1} + (-19336 + 13488 \, \text{I}) \, u_{ol+2-1} + (-1589 + 3419 \, \text{I}) \, u_{ol-2-21} + (31416 + 90032 \, \text{I}) \, u_{ol-1-21} + 265438 \, u_{ol-21} + (31416 - 90032 \, \text{I}) \, u_{ol+1-21} - (1589 + 3419 \, \text{I}) \, u_{ol+2-21} \big) \big), \, O( \, \Delta x_{ol}^7 \, )$$

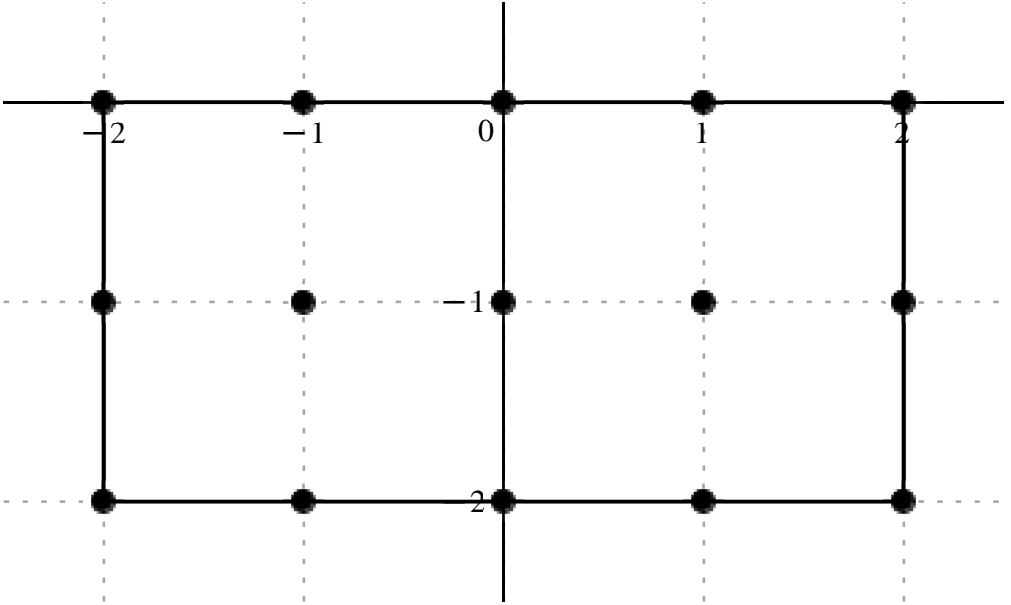
*Formula:*, 223, *Var:*, 1  
*Variavel :*,  $x_{ol}$ , *Derivada de Ordem :*, 9

*Error order:*, 6, *Error:*,  $2.5664704021785256467 \times 10^{-14}$ , *New Error:*,  $2.5622664247050855147 \times 10^{-20}$   
*Error order:*, 6, *Error:*,  $2.5622664247050855147 \times 10^{-20}$ , *New Error:*,  $2.5618375540851457596 \times 10^{-26}$

*Error order:*., 6,    *Error:*.,  $2.5618375540851457596 \times 10^{-26}$ ,    *New Error:*.,  $2.5617945823373723658 \times 10^{-32}$   
*Error order:*., 6,    *Error:*.,  $2.5617945823373723658 \times 10^{-32}$ ,    *New Error:*.,  $2.5617902843157804873 \times 10^{-38}$   
*Error order:*., 6,    *Error:*.,  $2.5617902843157804873 \times 10^{-38}$ ,    *New Error:*.,  $2.5617898545051531974 \times 10^{-44}$

$$x_o + h \cdot , \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2 -I & -1 -I & -I & 1 -I & 2 -I \\ -2 -2 I & -1 -2 I & -2 I & 1 -2 I & 2 -2 I \end{array} \right]$$

$$c = , \left[ \begin{array}{cc} -\frac{1272537}{170} - \frac{1133433 I}{170} & -\frac{780948}{5} - \frac{1045548 I}{5} & -729729 I & \frac{780948}{5} - \frac{1045548 I}{5} & \frac{1272537}{170} - \frac{1133433 I}{170} \\ -\frac{1622376}{85} + \frac{2723112 I}{85} & \frac{1894536}{5} - \frac{6670944 I}{5} & \frac{21418992 I}{5} & -\frac{1894536}{5} - \frac{6670944 I}{5} & \frac{1622376}{85} + \frac{2723112 I}{85} \\ \frac{190323}{34} + \frac{391041 I}{170} & \frac{703836}{5} - \frac{266868 I}{5} & -\frac{2080323 I}{5} & -\frac{703836}{5} - \frac{266868 I}{5} & -\frac{190323}{34} + \frac{391041 I}{170} \end{array} \right]$$



$$\frac{d^9}{dx_{ol}^9} u(x_{ol}) = \frac{1}{170 \Delta x_{ol}^9} \left( 189 \left( -(6733 + 5997 I) u_{ol-2} - (140488 + 188088 I) u_{ol-1} - 656370 I u_{ol} + (140488 - 188088 I) u_{ol+1} + (6733 - 5997 I) u_{ol+2} + (-17168 + 28816 I) u_{ol-2-1} + (340816 - 1200064 I) u_{ol-1-1} + 3853152 I u_{ol-1} - (340816 + 1200064 I) u_{ol+1-1} + (17168 + 28816 I) u_{ol+2-1} + (5035 + 2069 I) u_{ol-2-21} \right. \right. \\ \left. \left. + (126616 - 48008 I) u_{ol-1-21} - 374238 I u_{ol-21} - (126616 + 48008 I) u_{ol+1-21} + (-5035 + 2069 I) u_{ol+2-21} \right) \right), \quad O(\Delta x_{ol}^6)$$

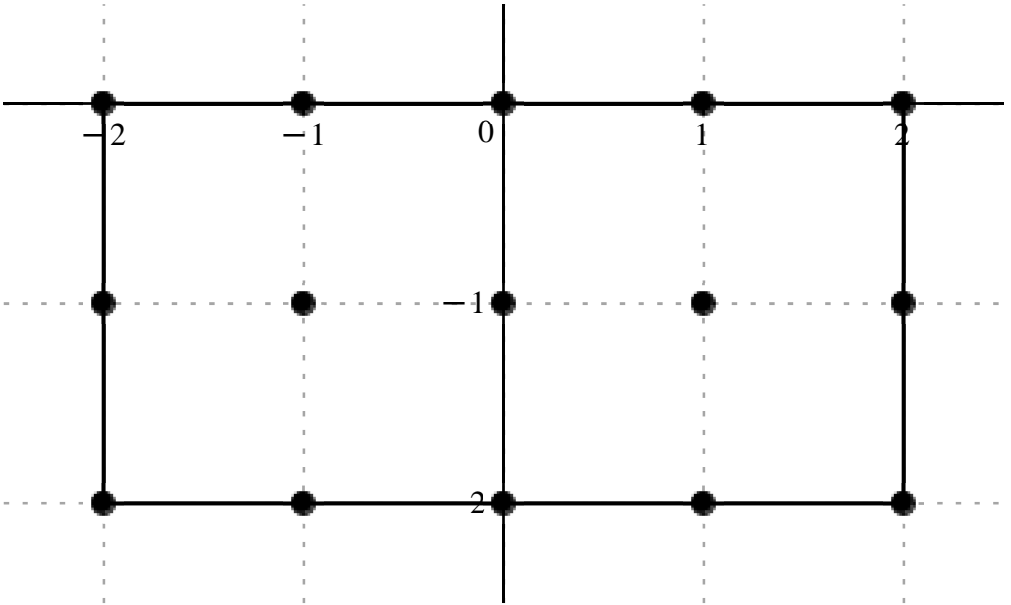
*Formula:*., 224,    *Var:*., 1  
*Variavel :*.,  $x_{ol}$ ,    *Derivada de Ordem :*., 10

*Error order:*., 5,    *Error:*.,  $9.9128133576634126835 \times 10^{-12}$ ,    *New Error:*.,  $9.8971053136234063546 \times 10^{-17}$

*Error order*.: 5,    *Error*.:  $9.8971053136234063546 \times 10^{-17}$ ,    *New Error*.:  $9.8955037324972283525 \times 10^{-22}$   
*Error order*.: 5,    *Error*.:  $9.8955037324972283525 \times 10^{-22}$ ,    *New Error*.:  $9.8953432667694130904 \times 10^{-27}$   
*Error order*.: 5,    *Error*.:  $9.8953432667694130904 \times 10^{-27}$ ,    *New Error*.:  $9.8953272171206326700 \times 10^{-32}$   
*Error order*.: 5,    *Error*.:  $9.8953272171206326700 \times 10^{-32}$ ,    *New Error*.:  $9.8953256121249947922 \times 10^{-37}$

$$x_o \neq h \text{ , } \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} \\ -2 - 2 \text{I} & -1 - 2 \text{I} & -2 \text{I} & 1 - 2 \text{I} & 2 - 2 \text{I} \end{array} \right]$$

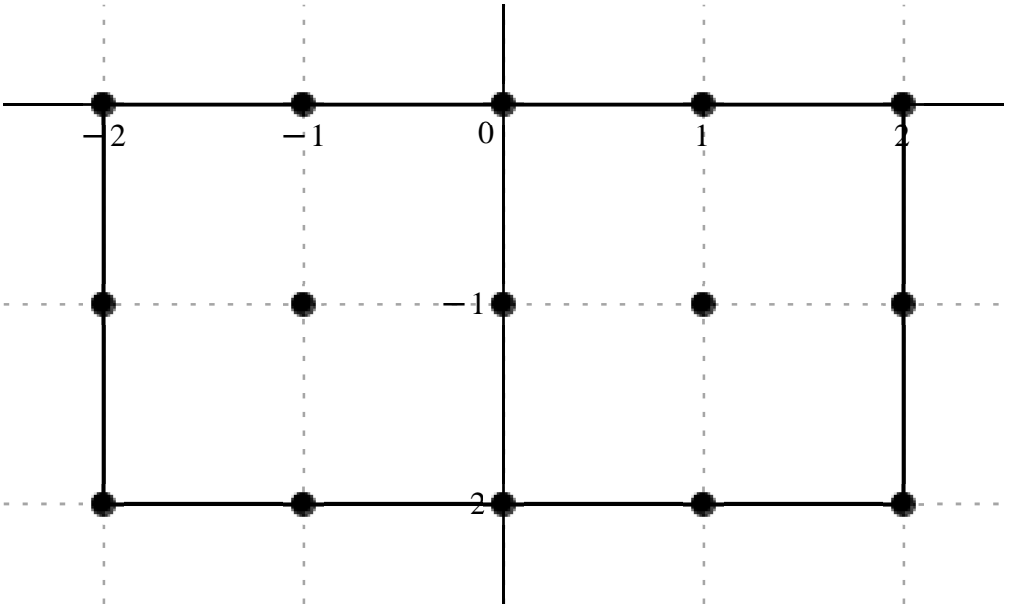
$$c = , \left[ \begin{array}{ccccc} -\frac{346059}{17} + \frac{519939 \text{ I}}{17} & -683424 + 594216 \text{ I} & -2491398 & -683424 - 594216 \text{ I} & -\frac{346059}{17} - \frac{519939 \text{ I}}{17} \\ \frac{2154600}{17} + \frac{1064448 \text{ I}}{17} & -4953312 - 1164240 \text{ I} & 15540336 & -4953312 + 1164240 \text{ I} & \frac{2154600}{17} - \frac{1064448 \text{ I}}{17} \\ \frac{132111}{17} - \frac{374409 \text{ I}}{17} & -217728 - 527688 \text{ I} & -1568322 & -217728 + 527688 \text{ I} & \frac{132111}{17} + \frac{374409 \text{ I}}{17} \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}} \; u(x_{ol}) = \frac{1}{17 \; \Delta x_{ol}^{10}} \Big( 189 \; \big( (-1831 + 2751 \; \text{I}) \; u_{ol-2} + (-61472 + 53448 \; \text{I}) \; u_{ol-1} - 224094 \; u_{ol} - (61472 + 53448 \; \text{I}) \; u_{ol+1} - (1831 + 2751 \; \text{I}) \; u_{ol+2} + (11400 + 5632 \; \text{I}) \; u_{ol-2-1} - (445536 + 104720 \; \text{I}) \; u_{ol-1-1} + 1397808 \; u_{ol-1} + (-445536 + 104720 \; \text{I}) \; u_{ol+1-1} + (11400 - 5632 \; \text{I}) \; u_{ol+2-1} + (699 - 1981 \; \text{I}) \; u_{ol-2-21} - (19584 + 47464 \; \text{I}) \; u_{ol-1-21} - 141066 \; u_{ol-21} + (-19584 + 47464 \; \text{I}) \; u_{ol+1-21} + (699 + 1981 \; \text{I}) \; u_{ol+2-21} \big) \big) , \; O( \; \Delta x_{ol}^5 \; )$$

*Error order:*, 4, *Error:*,  $3.3841069225027919156 \times 10^{-9}$ , *New Error:*,  $3.3789841011508163491 \times 10^{-13}$   
*Error order:*, 4, *Error:*,  $3.3789841011508163491 \times 10^{-13}$ , *New Error:*,  $3.3784621411172102801 \times 10^{-17}$   
*Error order:*, 4, *Error:*,  $3.3784621411172102801 \times 10^{-17}$ , *New Error:*,  $3.3784098483811615006 \times 10^{-21}$   
*Error order:*, 4, *Error:*,  $3.3784098483811615006 \times 10^{-21}$ , *New Error:*,  $3.3784046181402763452 \times 10^{-25}$   
*Error order:*, 4, *Error:*,  $3.3784046181402763452 \times 10^{-25}$ , *New Error:*,  $3.3784040951065150736 \times 10^{-29}$

$$\begin{aligned}
 & x_o \neq h \text{ , } \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2 - \mathbf{I} & -1 - \mathbf{I} & -\mathbf{I} & 1 - \mathbf{I} & 2 - \mathbf{I} \\ -2 - 2 \mathbf{I} & -1 - 2 \mathbf{I} & -2 \mathbf{I} & 1 - 2 \mathbf{I} & 2 - 2 \mathbf{I} \end{array} \right] \\
 c =, & \left[ \begin{array}{ccccc} \frac{1727649}{17} + \frac{829521 \mathbf{I}}{17} & 1896048 + 1896048 \mathbf{I} & 7297290 \mathbf{I} & -1896048 + 1896048 \mathbf{I} & -\frac{1727649}{17} + \frac{829521 \mathbf{I}}{17} \\ \frac{2794176}{17} - \frac{7251552 \mathbf{I}}{17} & -2893968 + 15700608 \mathbf{I} & -48299328 \mathbf{I} & 2893968 + 15700608 \mathbf{I} & -\frac{2794176}{17} - \frac{7251552 \mathbf{I}}{17} \\ -\frac{1266111}{17} - \frac{363825 \mathbf{I}}{17} & -1696464 + 765072 \mathbf{I} & 5076918 \mathbf{I} & 1696464 + 765072 \mathbf{I} & \frac{1266111}{17} - \frac{363825 \mathbf{I}}{17} \end{array} \right]
 \end{aligned}$$



$$\begin{aligned}
 \frac{\mathrm{d}\mathfrak{n}}{\mathrm{d}\mathfrak{x}_{ol}{}^{\mathfrak{n}}} \; u(x_{ol}) = & \frac{1}{17 \, \mathcal{A}_{ol}{}^{\mathfrak{n}}} \Big( 2079 \Big( (831 + 399 \mathbf{I}) \, u_{ol-2} + (15504 + 15504 \mathbf{I}) \, u_{ol-1} + 59670 \mathbf{I} u_{ol} + (-15504 + 15504 \mathbf{I}) \, u_{ol+1} + (-831 + 399 \mathbf{I}) \, u_{ol+2} \\
 & + (1344 - 3488 \mathbf{I}) \, u_{ol-2-1} + (-23664 + 128384 \mathbf{I}) \, u_{ol-1-1} - 394944 \mathbf{I} u_{ol-1} + (23664 + 128384 \mathbf{I}) \, u_{ol+1-1} - (1344 + 3488 \mathbf{I}) \, u_{ol+2-1} \\
 & - (609 + 175 \mathbf{I}) \, u_{ol-2-2\mathfrak{n}} + (-13872 + 6256 \mathbf{I}) \, u_{ol-1-2\mathfrak{n}} + 41514 \mathbf{I} u_{ol-2\mathfrak{n}} + (13872 + 6256 \mathbf{I}) \, u_{ol+1-2\mathfrak{n}} + (609 - 175 \mathbf{I}) \, u_{ol+2-2\mathfrak{n}} \Big) \Big), \; O(\mathcal{A}_{ol}{}^4) \; )
 \end{aligned}$$

$$Variavel \; :, x_{ol}, \; Derivada \; de \; Ordem \; :, 12$$

$$Error \; order.: 3, \; Error.: 9.8289914809443004720 \times 10^{-7}, \; New \; Error.: 9.8151156126017884273 \times 10^{-10}$$

$$Error \; order.: 3, \; Error.: 9.8151156126017884273 \times 10^{-10}, \; New \; Error.: 9.8137031091051337443 \times 10^{-13}$$

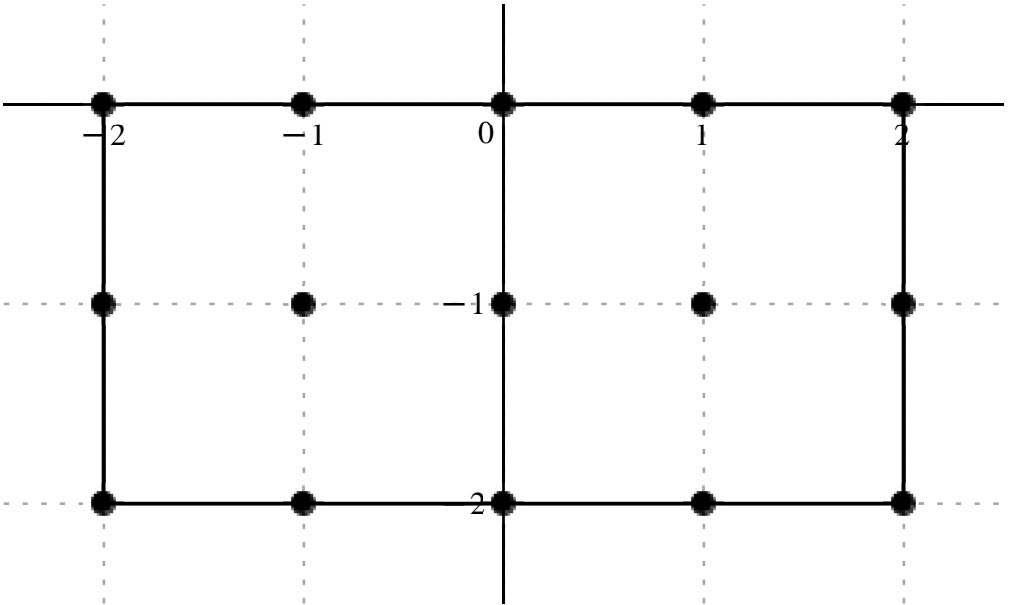
$$Error \; order.: 3, \; Error.: 9.8137031091051337443 \times 10^{-13}, \; New \; Error.: 9.8135616097030574079 \times 10^{-16}$$

$$Error \; order.: 3, \; Error.: 9.8135616097030574079 \times 10^{-16}, \; New \; Error.: 9.8135474572724405983 \times 10^{-19}$$

$$Error \; order.: 3, \; Error.: 9.8135474572724405983 \times 10^{-19}, \; New \; Error.: 9.8135460420044749406 \times 10^{-22}$$

$$x_o \; + h \; . \; , \; \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2 - I & -1 - I & -I & 1 - I & 2 - I \\ -2 - 2 \; I & -1 - 2 \; I & -2 \; I & 1 - 2 \; I & 2 - 2 \; I \end{array} \right]$$

$$c = , \; \left[ \begin{array}{ccccc} \frac{1422036}{17} - \frac{4415796 \; I}{17} & 4191264 - 4790016 \; I & 17214120 & 4191264 + 4790016 \; I & \frac{1422036}{17} + \frac{4415796 \; I}{17} \\ -\frac{19359648}{17} - \frac{5189184 \; I}{17} & 39916800 + 5189184 \; I & -120947904 & 39916800 - 5189184 \; I & -\frac{19359648}{17} + \frac{5189184 \; I}{17} \\ -\frac{723492}{17} + \frac{3467772 \; I}{17} & 2195424 + 4390848 \; I & 13322232 & 2195424 - 4390848 \; I & -\frac{723492}{17} - \frac{3467772 \; I}{17} \end{array} \right]$$



$$\frac{d^{12}}{dx_{ol}^{12}} \; u(x_{ol}) = \frac{1}{17 \; \Delta x_{ol}^{12}} \; \Big( 24948 \; \Big( (57 - 177 \; I) \; u_{ol - 2} + (2856 - 3264 \; I) \; u_{ol - 1} + 11730 \; u_{ol} + (2856 + 3264 \; I) \; u_{ol + 1} + (57 + 177 \; I) \; u_{ol + 2} - (776 + 208 \; I) \; u_{ol - 2 - 21} + (27200 + 3536 \; I) \; u_{ol - 1 - 1} - 82416 \; u_{ol - 1} + (27200 - 3536 \; I) \; u_{ol + 1 - 1} + (-776 + 208 \; I) \; u_{ol + 2 - 1} + (-29 + 139 \; I) \; u_{ol - 2 - 21} + (1496 + 2992 \; I) \; u_{ol - 1 - 21} + 9078 \; u_{ol - 21} + (1496 - 2992 \; I) \; u_{ol + 1 - 21} - (29 + 139 \; I) \; u_{ol + 2 - 21} \Big) \Big), \; O( \; \Delta x_{ol}^3 \; )$$

Formula:, 227, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 13

Error order:, 2, Error:, 0.00022830824201889924309, New Error:,  $2.2802362465022307928 \times 10^{-6}$

Error order:, 2, Error:,  $2.2802362465022307928 \times 10^{-6}$ , New Error:,  $2.2799469028183745358 \times 10^{-8}$

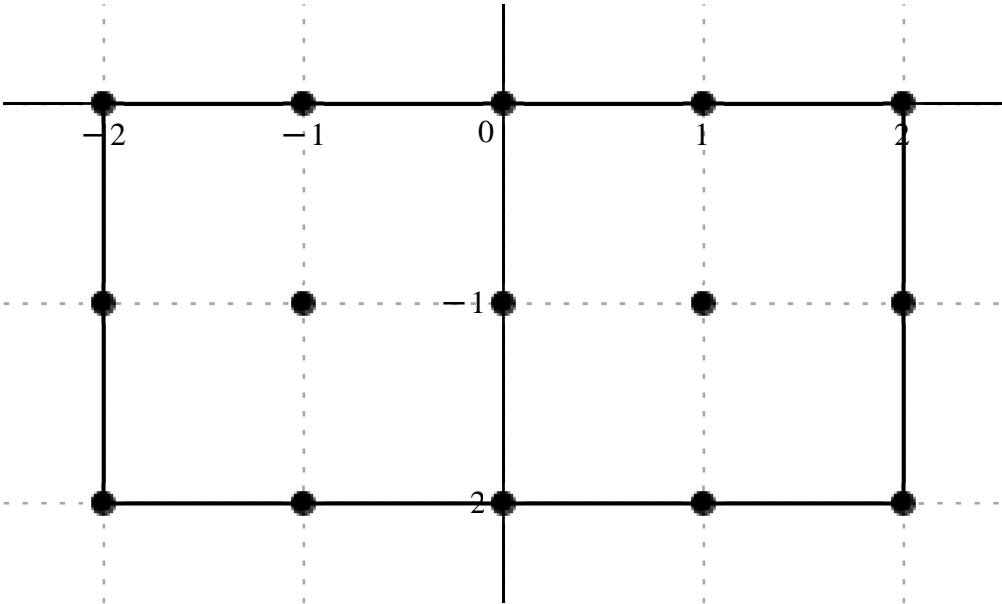
Error order:, 2, Error:,  $2.2799469028183745358 \times 10^{-8}$ , New Error:,  $2.2799179212072037077 \times 10^{-10}$

Error order:, 2, Error:,  $2.2799179212072037077 \times 10^{-10}$ , New Error:,  $2.2799150225736792577 \times 10^{-12}$

Error order:, 2, Error:,  $2.2799150225736792577 \times 10^{-12}$ , New Error:,  $2.2799147327056027595 \times 10^{-14}$

$$x_o + h.$$
$$., \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2 - I & -1 - I & -I & 1 - I & 2 - I \\ -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} -\frac{7808724}{17} - \frac{1422036 I}{17} & -8582112 - 6586272 I & -29189160 I & 8582112 - 6586272 I & \frac{7808724}{17} - \frac{1422036 I}{17} \\ -\frac{5189184}{17} + \frac{36324288 I}{17} & 5189184 - 72648576 I & 217945728 I & -5189184 - 72648576 I & \frac{5189184}{17} + \frac{36324288 I}{17} \\ \frac{6860700}{17} + \frac{723492 I}{17} & 8182944 - 4590432 I & -25297272 I & -8182944 - 4590432 I & -\frac{6860700}{17} + \frac{723492 I}{17} \end{array} \right]$$



$$\frac{d^{13}}{dx_{ol}^{13}} u(x_{ol}) = \frac{1}{17 \Delta x_{ol}^{13}} \left( 24948 \left( -(313 + 57 I) u_{ol-2} - (5848 + 4488 I) u_{ol-1} - 19890 I u_{ol} + (5848 - 4488 I) u_{ol+1} + (313 - 57 I) u_{ol+2} + (-208 + 1456 I) u_{ol-2-1} + (3536 - 49504 I) u_{ol-1-1} + 148512 I u_{ol-1} - (3536 + 49504 I) u_{ol+1-1} + (208 + 1456 I) u_{ol+2-1} + (275 + 29 I) u_{ol-2-21} + (5576 - 3128 I) u_{ol-1-21} - 17238 I u_{ol-21} \right. \right. \\ \left. \left. - (5576 + 3128 I) u_{ol+1-21} + (-275 + 29 I) u_{ol+2-21} \right) \right), O(\Delta x_{ol}^2)$$

Formula:, 228, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:, 1, Error:, 0.037887372556884731871, New Error:, 0.0037852335986452646521

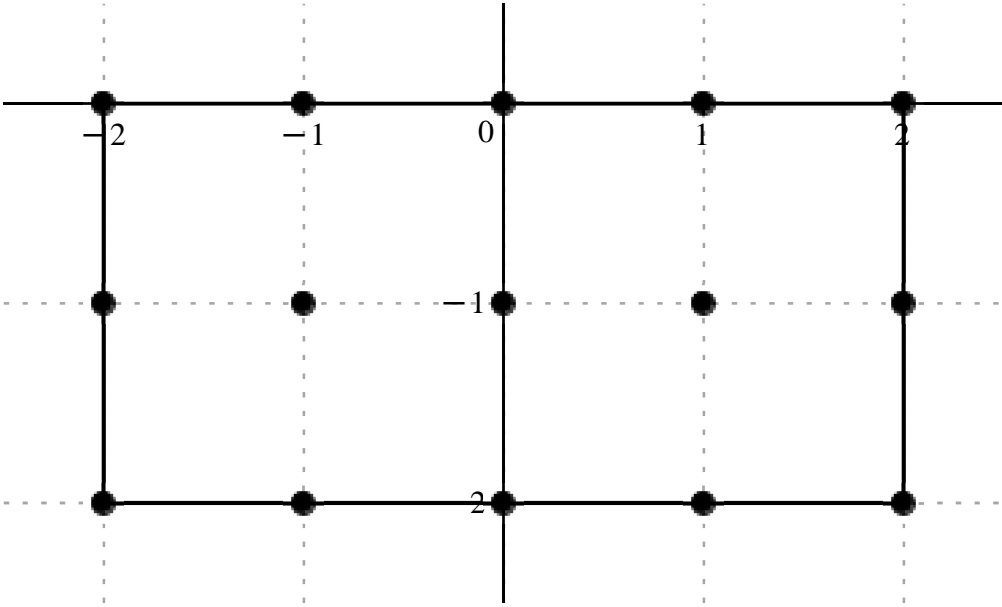
Error order:, 1, Error:, 0.0037852335986452646521, New Error:, 0.00037848781807904542849

Error order:, 1, Error:, 0.00037848781807904542849, New Error:, 0.000037848425885031315765

Error order:, 1, Error:, 0.000037848425885031315765, New Error:,  $3.7848390287694006509 \times 10^{-6}$

Error order:, 1, Error:,  $3.7848390287694006509 \times 10^{-6}$ , New Error:,  $3.7848386727909775916 \times 10^{-7}$

$$x_o + h . , \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -2 -I & -1 -I & -I & 1 -I & 2 -I \\ -2 -2 I & -1 -2 I & -2 I & 1 -2 I & 2 -2 I \end{array} \right]$$
$$c = , \left[ \begin{array}{ccccc} -\frac{349272}{17} + \frac{7334712 I}{17} & -5588352 + 8382528 I & -27243216 & -5588352 - 8382528 I & -\frac{349272}{17} - \frac{7334712 I}{17} \\ \frac{36324288}{17} & -72648576 & 217945728 & -72648576 & \frac{36324288}{17} \\ -\frac{349272}{17} - \frac{7334712 I}{17} & -5588352 - 8382528 I & -27243216 & -5588352 + 8382528 I & -\frac{349272}{17} + \frac{7334712 I}{17} \end{array} \right]$$



$$\frac{d^{14}}{dx_{ol}^{14}} u(x_{ol}) = \frac{349272 \left( (-1 + 21 I) u_{ol-2} + (-272 + 408 I) u_{ol-1} - 1326 u_{ol} - (272 + 408 I) u_{ol+1} - (1 + 21 I) u_{ol+2} + 104 u_{ol-2-I} - 3536 u_{ol-1-I} + 10608 u_{ol-I} - 3536 u_{ol+1-I} + 104 u_{ol+2-I} - (1 + 21 I) u_{ol-2-2I} - (272 + 408 I) u_{ol-1-2I} - 1326 u_{ol-2I} + (-272 + 408 I) u_{ol+1-2I} + (-1 + 21 I) u_{ol+2-2I} \right)}{17 \Delta x_{ol}^{14}}, O(\Delta x_{ol})$$



Formula:, 229, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 1

Error order:, 24, Error:,  $5.3212393700122268511 \times 10^{-66}$ , New Error:,  $5.3212393700209344030 \times 10^{-90}$

Error order:, 24, Error:,  $5.3212393700209344030 \times 10^{-90}$ , New Error:,  $5.3212393700209352738 \times 10^{-114}$

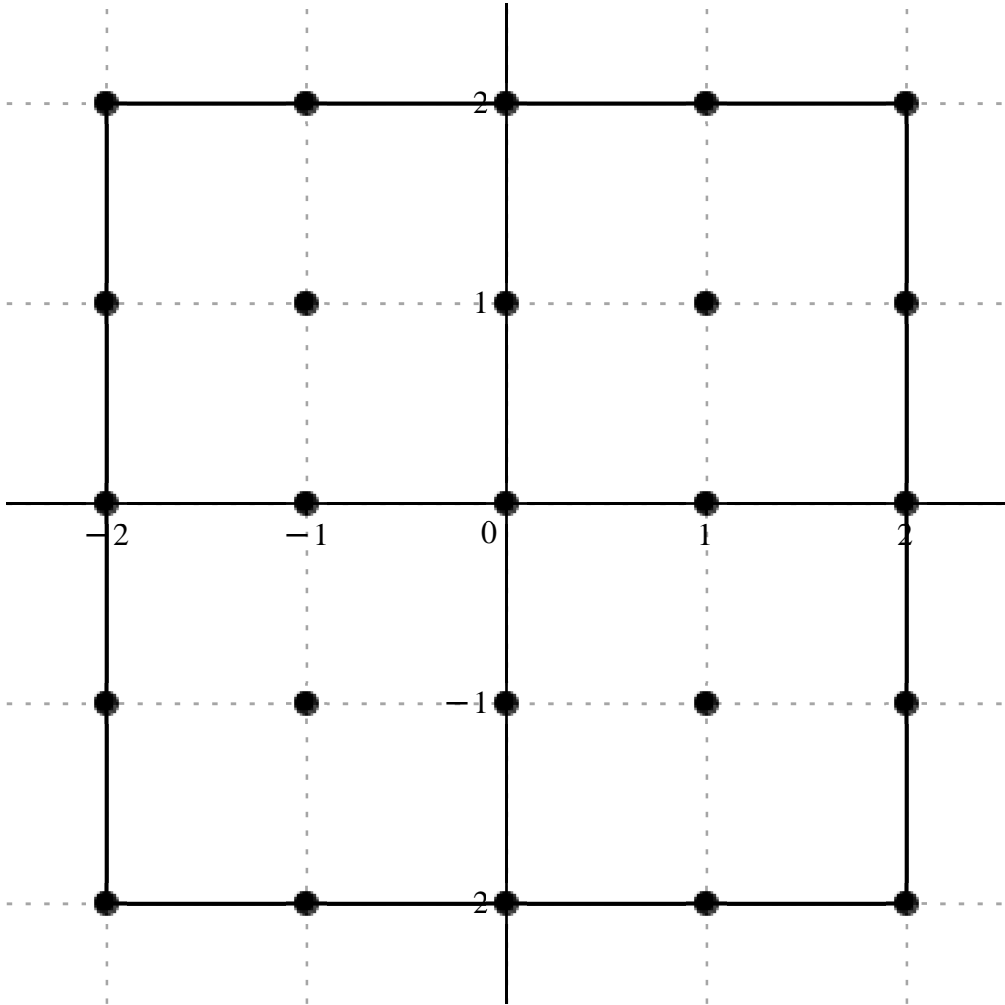
Error order:, 24, Error:,  $5.3212393700209352738 \times 10^{-114}$ , New Error:,  $5.3212393700209352739 \times 10^{-138}$

Error order:, 24, Error:,  $5.3212393700209352739 \times 10^{-138}$ , New Error:,  $5.3212393700209352739 \times 10^{-162}$

Error order:, 24, Error:,  $5.3212393700209352739 \times 10^{-162}$ , New Error:,  $5.3212393700209352739 \times 10^{-186}$

$$x_o+h., \begin{bmatrix} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\text{ I} & -1-\text{ I} & -\text{ I} & 1-\text{ I} & 2-\text{ I} \\ -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \end{bmatrix}$$

$$c=, \begin{bmatrix} \frac{1}{477360}+\frac{\text{ I}}{477360} & -\frac{4}{29835}-\frac{4\text{ I}}{29835} & \frac{\text{ I}}{1326} & \frac{4}{29835}-\frac{4\text{ I}}{29835} & -\frac{1}{477360}+\frac{\text{ I}}{477360} \\ -\frac{4}{29835}-\frac{4\text{ I}}{29835} & -\frac{8}{351}-\frac{8\text{ I}}{351} & -\frac{8\text{ I}}{39} & \frac{8}{351}-\frac{8\text{ I}}{351} & \frac{4}{29835}-\frac{4\text{ I}}{29835} \\ \frac{1}{1326} & -\frac{8}{39} & 0 & \frac{8}{39} & -\frac{1}{1326} \\ -\frac{4}{29835}+\frac{4\text{ I}}{29835} & -\frac{8}{351}+\frac{8\text{ I}}{351} & \frac{8\text{ I}}{39} & \frac{8}{351}+\frac{8\text{ I}}{351} & \frac{4}{29835}+\frac{4\text{ I}}{29835} \\ \frac{1}{477360}-\frac{\text{ I}}{477360} & -\frac{4}{29835}+\frac{4\text{ I}}{29835} & -\frac{\text{ I}}{1326} & \frac{4}{29835}+\frac{4\text{ I}}{29835} & -\frac{1}{477360}-\frac{\text{ I}}{477360} \end{bmatrix}$$



$$\frac{\text{d}}{\text{d}x_{ol}} u(x_{ol})=\frac{1}{477360\Delta x_{ol}}\left((1+\text{ I})\,u_{ol-2+2\text{ I}}-(64+64\text{ I})\,u_{ol-1+2\text{ I}}+360\text{ I}u_{ol+2\text{ I}}+(64-64\text{ I})\,u_{ol+1+2\text{ I}}+(-1+\text{ I})\,u_{ol+2+2\text{ I}}-(64+64\text{ I})\,u_{ol-2+1}-(10880+10880\text{ I})\,u_{ol-1+1}-97920\text{ I}u_{ol+1}+(10880-10880\text{ I})\,u_{ol+1+1}+(64-64\text{ I})\,u_{ol+2+1}+360\,u_{ol-2}-97920\,u_{ol-1}+97920\,u_{ol+1}-360\,u_{ol+2}+(-64+64\text{ I})\,u_{ol-2-1}+(-10880\right.$$

$$+10880\,\mathrm{I}\,)\,u_{o\,l-1-1}+97920\,\mathrm{I}\,u_{o\,l-1}+(10880+10880\,\mathrm{I}\,)\,u_{o\,l+1-1}+(64+64\,\mathrm{I}\,)\,u_{o\,l+2-1}+(1-\mathrm{I}\,)\,u_{o\,l-2-21}+(\,-64+64\,\mathrm{I}\,)\,u_{o\,l-1-21}-360\,\mathrm{I}\,u_{o\,l-21}+(64+64\,\mathrm{I}\,)\,u_{o\,l+1-21}-(1+\mathrm{I}\,)\,u_{o\,l+2-21}\Big),\,O(\,\mathcal{A}_{o\,l}{}^{24}\,)\,$$

Formula:, 230, Var:, 1

Variavel :,  $x_{o\,l}$ , Derivada de Ordem :, 2

Error order:, 24, Error:,  $4.0728965710014450625\times 10^{-67}$ , New Error:,  $4.0728965710072212163\times 10^{-91}$

Error order:, 24, Error:,  $4.0728965710072212163\times 10^{-91}$ , New Error:,  $4.0728965710072217940\times 10^{-115}$

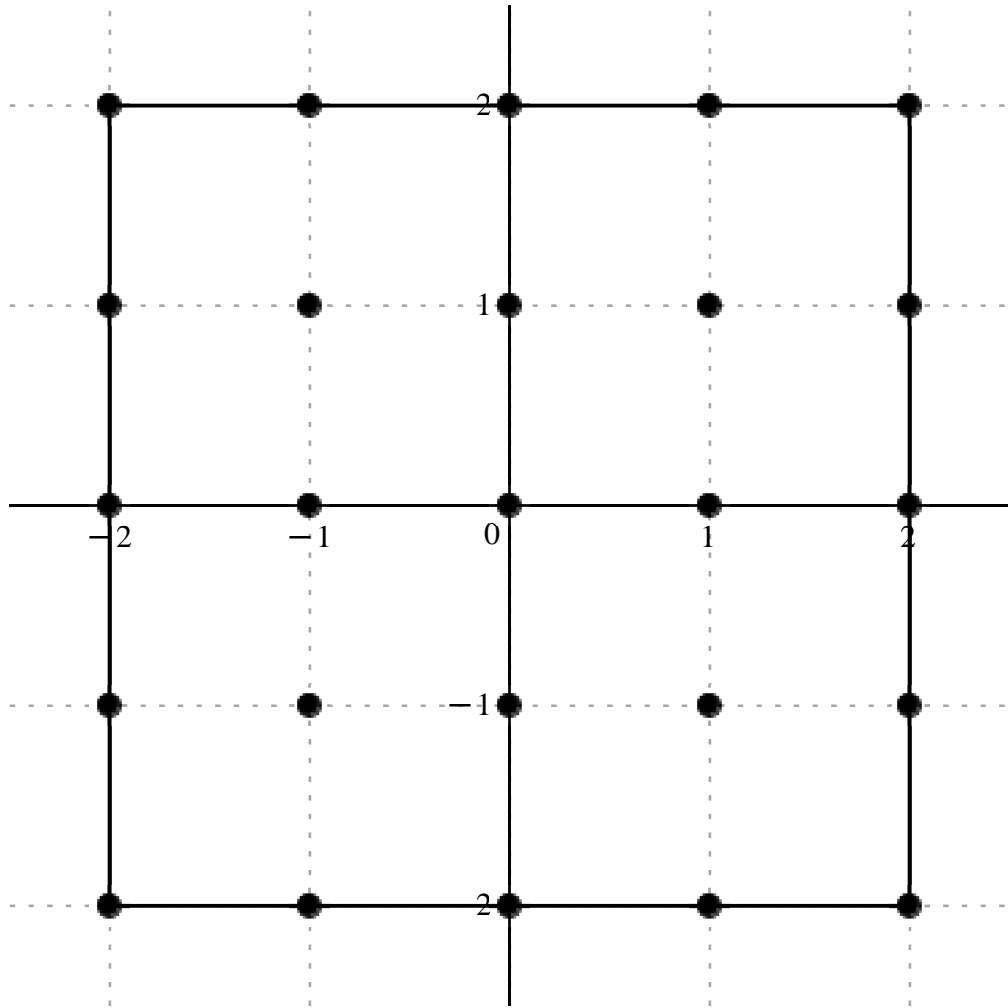
Error order:, 24, Error:,  $4.0728965710072217940\times 10^{-115}$ , New Error:,  $4.0728965710072217940\times 10^{-139}$

Error order:, 24, Error:,  $4.0728965710072217940\times 10^{-139}$ , New Error:,  $4.0728965710072217940\times 10^{-163}$

Error order:, 24, Error:,  $4.0728965710072217940\times 10^{-163}$ , New Error:,  $4.0728965710072217940\times 10^{-187}$

$$x_o+h\,,\left[\begin{array}{ccccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} \end{array}\right]$$

$$c=\left[\begin{array}{ccccc} -\frac{\mathrm{I}}{477360} & -\frac{8}{149175}+\frac{8\,\mathrm{I}}{49725} & \frac{1}{1326} & -\frac{8}{149175}-\frac{8\,\mathrm{I}}{49725} & \frac{\mathrm{I}}{477360} \\ \frac{8}{149175}+\frac{8\,\mathrm{I}}{49725} & \frac{16\,\mathrm{I}}{351} & -\frac{16}{39} & -\frac{16\,\mathrm{I}}{351} & \frac{8}{149175}-\frac{8\,\mathrm{I}}{49725} \\ -\frac{1}{1326} & \frac{16}{39} & 0 & \frac{16}{39} & -\frac{1}{1326} \\ \frac{8}{149175}-\frac{8\,\mathrm{I}}{49725} & -\frac{16\,\mathrm{I}}{351} & -\frac{16}{39} & \frac{16\,\mathrm{I}}{351} & \frac{8}{149175}+\frac{8\,\mathrm{I}}{49725} \\ \frac{\mathrm{I}}{477360} & -\frac{8}{149175}-\frac{8\,\mathrm{I}}{49725} & \frac{1}{1326} & -\frac{8}{149175}+\frac{8\,\mathrm{I}}{49725} & -\frac{\mathrm{I}}{477360} \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{2386800 \, \Delta x_{ol}^2} \big( -5 \, \mathrm{I} \, u_{ol-2+2\mathrm{I}} + (-128 + 384 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + 1800 \, u_{ol+2\mathrm{I}} - (128 + 384 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + 5 \, \mathrm{I} \, u_{ol+2+2\mathrm{I}} + (128 + 384 \, \mathrm{I}) \, u_{ol-2+1} + 108800 \, \mathrm{I} \, u_{ol-1+1} - 979200 \, u_{ol+1} - 108800 \, \mathrm{I} \, u_{ol+1+1} + (128 - 384 \, \mathrm{I}) \, u_{ol+2+1} - 1800 \, u_{ol-2} + 979200 \, u_{ol-1} + 979200 \, u_{ol+1} - 1800 \, u_{ol+2} + (128 - 384 \, \mathrm{I}) \, u_{ol-2-1} - 108800 \, \mathrm{I} \, u_{ol-1-1} - 979200 \, u_{ol-1} + 108800 \, \mathrm{I} \, u_{ol+1-1} + (128 + 384 \, \mathrm{I}) \, u_{ol+2-1} + 5 \, \mathrm{I} \, u_{ol-2-2\mathrm{I}} - (128 + 384 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + 1800 \, u_{ol-2\mathrm{I}} + (-128 + 384 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} - 5 \, \mathrm{I} \, u_{ol+2-2\mathrm{I}} \big), \, O( \, \Delta x_{ol}^{24} \, )$$

Formula:, 231, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 24, Error:,  $4.5029260044247545022 \times 10^{-68}$ , New Error:,  $4.5029260044303165184 \times 10^{-92}$

Error order:, 24, Error:,  $4.5029260044303165184 \times 10^{-92}$ , New Error:,  $4.5029260044303170746 \times 10^{-116}$

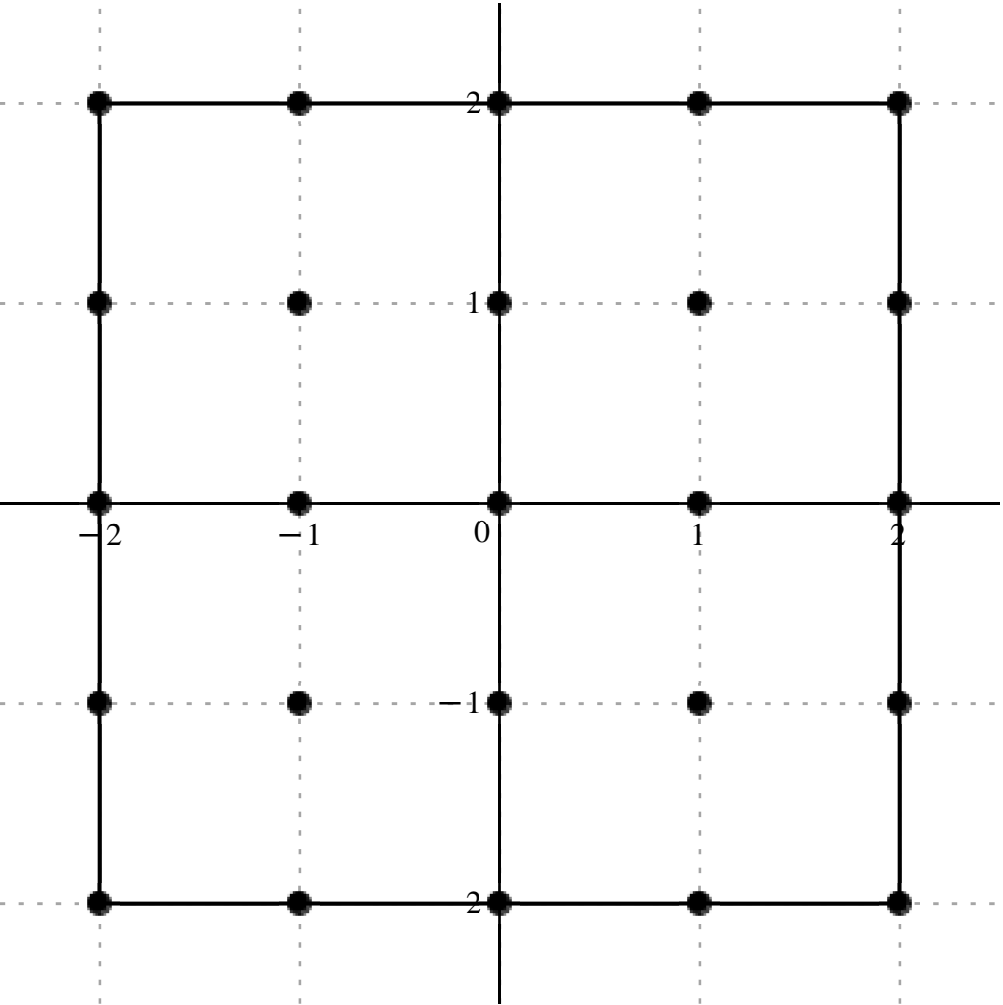
Error order:, 24, Error:,  $4.5029260044303170746 \times 10^{-116}$ , New Error:,  $4.5029260044303170746 \times 10^{-140}$

Error order:, 24, Error:,  $4.5029260044303170746 \times 10^{-140}$ , New Error:,  $4.5029260044303170746 \times 10^{-164}$

Error order:, 24, Error:,  $4.5029260044303170746 \times 10^{-164}$ , New Error:,  $4.5029260044303170746 \times 10^{-188}$

$$x_o + h \cdot , \left[ \begin{array}{ccccc} -2+2\mathrm{I} & -1+2\mathrm{I} & 2\mathrm{I} & 1+2\mathrm{I} & 2+2\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2-2\mathrm{I} & -1-2\mathrm{I} & -2\mathrm{I} & 1-2\mathrm{I} & 2-2\mathrm{I} \end{array} \right]$$

$$c =, \begin{bmatrix} -\frac{1}{636480} + \frac{\mathrm{I}}{636480} & \frac{56}{248625} - \frac{8\,\mathrm{I}}{248625} & -\frac{\mathrm{I}}{884} & -\frac{56}{248625} - \frac{8\,\mathrm{I}}{248625} & \frac{1}{636480} + \frac{\mathrm{I}}{636480} \\ \frac{8}{248625} - \frac{56\,\mathrm{I}}{248625} & \frac{8}{117} - \frac{8\,\mathrm{I}}{117} & \frac{16\,\mathrm{I}}{13} & -\frac{8}{117} - \frac{8\,\mathrm{I}}{117} & -\frac{8}{248625} - \frac{56\,\mathrm{I}}{248625} \\ \frac{1}{884} & -\frac{16}{13} & 0 & \frac{16}{13} & -\frac{1}{884} \\ \frac{8}{248625} + \frac{56\,\mathrm{I}}{248625} & \frac{8}{117} + \frac{8\,\mathrm{I}}{117} & -\frac{16\,\mathrm{I}}{13} & -\frac{8}{117} + \frac{8\,\mathrm{I}}{117} & -\frac{8}{248625} + \frac{56\,\mathrm{I}}{248625} \\ -\frac{1}{636480} - \frac{\mathrm{I}}{636480} & \frac{56}{248625} + \frac{8\,\mathrm{I}}{248625} & \frac{\mathrm{I}}{884} & -\frac{56}{248625} + \frac{8\,\mathrm{I}}{248625} & \frac{1}{636480} - \frac{\mathrm{I}}{636480} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \; u(x_{ol}) = \frac{1}{15912000 \; \Delta x_{ol}^3} \big( (-25 + 25 \, \mathrm{I}) \; u_{ol-2+2\mathrm{I}} + (3584 - 512 \, \mathrm{I}) \; u_{ol-1+2\mathrm{I}} - 18000 \, \mathrm{I} u_{ol+2\mathrm{I}} - (3584 + 512 \, \mathrm{I}) \; u_{ol+1+2\mathrm{I}} + (25 + 25 \, \mathrm{I}) \; u_{ol+2+2\mathrm{I}} + (512 - 3584 \, \mathrm{I}) \; u_{ol-2+1} + (1088000 - 1088000 \, \mathrm{I}) \; u_{ol-1+1} + 19584000 \, \mathrm{I} u_{ol+1} - (1088000 + 1088000 \, \mathrm{I}) \; u_{ol+1+1} - (512 + 3584 \, \mathrm{I}) \; u_{ol+2+1} + 18000 \; u_{ol-2} - 19584000 \; u_{ol-1} \\ + 19584000 \; u_{ol+1} - 18000 \; u_{ol+2} + (512 + 3584 \, \mathrm{I}) \; u_{ol-2-1} + (1088000 + 1088000 \, \mathrm{I}) \; u_{ol-1-1} - 19584000 \, \mathrm{I} u_{ol-1} + (-1088000 + 1088000 \, \mathrm{I}) \; u_{ol+1-1} + (-512 + 3584 \, \mathrm{I}) \; u_{ol+2-1} - (25 + 25 \, \mathrm{I}) \; u_{ol-2-2\mathrm{I}} + (3584 + 512 \, \mathrm{I}) \; u_{ol-1-2\mathrm{I}} + 18000 \, \mathrm{I} u_{ol-2\mathrm{I}} + (-3584 + 512 \, \mathrm{I}) \; u_{ol+1-2\mathrm{I}} + (25 - 25 \, \mathrm{I}) \; u_{ol+2-2\mathrm{I}} \big), \; O( \; \Delta x_{ol}^{24} \; )$$

Formula:, 232, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 4

Error order:., 24, Error:., 6.4007476964114425355 × 10<sup>−69</sup>, New Error:., 6.4007476964183604661 × 10<sup>−93</sup>

Error order:., 24, Error:., 6.4007476964183604661 × 10<sup>−93</sup>, New Error:., 6.4007476964183611579 × 10<sup>−117</sup>

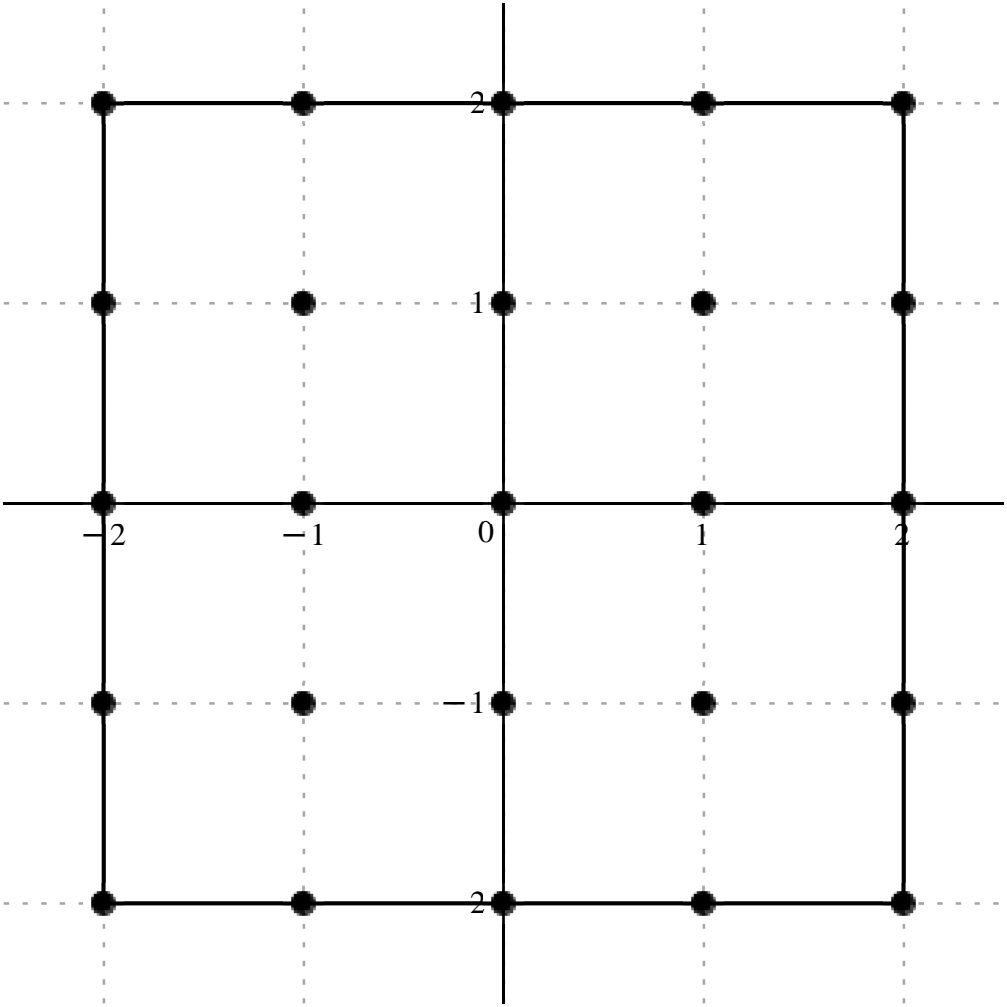
Error order:., 24, Error:., 6.4007476964183611579 × 10<sup>−117</sup>, New Error:., 6.4007476964183611580 × 10<sup>−141</sup>

Error order:., 24, Error:., 6.4007476964183611580 × 10<sup>−141</sup>, New Error:., 6.4007476964183611580 × 10<sup>−165</sup>

Error order:., 24, Error:., 6.4007476964183611580 × 10<sup>−165</sup>, New Error:., 6.4007476964183611580 × 10<sup>−189</sup>

$$x_o \neq h., \left[ \begin{array}{ccccc} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\text{ I} & -1-\text{ I} & -\text{ I} & 1-\text{ I} & 2-\text{ I} \\ -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \end{array} \right]$$

$$c=,\left[\begin{array}{ccccc}\frac{1}{318240}&-\frac{32}{138125}-\frac{32\text{ I}}{95625}&-\frac{1}{442}&-\frac{32}{138125}+\frac{32\text{ I}}{95625}&\frac{1}{318240}\\-\frac{32}{138125}+\frac{32\text{ I}}{95625}&-\frac{32}{117}&\frac{64}{13}&-\frac{32}{117}&-\frac{32}{138125}-\frac{32\text{ I}}{95625}\\\frac{-1}{442}&\frac{64}{13}&-\frac{92937}{5000}&\frac{64}{13}&\frac{-1}{442}\\-\frac{32}{138125}-\frac{32\text{ I}}{95625}&-\frac{32}{117}&\frac{64}{13}&-\frac{32}{117}&-\frac{32}{138125}+\frac{32\text{ I}}{95625}\\\frac{1}{318240}&-\frac{32}{138125}+\frac{32\text{ I}}{95625}&-\frac{1}{442}&-\frac{32}{138125}-\frac{32\text{ I}}{95625}&\frac{1}{318240}\end{array}\right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d} x_{ol}^4} \; u(x_{ol}) = \frac{1}{39780000 \; \Delta x_{ol}^4} \; (125 \; u_{ol-2+2\text{ I}} - (9216 + 13312 \; \text{I}) \; u_{ol-1+2\text{ I}} - 90000 \; u_{ol+2\text{ I}} + (-9216 + 13312 \; \text{I}) \; u_{ol+1+2\text{ I}} + 125 \; u_{ol+2+2\text{ I}} + (-9216 + 13312 \; \text{I}) \; u_{ol-2+1} - 10880000 \; u_{ol-1+1} + 195840000 \; u_{ol+1} - 10880000 \; u_{ol+1+1} - (9216 + 13312 \; \text{I}) \; u_{ol+2+1} - 90000 \; u_{ol-2} + 195840000 \; u_{ol-1} - 739406772 \; u_{ol} + 195840000 \; u_{ol+1} - 90000 \; u_{ol+2} - (9216 + 13312 \; \text{I}) \; u_{ol-2-1} - 10880000 \; u_{ol-1-1} + 195840000 \; u_{ol-1} - 10880000 \; u_{ol+1-1} + (-9216 + 13312 \; \text{I}) \; u_{ol+2-1} + 125 \; u_{ol-2-2\text{ I}} + (-9216 + 13312 \; \text{I}) \; u_{ol-1-2\text{ I}} - 90000 \; u_{ol-2\text{ I}} - (9216 + 13312 \; \text{I}) \; u_{ol+1-2\text{ I}} + 125 \; u_{ol+2-2\text{ I}}), \; O( \; \Delta x_{ol}^{24} \; )$$

$$Variavel \, :, x_{ol} \, , \quad Derivada \, de \, Ordem \, :, 5$$

$$Error \, order:, 20, \quad Error:, 3.3777749015149938513 \times 10^{-56}, \quad New \, Error:, 3.3777749015206309611 \times 10^{-76}$$

$$Error \, order:, 20, \quad Error:, 3.3777749015206309611 \times 10^{-76}, \quad New \, Error:, 3.3777749015206315248 \times 10^{-96}$$

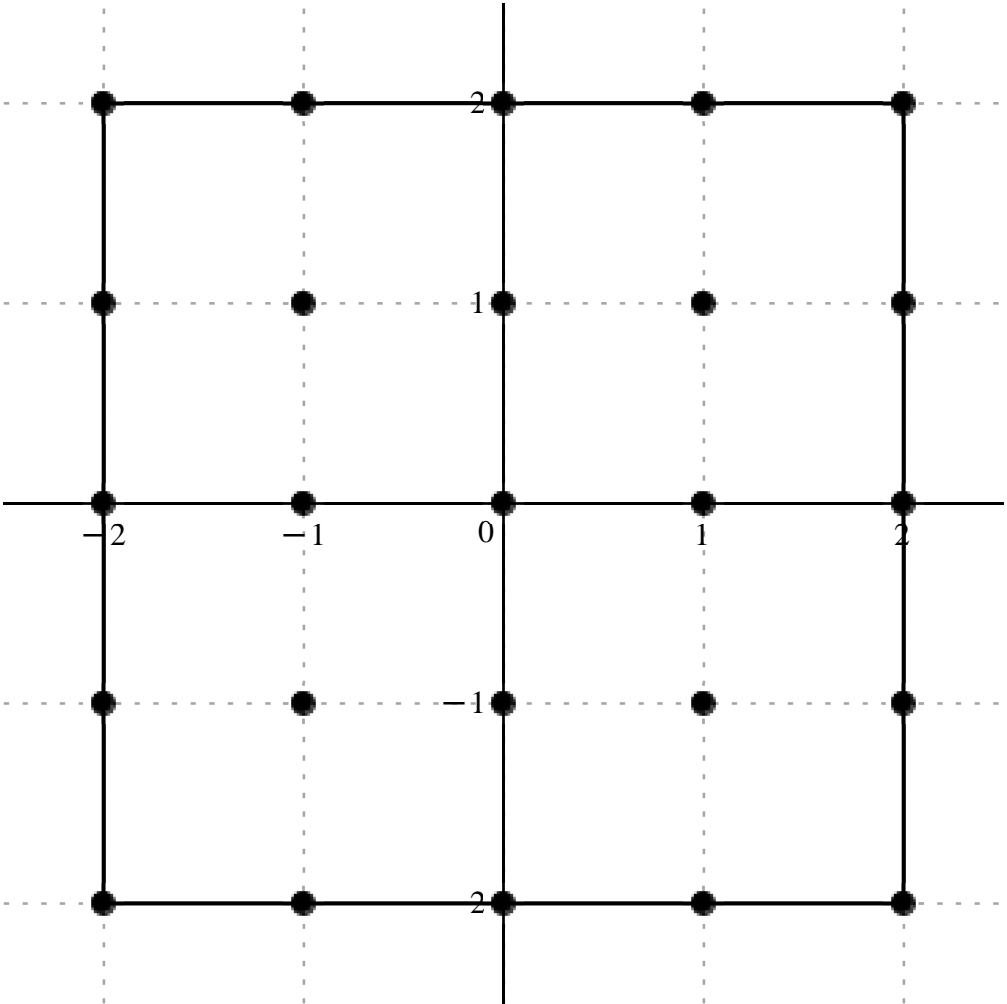
$$Error \, order:, 20, \quad Error:, 3.3777749015206315248 \times 10^{-96}, \quad New \, Error:, 3.3777749015206315248 \times 10^{-116}$$

$$Error \, order:, 20, \quad Error:, 3.3777749015206315248 \times 10^{-116}, \quad New \, Error:, 3.3777749015206315248 \times 10^{-136}$$

$$Error \, order:, 20, \quad Error:, 3.3777749015206315248 \times 10^{-136}, \quad New \, Error:, 3.3777749015206315248 \times 10^{-156}$$

$$x_o \, + h \, . \, , \quad \left[ \begin{array}{ccccc} -2 + 2 \, \text{I} & -1 + 2 \, \text{I} & 2 \, \text{I} & 1 + 2 \, \text{I} & 2 + 2 \, \text{I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} \\ -2 - 2 \, \text{I} & -1 - 2 \, \text{I} & -2 \, \text{I} & 1 - 2 \, \text{I} & 2 - 2 \, \text{I} \end{array} \right]$$

$$c = , \quad \left[ \begin{array}{ccccc} -\frac{7901}{39780000} - \frac{7901 \, \text{I}}{39780000} & \frac{29891}{2486250} + \frac{1939 \, \text{I}}{146250} & -\frac{28479 \, \text{I}}{442000} & -\frac{29891}{2486250} + \frac{1939 \, \text{I}}{146250} & \frac{7901}{39780000} - \frac{7901 \, \text{I}}{39780000} \\ \frac{1939}{146250} + \frac{29891 \, \text{I}}{2486250} & \frac{40979}{14625} + \frac{40979 \, \text{I}}{14625} & -\frac{9021 \, \text{I}}{1625} & -\frac{40979}{14625} + \frac{40979 \, \text{I}}{14625} & -\frac{1939}{146250} + \frac{29891 \, \text{I}}{2486250} \\ -\frac{28479}{442000} & -\frac{9021}{1625} & 0 & \frac{9021}{1625} & \frac{28479}{442000} \\ \frac{1939}{146250} - \frac{29891 \, \text{I}}{2486250} & \frac{40979}{14625} - \frac{40979 \, \text{I}}{14625} & \frac{9021 \, \text{I}}{1625} & -\frac{40979}{14625} - \frac{40979 \, \text{I}}{14625} & -\frac{1939}{146250} - \frac{29891 \, \text{I}}{2486250} \\ -\frac{7901}{39780000} + \frac{7901 \, \text{I}}{39780000} & \frac{29891}{2486250} - \frac{1939 \, \text{I}}{146250} & \frac{28479 \, \text{I}}{442000} & -\frac{29891}{2486250} - \frac{1939 \, \text{I}}{146250} & \frac{7901}{39780000} + \frac{7901 \, \text{I}}{39780000} \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^{\,5}} \, \, u(x_{ol}) = \frac{1}{39780000 \, \Delta x_{ol}^{\,5}} \, \big( \, -(7901 + 7901 \, \text{I}) \, u_{ol-2+2\text{I}} + (478256 + 527408 \, \text{I}) \, u_{ol-1+2\text{I}} - 2563110 \, \text{I} u_{ol+2\text{I}} + ( \, -478256 + 527408 \, \text{I}) \, u_{ol+1+2\text{I}} + (7901 - 7901 \, \text{I}) \, u_{ol+2+2\text{I}} + (527408 + 478256 \, \text{I}) \, u_{ol-2+1} + (111462880 + 111462880 \, \text{I}) \, u_{ol-1+1} - 220834080 \, \text{I} u_{ol+1} + ( \, -111462880 + 111462880 \, \text{I}) \, u_{ol+1+1} + ( \, -527408$$

$$+ 478256 \, \text{I}) \, u_{ol+2+1} - 2563110 \, u_{ol-2} - 220834080 \, u_{ol-1} + 220834080 \, u_{ol+1} + 2563110 \, u_{ol+2} + (527408 - 478256 \, \text{I}) \, u_{ol-2-1} + (111462880 - 111462880 \, \text{I}) \, u_{ol-1-1} + 220834080 \, \text{I} u_{ol-1} - (111462880 + 111462880 \, \text{I}) \, u_{ol+1-1} - (527408 + 478256 \, \text{I}) \, u_{ol+2-1} + ( \, -7901 + 7901 \, \text{I}) \, u_{ol-2-2\text{I}} + (478256 - 527408 \, \text{I}) \, u_{ol-1-2\text{I}}$$

$$+ 2563110 \, \text{I} u_{ol-2\text{I}} - (478256 + 527408 \, \text{I}) \, u_{ol+1-2\text{I}} + (7901 + 7901 \, \text{I}) \, u_{ol+2-2\text{I}} \big) . \, \, O( \, \Delta x_{ol}^{\,20} \, )$$

Formula:, 234, Var:, 1

Variavel :,  $x_{oi}$  , Derivada de Ordem :, 6

Error order:, 20, Error:,  $7.7560847336756499222 \times 10^{-57}$ , New Error:,  $7.7560847336868680510 \times 10^{-77}$

Error order:, 20, Error:,  $7.7560847336868680510 \times 10^{-77}$ , New Error:,  $7.7560847336868691728 \times 10^{-97}$

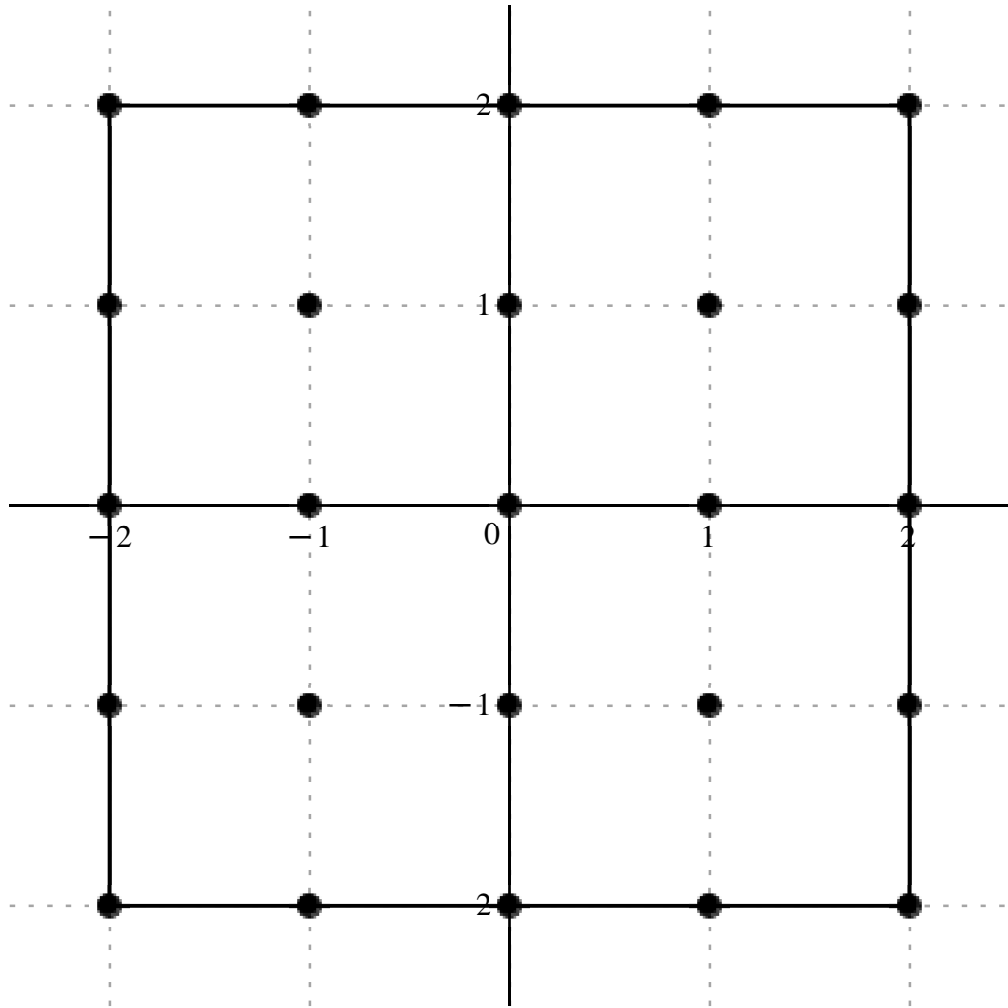
Error order:, 20, Error:,  $7.7560847336868691728 \times 10^{-97}$ , New Error:,  $7.7560847336868691730 \times 10^{-117}$

Error order:, 20, Error:,  $7.7560847336868691730 \times 10^{-117}$ , New Error:,  $7.7560847336868691730 \times 10^{-137}$

Error order:, 20, Error:,  $7.7560847336868691730 \times 10^{-137}$ , New Error:,  $7.7560847336868691730 \times 10^{-157}$

$$x_o+h., \left[ \begin{array}{ccccc} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\text{ I} & -1-\text{ I} & -\text{ I} & 1-\text{ I} & 2-\text{ I} \\ -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \end{array} \right]$$

$$c=,\left[ \begin{array}{ccccc} \frac{7901\text{ I}}{13260000} & \frac{7207}{414375}-\frac{6183\text{ I}}{138125} & -\frac{85437}{442000} & \frac{7207}{414375}+\frac{6183\text{ I}}{138125} & -\frac{7901\text{ I}}{13260000} \\ -\frac{7207}{414375}-\frac{6183\text{ I}}{138125} & -\frac{81958\text{ I}}{4875} & -\frac{54126}{1625} & \frac{81958\text{ I}}{4875} & -\frac{7207}{414375}+\frac{6183\text{ I}}{138125} \\ \frac{85437}{442000} & \frac{54126}{1625} & 0 & \frac{54126}{1625} & \frac{85437}{442000} \\ -\frac{7207}{414375}+\frac{6183\text{ I}}{138125} & \frac{81958\text{ I}}{4875} & -\frac{54126}{1625} & -\frac{81958\text{ I}}{4875} & -\frac{7207}{414375}-\frac{6183\text{ I}}{138125} \\ -\frac{7901\text{ I}}{13260000} & \frac{7207}{414375}+\frac{6183\text{ I}}{138125} & -\frac{85437}{442000} & \frac{7207}{414375}-\frac{6183\text{ I}}{138125} & \frac{7901\text{ I}}{13260000} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} u(x_{ol}) = \frac{1}{13260000 \mathcal{A}x_{ol}^6} \left( 7901 \operatorname{I} u_{ol-2+2\mathbf{I}} + (230624 - 593568 \operatorname{I}) u_{ol-1+2\mathbf{I}} - 2563110 u_{ol+2\mathbf{I}} + (230624 + 593568 \operatorname{I}) u_{ol+1+2\mathbf{I}} - 7901 \operatorname{I} u_{ol+2+2\mathbf{I}} - (230624 + 593568 \operatorname{I}) u_{ol-2+\mathbf{I}} - 222925760 \operatorname{I} u_{ol-1+\mathbf{I}} - 441668160 u_{ol+\mathbf{I}} + 222925760 \operatorname{I} u_{ol+1+\mathbf{I}} + (-230624 + 593568 \operatorname{I}) u_{ol+2+\mathbf{I}} + 2563110 u_{ol-2} + 441668160 u_{ol-1} + 441668160 u_{ol+1} + 2563110 u_{ol+2} + (-230624 + 593568 \operatorname{I}) u_{ol-2-\mathbf{I}} + 222925760 \operatorname{I} u_{ol-1-\mathbf{I}} - 441668160 u_{ol-\mathbf{I}} - 222925760 \operatorname{I} u_{ol+1-\mathbf{I}} - (230624 + 593568 \operatorname{I}) u_{ol+2-\mathbf{I}} - 7901 \operatorname{I} u_{ol-2-2\mathbf{I}} + (230624 + 593568 \operatorname{I}) u_{ol-1-2\mathbf{I}} - 2563110 u_{ol-2\mathbf{I}} + (230624 - 593568 \operatorname{I}) u_{ol+1-2\mathbf{I}} + 7901 \operatorname{I} u_{ol+2-2\mathbf{I}} \right), \quad O(\mathcal{A}x_{ol}^{20})$$

Formula: 235, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order: 20, Error:  $2.0008326197066402422 \times 10^{-57}$ , New Error:  $2.0008326197091607655 \times 10^{-77}$

Error order: 20, Error:  $2.0008326197091607655 \times 10^{-77}$ , New Error:  $2.0008326197091610175 \times 10^{-97}$

Error order: 20, Error:  $2.0008326197091610175 \times 10^{-97}$ , New Error:  $2.0008326197091610175 \times 10^{-117}$

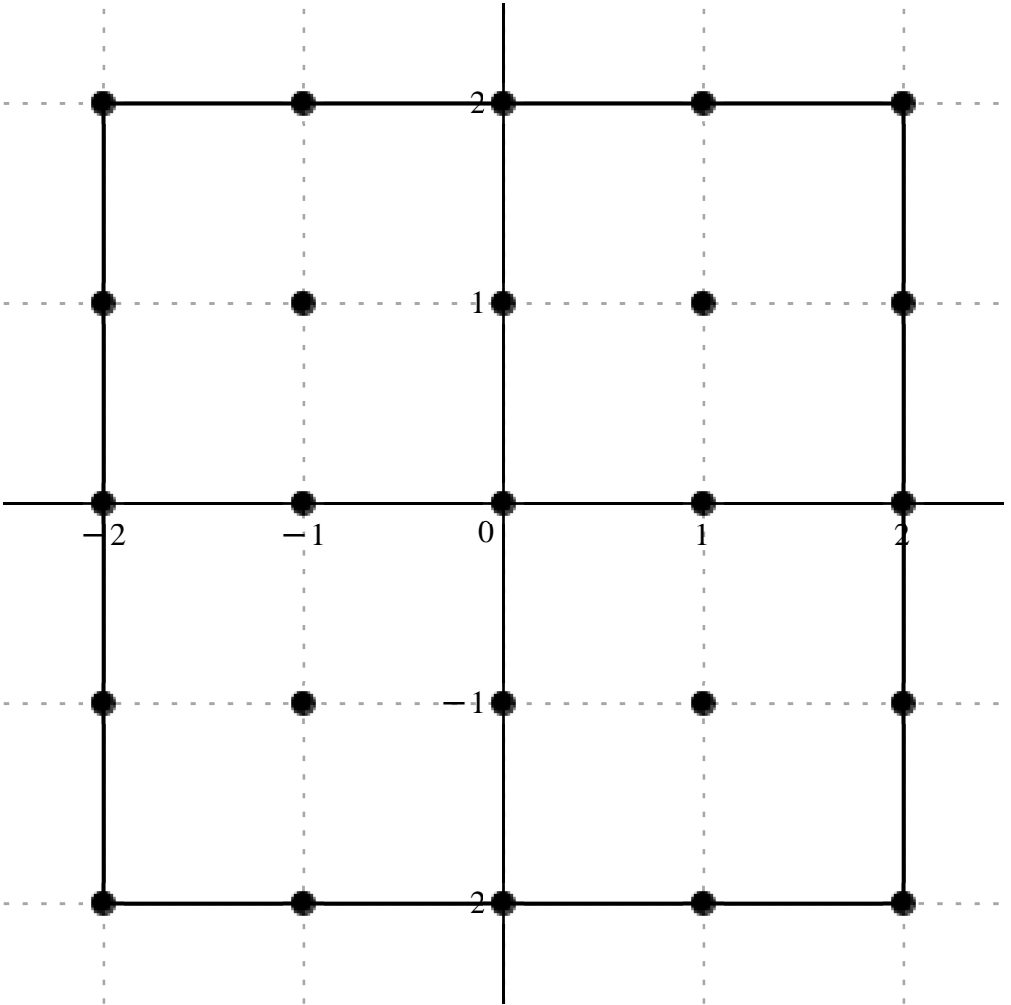
Error order: 20, Error:  $2.0008326197091610175 \times 10^{-117}$ , New Error:  $2.0008326197091610175 \times 10^{-137}$

Error order: 20, Error:  $2.0008326197091610175 \times 10^{-137}$ , New Error:  $2.0008326197091610175 \times 10^{-157}$

$$x_o + h \cdot , \left[ \begin{array}{ccccc} -2+2\mathbf{I} & -1+2\mathbf{I} & 2\mathbf{I} & 1+2\mathbf{I} & 2+2\mathbf{I} \\ -2+\mathbf{I} & -1+\mathbf{I} & \mathbf{I} & 1+\mathbf{I} & 2+\mathbf{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\mathbf{I} & -1-\mathbf{I} & -\mathbf{I} & 1-\mathbf{I} & 2-\mathbf{I} \\ -2-2\mathbf{I} & -1-2\mathbf{I} & -2\mathbf{I} & 1-2\mathbf{I} & 2-2\mathbf{I} \end{array} \right]$$



$$c = , \left[ \begin{array}{cccccc} \frac{55307}{53040000} - \frac{55307 \text{ I}}{53040000} & - \frac{62027}{414375} + \frac{5789 \text{ I}}{414375} & \frac{598059 \text{ I}}{884000} & \frac{62027}{414375} + \frac{5789 \text{ I}}{414375} & - \frac{55307}{53040000} - \frac{55307 \text{ I}}{53040000} \\ - \frac{5789}{414375} + \frac{62027 \text{ I}}{414375} & - \frac{286853}{4875} + \frac{286853 \text{ I}}{4875} & \frac{378882 \text{ I}}{1625} & \frac{286853}{4875} + \frac{286853 \text{ I}}{4875} & \frac{5789}{414375} + \frac{62027 \text{ I}}{414375} \\ - \frac{598059}{884000} & - \frac{378882}{1625} & 0 & \frac{378882}{1625} & \frac{598059}{884000} \\ - \frac{5789}{414375} - \frac{62027 \text{ I}}{414375} & - \frac{286853}{4875} - \frac{286853 \text{ I}}{4875} & - \frac{378882 \text{ I}}{1625} & \frac{286853}{4875} - \frac{286853 \text{ I}}{4875} & \frac{5789}{414375} - \frac{62027 \text{ I}}{414375} \\ \frac{55307}{53040000} + \frac{55307 \text{ I}}{53040000} & - \frac{62027}{414375} - \frac{5789 \text{ I}}{414375} & - \frac{598059 \text{ I}}{884000} & \frac{62027}{414375} - \frac{5789 \text{ I}}{414375} & - \frac{55307}{53040000} + \frac{55307 \text{ I}}{53040000} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}{}^7} \, u(x_{ol}) = \frac{1}{53040000 \, \mathcal{A}x_{ol}{}^7} \, \big( 7 \, \big( (7901 - 7901 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (-1134208 + 105856 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + 5126220 \, \mathrm{I} \, u_{ol+2\mathrm{I}} + (1134208 + 105856 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} - (7901 + 7901 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (-105856 + 1134208 \, \mathrm{I}) \, u_{ol-2+1} + (-445851520 + 445851520 \, \mathrm{I}) \, u_{ol-1+1} + 1766672640 \, \mathrm{I} \, u_{ol+1} + (445851520 + 445851520 \, \mathrm{I}) \, u_{ol+1+1} + (105856 + 1134208 \, \mathrm{I}) \, u_{ol+2+1} - 5126220 \, u_{ol-2} - 1766672640 \, u_{ol-1} + 1766672640 \, u_{ol+1} + 5126220 \, u_{ol+2} - (105856 + 1134208 \, \mathrm{I}) \, u_{ol-2-1} - (445851520 + 445851520 \, \mathrm{I}) \, u_{ol-1-1} - 1766672640 \, \mathrm{I} \, u_{ol-1} + (445851520 - 445851520 \, \mathrm{I}) \, u_{ol+1-1} + (105856 - 1134208 \, \mathrm{I}) \, u_{ol+2-1} + (7901 + 7901 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} - (1134208 + 105856 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} - 5126220 \, \mathrm{I} \, u_{ol-2\mathrm{I}} + (1134208 - 105856 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (-7901 + 7901 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} \big) \big), \, O(\, \mathcal{A}x_{ol}{}^{20} \, )$$

Formula.: 236, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 8

Error order.: 20, Error.: 5.6882235101832419023 × 10<sup>−58</sup>, New Error.: 5.6882235101895118606 × 10<sup>−78</sup>

Error order.: 20, Error.: 5.6882235101895118606 × 10<sup>−78</sup>, New Error.: 5.6882235101895124876 × 10<sup>−98</sup>

Error order.: 20, Error.: 5.6882235101895124876 × 10<sup>−98</sup>, New Error.: 5.6882235101895124876 × 10<sup>−118</sup>

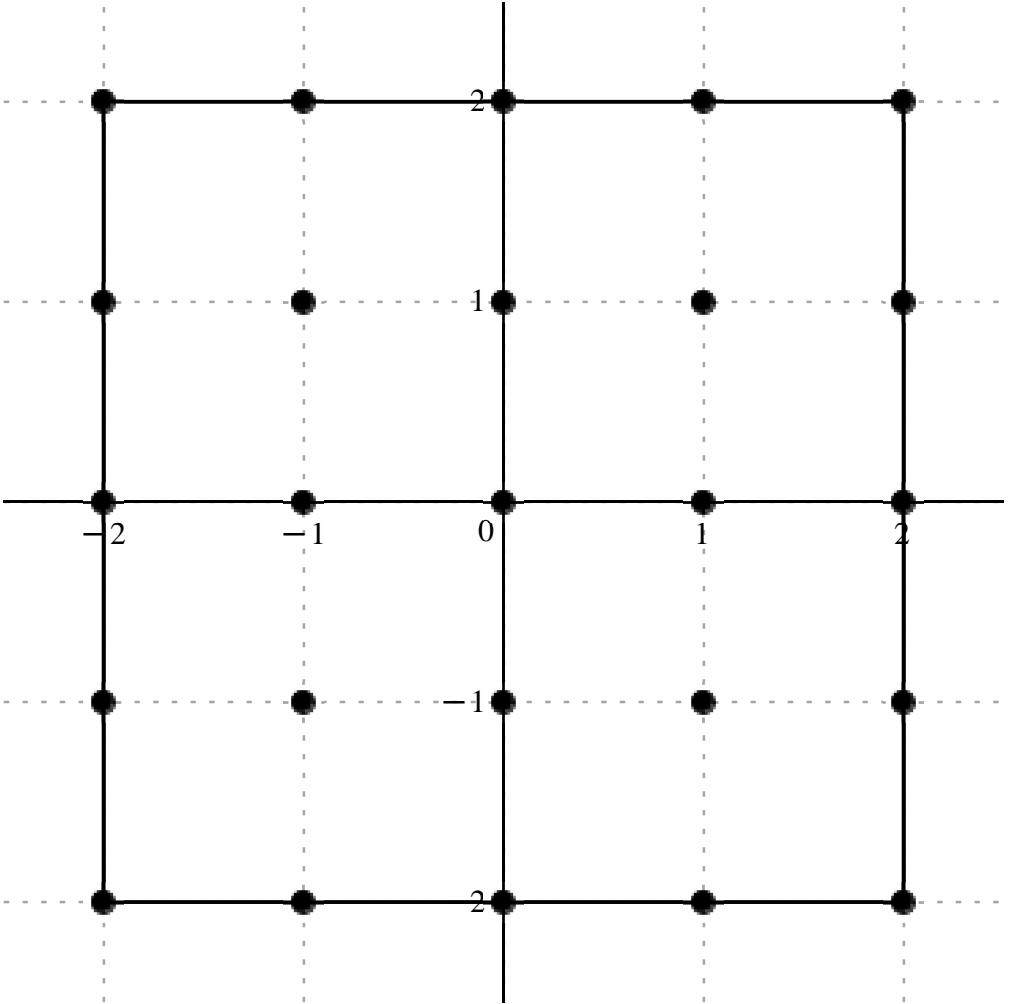
Error order.: 20, Error.: 5.6882235101895124876 × 10<sup>−118</sup>, New Error.: 5.6882235101895124876 × 10<sup>−138</sup>

$$x_o+h.,$$

$$\begin{bmatrix} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} \end{bmatrix}$$

$$c=,$$

$$\begin{bmatrix} -\frac{55307}{13260000} & \frac{39256}{138125}+\frac{189224\,\mathrm{I}}{414375} & \frac{598059}{221000} & \frac{39256}{138125}-\frac{189224\,\mathrm{I}}{414375} & -\frac{55307}{13260000} \\ \frac{39256}{138125}-\frac{189224\,\mathrm{I}}{414375} & \frac{2294824}{4875} & \frac{3031056}{1625} & \frac{2294824}{4875} & \frac{39256}{138125}+\frac{189224\,\mathrm{I}}{414375} \\ \frac{598059}{221000} & \frac{3031056}{1625} & -\frac{374283}{40} & \frac{3031056}{1625} & \frac{598059}{221000} \\ \frac{39256}{138125}+\frac{189224\,\mathrm{I}}{414375} & \frac{2294824}{4875} & \frac{3031056}{1625} & \frac{2294824}{4875} & \frac{39256}{138125}-\frac{189224\,\mathrm{I}}{414375} \\ -\frac{55307}{13260000} & \frac{39256}{138125}-\frac{189224\,\mathrm{I}}{414375} & \frac{598059}{221000} & \frac{39256}{138125}+\frac{189224\,\mathrm{I}}{414375} & -\frac{55307}{13260000} \end{bmatrix}$$



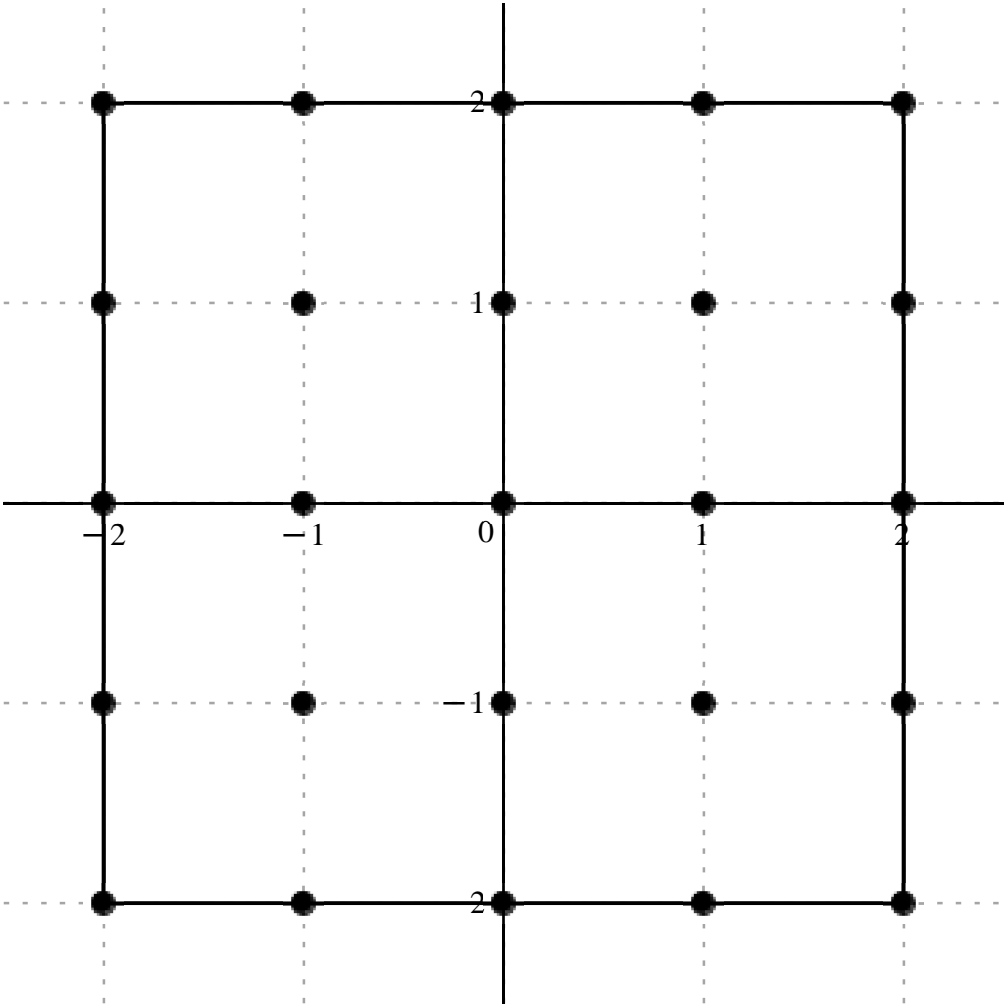
$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{13260000 \, \Delta x_{ol}^8} \, (7 \, ( -7901 \, u_{ol-2+2\mathrm{I}} + (538368 + 865024 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + 5126220 \, u_{ol+2\mathrm{I}} + (538368 - 865024 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} - 7901 \, u_{ol+2+2\mathrm{I}} + (538368 - 865024 \, \mathrm{I}) \, u_{ol-2+1} + 891703040 \, u_{ol-1+1} + 3533345280 \, u_{ol+1} + 891703040 \, u_{ol+1+1} + (538368 + 865024 \, \mathrm{I}) \, u_{ol+2+1} + 5126220 \, u_{ol-2} + 3533345280 \, u_{ol-1} - 17724973500 \, u_{ol}$$

$$+ 3533345280 \, u_{ol+1} + 5126220 \, u_{ol+2} + (538368 + 865024 \, \mathrm{I}) \, u_{ol-2-1} + 891703040 \, u_{ol-1-1} + 3533345280 \, u_{ol-1} + 891703040 \, u_{ol+1-1} + (538368 - 865024 \, \mathrm{I}) \, u_{ol+2-1} - 7901 \, u_{ol-2-2\mathrm{I}} + (538368 - 865024 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + 5126220 \, u_{ol-2\mathrm{I}} + (538368 + 865024 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} - 7901 \, u_{ol+2-2\mathrm{I}} ) ), \, O( \, \Delta x_{ol}^{20} \, )$$

Error order.: 16, Error.:  $2.090518110623339164 \times 10^{-45}$ , New Error.:  $2.0905181106265791562 \times 10^{-61}$   
Error order.: 16, Error.:  $2.0905181106265791562 \times 10^{-61}$ , New Error.:  $2.0905181106265794807 \times 10^{-77}$   
Error order.: 16, Error.:  $2.0905181106265794807 \times 10^{-77}$ , New Error.:  $2.0905181106265794807 \times 10^{-93}$   
Error order.: 16, Error.:  $2.0905181106265794807 \times 10^{-93}$ , New Error.:  $2.0905181106265794807 \times 10^{-109}$   
Error order.: 16, Error.:  $2.0905181106265794807 \times 10^{-109}$ , New Error.:  $2.0905181106265794807 \times 10^{-125}$

$$x_o + h . , \left[ \begin{array}{ccccc} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ -2 + \text{ I} & -1 + \text{ I} & \text{ I} & 1 + \text{ I} & 2 + \text{ I} \\ -2 & -1 & 0 & 1 & 2 \\ -2 - \text{ I} & -1 - \text{ I} & -\text{ I} & 1 - \text{ I} & 2 - \text{ I} \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} -\frac{10857}{65000} - \frac{10857 \text{ I}}{65000} & \frac{201873}{16250} + \frac{153489 \text{ I}}{16250} & -\frac{491967 \text{ I}}{6500} & -\frac{201873}{16250} + \frac{153489 \text{ I}}{16250} & \frac{10857}{65000} - \frac{10857 \text{ I}}{65000} \\ \frac{153489}{16250} + \frac{201873 \text{ I}}{16250} & -\frac{323211}{1625} - \frac{323211 \text{ I}}{1625} & \frac{791721 \text{ I}}{1625} & \frac{323211}{1625} - \frac{323211 \text{ I}}{1625} & -\frac{153489}{16250} + \frac{201873 \text{ I}}{16250} \\ -\frac{491967}{6500} & \frac{791721}{1625} & 0 & -\frac{791721}{1625} & \frac{491967}{6500} \\ \frac{153489}{16250} - \frac{201873 \text{ I}}{16250} & -\frac{323211}{1625} + \frac{323211 \text{ I}}{1625} & -\frac{791721 \text{ I}}{1625} & \frac{323211}{1625} + \frac{323211 \text{ I}}{1625} & -\frac{153489}{16250} - \frac{201873 \text{ I}}{16250} \\ -\frac{10857}{65000} + \frac{10857 \text{ I}}{65000} & \frac{201873}{16250} - \frac{153489 \text{ I}}{16250} & \frac{491967 \text{ I}}{6500} & -\frac{201873}{16250} - \frac{153489 \text{ I}}{16250} & \frac{10857}{65000} + \frac{10857 \text{ I}}{65000} \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{65000 \, \Delta x_{ol}^9} \Big( 21 \, \Big( -(517 + 517 \, \mathrm{I}) \, u_{ol-2+21} + (38452 + 29236 \, \mathrm{I}) \, u_{ol-1+21} - 234270 \, \mathrm{I} u_{ol+21} + (-38452 + 29236 \, \mathrm{I}) \, u_{ol+1+21} + (517 - 517 \, \mathrm{I}) \, u_{ol+2+21} + (29236 + 38452 \, \mathrm{I}) \, u_{ol-2+1} - (615640 + 615640 \, \mathrm{I}) \, u_{ol-1+1} + 1508040 \, \mathrm{I} u_{ol+1} + (615640 - 615640 \, \mathrm{I}) \, u_{ol+1+1} + (-29236 + 38452 \, \mathrm{I}) \, u_{ol+2+1} - 234270 \, u_{ol-2}$$

$$+ 1508040 \, u_{ol-1} - 1508040 \, u_{ol+1} + 234270 \, u_{ol+2} + (29236 - 38452 \, \mathrm{I}) \, u_{ol-2-1} + (-615640 + 615640 \, \mathrm{I}) \, u_{ol-1-1} - 1508040 \, \mathrm{I} u_{ol-1} + (615640 + 615640 \, \mathrm{I}) \, u_{ol+1-1} - (29236 + 38452 \, \mathrm{I}) \, u_{ol+2-1} + (-517 + 517 \, \mathrm{I}) \, u_{ol-2-21} + (38452 - 29236 \, \mathrm{I}) \, u_{ol-1-21} + 234270 \, \mathrm{I} u_{ol-21} - (38452 + 29236 \, \mathrm{I}) \, u_{ol+1-21} + (517 + 517 \, \mathrm{I}) \, u_{ol+2-21} \Big) \Big) ,$$

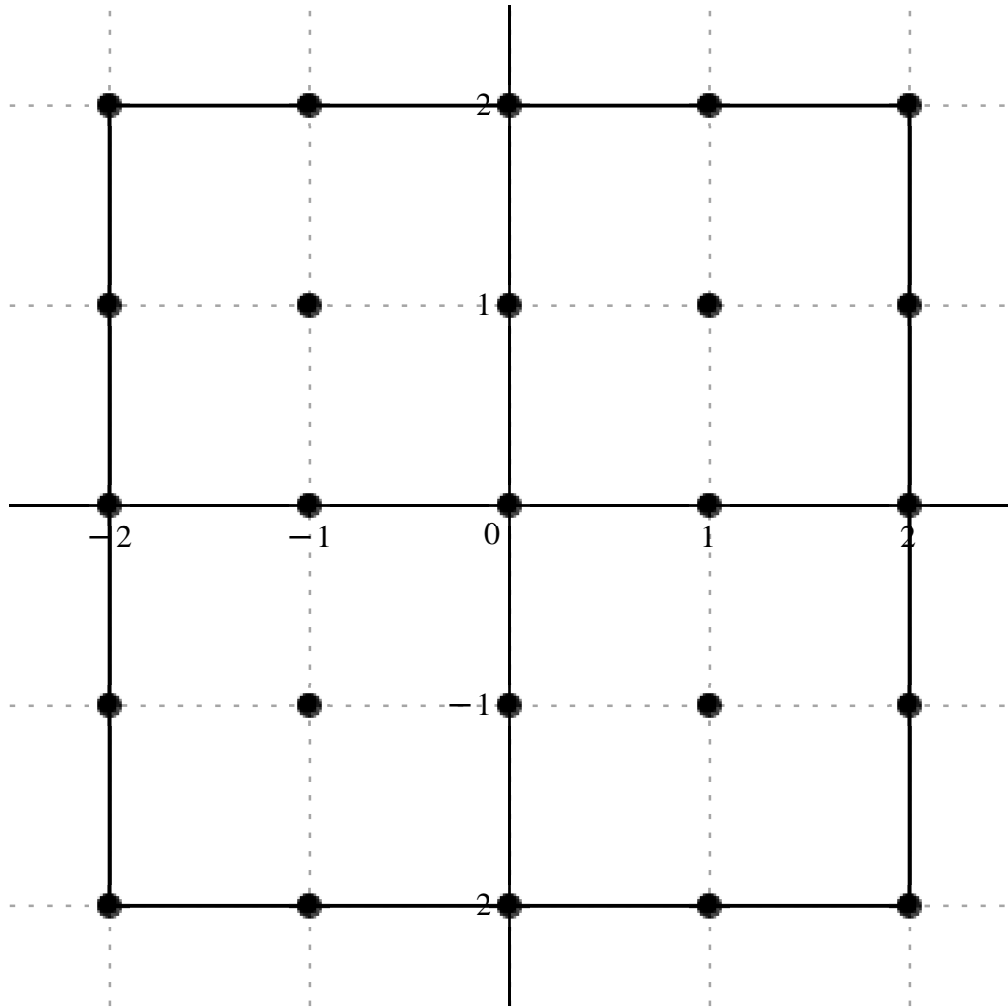
$O( \Delta x_{ol}^{16} )$

Formula:, 238, Var:, 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 10

Error order:, 16, Error:,  $8.0004520115720117042 \times 10^{-46}$ , New Error:,  $8.0004520115827753520 \times 10^{-62}$   
Error order:, 16, Error:,  $8.0004520115827753520 \times 10^{-62}$ , New Error:,  $8.0004520115827764283 \times 10^{-78}$   
Error order:, 16, Error:,  $8.0004520115827764283 \times 10^{-78}$ , New Error:,  $8.0004520115827764284 \times 10^{-94}$   
Error order:, 16, Error:,  $8.0004520115827764284 \times 10^{-94}$ , New Error:,  $8.0004520115827764284 \times 10^{-110}$   
Error order:, 16, Error:,  $8.0004520115827764284 \times 10^{-110}$ , New Error:,  $8.0004520115827764284 \times 10^{-126}$

$$x_o + h \cdot , \left[ \begin{array}{ccccc} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ -2 + \text{ I} & -1 + \text{ I} & \text{ I} & 1 + \text{ I} & 2 + \text{ I} \\ -2 & -1 & 0 & 1 & 2 \\ -2 - \text{ I} & -1 - \text{ I} & -\text{ I} & 1 - \text{ I} & 2 - \text{ I} \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \end{array} \right]$$
$$c = , \left[ \begin{array}{ccccc} \frac{10857 \text{ I}}{13000} & \frac{1617}{125} - \frac{111447 \text{ I}}{1625} & - \frac{491967}{1300} & \frac{1617}{125} + \frac{111447 \text{ I}}{1625} & - \frac{10857 \text{ I}}{13000} \\ - \frac{1617}{125} - \frac{111447 \text{ I}}{1625} & \frac{646422 \text{ I}}{325} & \frac{1583442}{325} & - \frac{646422 \text{ I}}{325} & - \frac{1617}{125} + \frac{111447 \text{ I}}{1625} \\ \frac{491967}{1300} & - \frac{1583442}{325} & 0 & - \frac{1583442}{325} & \frac{491967}{1300} \\ - \frac{1617}{125} + \frac{111447 \text{ I}}{1625} & - \frac{646422 \text{ I}}{325} & \frac{1583442}{325} & \frac{646422 \text{ I}}{325} & - \frac{1617}{125} - \frac{111447 \text{ I}}{1625} \\ - \frac{10857 \text{ I}}{13000} & \frac{1617}{125} + \frac{111447 \text{ I}}{1625} & - \frac{491967}{1300} & \frac{1617}{125} - \frac{111447 \text{ I}}{1625} & \frac{10857 \text{ I}}{13000} \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{13000\,\mathcal{A}x_{ol}^{10}}\left(21\left(517\,\mathrm{I}\,u_{ol-2+2\mathrm{I}}+(8008-42456\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}-234270\,u_{ol+2\mathrm{I}}+(8008+42456\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}-517\,\mathrm{I}\,u_{ol+2+2\mathrm{I}}-(8008+42456\,\mathrm{I})\,u_{ol-2+1}+1231280\,\mathrm{I}\,u_{ol-1+1}+3016080\,u_{ol+1}-1231280\,\mathrm{I}\,u_{ol+1+1}+(-8008+42456\,\mathrm{I})\,u_{ol+2+1}+234270\,u_{ol-2}-3016080\,u_{ol-1}-3016080\,u_{ol+1}+234270\,u_{ol+2}+(-8008\right.\\ \left.+42456\,\mathrm{I})\,u_{ol-2-1}-1231280\,\mathrm{I}\,u_{ol-1-1}+3016080\,u_{ol-1}+1231280\,\mathrm{I}\,u_{ol+1-1}-(8008+42456\,\mathrm{I})\,u_{ol+2-1}-517\,\mathrm{I}\,u_{ol-2-2\mathrm{I}}+(8008+42456\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}-234270\,u_{ol-2\mathrm{I}}+(8008-42456\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}+517\,\mathrm{I}\,u_{ol+2-2\mathrm{I}}\right)\right),\;O(\;\mathcal{A}x_{ol}^{16}\;)$$

Formula: 239, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 11

Error order: 16, Error:  $3.2432272757437776934 \times 10^{-46}$ , New Error:  $3.2432272757475780505 \times 10^{-62}$

Error order: 16, Error:  $3.2432272757475780505 \times 10^{-62}$ , New Error:  $3.2432272757475784305 \times 10^{-78}$

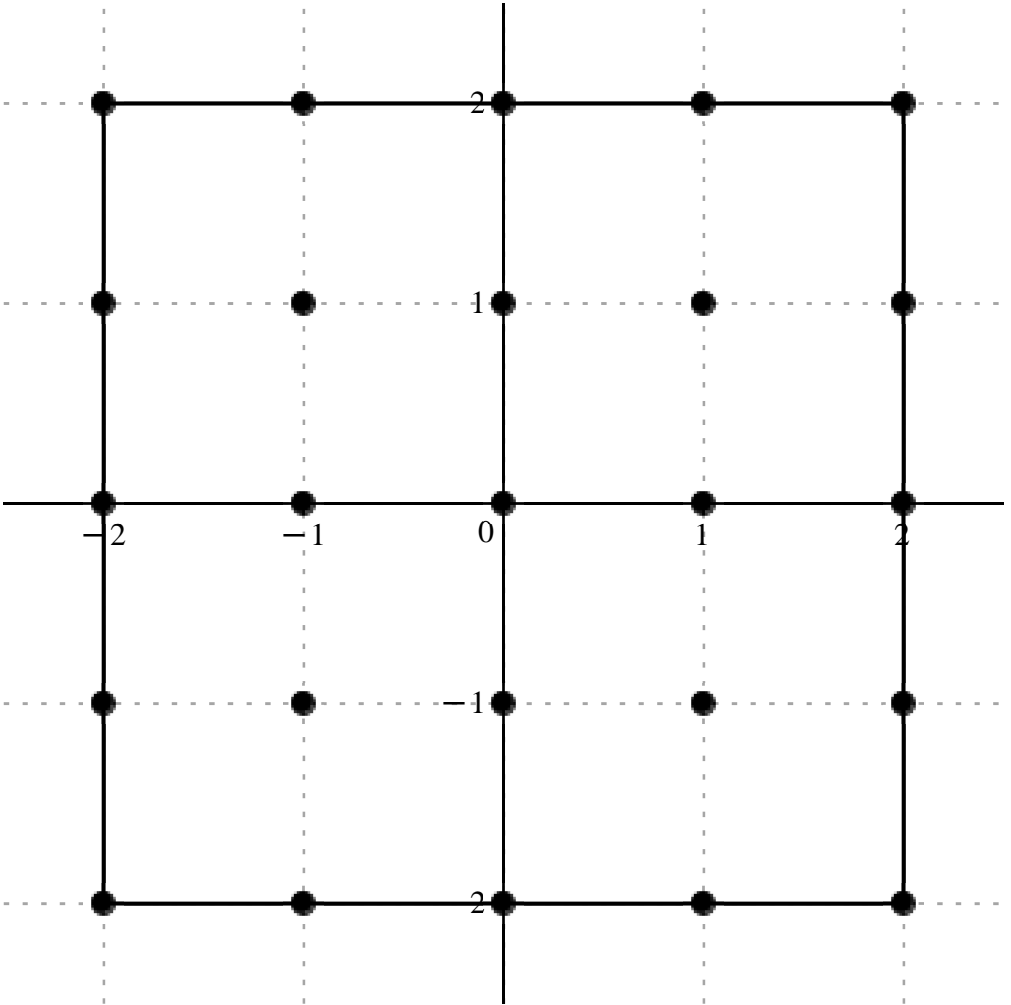
Error order: 16, Error:  $3.2432272757475784305 \times 10^{-78}$ , New Error:  $3.2432272757475784305 \times 10^{-94}$

Error order: 16, Error:  $3.2432272757475784305 \times 10^{-94}$ , New Error:  $3.2432272757475784305 \times 10^{-110}$

Error order: 16, Error:  $3.2432272757475784305 \times 10^{-110}$ , New Error:  $3.2432272757475784305 \times 10^{-126}$

$$x_o+h\;,\;\left[\begin{array}{ccccc}-2+2\,\mathrm{I}&-1+2\,\mathrm{I}&2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}\\-2+\mathrm{I}&-1+\mathrm{I}&\mathrm{I}&1+\mathrm{I}&2+\mathrm{I}\\-2&-1&0&1&2\\-2-\mathrm{I}&-1-\mathrm{I}&-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}\\-2-2\,\mathrm{I}&-1-2\,\mathrm{I}&-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}\end{array}\right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{119427}{52000} - \frac{119427 \text{ I}}{52000} & -\frac{536613}{1625} + \frac{152691 \text{ I}}{1625} & \frac{5411637 \text{ I}}{2600} & \frac{536613}{1625} + \frac{152691 \text{ I}}{1625} & -\frac{119427}{52000} - \frac{119427 \text{ I}}{52000} \\ -\frac{152691}{1625} + \frac{536613 \text{ I}}{1625} & \frac{3555321}{325} - \frac{3555321 \text{ I}}{325} & -\frac{17417862 \text{ I}}{325} & -\frac{3555321}{325} - \frac{3555321 \text{ I}}{325} & \frac{152691}{1625} + \frac{536613 \text{ I}}{1625} \\ -\frac{5411637}{2600} & \frac{17417862}{325} & 0 & -\frac{17417862}{325} & \frac{5411637}{2600} \\ -\frac{152691}{1625} - \frac{536613 \text{ I}}{1625} & \frac{3555321}{325} + \frac{3555321 \text{ I}}{325} & \frac{17417862 \text{ I}}{325} & -\frac{3555321}{325} + \frac{3555321 \text{ I}}{325} & \frac{152691}{1625} - \frac{536613 \text{ I}}{1625} \\ \frac{119427}{52000} + \frac{119427 \text{ I}}{52000} & -\frac{536613}{1625} - \frac{152691 \text{ I}}{1625} & -\frac{5411637 \text{ I}}{2600} & \frac{536613}{1625} - \frac{152691 \text{ I}}{1625} & -\frac{119427}{52000} + \frac{119427 \text{ I}}{52000} \end{array} \right]$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d} x_{o l}^{11}} \; u(x_{o l}) = \frac{1}{52000 \; \Delta x_{o l}^{11}} \Big( 231 \; \big( (517 - 517 \; \text{I}) \; u_{o l - 2 + 21} + ( - 74336 + 21152 \; \text{I}) \; u_{o l - 1 + 21} + 468540 \; \text{I} u_{o l + 21} + (74336 + 21152 \; \text{I}) \; u_{o l + 1 + 21} - (517 + 517 \; \text{I}) \; u_{o l + 2 + 21} + ( - 21152 + 74336 \; \text{I}) \; u_{o l - 2 + 1} + (2462560 - 2462560 \; \text{I}) \; u_{o l - 1 + 1} - 12064320 \; \text{I} u_{o l + 1} - (2462560 + 2462560 \; \text{I}) \; u_{o l + 1 + 1} + (21152 + 74336 \; \text{I}) \; u_{o l + 2 + 1} - 468540 \; u_{o l - 2} \\ + 12064320 \; u_{o l - 1} - 12064320 \; u_{o l + 1} + 468540 \; u_{o l + 2} - (21152 + 74336 \; \text{I}) \; u_{o l - 2 - 1} + (2462560 + 2462560 \; \text{I}) \; u_{o l - 1 - 1} + 12064320 \; \text{I} u_{o l - 1} + ( - 2462560 + 2462560 \; \text{I}) \; u_{o l + 1 - 1} + (21152 - 74336 \; \text{I}) \; u_{o l + 2 - 1} + (517 + 517 \; \text{I}) \; u_{o l - 2 - 21} - (74336 + 21152 \; \text{I}) \; u_{o l - 1 - 21} - 468540 \; \text{I} u_{o l - 21} + (74336 - 21152 \; \text{I}) \; u_{o l + 1 - 21} + ( - 517 \\ + 517 \; \text{I}) \; u_{o l + 2 - 21} \big) \Big) , \; O( \; \Delta x_{o l}^{16} \; )$$

Formula.: 240, Var.: 1

Variavel :, x\_{o l}^{,} Derivada de Ordem :, 12

Error order.: 16, Error.: 1.3830393499975491623 × 10−46, New Error.: 1.3830393499989672060 × 10−62

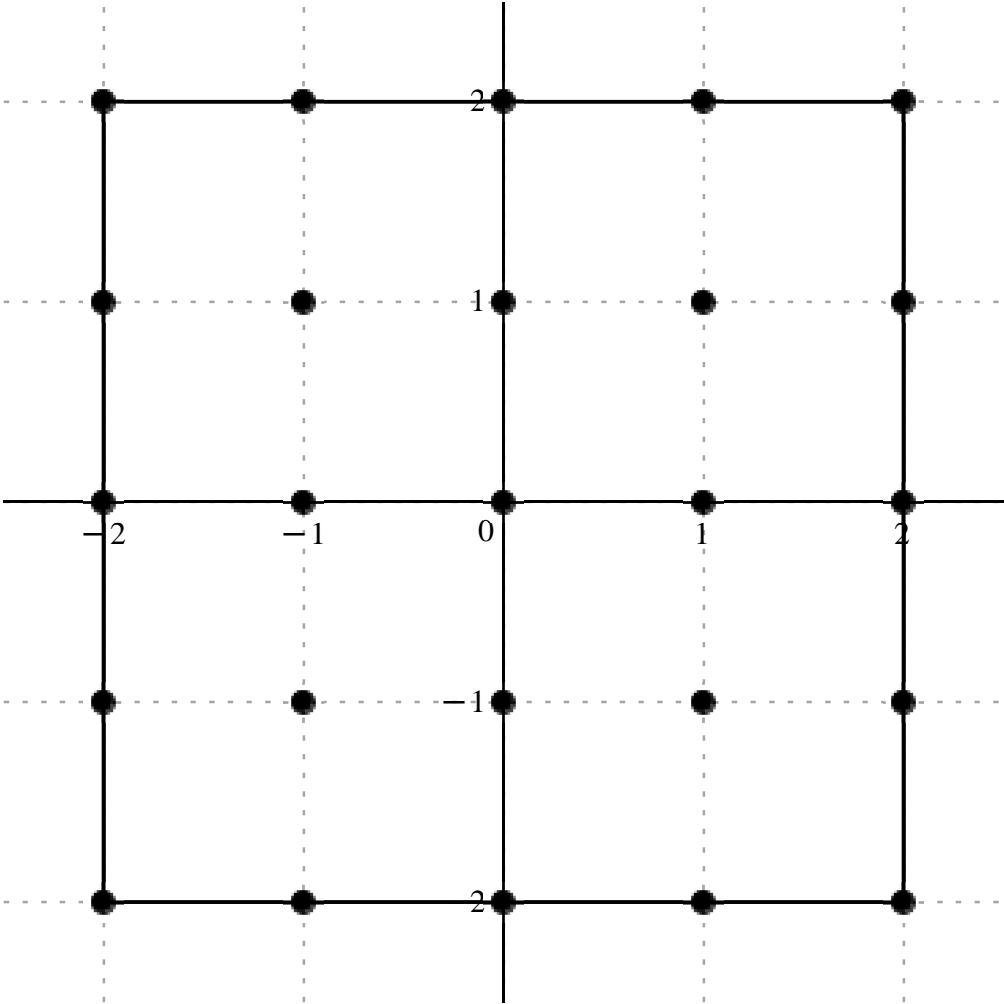
Error order.: 16, Error.: 1.3830393499989672060 × 10−62, New Error.: 1.3830393499989673478 × 10−78

Error order.: 16, Error.: 1.3830393499989673478 × 10−78, New Error.: 1.3830393499989673478 × 10−94

Error order.: 16, Error.: 1.3830393499989673478 × 10−94, New Error.: 1.3830393499989673478 × 10−110

$$x_o \neq h., \begin{bmatrix} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} \end{bmatrix}$$

$$c = , \begin{bmatrix} -\frac{358281}{26000} & \frac{2020788}{1625} + \frac{2209284\,\mathrm{I}}{1625} & \frac{16234911}{1300} & \frac{2020788}{1625} - \frac{2209284\,\mathrm{I}}{1625} & -\frac{358281}{26000} \\ \frac{2020788}{1625} - \frac{2209284\,\mathrm{I}}{1625} & -\frac{42663852}{325} & -\frac{209014344}{325} & -\frac{42663852}{325} & \frac{2020788}{1625} + \frac{2209284\,\mathrm{I}}{1625} \\ \frac{16234911}{1300} & -\frac{209014344}{325} & \frac{60754617}{20} & -\frac{209014344}{325} & \frac{16234911}{1300} \\ \frac{2020788}{1625} + \frac{2209284\,\mathrm{I}}{1625} & -\frac{42663852}{325} & -\frac{209014344}{325} & -\frac{42663852}{325} & \frac{2020788}{1625} - \frac{2209284\,\mathrm{I}}{1625} \\ -\frac{358281}{26000} & \frac{2020788}{1625} - \frac{2209284\,\mathrm{I}}{1625} & \frac{16234911}{1300} & \frac{2020788}{1625} + \frac{2209284\,\mathrm{I}}{1625} & -\frac{358281}{26000} \end{bmatrix}$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\, u(x_{ol}) = \frac{1}{26000\,\Delta x_{ol}^{12}}\, \big( 693\, \big( -517\, u_{ol-2+2\,\mathrm{I}} + (46656+51008\,\mathrm{I})\, u_{ol-1+2\,\mathrm{I}} + 468540\, u_{ol+2\,\mathrm{I}} + (46656-51008\,\mathrm{I})\, u_{ol+1+2\,\mathrm{I}} - 517\, u_{ol+2+2\,\mathrm{I}} + (46656-51008\,\mathrm{I})\, u_{ol-2+1} - 4925120\, u_{ol-1+1} - 24128640\, u_{ol+1} - 4925120\, u_{ol+1+1} + (46656+51008\,\mathrm{I})\, u_{ol+2+1} + 468540\, u_{ol-2} - 24128640\, u_{ol-1} + 113969700\, u_{ol} - 24128640\, u_{ol+1} \\ + 468540\, u_{ol+2} + (46656+51008\,\mathrm{I})\, u_{ol-2-1} - 4925120\, u_{ol-1-1} - 24128640\, u_{ol-1} - 4925120\, u_{ol+1-1} + (46656-51008\,\mathrm{I})\, u_{ol+2-1} - 517\, u_{ol-2-2\,\mathrm{I}} + (46656-51008\,\mathrm{I})\, u_{ol-1-2\,\mathrm{I}} + 468540\, u_{ol-2\,\mathrm{I}} + (46656+51008\,\mathrm{I})\, u_{ol+1-2\,\mathrm{I}} - 517\, u_{ol+2-2\,\mathrm{I}} \big) \big), \, O(\,\Delta x_{ol}^{16}\,)$$

Error order:, 12, Error:,  $6.6956573069265380797 \times 10^{-35}$ , New Error:,  $6.6956573069436630668 \times 10^{-47}$

Error order:, 12, Error:,  $6.6956573069436630668 \times 10^{-47}$ , New Error:,  $6.6956573069436647793 \times 10^{-59}$

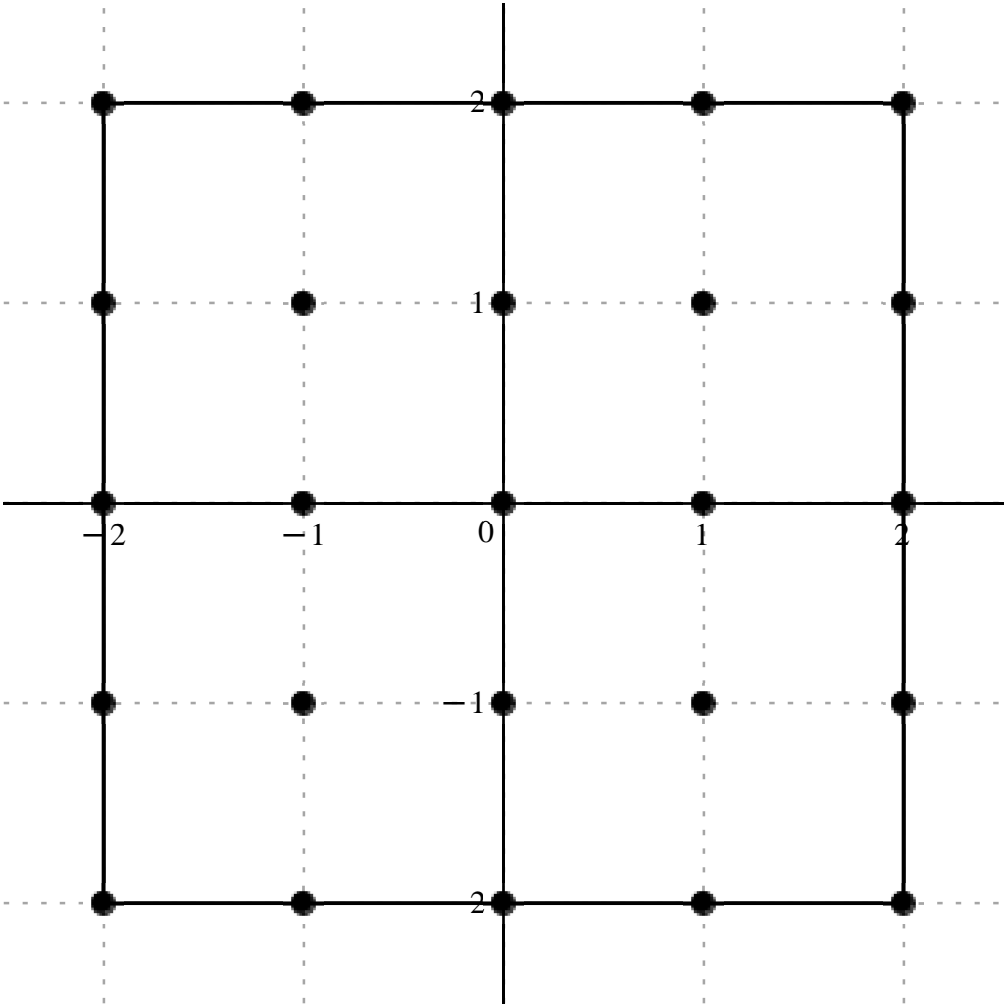
Error order:, 12, Error:,  $6.6956573069436647793 \times 10^{-59}$ , New Error:,  $6.6956573069436647794 \times 10^{-71}$

Error order:, 12, Error:,  $6.6956573069436647794 \times 10^{-71}$ , New Error:,  $6.6956573069436647794 \times 10^{-83}$

Error order:, 12, Error:,  $6.6956573069436647794 \times 10^{-83}$ , New Error:,  $6.6956573069436647794 \times 10^{-95}$

$$x_o + h . , \left[ \begin{array}{ccccc} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ -2 + \text{ I} & -1 + \text{ I} & \text{ I} & 1 + \text{ I} & 2 + \text{ I} \\ -2 & -1 & 0 & 1 & 2 \\ -2 - \text{ I} & -1 - \text{ I} & -\text{ I} & 1 - \text{ I} & 2 - \text{ I} \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} \frac{15939}{125} + \frac{15939 \text{ I}}{125} & -\frac{182259}{125} - \frac{1911987 \text{ I}}{125} & -\frac{1284822 \text{ I}}{25} & \frac{182259}{125} - \frac{1911987 \text{ I}}{125} & -\frac{15939}{125} + \frac{15939 \text{ I}}{125} \\ -\frac{1911987}{125} - \frac{182259 \text{ I}}{125} & -\frac{1169784}{25} - \frac{1169784 \text{ I}}{25} & \frac{6498954 \text{ I}}{25} & \frac{1169784}{25} - \frac{1169784 \text{ I}}{25} & \frac{1911987}{125} - \frac{182259 \text{ I}}{125} \\ -\frac{1284822}{25} & \frac{6498954}{25} & 0 & -\frac{6498954}{25} & \frac{1284822}{25} \\ -\frac{1911987}{125} + \frac{182259 \text{ I}}{125} & -\frac{1169784}{25} + \frac{1169784 \text{ I}}{25} & -\frac{6498954 \text{ I}}{25} & \frac{1169784}{25} + \frac{1169784 \text{ I}}{25} & \frac{1911987}{125} + \frac{182259 \text{ I}}{125} \\ \frac{15939}{125} - \frac{15939 \text{ I}}{125} & -\frac{182259}{125} + \frac{1911987 \text{ I}}{125} & \frac{1284822 \text{ I}}{25} & \frac{182259}{125} + \frac{1911987 \text{ I}}{125} & -\frac{15939}{125} - \frac{15939 \text{ I}}{125} \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}} \; u(x_{ol}) = \frac{1}{125 \; \Delta x_{ol}^{13}} \big( 693 \; \big( (23 + 23 \; \text{I}) \; u_{ol - 2 + 2 \text{I}} - (263 + 2759 \; \text{I}) \; u_{ol - 1 + 2 \text{I}} - 9270 \; \text{I} u_{ol + 2 \text{I}} + (263 - 2759 \; \text{I}) \; u_{ol + 1 + 2 \text{I}} + (-23 + 23 \; \text{I}) \; u_{ol + 2 + 2 \text{I}} - (2759 + 263 \; \text{I}) \; u_{ol - 2 + 1} - (8440 + 8440 \; \text{I}) \; u_{ol - 1 + 1} + 46890 \; \text{I} u_{ol + 1} + (8440 - 8440 \; \text{I}) \; u_{ol + 1 + 1} + (2759 - 263 \; \text{I}) \; u_{ol + 2 + 1} - 9270 \; u_{ol - 2} + 46890 \; u_{ol - 1} - 46890 \; u_{ol + 1} + 9270 \; u_{ol + 2} + (-2759$$

$$+ 263 \; \text{I}) \; u_{ol - 2 - 1} + (-8440 + 8440 \; \text{I}) \; u_{ol - 1 - 1} - 46890 \; \text{I} u_{ol - 1} + (8440 + 8440 \; \text{I}) \; u_{ol + 1 - 1} + (2759 + 263 \; \text{I}) \; u_{ol + 2 - 1} + (23 - 23 \; \text{I}) \; u_{ol - 2 - 2 \text{I}} + (-263 + 2759 \; \text{I}) \; u_{ol - 1 - 2 \text{I}} + 9270 \; \text{I} u_{ol - 2 \text{I}} + (263 + 2759 \; \text{I}) \; u_{ol + 1 - 2 \text{I}} - (23 + 23 \; \text{I}) \; u_{ol + 2 - 2 \text{I}} \big) \big), \; O( \; \Delta x_{ol}^{12} \; )$$

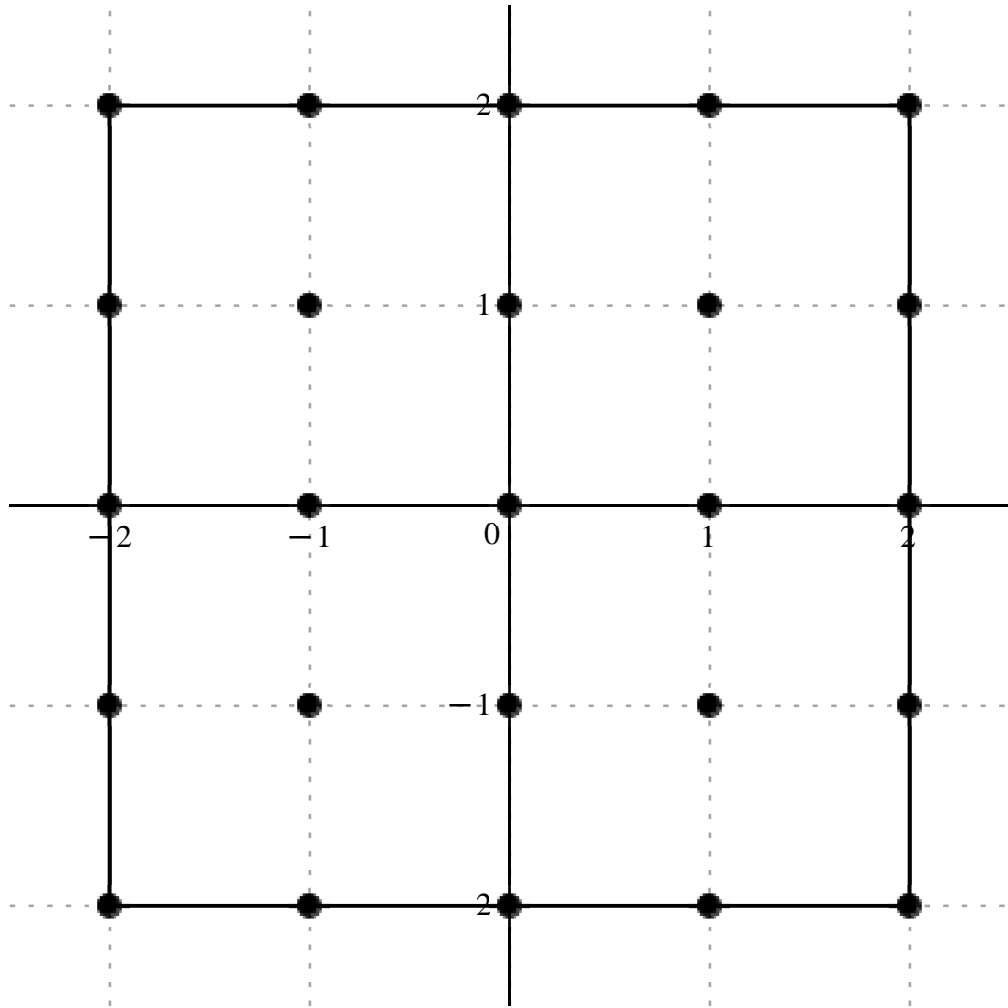


Formula.: 242, Var.: 1

Variavel .:,  $x_{oi}$ , Derivada de Ordem .:, 14

Error order.: 12, Error.:  $3.5874168502488902776 \times 10^{-35}$ , New Error.:  $3.5874168502568421788 \times 10^{-47}$   
Error order.: 12, Error.:  $3.5874168502568421788 \times 10^{-47}$ , New Error.:  $3.5874168502568429740 \times 10^{-59}$   
Error order.: 12, Error.:  $3.5874168502568429740 \times 10^{-59}$ , New Error.:  $3.5874168502568429741 \times 10^{-71}$   
Error order.: 12, Error.:  $3.5874168502568429741 \times 10^{-71}$ , New Error.:  $3.5874168502568429741 \times 10^{-83}$   
Error order.: 12, Error.:  $3.5874168502568429741 \times 10^{-83}$ , New Error.:  $3.5874168502568429741 \times 10^{-95}$

$$c =, \begin{bmatrix} x_o + h., \begin{bmatrix} -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \end{bmatrix} \\ -\frac{111573 \text{ I}}{125} & -\frac{10196802}{125} + \frac{6374214 \text{ I}}{125} & -\frac{8993754}{25} & -\frac{10196802}{125} - \frac{6374214 \text{ I}}{125} & \frac{111573 \text{ I}}{125} \\ \frac{10196802}{125} + \frac{6374214 \text{ I}}{125} & \frac{16376976 \text{ I}}{25} & \frac{90985356}{25} & -\frac{16376976 \text{ I}}{25} & \frac{10196802}{125} - \frac{6374214 \text{ I}}{125} \\ \frac{8993754}{25} & -\frac{90985356}{25} & 0 & -\frac{90985356}{25} & \frac{8993754}{25} \\ \frac{10196802}{125} - \frac{6374214 \text{ I}}{125} & -\frac{16376976 \text{ I}}{25} & \frac{90985356}{25} & \frac{16376976 \text{ I}}{25} & \frac{10196802}{125} + \frac{6374214 \text{ I}}{125} \\ \frac{111573 \text{ I}}{125} & -\frac{10196802}{125} - \frac{6374214 \text{ I}}{125} & -\frac{8993754}{25} & -\frac{10196802}{125} + \frac{6374214 \text{ I}}{125} & -\frac{111573 \text{ I}}{125} \end{bmatrix}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}}\; u(x_{ol}) = \frac{1}{125\; \Delta x_{ol}^{14}}\; \big( 4851\; \big( -23\; \mathrm{I}\, u_{ol-2+2\mathrm{I}} + ( -2102 + 1314\; \mathrm{I})\; u_{ol-1+2\mathrm{I}} - 9270\; u_{ol+2\mathrm{I}} - (2102 + 1314\; \mathrm{I})\; u_{ol+1+2\mathrm{I}} + 23\; \mathrm{I}\, u_{ol+2+2\mathrm{I}} + (2102 + 1314\; \mathrm{I})\; u_{ol-2+1} + 16880\; \mathrm{I}\, u_{ol-1+1} + 93780\; u_{ol+1} - 16880\; \mathrm{I}\, u_{ol+1+1} + (2102 - 1314\; \mathrm{I})\; u_{ol+2+1} + 9270\; u_{ol-2} - 93780\; u_{ol-1} - 93780\; u_{ol+1} + 9270\; u_{ol+2} + (2102 - 1314\; \mathrm{I})\; u_{ol-2-1} - 16880\; \mathrm{I}\, u_{ol-1-1} + 93780\; u_{ol-1} + 16880\; \mathrm{I}\, u_{ol+1-1} + (2102 + 1314\; \mathrm{I})\; u_{ol+2-1} + 23\; \mathrm{I}\, u_{ol-2-2\mathrm{I}} - (2102 + 1314\; \mathrm{I})\; u_{ol-1-2\mathrm{I}} - 9270\; u_{ol-2\mathrm{I}} + ( -2102 + 1314\; \mathrm{I})\; u_{ol+1-2\mathrm{I}} - 23\; \mathrm{I}\, u_{ol+2-2\mathrm{I}} \big) \big),\; O(\; \Delta x_{ol}^{12}\; )$$

Formula:, 243, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 15

Error order:, 12, Error:, 1.9830938917909985804 × 10<sup>-35</sup>, New Error:, 1.9830938917948271318 × 10<sup>-47</sup>

Error order:, 12, Error:, 1.9830938917948271318 × 10<sup>-47</sup>, New Error:, 1.9830938917948275146 × 10<sup>-59</sup>

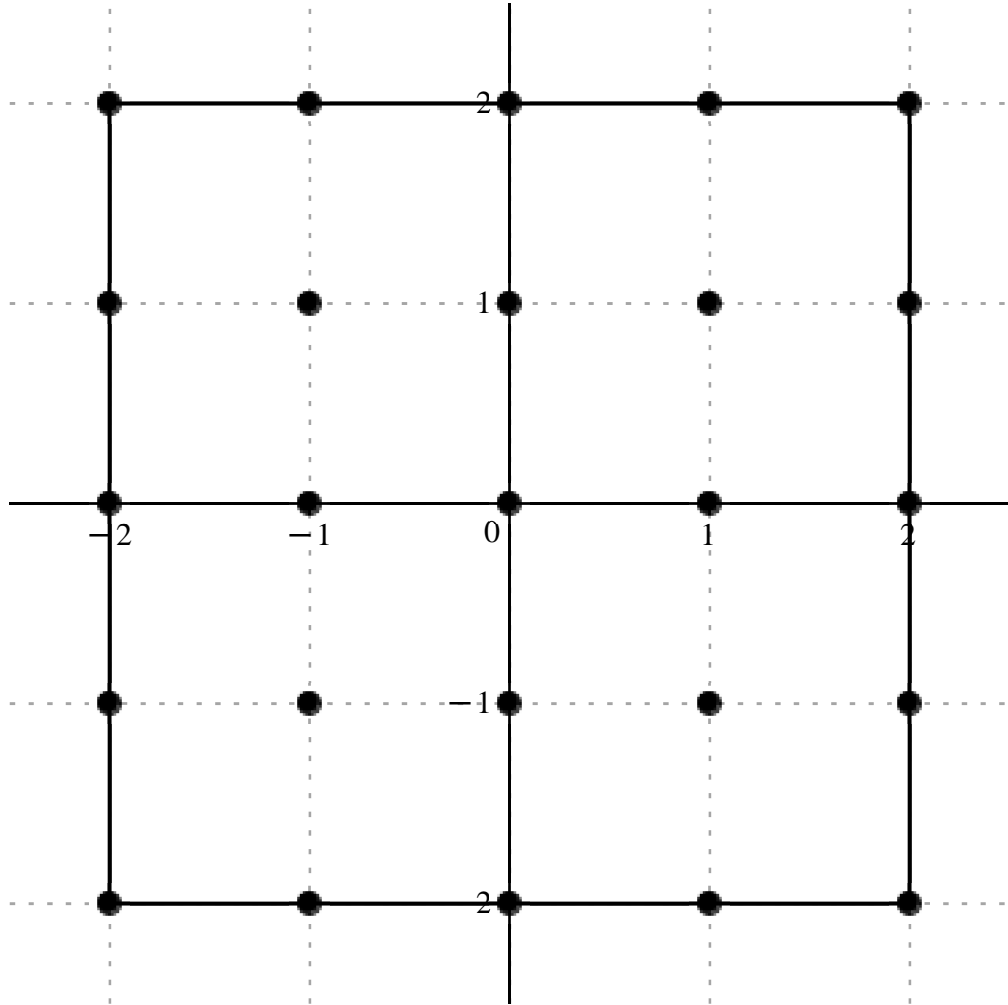
Error order:, 12, Error:, 1.9830938917948275146 × 10<sup>-59</sup>, New Error:, 1.9830938917948275147 × 10<sup>-71</sup>

Error order:, 12, Error:, 1.9830938917948275147 × 10<sup>-71</sup>, New Error:, 1.9830938917948275147 × 10<sup>-83</sup>

Error order:, 12, Error:, 1.9830938917948275147 × 10<sup>-83</sup>, New Error:, 1.9830938917948275147 × 10<sup>-95</sup>

$$x_o\; + h\; ,\; \left[ \begin{array}{ccccc} -2+2\; \mathrm{I} & -1+2\; \mathrm{I} & 2\; \mathrm{I} & 1+2\; \mathrm{I} & 2+2\; \mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2-2\; \mathrm{I} & -1-2\; \mathrm{I} & -2\; \mathrm{I} & 1-2\; \mathrm{I} & 2-2\; \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} -\frac{334719}{100} + \frac{334719 \text{ I}}{100} & \frac{13767138}{25} + \frac{8411634 \text{ I}}{25} & \frac{13490631 \text{ I}}{5} & -\frac{13767138}{25} + \frac{8411634 \text{ I}}{25} & \frac{334719}{100} + \frac{334719 \text{ I}}{100} \\ -\frac{8411634}{25} - \frac{13767138 \text{ I}}{25} & \frac{24565464}{5} - \frac{24565464 \text{ I}}{5} & -\frac{272956068 \text{ I}}{5} & -\frac{24565464}{5} - \frac{24565464 \text{ I}}{5} & \frac{8411634}{25} - \frac{13767138 \text{ I}}{25} \\ -\frac{13490631}{5} & \frac{272956068}{5} & 0 & -\frac{272956068}{5} & \frac{13490631}{5} \\ -\frac{8411634}{25} + \frac{13767138 \text{ I}}{25} & \frac{24565464}{5} + \frac{24565464 \text{ I}}{5} & \frac{272956068 \text{ I}}{5} & -\frac{24565464}{5} + \frac{24565464 \text{ I}}{5} & \frac{8411634}{25} + \frac{13767138 \text{ I}}{25} \\ -\frac{334719}{100} - \frac{334719 \text{ I}}{100} & \frac{13767138}{25} - \frac{8411634 \text{ I}}{25} & -\frac{13490631 \text{ I}}{5} & -\frac{13767138}{25} - \frac{8411634 \text{ I}}{25} & \frac{334719}{100} - \frac{334719 \text{ I}}{100} \end{array} \right]$$



$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}}\; u(x_{ol}) = \frac{1}{100 \; \Delta x_{ol}^{15}} \big( 14553 \; \big( (-23 + 23 \; \text{I}) \; u_{ol-2+2\text{I}} + (3784 + 2312 \; \text{I}) \; u_{ol-1+2\text{I}} + 18540 \; \text{I} u_{ol+2\text{I}} + (-3784 + 2312 \; \text{I}) \; u_{ol+1+2\text{I}} + (23 + 23 \; \text{I}) \; u_{ol+2+2\text{I}} - (2312 + 3784 \; \text{I}) \; u_{ol-2+1} + (33760 - 33760 \; \text{I}) \; u_{ol-1+1} - 375120 \; \text{I} u_{ol+1} - (33760 + 33760 \; \text{I}) \; u_{ol+1+1} + (2312 - 3784 \; \text{I}) \; u_{ol+2+1} - 18540 \; u_{ol-2} + 375120 \; u_{ol-1} - 375120 \; u_{ol+1} \\ + 18540 \; u_{ol+2} + (-2312 + 3784 \; \text{I}) \; u_{ol-2-1} + (33760 + 33760 \; \text{I}) \; u_{ol-1-1} + 375120 \; \text{I} u_{ol-1} + (-33760 + 33760 \; \text{I}) \; u_{ol+1-1} + (2312 + 3784 \; \text{I}) \; u_{ol+2-1} - (23 + 23 \; \text{I}) \; u_{ol-2-2\text{I}} + (3784 - 2312 \; \text{I}) \; u_{ol-1-2\text{I}} - 18540 \; \text{I} u_{ol-2\text{I}} - (3784 + 2312 \; \text{I}) \; u_{ol+1-2\text{I}} + (23 - 23 \; \text{I}) \; u_{ol+2-2\text{I}} \big) \big) , \; O( \; \Delta x_{ol}^{12} \; )$$

Formula: 244, Var.: 1

Variavel : x<sub>ol</sub>, Derivada de Ordem : 16

Error order: 12, Error: 1.1275587160150545542 × 10<sup>−35</sup>, New Error: 1.1275587160169593061 × 10<sup>−47</sup>

Error order: 12, Error: 1.1275587160169593061 × 10<sup>−47</sup>, New Error: 1.1275587160169594966 × 10<sup>−59</sup>

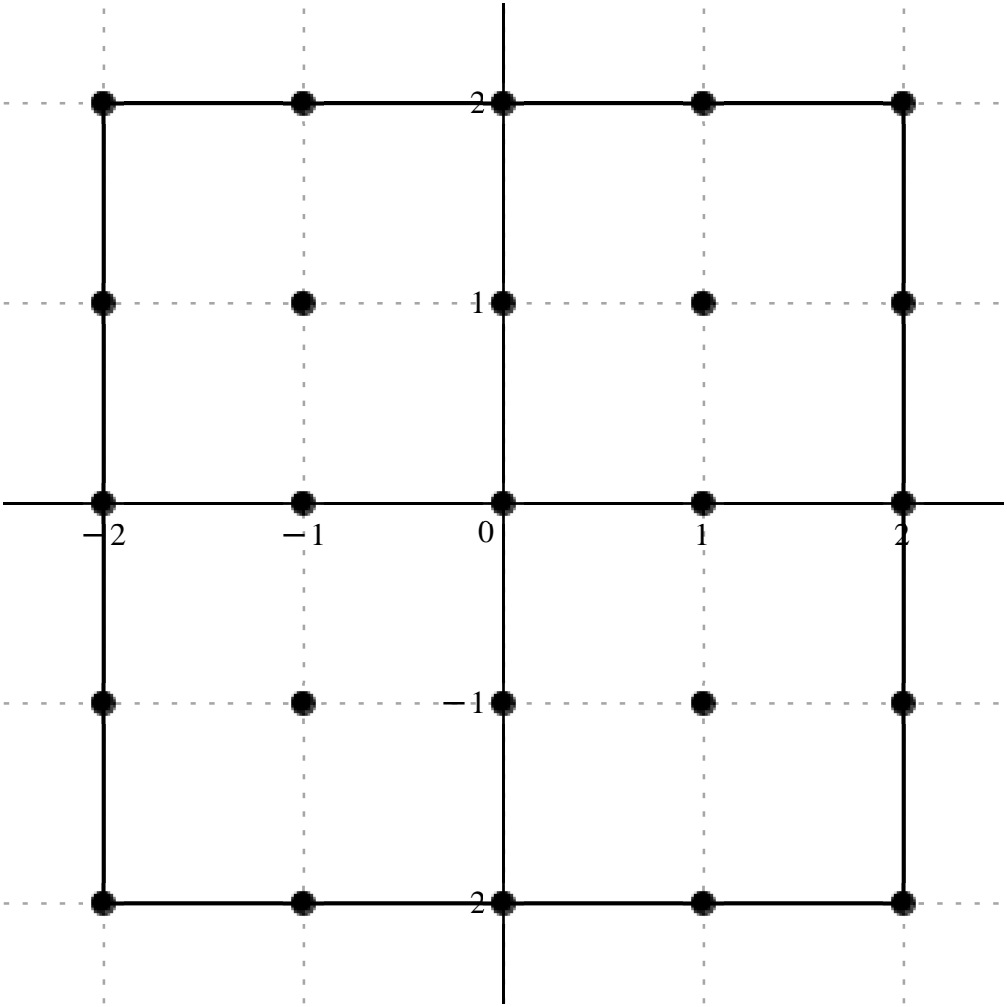
Error order: 12, Error: 1.1275587160169594966 × 10<sup>−59</sup>, New Error: 1.1275587160169594966 × 10<sup>−71</sup>

Error order: 12, Error: 1.1275587160169594966 × 10<sup>−71</sup>, New Error: 1.1275587160169594966 × 10<sup>−83</sup>

Error order: 12, Error: 1.1275587160169594966 × 10<sup>−83</sup>, New Error: 1.1275587160169594966 × 10<sup>−95</sup>

$$x_o+h.,\begin{bmatrix}-2+2\,\mathrm{I}&-1+2\,\mathrm{I}&2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}\\-2+\mathrm{I}&-1+\mathrm{I}&\mathrm{I}&1+\mathrm{I}&2+\mathrm{I}\\-2&-1&0&1&2\\-2-\mathrm{I}&-1-\mathrm{I}&-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}\\-2-2\,\mathrm{I}&-1-2\,\mathrm{I}&-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}\end{bmatrix}$$

$$c=,\begin{bmatrix}\frac{669438}{25}&\frac{9779616}{25}-\frac{115026912\,\mathrm{I}}{25}&\frac{107925048}{5}&\frac{9779616}{25}+\frac{115026912\,\mathrm{I}}{25}&\frac{669438}{25}\\\frac{\frac{9779616}{25}+\frac{115026912\,\mathrm{I}}{25}}{5}&-\frac{393047424}{5}&-\frac{4367297088}{5}&-\frac{393047424}{5}&\frac{\frac{9779616}{25}-\frac{115026912\,\mathrm{I}}{25}}{5}\\\frac{107925048}{5}&-\frac{4367297088}{5}&3718698984&-\frac{4367297088}{5}&\frac{107925048}{5}\\\frac{\frac{9779616}{25}-\frac{115026912\,\mathrm{I}}{25}}{5}&-\frac{393047424}{5}&-\frac{4367297088}{5}&-\frac{393047424}{5}&\frac{\frac{9779616}{25}+\frac{115026912\,\mathrm{I}}{25}}{5}\\\frac{669438}{25}&\frac{9779616}{25}+\frac{115026912\,\mathrm{I}}{25}&\frac{107925048}{5}&\frac{9779616}{25}-\frac{115026912\,\mathrm{I}}{25}&\frac{669438}{25}\end{bmatrix}$$



$$\frac{\mathrm{d}16}{\mathrm{d}x_{ol}^{16}}\,u(x_{ol})=\frac{1}{25\,\Delta x_{ol}^{16}}\big(29106\,(23\,u_{ol-2+21}+(336-3952\,\mathrm{I})\,u_{ol-1+21}+18540\,u_{ol+21}+(336+3952\,\mathrm{I})\,u_{ol+1+21}+23\,u_{ol+2+21}+(336+3952\,\mathrm{I})\,u_{ol-2+1}-67520\,u_{ol-1+1}-750240\,u_{ol+1}-67520\,u_{ol+1+1}+(336-3952\,\mathrm{I})\,u_{ol+2+1}+18540\,u_{ol-2}-750240\,u_{ol-1}+3194100\,u_{ol}-750240\,u_{ol+1}+18540\,u_{ol+2}+(336-3952\,\mathrm{I})\,u_{ol-2-1}-67520\,u_{ol-1-1}-750240\,u_{ol-1}-67520\,u_{ol+1-1}+(336+3952\,\mathrm{I})\,u_{ol+2-1}+23\,u_{ol-2-21}+(336+3952\,\mathrm{I})\,u_{ol-1-21}+18540\,u_{ol-21}+(336-3952\,\mathrm{I})\,u_{ol+1-21}+23\,u_{ol+2-21})\big),\,O(\,\Delta x_{ol}^{12}\,)\,$$

$$\text{Variavel } :, x_{ol}, \text{ Derivada de Ordem } :, 17$$

$$\text{Error order:}, 8, \text{ Error:}, 7.3209894260562256287 \times 10^{-24}, \text{ New Error:}, 7.3209894260616292404 \times 10^{-32}$$

$$\text{Error order:}, 8, \text{ Error:}, 7.3209894260616292404 \times 10^{-32}, \text{ New Error:}, 7.3209894260616297808 \times 10^{-40}$$

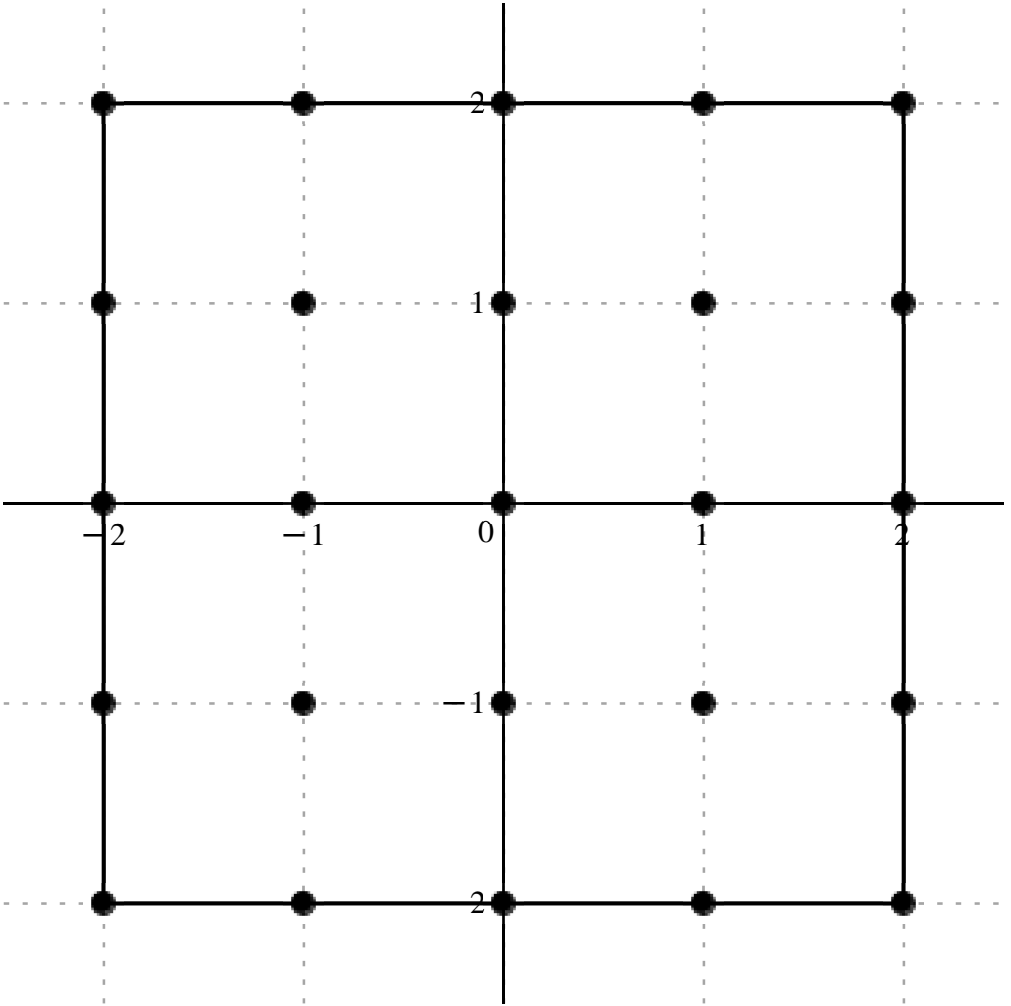
$$\text{Error order:}, 8, \text{ Error:}, 7.3209894260616297808 \times 10^{-40}, \text{ New Error:}, 7.3209894260616297808 \times 10^{-48}$$

$$\text{Error order:}, 8, \text{ Error:}, 7.3209894260616297808 \times 10^{-48}, \text{ New Error:}, 7.3209894260616297808 \times 10^{-56}$$

$$\text{Error order:}, 8, \text{ Error:}, 7.3209894260616297808 \times 10^{-56}, \text{ New Error:}, 7.3209894260616297808 \times 10^{-64}$$

$$x_o+h., \begin{bmatrix} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} \end{bmatrix}$$

$$c=, \begin{bmatrix} \frac{465696}{25}+\frac{465696\,\mathrm{I}}{25} & -\frac{1027325376}{25}+\frac{112698432\,\mathrm{I}}{25} & -\frac{678984768}{5} & \frac{1027325376}{25}+\frac{112698432\,\mathrm{I}}{25} & -\frac{465696}{25}+\frac{465696\,\mathrm{I}}{25} \\ \frac{112698432}{25}-\frac{1027325376\,\mathrm{I}}{25} & -\frac{3863414016}{5}-\frac{3863414016\,\mathrm{I}}{5} & \frac{9405196416\,\mathrm{I}}{5} & \frac{3863414016}{5}-\frac{3863414016\,\mathrm{I}}{5} & -\frac{112698432}{25}-\frac{1027325376\,\mathrm{I}}{25} \\ -\frac{678984768}{5} & \frac{9405196416}{5} & 0 & -\frac{9405196416}{5} & \frac{678984768}{5} \\ \frac{112698432}{25}+\frac{1027325376\,\mathrm{I}}{25} & -\frac{3863414016}{5}+\frac{3863414016\,\mathrm{I}}{5} & -\frac{9405196416\,\mathrm{I}}{5} & \frac{3863414016}{5}+\frac{3863414016\,\mathrm{I}}{5} & -\frac{112698432}{25}+\frac{1027325376\,\mathrm{I}}{25} \\ \frac{465696}{25}-\frac{465696\,\mathrm{I}}{25} & -\frac{1027325376}{25}-\frac{112698432\,\mathrm{I}}{25} & \frac{678984768\,\mathrm{I}}{5} & \frac{1027325376}{25}-\frac{112698432\,\mathrm{I}}{25} & -\frac{465696}{25}-\frac{465696\,\mathrm{I}}{25} \end{bmatrix}$$



$$\frac{\mathrm{d}17}{\mathrm{d}x_{ol}^{17}}\;u(x_{ol})=\frac{1}{25\,\Delta x_{ol}^{17}}\Big(465696\left((1+\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(-2206+242\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}-7290\,\mathrm{I}u_{ol+2\mathrm{I}}+(2206+242\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+(-1+\mathrm{I})\,u_{ol+2+2\mathrm{I}}+(242-2206\,\mathrm{I})\,u_{ol-2+\mathrm{I}}-(41480+41480\,\mathrm{I})\,u_{ol-1+\mathrm{I}}+100980\,\mathrm{I}u_{ol+\mathrm{I}}+(41480-41480\,\mathrm{I})\,u_{ol+1+\mathrm{I}}-(242+2206\,\mathrm{I})\,u_{ol+2+\mathrm{I}}-7290\,u_{ol-2}+100980\,u_{ol-1}-100980\,u_{ol+1}+7290\,u_{ol+2}\right.\\ \left.+(242+2206\,\mathrm{I})\,u_{ol-2-\mathrm{I}}+(-41480+41480\,\mathrm{I})\,u_{ol-1-\mathrm{I}}-100980\,\mathrm{I}u_{ol-\mathrm{I}}+(41480+41480\,\mathrm{I})\,u_{ol+1-\mathrm{I}}+(-242+2206\,\mathrm{I})\,u_{ol+2-\mathrm{I}}+(1-\mathrm{I})\,u_{ol-2-2\mathrm{I}}-(2206+242\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}+7290\,\mathrm{I}u_{ol-2\mathrm{I}}+(2206-242\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}-(1+\mathrm{I})\,u_{ol+2-2\mathrm{I}}\right)\Big). \;O(\;\Delta x_{ol}^8\;)$$

Formula:, 246, Var:, 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 18

Error order:, 8, Error:,  $5.0431614875248768191 \times 10^{-24}$ , New Error:,  $5.0431614875281028559 \times 10^{-32}$

Error order:, 8, Error:,  $5.0431614875281028559 \times 10^{-32}$ , New Error:,  $5.0431614875281031785 \times 10^{-40}$

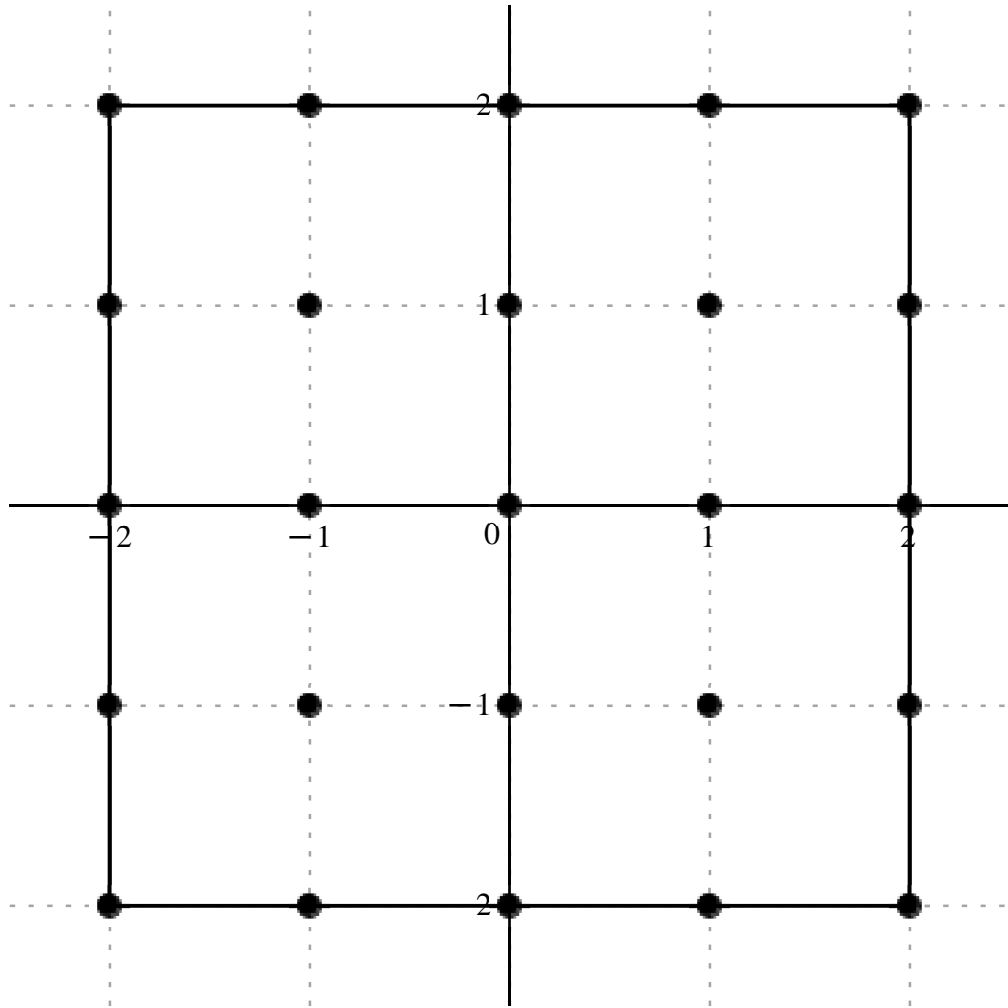
Error order:, 8, Error:,  $5.0431614875281031785 \times 10^{-40}$ , New Error:,  $5.0431614875281031785 \times 10^{-48}$

Error order:, 8, Error:,  $5.0431614875281031785 \times 10^{-48}$ , New Error:,  $5.0431614875281031785 \times 10^{-56}$

Error order:, 8, Error:,  $5.0431614875281031785 \times 10^{-56}$ , New Error:,  $5.0431614875281031785 \times 10^{-64}$

$$x_o+h., \left[ \begin{array}{ccccc} -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\text{ I} & -1-\text{ I} & -\text{ I} & 1-\text{ I} & 2-\text{ I} \\ -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \end{array} \right]$$

$$c=,\left[ \begin{array}{ccccc} -\frac{4191264\text{ I}}{25} & \frac{4509800064}{25}+\frac{6991028352\text{ I}}{25} & -\frac{6110862912}{5} & \frac{4509800064}{25}-\frac{6991028352\text{ I}}{25} & \frac{4191264\text{ I}}{25} \\ -\frac{4509800064}{25}+\frac{6991028352\text{ I}}{25} & \frac{69541452288\text{ I}}{5} & \frac{169293535488}{5} & -\frac{69541452288\text{ I}}{5} & -\frac{4509800064}{25}-\frac{6991028352\text{ I}}{25} \\ \frac{6110862912}{5} & -\frac{169293535488}{5} & 0 & -\frac{169293535488}{5} & \frac{6110862912}{5} \\ -\frac{4509800064}{25}-\frac{6991028352\text{ I}}{25} & -\frac{69541452288\text{ I}}{5} & \frac{169293535488}{5} & \frac{69541452288\text{ I}}{5} & -\frac{4509800064}{25}+\frac{6991028352\text{ I}}{25} \\ \frac{4191264\text{ I}}{25} & \frac{4509800064}{25}-\frac{6991028352\text{ I}}{25} & -\frac{6110862912}{5} & \frac{4509800064}{25}+\frac{6991028352\text{ I}}{25} & -\frac{4191264\text{ I}}{25} \end{array} \right]$$



$$\frac{\mathrm{d}^{18}}{\mathrm{d}x_{ol}^{18}}\;u(x_{ol})=\frac{1}{25\,\Delta x_{ol}^{18}}\Big(4191264\left(-1u_{ol-2+21}+(1076+1668\,\mathrm{I})\,u_{ol-1+21}-7290\,u_{ol+21}+(1076-1668\,\mathrm{I})\,u_{ol+1+21}+1u_{ol+2+21}+(-1076+1668\,\mathrm{I})\,u_{ol-2+1}+82960\,\mathrm{I}u_{ol-1+1}+201960\,u_{ol+1}-82960\,\mathrm{I}u_{ol+1+1}-(1076+1668\,\mathrm{I})\,u_{ol+2+1}+7290\,u_{ol-2}-201960\,u_{ol-1}-201960\,u_{ol+1}+7290\,u_{ol+2}-(1076+1668\,\mathrm{I})\,u_{ol-2-1}\right.\\ \left.-82960\,\mathrm{I}u_{ol-1-1}+201960\,u_{ol-1}+82960\,\mathrm{I}u_{ol+1-1}+(-1076+1668\,\mathrm{I})\,u_{ol+2-1}+1u_{ol-2-21}+(1076-1668\,\mathrm{I})\,u_{ol-1-21}-7290\,u_{ol-21}+(1076+1668\,\mathrm{I})\,u_{ol+1-21}-1u_{ol+2-21}\right)\Big),\;O(\;\Delta x_{ol}^8\;)$$

Formula: 247, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 19

Error order: 8, Error:  $3.5312352409427149197 \times 10^{-24}$ , New Error:  $3.5312352409446823310 \times 10^{-32}$

Error order: 8, Error:  $3.5312352409446823310 \times 10^{-32}$ , New Error:  $3.5312352409446825278 \times 10^{-40}$

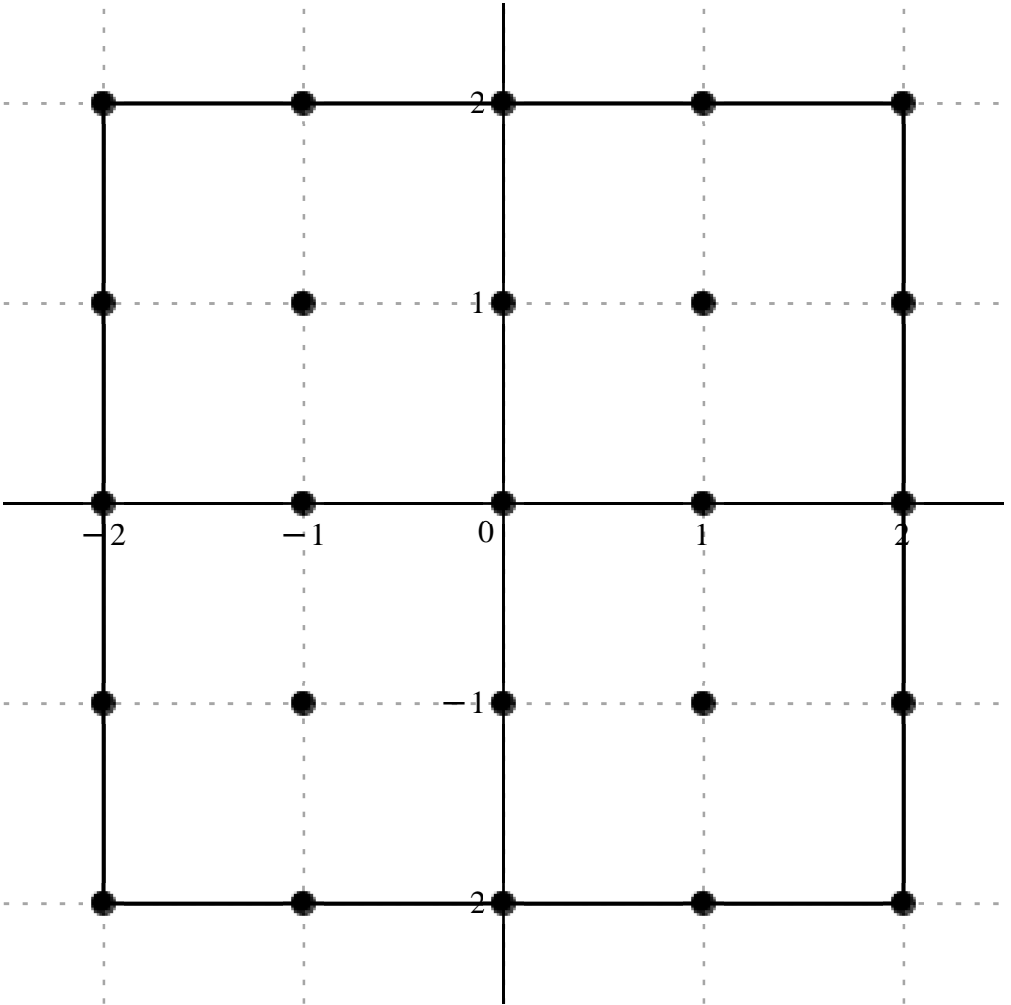
Error order: 8, Error:  $3.5312352409446825278 \times 10^{-40}$ , New Error:  $3.5312352409446825278 \times 10^{-48}$

Error order: 8, Error:  $3.5312352409446825278 \times 10^{-48}$ , New Error:  $3.5312352409446825278 \times 10^{-56}$

Error order: 8, Error:  $3.5312352409446825278 \times 10^{-56}$ , New Error:  $3.5312352409446825278 \times 10^{-64}$

$$x_o+h\cdot,\left[\begin{array}{ccccc} -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} \end{array}\right]$$

$$c = , \left[ \begin{array}{ccccc} -\frac{19908504}{25} + \frac{19908504 \text{ I}}{25} & \frac{35994575232}{25} - \frac{60840388224 \text{ I}}{25} & \frac{58053197664 \text{ I}}{5} & -\frac{35994575232}{25} - \frac{60840388224 \text{ I}}{25} & \frac{19908504}{25} + \frac{19908504 \text{ I}}{25} \\ \frac{60840388224}{25} - \frac{35994575232 \text{ I}}{25} & \frac{660643796736}{5} - \frac{660643796736 \text{ I}}{5} & -\frac{3216577174272 \text{ I}}{5} & -\frac{660643796736}{5} - \frac{660643796736 \text{ I}}{5} & -\frac{60840388224}{25} - \frac{35994575232 \text{ I}}{25} \\ -\frac{58053197664}{5} & \frac{3216577174272}{5} & 0 & -\frac{3216577174272}{5} & \frac{58053197664}{5} \\ \frac{60840388224}{25} + \frac{35994575232 \text{ I}}{25} & \frac{660643796736}{5} + \frac{660643796736 \text{ I}}{5} & \frac{3216577174272 \text{ I}}{5} & -\frac{660643796736}{5} + \frac{660643796736 \text{ I}}{5} & -\frac{60840388224}{25} + \frac{35994575232 \text{ I}}{25} \\ -\frac{19908504}{25} - \frac{19908504 \text{ I}}{25} & \frac{35994575232}{25} + \frac{60840388224 \text{ I}}{25} & -\frac{58053197664 \text{ I}}{5} & -\frac{35994575232}{25} + \frac{60840388224 \text{ I}}{25} & \frac{19908504}{25} - \frac{19908504 \text{ I}}{25} \end{array} \right]$$



$$\frac{\mathrm{d}^{19}}{\mathrm{d}x_{ol}^{19}}\; u(x_{ol}) = \frac{1}{25\,\Delta x_{ol}^{19}} \Big( 19908504 \left( (-1 + \text{I})\, u_{ol-2+2\text{I}} + (1808 - 3056 \text{ I})\, u_{ol-1+2\text{I}} + 14580 \text{ I} u_{ol+2\text{I}} - (1808 + 3056 \text{ I})\, u_{ol+1+2\text{I}} + (1 + \text{I})\, u_{ol+2+2\text{I}} + (3056 - 1808 \text{ I})\, u_{ol-2+1} + (165920 - 165920 \text{ I})\, u_{ol-1+1} - 807840 \text{ I} u_{ol+1} - (165920 + 165920 \text{ I})\, u_{ol+1+1} - (3056 + 1808 \text{ I})\, u_{ol+2+1} - 14580\, u_{ol-2} + 807840\, u_{ol-1} - 807840\, u_{ol+1} \right. \\ \left. + 14580\, u_{ol+2} + (3056 + 1808 \text{ I})\, u_{ol-2-1} + (165920 + 165920 \text{ I})\, u_{ol-1-1} + 807840 \text{ I} u_{ol-1} + (-165920 + 165920 \text{ I})\, u_{ol+1-1} + (-3056 + 1808 \text{ I})\, u_{ol+2-1} - (1 + \text{I})\, u_{ol-2-2\text{I}} + (1808 + 3056 \text{ I})\, u_{ol-1-2\text{I}} - 14580 \text{ I} u_{ol-2\text{I}} + (-1808 + 3056 \text{ I})\, u_{ol+1-2\text{I}} + (1 - \text{I})\, u_{ol+2-2\text{I}} \right) \Big), \; O(\,\Delta x_{ol}^8\,)$$

Formula: 248, Var.: 1

Variavel : x<sub>ol</sub>, Derivada de Ordem : 20

Error order: 8, Error: 2.5097620760077902422 × 10<sup>−24</sup>, New Error: 2.5097620760090137567 × 10<sup>−32</sup>

Error order: 8, Error: 2.5097620760090137567 × 10<sup>−32</sup>, New Error: 2.5097620760090138790 × 10<sup>−40</sup>

Error order: 8, Error: 2.5097620760090138790 × 10<sup>−40</sup>, New Error: 2.5097620760090138790 × 10<sup>−48</sup>

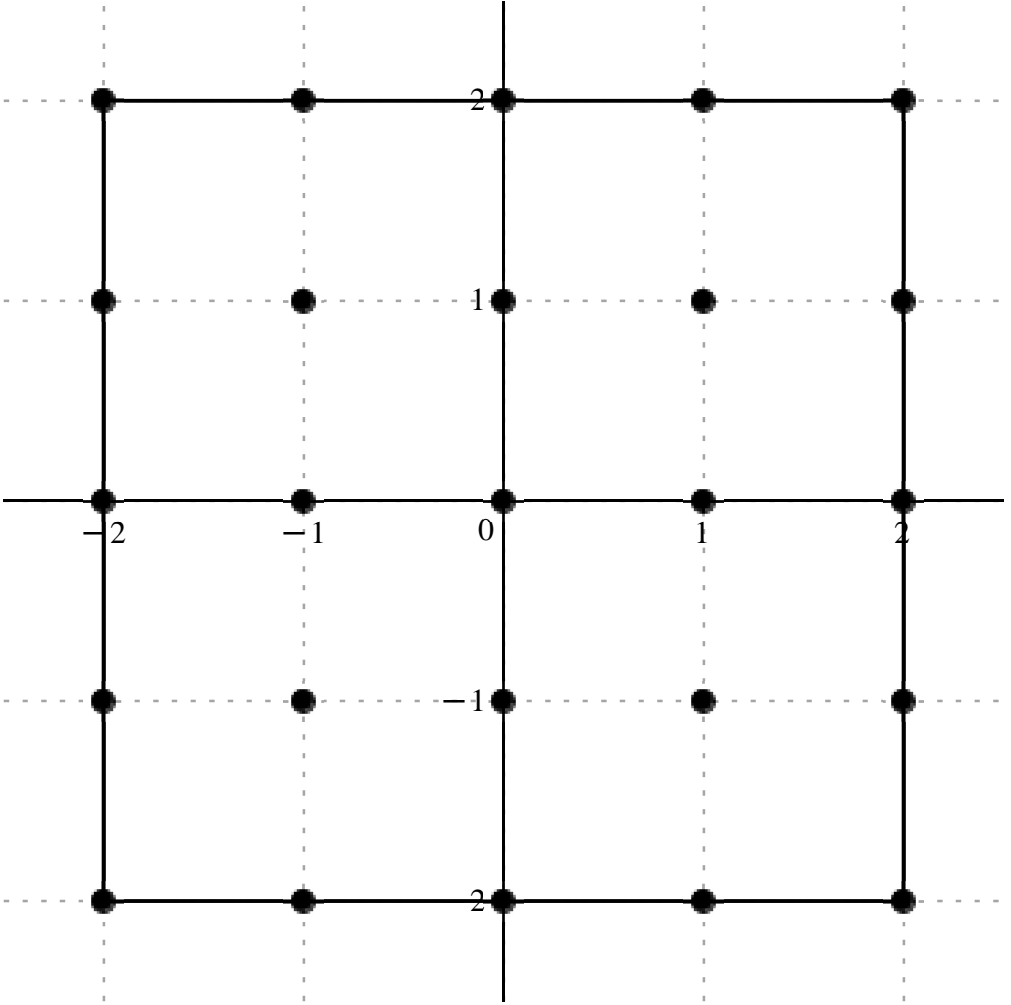
Error order: 8, Error: 2.5097620760090138790 × 10<sup>−48</sup>, New Error: 2.5097620760090138790 × 10<sup>−56</sup>

Error order: 8, Error: 2.5097620760090138790 × 10<sup>−56</sup>, New Error: 2.5097620760090138790 × 10<sup>−64</sup>



$$x_o \neq h, \begin{bmatrix} -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} \\ -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} \\ -2 & -1 & 0 & 1 & 2 \\ -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} \\ -2-2\text{I} & -1-2\text{I} & -2\text{I} & 1-2\text{I} & 2-2\text{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{39817008}{5} & -\frac{126140281344}{5} - \frac{8919009792\text{I}}{5} & 116106395328 & -\frac{126140281344}{5} + \frac{8919009792\text{I}}{5} & \frac{39817008}{5} \\ -\frac{126140281344}{5} + \frac{8919009792\text{I}}{5} & -2642575186944 & -12866308697088 & -2642575186944 & -\frac{126140281344}{5} - \frac{8919009792\text{I}}{5} \\ 116106395328 & -12866308697088 & 61772902551360 & -12866308697088 & 116106395328 \\ -\frac{126140281344}{5} - \frac{8919009792\text{I}}{5} & -2642575186944 & -12866308697088 & -2642575186944 & -\frac{126140281344}{5} + \frac{8919009792\text{I}}{5} \\ \frac{39817008}{5} & -\frac{126140281344}{5} + \frac{8919009792\text{I}}{5} & 116106395328 & -\frac{126140281344}{5} - \frac{8919009792\text{I}}{5} & \frac{39817008}{5} \end{bmatrix}$$



$$\frac{\mathrm{d}^{20}}{\mathrm{d}x_{ol}^{20}}\;u(x_{ol})=\frac{1}{5\,\Delta x_{ol}^{20}}\Big(39817008\left(u_{ol-2+2\text{I}}-(3168+224\text{I})\,u_{ol-1+2\text{I}}+14580\,u_{ol+2\text{I}}+(-3168+224\text{I})\,u_{ol+1+2\text{I}}+u_{ol+2+2\text{I}}+(-3168+224\text{I})\,u_{ol-2+\text{I}}-331840\,u_{ol-1+\text{I}}-1615680\,u_{ol+\text{I}}-331840\,u_{ol+1+\text{I}}-(3168+224\text{I})\,u_{ol+2+\text{I}}+14580\,u_{ol-2}-1615680\,u_{ol-1}+7757100\,u_{ol}-1615680\,u_{ol+1}+14580\,u_{ol+2}-(3168\right.\\ \left.+224\text{I})\,u_{ol-2-\text{I}}-331840\,u_{ol-1-\text{I}}-1615680\,u_{ol-\text{I}}-331840\,u_{ol+1-\text{I}}+(-3168+224\text{I})\,u_{ol+2-\text{I}}+u_{ol-2-2\text{I}}+(-3168+224\text{I})\,u_{ol-1-2\text{I}}+14580\,u_{ol-2\text{I}}-(3168+224\text{I})\,u_{ol+1-2\text{I}}+u_{ol+2-2\text{I}}\Big)\Big),\;O(\;\Delta x_{ol}^{\text{8}}\;)$$

$$Variavel \, :, x_{ol}, \, Derivada \, de \, Ordem \, :, 21$$

$$Error \, order:, 4, \, Error:, 1.0260685951954461268 \times 10^{-11}, \, New \, Error:, 1.0260685951969443424 \times 10^{-15}$$

$$Error \, order:, 4, \, Error:, 1.0260685951969443424 \times 10^{-15}, \, New \, Error:, 1.0260685951969444922 \times 10^{-19}$$

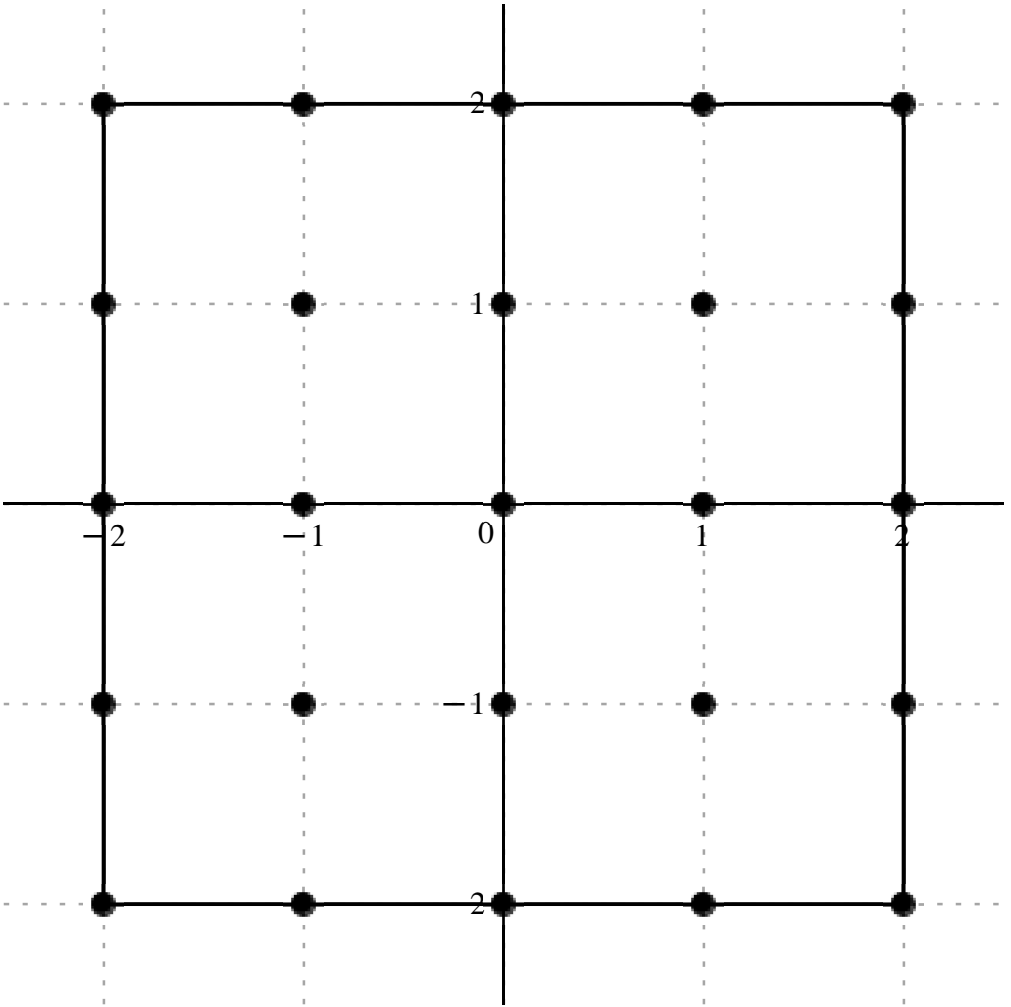
$$Error \, order:, 4, \, Error:, 1.0260685951969444922 \times 10^{-19}, \, New \, Error:, 1.0260685951969444922 \times 10^{-23}$$

$$Error \, order:, 4, \, Error:, 1.0260685951969444922 \times 10^{-23}, \, New \, Error:, 1.0260685951969444922 \times 10^{-27}$$

$$Error \, order:, 4, \, Error:, 1.0260685951969444922 \times 10^{-27}, \, New \, Error:, 1.0260685951969444922 \times 10^{-31}$$

$$x_o+h., \left[ \begin{array}{ccccc} -2+2\,I & -1+2\,I & 2\,I & 1+2\,I & 2+2\,I \\ -2+I & -1+I & I & 1+I & 2+I \\ -2 & -1 & 0 & 1 & 2 \\ -2-I & -1-I & -I & 1-I & 2-I \\ -2-2\,I & -1-2\,I & -2\,I & 1-2\,I & 2-2\,I \end{array} \right]$$

$$c=,\left[ \begin{array}{ccccc} \frac{13378514688}{5}+\frac{13378514688\,I}{5} & -\frac{414733955328}{5}+\frac{227434749696\,I}{5} & -240813264384\,I & \frac{414733955328}{5}+\frac{227434749696\,I}{5} & -\frac{13378514688}{5}+\frac{13378514688\,I}{5} \\ \frac{227434749696}{5}-\frac{414733955328\,I}{5} & -1819477997568-1819477997568\,I & 4093825494528\,I & 1819477997568-1819477997568\,I & -\frac{227434749696}{5}-\frac{414733955328\,I}{5} \\ -240813264384 & 4093825494528 & 0 & -4093825494528 & 240813264384 \\ \frac{227434749696}{5}+\frac{414733955328\,I}{5} & -1819477997568+1819477997568\,I & -4093825494528\,I & 1819477997568+1819477997568\,I & -\frac{227434749696}{5}+\frac{414733955328\,I}{5} \\ \frac{13378514688}{5}-\frac{13378514688\,I}{5} & -\frac{414733955328}{5}-\frac{227434749696\,I}{5} & 240813264384\,I & \frac{414733955328}{5}-\frac{227434749696\,I}{5} & -\frac{13378514688}{5}-\frac{13378514688\,I}{5} \end{array} \right]$$



$$\frac{\mathrm{d}^{21}}{\mathrm{d}x_{ol}^{21}}\,u(x_o)=\frac{1}{5\,\Delta x_{ol}^{21}}\Big(13378514688\,\Big((1+I)\,u_{ol-2+21}+(-31+17\,I)\,u_{ol-1+21}-90\,Iu_{ol+21}+(31+17\,I)\,u_{ol+1+21}+(-1+I)\,u_{ol+2+21}+(17-31\,I)\,u_{ol-2+1}- (680+680\,I)\,u_{ol-1+1}+1530\,Iu_{ol+1}+(680-680\,I)\,u_{ol+1+1}-(17+31\,I)\,u_{ol+2+1}-90\,u_{ol-2}+1530\,u_{ol-1}-1530\,u_{ol+1}+90\,u_{ol+2}+(17+31\,I)\,u_{ol-2-1}+(-680+680\,I)\,u_{ol-1-1}-1530\,Iu_{ol-1}+(680+680\,I)\,u_{ol+1-1}+(-17+31\,I)\,u_{ol+2-1}+(1-I)\,u_{ol-2-21}-(31+17\,I)\,u_{ol-1-21}+90\,Iu_{ol-21}+(31-17\,I)\,u_{ol+1-21}-(1+I)\,u_{ol+2-21})\Big),\,O(\,\Delta x_{ol}^4\,)\,$$

Formula:, 250, Var.: 1

Variavel :,  $x_o$ !, Derivada de Ordem :, 22

Error order:, 4, Error:,  $8.6389242611191006484 \times 10^{-12}$ , New Error:,  $8.6389242611300329014 \times 10^{-16}$

Error order:, 4, Error:,  $8.6389242611300329014 \times 10^{-16}$ , New Error:,  $8.6389242611300339947 \times 10^{-20}$

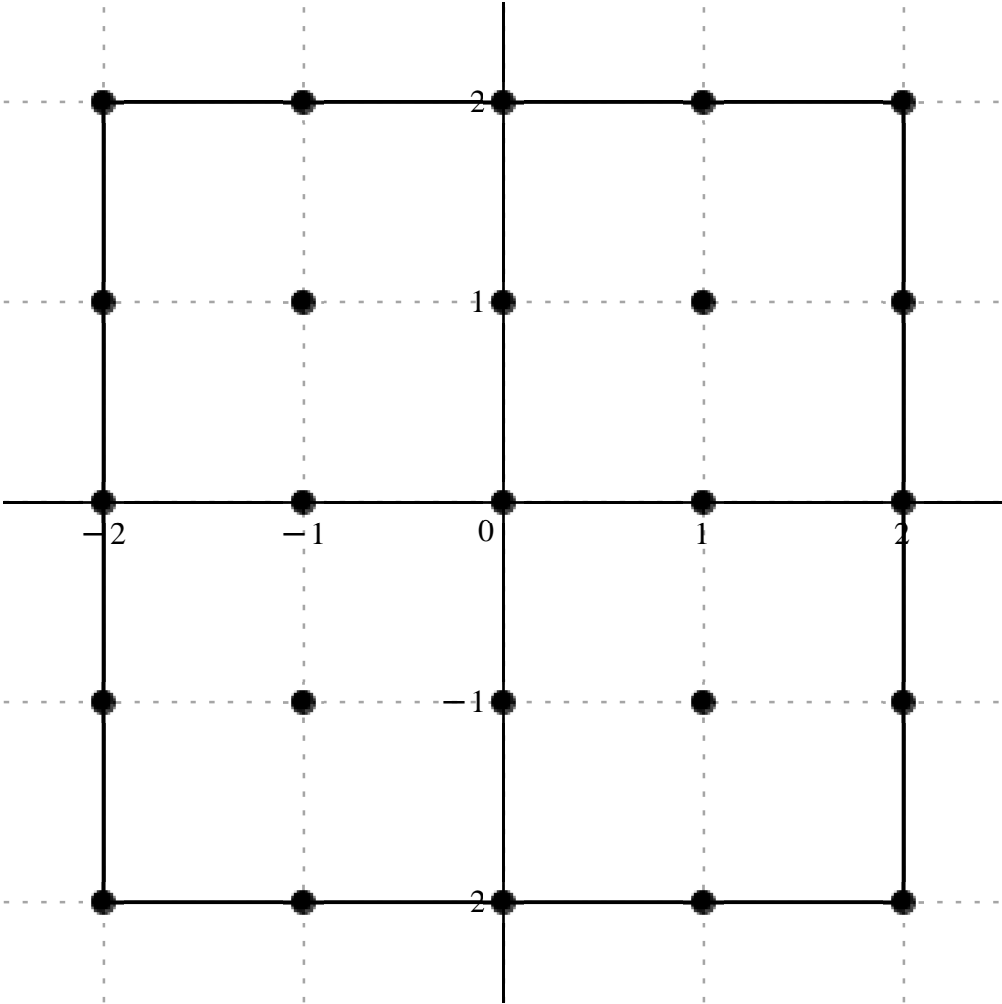
Error order:, 4, Error:,  $8.6389242611300339947 \times 10^{-20}$ , New Error:,  $8.6389242611300339948 \times 10^{-24}$

Error order:, 4, Error:,  $8.6389242611300339948 \times 10^{-24}$ , New Error:,  $8.6389242611300339948 \times 10^{-28}$

Error order:, 4, Error:,  $8.6389242611300339948 \times 10^{-28}$ , New Error:,  $8.6389242611300339948 \times 10^{-32}$

$$x_o + h.$$
$$\begin{bmatrix} -2 + 2 I & -1 + 2 I & 2 I & 1 + 2 I & 2 + 2 I \\ -2 + I & -1 + I & I & 1 + I & 2 + I \\ -2 & -1 & 0 & 1 & 2 \\ -2 - I & -1 - I & -I & 1 - I & 2 - I \\ -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I \end{bmatrix}$$

$$c = , \begin{bmatrix} -\frac{147163661568 I}{5} & \frac{3826255200768}{5} + \frac{2648945908224 I}{5} & -2648945908224 & \frac{3826255200768}{5} - \frac{2648945908224 I}{5} & \frac{147163661568 I}{5} \\ -\frac{3826255200768}{5} + \frac{2648945908224 I}{5} & 40028515946496 I & 90064160879616 & -40028515946496 I & -\frac{3826255200768}{5} - \frac{2648945908224 I}{5} \\ 2648945908224 & -90064160879616 & 0 & -90064160879616 & 2648945908224 \\ -\frac{3826255200768}{5} - \frac{2648945908224 I}{5} & -40028515946496 I & 90064160879616 & 40028515946496 I & -\frac{3826255200768}{5} + \frac{2648945908224 I}{5} \\ \frac{147163661568 I}{5} & \frac{3826255200768}{5} - \frac{2648945908224 I}{5} & -2648945908224 & \frac{3826255200768}{5} + \frac{2648945908224 I}{5} & -\frac{147163661568 I}{5} \end{bmatrix}$$



$$\frac{\mathrm{d}^{22}}{\mathrm{d}x_{ol}^{22}}\,u(x_{ol})=\frac{1}{5\,\Delta x_{ol}^{22}}\big(147163661568\,(-\mathrm{I}u_{ol-2+2\mathrm{I}}+(26+18\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}-90\,u_{ol+2\mathrm{I}}+(26-18\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+\mathrm{I}u_{ol+2+2\mathrm{I}}+(-26+18\,\mathrm{I})\,u_{ol-2+\mathrm{I}}+1360\,\mathrm{I}u_{ol-1+\mathrm{I}}+3060\,u_{ol+\mathrm{I}}-1360\,\mathrm{I}u_{ol+1+\mathrm{I}}-(26+18\,\mathrm{I})\,u_{ol+2+\mathrm{I}}+90\,u_{ol-2}-3060\,u_{ol-1}-3060\,u_{ol+\mathrm{I}}+90\,u_{ol+2}-(26+18\,\mathrm{I})\,u_{ol-2-\mathrm{I}}-1360\,\mathrm{I}u_{ol-1-\mathrm{I}}+3060\,u_{ol-\mathrm{I}}+1360\,\mathrm{I}u_{ol+1-\mathrm{I}}+(-26+18\,\mathrm{I})\,u_{ol+2-\mathrm{I}}+\mathrm{I}u_{ol-2-2\mathrm{I}}+(26-18\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}-90\,u_{ol-2\mathrm{I}}+(26+18\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}-\mathrm{I}u_{ol+2-2\mathrm{I}})\big),\,O(\,\Delta x_{ol}^4\,)$$

Square: Interval, 5

Formula:, 251, Var.:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 1

Error order:., 35, Error:., 1.1859007705172253046 × 10<sup>−90</sup>, New Error:., 1.1403525807617562592 × 10<sup>−125</sup>

Error order:., 35, Error:., 1.1403525807617562592 × 10<sup>−125</sup>, New Error:., 1.1358445220794103648 × 10<sup>−160</sup>

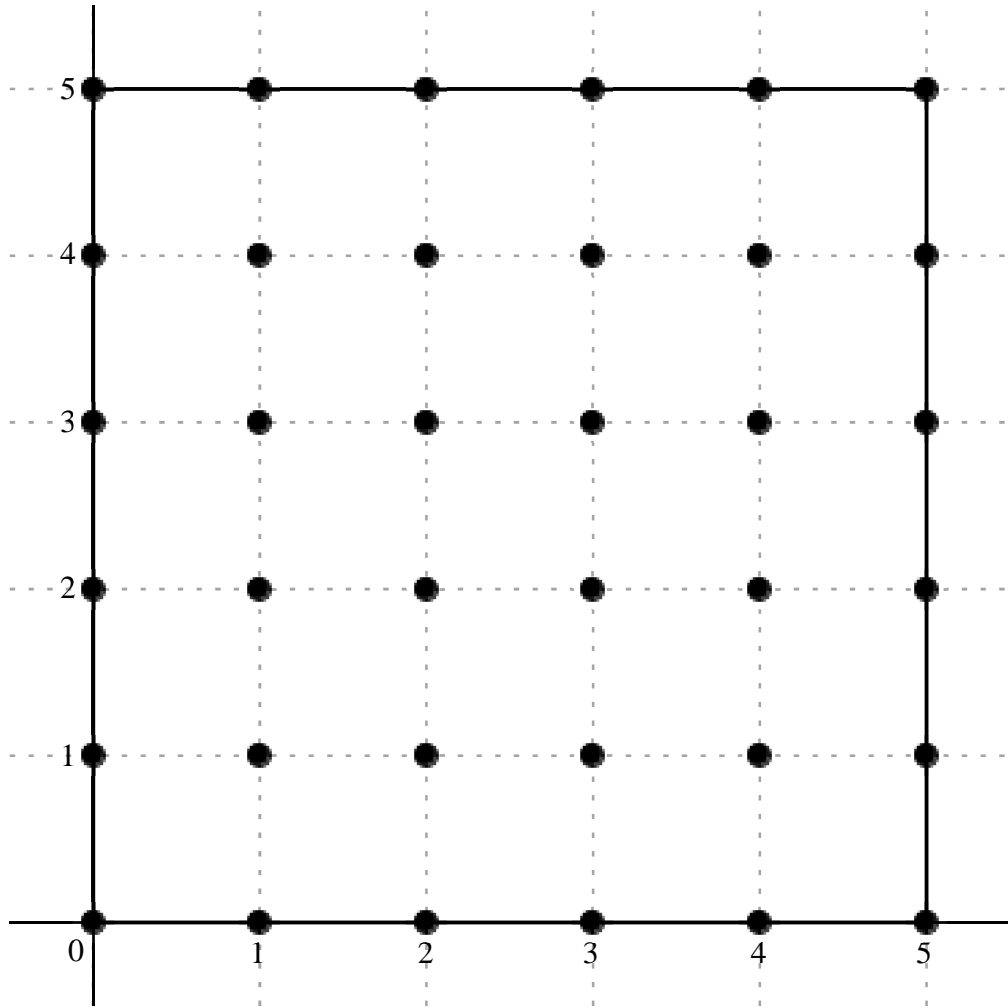
Error order:., 35, Error:., 1.1358445220794103648 × 10<sup>−160</sup>, New Error:., 1.1353941861060285914 × 10<sup>−195</sup>

Error order:., 35, Error:., 1.1353941861060285914 × 10<sup>−195</sup>, New Error:., 1.1353491572098450505 × 10<sup>−230</sup>

Error order:., 35, Error:., 1.1353491572098450505 × 10<sup>−230</sup>, New Error:., 1.1353446543672404404 × 10<sup>−265</sup>

$$x_o+h\,,\left[\begin{array}{cccccc}5\,\mathrm{I}&1+5\,\mathrm{I}&2+5\,\mathrm{I}&3+5\,\mathrm{I}&4+5\,\mathrm{I}&5+5\,\mathrm{I}\\4\,\mathrm{I}&1+4\,\mathrm{I}&2+4\,\mathrm{I}&3+4\,\mathrm{I}&4+4\,\mathrm{I}&5+4\,\mathrm{I}\\3\,\mathrm{I}&1+3\,\mathrm{I}&2+3\,\mathrm{I}&3+3\,\mathrm{I}&4+3\,\mathrm{I}&5+3\,\mathrm{I}\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&3+2\,\mathrm{I}&4+2\,\mathrm{I}&5+2\,\mathrm{I}\\\mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}&4+\mathrm{I}&5+\mathrm{I}\\0&1&2&3&4&5\end{array}\right]$$

$$c=\,,\left[\begin{array}{cccccc} \frac{1}{5} & -\frac{5375}{442}-\frac{13945\,\mathrm{I}}{442} & -\frac{145960}{377}-\frac{15580\,\mathrm{I}}{377} & -\frac{57810}{221}+\frac{54530\,\mathrm{I}}{221} & \frac{6095}{697}+\frac{17750\,\mathrm{I}}{697} & \frac{1}{10}-\frac{\mathrm{I}}{10} \\ -\frac{785}{34}+\frac{2475\,\mathrm{I}}{68} & -\frac{309140}{17}-\frac{77285\,\mathrm{I}}{17} & \frac{646816}{5}-\frac{1495762\,\mathrm{I}}{5} & \frac{5578788}{25}+\frac{4689416\,\mathrm{I}}{25} & -\frac{77285}{8}+\frac{77285\,\mathrm{I}}{8} & -\frac{17750}{697}-\frac{6095\,\mathrm{I}}{697} \\ -\frac{26240}{39}-\frac{2460\,\mathrm{I}}{13} & -\frac{848946}{5}+\frac{2142578\,\mathrm{I}}{5} & \frac{103086300}{13}+\frac{68724200\,\mathrm{I}}{13} & \frac{17181050}{3}-\frac{17181050\,\mathrm{I}}{3} & -\frac{4689416}{25}-\frac{5578788\,\mathrm{I}}{25} & -\frac{54530}{221}+\frac{57810\,\mathrm{I}}{221} \\ -\frac{3690}{13}-\frac{13120\,\mathrm{I}}{13} & \frac{2991524}{5}+\frac{1293632\,\mathrm{I}}{5} & -8590525+8590525\,\mathrm{I} & -\frac{68724200}{13}-\frac{103086300\,\mathrm{I}}{13} & \frac{1495762}{5}-\frac{646816\,\mathrm{I}}{5} & \frac{15580}{377}+\frac{145960\,\mathrm{I}}{377} \\ \frac{2475}{17}-\frac{1570\,\mathrm{I}}{17} & \frac{77285}{2}-\frac{77285\,\mathrm{I}}{2} & -\frac{1293632}{5}-\frac{2991524\,\mathrm{I}}{5} & -\frac{2142578}{5}+\frac{848946\,\mathrm{I}}{5} & \frac{77285}{17}+\frac{309140\,\mathrm{I}}{17} & \frac{13945}{442}+\frac{5375\,\mathrm{I}}{442} \\ -\frac{347416769}{52553800}+\frac{347416769\,\mathrm{I}}{52553800} & \frac{1570}{17}-\frac{2475\,\mathrm{I}}{17} & \frac{13120}{13}+\frac{3690\,\mathrm{I}}{13} & \frac{2460}{13}+\frac{26240\,\mathrm{I}}{39} & -\frac{2475}{68}+\frac{785\,\mathrm{I}}{34} & -\frac{\mathrm{I}}{5} \end{array}\right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{157661400\,\Delta x_{ol}}\,(31532280\,u_{ol+5\mathrm{I}}-(1917262500+4974181500\,\mathrm{I})\,u_{ol+1+5\mathrm{I}}-(61040472000+6515556000\,\mathrm{I})\,u_{ol+2+5\mathrm{I}}+( -41241654000+38901702000\,\mathrm{I})\,u_{ol+3+5\mathrm{I}}+(1378689000+4015050000\,\mathrm{I})\,u_{ol+4+5\mathrm{I}}+(15766140-15766140\,\mathrm{I})\,u_{ol+5+5\mathrm{I}}+( -3640123500+5738411250\,\mathrm{I})\,u_{ol+4\mathrm{I}}-(2867026188000+716756547000\,\mathrm{I})\,u_{ol+1+4\mathrm{I}}+(20395583220480-47164786197360\,\mathrm{I})\,u_{ol+2+4\mathrm{I}}+(35182381055328+29573595669696\,\mathrm{I})\,u_{ol+3+4\mathrm{I}}+(-1523107662375+1523107662375\,\mathrm{I})\,u_{ol+4+4\mathrm{I}}-(4015050000+1378689000\,\mathrm{I})\,u_{ol+5+4\mathrm{I}}-(106077824000+29834388000\,\mathrm{I})\,u_{ol+3\mathrm{I}}+( -26769202976880+67560369417840\,\mathrm{I})\,u_{ol+1+3\mathrm{I}}+(1250210029140000+833473352760000\,\mathrm{I})\,u_{ol+2+3\mathrm{I}}+(902929465490000-902929465490000\,\mathrm{I})\,u_{ol+3+3\mathrm{I}}-(29573595669696+35182381055328\,\mathrm{I})\,u_{ol+4+3\mathrm{I}}+(-38901702000+41241654000\,\mathrm{I})\,u_{ol+5+3\mathrm{I}}-(44751582000+159116736000\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(94329572394720+40791166440960\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+( -1354394198235000+1354394198235000\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}-(833473352760000+1250210029140000\,\mathrm{I})\,u_{ol+3+2\mathrm{I}}+(47164786197360-20395583220480\,\mathrm{I})\,u_{ol+4+2\mathrm{I}}+(6515556000+61040472000\,\mathrm{I})\,u_{ol+5+2\mathrm{I}}+(22953645000-14560494000\,\mathrm{I})\,u_{ol+\mathrm{I}}+(6092430649500-6092430649500\,\mathrm{I})\,u_{ol+1+\mathrm{I}}-(40791166440960+94329572394720\,\mathrm{I})\,u_{ol+2+\mathrm{I}}+( -67560369417840+26769202976880\,\mathrm{I})\,u_{ol+3+\mathrm{I}}+(716756547000+2867026188000\,\mathrm{I})\,u_{ol+4+\mathrm{I}}+(4974181500+1917262500\,\mathrm{I})\,u_{ol+5+\mathrm{I}}+( -1042250307+1042250307\,\mathrm{I})\,u_{ol}+(14560494000-22953645000\,\mathrm{I})\,u_{ol+1}+(159116736000+44751582000\,\mathrm{I})\,u_{ol+2}+(29834388000+106077824000\,\mathrm{I})\,u_{ol+3}+( -5738411250+3640123500\,\mathrm{I})\,u_{ol+4}-31532280\,\mathrm{I}u_{ol+5}),\,\,O(\,\,\Delta x_{ol}^{35}\,\,)$$

Formula:, 252, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 34, Error:, 2.3059264050368873691 × 10<sup>−87</sup>, New Error:, 2.2634625689214809904 × 10<sup>−121</sup>

Error order:, 34, Error:, 2.2634625689214809904 × 10<sup>−121</sup>, New Error:, 2.2591847790763622781 × 10<sup>−155</sup>

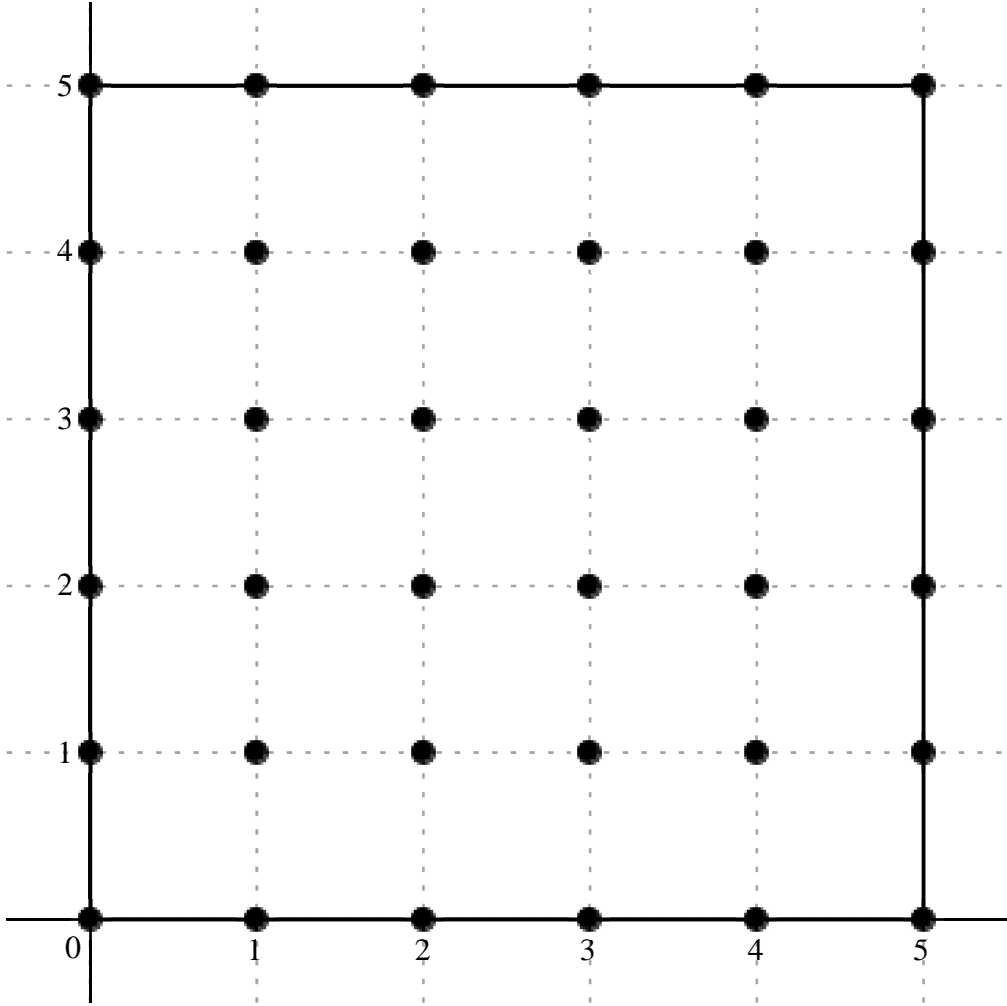
Error order:, 34, Error:, 2.2591847790763622781 × 10<sup>−155</sup>, New Error:, 2.2587567014954313261 × 10<sup>−189</sup>

Error order:, 34, Error:, 2.2587567014954313261 × 10<sup>−189</sup>, New Error:, 2.2587138907666706386 × 10<sup>−223</sup>

Error order:, 34, Error:, 2.2587138907666706386 × 10<sup>−223</sup>, New Error:, 2.2587096096641031737 × 10<sup>−257</sup>

$$x_o\, +h\, .\, .\, \left[\begin{array}{cccccc} 5\,\mathrm{I} & 1+5\,\mathrm{I} & 2+5\,\mathrm{I} & 3+5\,\mathrm{I} & 4+5\,\mathrm{I} & 5+5\,\mathrm{I} \\ 4\,\mathrm{I} & 1+4\,\mathrm{I} & 2+4\,\mathrm{I} & 3+4\,\mathrm{I} & 4+4\,\mathrm{I} & 5+4\,\mathrm{I} \\ 3\,\mathrm{I} & 1+3\,\mathrm{I} & 2+3\,\mathrm{I} & 3+3\,\mathrm{I} & 4+3\,\mathrm{I} & 5+3\,\mathrm{I} \\ 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & 3+2\,\mathrm{I} & 4+2\,\mathrm{I} & 5+2\,\mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & 4+\mathrm{I} & 5+\mathrm{I} \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array}\right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{347416769}{131384500} + \frac{336906009 \text{ I}}{131384500} & \frac{164007308677}{290359745} + \frac{300349711933 \text{ I}}{1161438980} & \frac{2331855217}{416585} - \frac{1851561099 \text{ I}}{416585} & \frac{1576696776}{7081945} - \frac{46742870953 \text{ I}}{7081945} & -\frac{39703135721}{89341460} - \frac{19498524379 \text{ I}}{89341460} & \frac{342161389 \text{ I}}{131384500} \\ -\frac{56378902439}{357365840} - \frac{276934692821 \text{ I}}{357365840} & \frac{342470529}{1156} - \frac{995879307 \text{ I}}{5780} & \frac{6990940109}{3250} + \frac{18050467537 \text{ I}}{3250} & -\frac{8639816987}{1625} + \frac{721432991 \text{ I}}{1625} & -\frac{42605943 \text{ I}}{170} & \frac{39703135721}{89341460} - \frac{19498524379 \text{ I}}{89341460} \\ \frac{14086426129}{1249755} - \frac{22290035461 \text{ I}}{3749265} & -\frac{5196047084}{1625} - \frac{12549608413 \text{ I}}{1625} & -\frac{28705734965}{169} + \frac{5562464073 \text{ I}}{169} & \frac{17271547919 \text{ I}}{117} & \frac{8639816987}{1625} + \frac{721432991 \text{ I}}{1625} & -\frac{1576696776}{7081945} - \frac{46742870953 \text{ I}}{7081945} \\ \frac{13403226729}{833170} + \frac{8227077787 \text{ I}}{833170} & -\frac{17687846317}{1625} + \frac{6686128069 \text{ I}}{1625} & -\frac{5682731423 \text{ I}}{26} & \frac{28705734965}{169} + \frac{5562464073 \text{ I}}{169} & -\frac{6990940109}{3250} + \frac{18050467537 \text{ I}}{3250} & -\frac{2331855217}{416585} - \frac{1851561099 \text{ I}}{416585} \\ -\frac{79384328389}{89341460} + \frac{255046035121 \text{ I}}{89341460} & \frac{321139869 \text{ I}}{340} & \frac{17687846317}{1625} + \frac{6686128069 \text{ I}}{1625} & \frac{5196047084}{1625} - \frac{12549608413 \text{ I}}{1625} & -\frac{342470529}{1156} - \frac{995879307 \text{ I}}{5780} & -\frac{164007308677}{290359745} + \frac{300349711933 \text{ I}}{1161438980} \\ & -\frac{44790771896407 \text{ I}}{522647541000} & \frac{79384328389}{89341460} + \frac{255046035121 \text{ I}}{89341460} & -\frac{13403226729}{833170} + \frac{8227077787 \text{ I}}{833170} & -\frac{14086426129}{1249755} - \frac{22290035461 \text{ I}}{3749265} & \frac{56378902439}{357365840} - \frac{276934692821 \text{ I}}{357365840} \\ & & & & & \frac{347416769}{131384500} + \frac{336906009 \text{ I}}{131384500} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{1045295082000 \, \Delta x_{ol}^2} \big( ( \, -2764047814164 + 2680424207604 \, \mathrm{I} \, ) \, u_{ol+5\mathrm{I}} + ( 590426311237200 + 270314740739700 \, \mathrm{I} ) \, u_{ol+1+5\mathrm{I}} + ( 5851091110496400 - 4645937109610800 \, \mathrm{I} ) \, u_{ol+2+5\mathrm{I}} + ( 232720444137600 - 6899247752662800 \, \mathrm{I} ) \, u_{ol+3+5\mathrm{I}} - ( 464526687935700 + 228132735234300 \, \mathrm{I} ) \, u_{ol+4+5\mathrm{I}} + 2722236010884 \, \mathrm{I} u_{ol+5+5\mathrm{I}} \\ - ( 164908289634075 + 810033976501425 \, \mathrm{I} ) \, u_{ol+4\mathrm{I}} + ( 309673667555050500 - 180101685445098300 \, \mathrm{I} ) \, u_{ol+1+4\mathrm{I}} + ( 2248490865998228904 + 5805558444377462472 \, \mathrm{I} ) \, u_{ol+2+4\mathrm{I}} + ( -5557635819009943344 + 464067912298369392 \, \mathrm{I} ) \, u_{ol+3+4\mathrm{I}} - 261975192246307800 \, \mathrm{I} u_{ol+4+4\mathrm{I}} + ( 464526687935700 - 228132735234300 \, \mathrm{I} ) \, u_{ol+5+4\mathrm{I}} \\ + ( 11781886814295600 - 6214461886526800 \, \mathrm{I} ) \, u_{ol+3\mathrm{I}} - ( 3342401515535779008 + 8072642433929061456 \, \mathrm{I} ) \, u_{ol+1+3\mathrm{I}} + ( -177550080379348770000 + 34404830410109994000 \, \mathrm{I} ) \, u_{ol+2+3\mathrm{I}} + 154306530754342174000 \, \mathrm{I} u_{ol+3+3\mathrm{I}} + ( 5557635819009943344 + 464067912298369392 \, \mathrm{I} ) \, u_{ol+4+3\mathrm{I}} - ( 232720444137600 \\ + 6899247752662800 \, \mathrm{I} ) \, u_{ol+5+3\mathrm{I}} + ( 16815688254203400 + 10321691791570200 \, \mathrm{I} ) \, u_{ol+2\mathrm{I}} + ( -11377857702358100304 + 4300908792706373328 \, \mathrm{I} ) \, u_{ol+1+2\mathrm{I}} - 228466584953413911000 \, \mathrm{I} u_{ol+2+2\mathrm{I}} + ( 177550080379348770000 + 34404830410109994000 \, \mathrm{I} ) \, u_{ol+3+2\mathrm{I}} + ( -2248490865998228904 + 5805558444377462472 \, \mathrm{I} ) \, u_{ol+4+2\mathrm{I}} \\ - ( 5851091110496400 + 4645937109610800 \, \mathrm{I} ) \, u_{ol+5+2\mathrm{I}} + ( -928796642151300 + 2984038610915700 \, \mathrm{I} ) \, u_{ol+1\mathrm{I}} + 987311546175953700 \, \mathrm{I} u_{ol+1+1\mathrm{I}} + ( 11377857702358100304 + 4300908792706373328 \, \mathrm{I} ) \, u_{ol+2+1\mathrm{I}} + ( 3342401515535779008 - 8072642433929061456 \, \mathrm{I} ) \, u_{ol+3+1\mathrm{I}} - ( 309673667555050500 \\ + 180101685445098300 \, \mathrm{I} ) \, u_{ol+4+1\mathrm{I}} + ( -590426311237200 + 270314740739700 \, \mathrm{I} ) \, u_{ol+5+1\mathrm{I}} - 89581543792814 \, \mathrm{I} u_{ol\mathrm{I}} + ( 928796642151300 + 2984038610915700 \, \mathrm{I} ) \, u_{ol+1\mathrm{I}} + ( -16815688254203400 + 10321691791570200 \, \mathrm{I} ) \, u_{ol+2\mathrm{I}} - ( 11781886814295600 + 6214461886526800 \, \mathrm{I} ) \, u_{ol+3\mathrm{I}} + ( 164908289634075 - 810033976501425 \, \mathrm{I} ) \, u_{ol+4\mathrm{I}} \\ + ( 2764047814164 + 2680424207604 \, \mathrm{I} ) \, u_{ol+5\mathrm{I}} \big) , \, O( \, \Delta x_{ol}^{34} \, )$$

Formula:, 253, Var.: 1

Variavel :,  $x_o$  , Derivada de Ordem :, 1

Error order:, 35, Error:,  $1.1244057927926655639 \times 10^{-90}$ , New Error:,  $1.1342966435118276525 \times 10^{-125}$

Error order:, 35, Error:,  $1.1342966435118276525 \times 10^{-125}$ , New Error:,  $1.1352398767148242755 \times 10^{-160}$

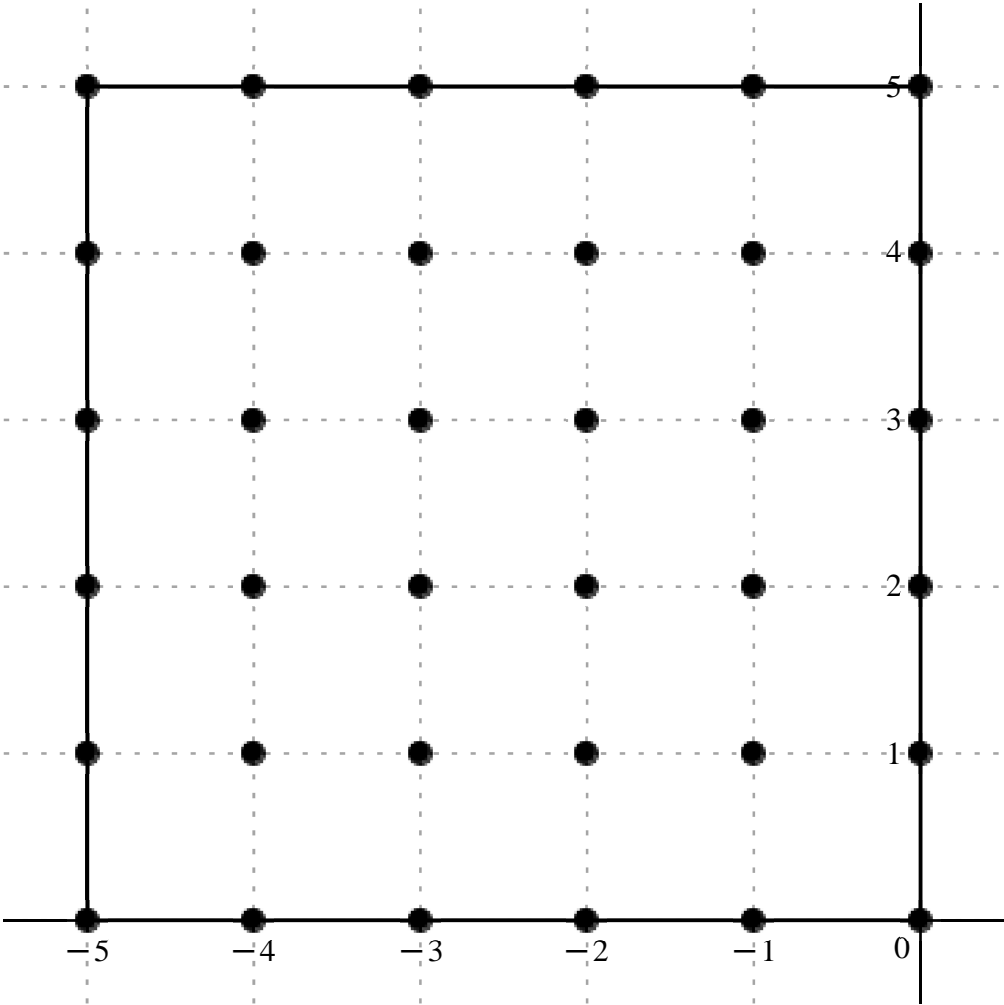
Error order:, 35, Error:,  $1.1352398767148242755 \times 10^{-160}$ , New Error:,  $1.1353337310659282175 \times 10^{-195}$

Error order:, 35, Error:,  $1.1353337310659282175 \times 10^{-195}$ , New Error:,  $1.1353431118008113496 \times 10^{-230}$

Error order:, 35, Error:,  $1.1353431118008113496 \times 10^{-230}$ , New Error:,  $1.1353440498272868464 \times 10^{-265}$

$$x_o + h., \begin{bmatrix} -5 + 5 \text{ I} & -4 + 5 \text{ I} & -3 + 5 \text{ I} & -2 + 5 \text{ I} & -1 + 5 \text{ I} & 5 \text{ I} \\ -5 + 4 \text{ I} & -4 + 4 \text{ I} & -3 + 4 \text{ I} & -2 + 4 \text{ I} & -1 + 4 \text{ I} & 4 \text{ I} \\ -5 + 3 \text{ I} & -4 + 3 \text{ I} & -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -5 + 2 \text{ I} & -4 + 2 \text{ I} & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -5 + \text{ I} & -4 + \text{ I} & -3 + \text{ I} & -2 + \text{ I} & -1 + \text{ I} & \text{ I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{1}{10} - \frac{\text{I}}{10} & -\frac{6095}{697} + \frac{17750 \text{ I}}{697} & \frac{57810}{221} + \frac{54530 \text{ I}}{221} & \frac{145960}{377} - \frac{15580 \text{ I}}{377} & \frac{5375}{442} - \frac{13945 \text{ I}}{442} & -\frac{1}{5} \\ \frac{17750}{697} - \frac{6095 \text{ I}}{697} & \frac{77285}{8} + \frac{77285 \text{ I}}{8} & -\frac{5578788}{25} + \frac{4689416 \text{ I}}{25} & -\frac{646816}{5} - \frac{1495762 \text{ I}}{5} & \frac{309140}{17} - \frac{77285 \text{ I}}{17} & \frac{785}{34} + \frac{2475 \text{ I}}{68} \\ \frac{54530}{221} + \frac{57810 \text{ I}}{221} & \frac{4689416}{25} - \frac{5578788 \text{ I}}{25} & -\frac{17181050}{3} - \frac{17181050 \text{ I}}{3} & -\frac{103086300}{13} + \frac{68724200 \text{ I}}{13} & \frac{848946}{5} + \frac{2142578 \text{ I}}{5} & \frac{26240}{39} - \frac{2460 \text{ I}}{13} \\ -\frac{15580}{377} + \frac{145960 \text{ I}}{377} & -\frac{1495762}{5} - \frac{646816 \text{ I}}{5} & \frac{68724200}{13} - \frac{103086300 \text{ I}}{13} & 8590525 + 8590525 \text{ I} & -\frac{2991524}{5} + \frac{1293632 \text{ I}}{5} & \frac{3690}{13} - \frac{13120 \text{ I}}{13} \\ -\frac{13945}{442} + \frac{5375 \text{ I}}{442} & -\frac{77285}{17} + \frac{309140 \text{ I}}{17} & \frac{2142578}{5} + \frac{848946 \text{ I}}{5} & \frac{1293632}{5} - \frac{2991524 \text{ I}}{5} & -\frac{77285}{2} - \frac{77285 \text{ I}}{2} & -\frac{2475}{17} - \frac{1570 \text{ I}}{17} \\ -\frac{\text{I}}{5} & \frac{2475}{68} + \frac{785 \text{ I}}{34} & -\frac{2460}{13} + \frac{26240 \text{ I}}{39} & -\frac{13120}{13} + \frac{3690 \text{ I}}{13} & -\frac{1570}{17} - \frac{2475 \text{ I}}{17} & \frac{347416769}{52553800} + \frac{347416769 \text{ I}}{52553800} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u\big(x_{ol}\big)=\frac{1}{157661400\,\mathcal{A}x_{ol}}\,\big( -(15766140+15766140\,\mathrm{I})\,u_{ol-5+5\mathrm{I}}+( -1378689000+4015050000\,\mathrm{I})\,u_{ol-4+5\mathrm{I}}+(41241654000+38901702000\,\mathrm{I})\,u_{ol-3+5\mathrm{I}}+(61040472000-6515556000\,\mathrm{I})\,u_{ol-2+5\mathrm{I}}+(1917262500-4974181500\,\mathrm{I})\,u_{ol-1+5\mathrm{I}}-31532280\,u_{ol+5\mathrm{I}}+(4015050000-1378689000\,\mathrm{I})\,u_{ol-5+4\mathrm{I}}+(1523107662375$$

$$+1523107662375\,\mathrm{I})\,u_{ol-4+4\mathrm{I}}+( -35182381055328+29573595669696\,\mathrm{I})\,u_{ol-3+4\mathrm{I}}-(20395583220480+47164786197360\,\mathrm{I})\,u_{ol-2+4\mathrm{I}}+(2867026188000-716756547000\,\mathrm{I})\,u_{ol-1+4\mathrm{I}}+(3640123500+5738411250\,\mathrm{I})\,u_{ol+4\mathrm{I}}+(38901702000+41241654000\,\mathrm{I})\,u_{ol-5+3\mathrm{I}}+(29573595669696-35182381055328\,\mathrm{I})\,u_{ol-4+3\mathrm{I}}$$

$$-(902929465490000+902929465490000\,\mathrm{I})\,u_{ol-3+3\mathrm{I}}+( -1250210029140000+833473352760000\,\mathrm{I})\,u_{ol-2+3\mathrm{I}}+(26769202976880+67560369417840\,\mathrm{I})\,u_{ol-1+3\mathrm{I}}+(106077824000-29834388000\,\mathrm{I})\,u_{ol+3\mathrm{I}}+( -6515556000+61040472000\,\mathrm{I})\,u_{ol-5+2\mathrm{I}}-(47164786197360+20395583220480\,\mathrm{I})\,u_{ol-4+2\mathrm{I}}+(833473352760000$$

$$-1250210029140000\,\mathrm{I})\,u_{ol-3+2\mathrm{I}}+(1354394198235000+1354394198235000\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+( -94329572394720+40791166440960\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+(44751582000-159116736000\,\mathrm{I})\,u_{ol+2\mathrm{I}}+( -4974181500+1917262500\,\mathrm{I})\,u_{ol-5+1\mathrm{I}}+( -716756547000+2867026188000\,\mathrm{I})\,u_{ol-4+1\mathrm{I}}+(67560369417840+26769202976880\,\mathrm{I})\,u_{ol-3+1\mathrm{I}}$$

$$+(40791166440960-94329572394720\,\mathrm{I})\,u_{ol-2+1\mathrm{I}}-(6092430649500+6092430649500\,\mathrm{I})\,u_{ol-1+1\mathrm{I}}-(22953645000+14560494000\,\mathrm{I})\,u_{ol+1\mathrm{I}}-31532280\,\mathrm{I}u_{ol-5}+(5738411250+3640123500\,\mathrm{I})\,u_{ol-4}+( -29834388000+106077824000\,\mathrm{I})\,u_{ol-3}+( -159116736000+44751582000\,\mathrm{I})\,u_{ol-2}-(14560494000+22953645000\,\mathrm{I})\,u_{ol-1}$$

$$+(1042250307+1042250307\,\mathrm{I})\,u_{ol}\big),\,O(\,\mathcal{A}x_{ol}^{\,35}\,)$$

Formula:, 254, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 2

Error order:., 34, Error:., 2.1864522148787556852 × 10<sup>−87</sup>, New Error:., 2.2514523579438799163 × 10<sup>−121</sup>

Error order:., 34, Error:., 2.2514523579438799163 × 10<sup>−121</sup>, New Error:., 2.2579831553741377578 × 10<sup>−155</sup>

Error order:., 34, Error:., 2.2579831553741377578 × 10<sup>−155</sup>, New Error:., 2.2586365331244773889 × 10<sup>−189</sup>

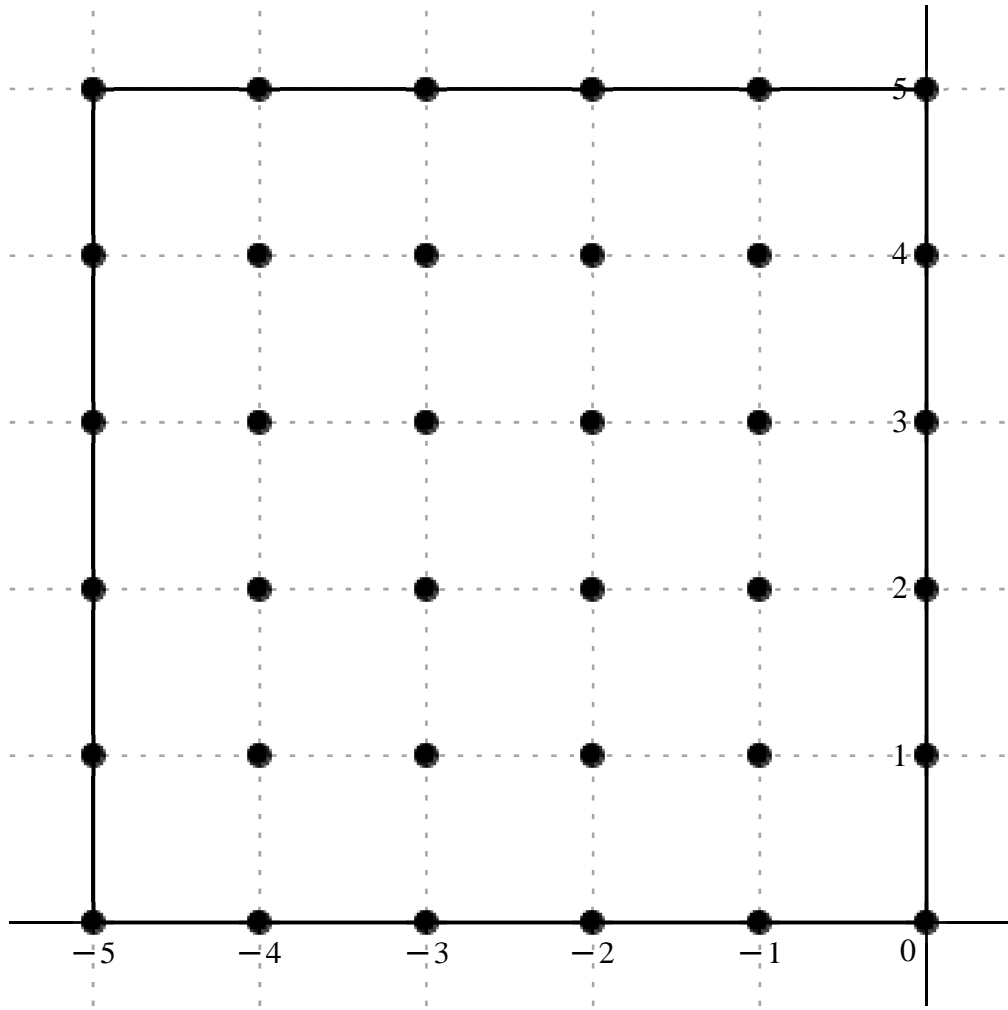
Error order:., 34, Error:., 2.2586365331244773889 × 10<sup>−189</sup>, New Error:., 2.2587018738695932432 × 10<sup>−223</sup>

Error order:., 34, Error:., 2.2587018738695932432 × 10<sup>−223</sup>, New Error:., 2.2587084079737956395 × 10<sup>−257</sup>

$$x_o\neq h.,\left[\begin{array}{cccccc} -5+5\,\mathrm{I} & -4+5\,\mathrm{I} & -3+5\,\mathrm{I} & -2+5\,\mathrm{I} & -1+5\,\mathrm{I} & 5\,\mathrm{I} \\ -5+4\,\mathrm{I} & -4+4\,\mathrm{I} & -3+4\,\mathrm{I} & -2+4\,\mathrm{I} & -1+4\,\mathrm{I} & 4\,\mathrm{I} \\ -5+3\,\mathrm{I} & -4+3\,\mathrm{I} & -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ -5+2\,\mathrm{I} & -4+2\,\mathrm{I} & -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -5+\mathrm{I} & -4+\mathrm{I} & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{array}\right]$$

$$c=,\left[\begin{array}{ccccccccc} -\frac{342161389\,\mathrm{I}}{131384500} & -\frac{39703135721}{89341460}+\frac{19498524379\,\mathrm{I}}{89341460} & \frac{1576696776}{7081945}+\frac{46742870953\,\mathrm{I}}{7081945} & \frac{2331855217}{416585}+\frac{1851561099\,\mathrm{I}}{416585} & \frac{164007308677}{290359745}-\frac{300349711933\,\mathrm{I}}{1161438980} & -\frac{347416769}{131384500}-\frac{336906009\,\mathrm{I}}{131384500} \\ \frac{39703135721}{89341460}+\frac{19498524379\,\mathrm{I}}{89341460} & \frac{42605943\,\mathrm{I}}{170} & -\frac{8639816987}{1625}-\frac{721432991\,\mathrm{I}}{1625} & \frac{6990940109}{3250}-\frac{18050467537\,\mathrm{I}}{3250} & \frac{342470529}{1156}+\frac{995879307\,\mathrm{I}}{5780} & -\frac{56378902439}{357365840}+\frac{276934692821\,\mathrm{I}}{357365840} \\ -\frac{1576696776}{7081945}+\frac{46742870953\,\mathrm{I}}{7081945} & \frac{8639816987}{1625}-\frac{721432991\,\mathrm{I}}{1625} & -\frac{17271547919\,\mathrm{I}}{117} & -\frac{28705734965}{169}-\frac{5562464073\,\mathrm{I}}{169} & -\frac{5196047084}{1625}+\frac{12549608413\,\mathrm{I}}{1625} & \frac{14086426129}{1249755}+\frac{22290035461\,\mathrm{I}}{3749265} \\ -\frac{2331855217}{416585}+\frac{1851561099\,\mathrm{I}}{416585} & -\frac{6990940109}{3250}-\frac{18050467537\,\mathrm{I}}{3250} & \frac{28705734965}{169}-\frac{5562464073\,\mathrm{I}}{169} & \frac{5682731423\,\mathrm{I}}{26} & -\frac{17687846317}{1625}-\frac{6686128069\,\mathrm{I}}{1625} & \frac{13403226729}{833170}-\frac{8227077787\,\mathrm{I}}{833170} \\ -\frac{164007308677}{290359745}-\frac{300349711933\,\mathrm{I}}{1161438980} & -\frac{342470529}{1156}+\frac{995879307\,\mathrm{I}}{5780} & \frac{5196047084}{1625}+\frac{12549608413\,\mathrm{I}}{1625} & \frac{17687846317}{1625}-\frac{6686128069\,\mathrm{I}}{1625} & -\frac{321139869\,\mathrm{I}}{340} & -\frac{79384328389}{89341460}-\frac{255046035121\,\mathrm{I}}{89341460} \\ \frac{347416769}{131384500}-\frac{336906009\,\mathrm{I}}{131384500} & \frac{56378902439}{357365840}+\frac{276934692821\,\mathrm{I}}{357365840} & -\frac{14086426129}{1249755}+\frac{22290035461\,\mathrm{I}}{3749265} & -\frac{13403226729}{833170}-\frac{8227077787\,\mathrm{I}}{833170} & \frac{79384328389}{89341460}-\frac{255046035121\,\mathrm{I}}{89341460} & \frac{44790771896407\,\mathrm{I}}{522647541000} \end{array}\right]$$





$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{1}{1045295082000 \Delta x_{ol}^2} \big( -2722236010884 \operatorname{I} u_{ol-5+51} + (-464526687935700 + 228132735234300 \operatorname{I}) u_{ol-4+51} + (232720444137600 + 6899247752662800 \operatorname{I}) u_{ol-3+51} + (5851091110496400 + 4645937109610800 \operatorname{I}) u_{ol-2+51} + (590426311237200 - 270314740739700 \operatorname{I}) u_{ol-1+51} - (2764047814164 + 2680424207604 \operatorname{I}) u_{ol+51} \\ + (464526687935700 + 228132735234300 \operatorname{I}) u_{ol-5+41} + 261975192246307800 \operatorname{I} u_{ol-4+41} - (5557635819009943344 + 464067912298369392 \operatorname{I}) u_{ol-3+41} + (2248490865998228904 - 5805558444377462472 \operatorname{I}) u_{ol-2+41} + (309673667555050500 + 180101685445098300 \operatorname{I}) u_{ol-1+41} + (-164908289634075 + 810033976501425 \operatorname{I}) u_{ol+41} \\ + (-232720444137600 + 6899247752662800 \operatorname{I}) u_{ol-5+31} + (5557635819009943344 - 464067912298369392 \operatorname{I}) u_{ol-4+31} - 154306530754342174000 \operatorname{I} u_{ol-3+31} - (177550080379348770000 + 34404830410109994000 \operatorname{I}) u_{ol-2+31} + (-3342401515535779008 + 8072642433929061456 \operatorname{I}) u_{ol-1+31} + (11781886814295600 \\ + 6214461886526800 \operatorname{I}) u_{ol+31} + (-5851091110496400 + 4645937109610800 \operatorname{I}) u_{ol-5+21} - (2248490865998228904 + 5805558444377462472 \operatorname{I}) u_{ol-4+21} + (177550080379348770000 - 34404830410109994000 \operatorname{I}) u_{ol-3+21} + 228466584953413911000 \operatorname{I} u_{ol-2+21} - (11377857702358100304 + 4300908792706373328 \operatorname{I}) u_{ol-1+21} \\ + (16815688254203400 - 10321691791570200 \operatorname{I}) u_{ol+21} - (590426311237200 + 270314740739700 \operatorname{I}) u_{ol-5+1} + (-309673667555050500 + 180101685445098300 \operatorname{I}) u_{ol-4+1} + (3342401515535779008 + 8072642433929061456 \operatorname{I}) u_{ol-3+1} + (11377857702358100304 - 4300908792706373328 \operatorname{I}) u_{ol-2+1} \\ - 987311546175953700 \operatorname{I} u_{ol-1+1} - (928796642151300 + 2984038610915700 \operatorname{I}) u_{ol+1} + (2764047814164 - 2680424207604 \operatorname{I}) u_{ol-5} + (164908289634075 + 810033976501425 \operatorname{I}) u_{ol-4} + (-11781886814295600 + 6214461886526800 \operatorname{I}) u_{ol-3} - (16815688254203400 + 10321691791570200 \operatorname{I}) u_{ol-2} + (928796642151300 \\ - 2984038610915700 \operatorname{I}) u_{ol-1} + 89581543792814 \operatorname{I} u_{ol} \big), \quad O(\Delta x_{ol}^{34})$$

Formula.: 255, Var.: 1

Variavel.:  $x_{ol}$ , Derivada de Ordem.: 1

Error order.: 35, Error.:  $1.1452270159924223841 \times 10^{-90}$ , New Error.:  $1.1363811114891861851 \times 10^{-125}$

Error order.: 35, Error.:  $1.1363811114891861851 \times 10^{-125}$ , New Error.:  $1.1354483258581827167 \times 10^{-160}$

Error order.: 35, Error.:  $1.1354483258581827167 \times 10^{-160}$ , New Error.:  $1.1353545759826096838 \times 10^{-195}$

Error order.: 35, Error.:  $1.1353545759826096838 \times 10^{-195}$ , New Error.:  $1.1353451962924818419 \times 10^{-230}$

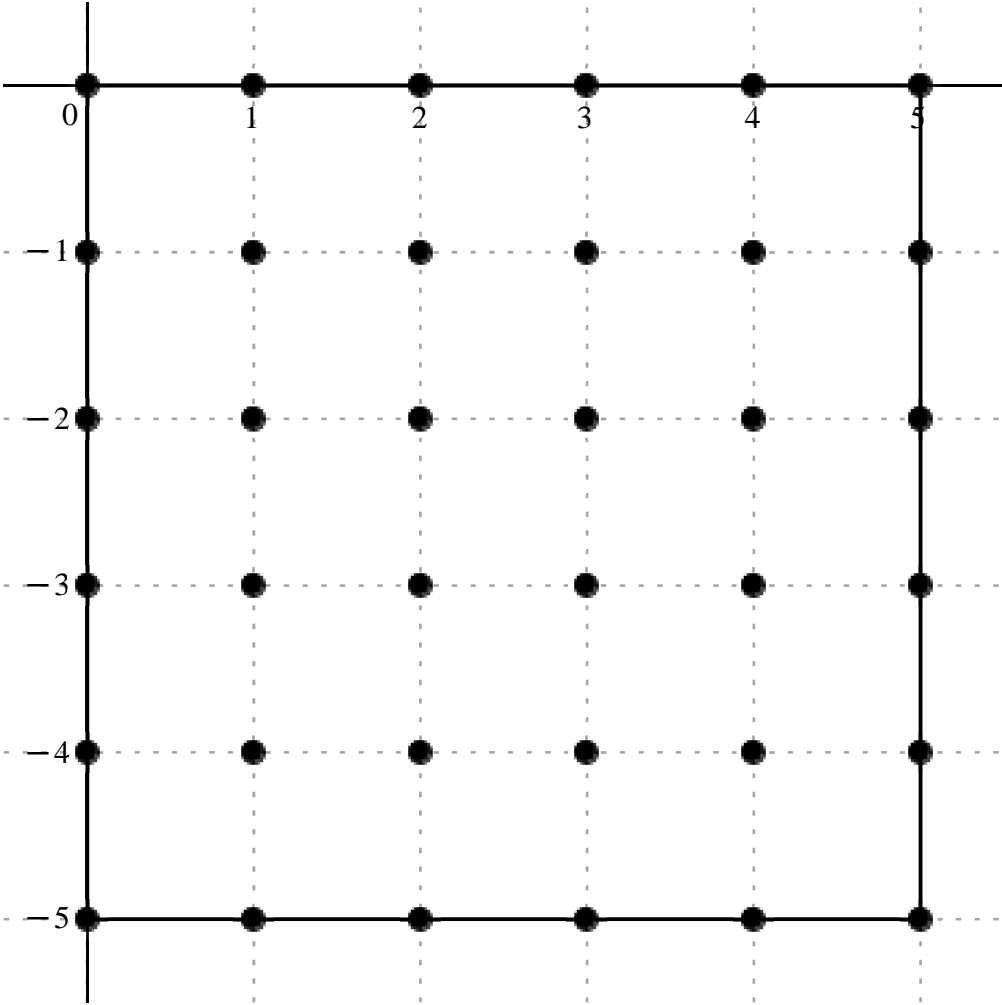
Error order.: 35, Error.:  $1.1353451962924818419 \times 10^{-230}$ , New Error.:  $1.1353442582764538980 \times 10^{-265}$

$$x_o + h \cdot,$$

0	1	2	3	4	5
−1	1−1	2−1	3−1	4−1	5−1
−2 I	1−2 I	2−2 I	3−2 I	4−2 I	5−2 I
−3 I	1−3 I	2−3 I	3−3 I	4−3 I	5−3 I
−4 I	1−4 I	2−4 I	3−4 I	4−4 I	5−4 I
−5 I	1−5 I	2−5 I	3−5 I	4−5 I	5−5 I

$$c =,$$

$-\frac{347416769}{52553800} - \frac{347416769 I}{52553800}$	$\frac{1570}{17} + \frac{2475 I}{17}$	$\frac{13120}{13} - \frac{3690 I}{13}$	$\frac{2460}{13} - \frac{26240 I}{39}$	$-\frac{2475}{68} - \frac{785 I}{34}$	$\frac{I}{5}$
$\frac{2475}{17} + \frac{1570 I}{17}$	$\frac{77285}{2} + \frac{77285 I}{2}$	$-\frac{1293632}{5} + \frac{2991524 I}{5}$	$-\frac{2142578}{5} - \frac{848946 I}{5}$	$\frac{77285}{17} - \frac{309140 I}{17}$	$\frac{13945}{442} - \frac{5375 I}{442}$
$-\frac{3690}{13} + \frac{13120 I}{13}$	$\frac{2991524}{5} - \frac{1293632 I}{5}$	$-8590525 - 8590525 I$	$-\frac{68724200}{13} + \frac{103086300 I}{13}$	$\frac{1495762}{5} + \frac{646816 I}{5}$	$\frac{15580}{377} - \frac{145960 I}{377}$
$-\frac{26240}{39} + \frac{2460 I}{13}$	$-\frac{848946}{5} - \frac{2142578 I}{5}$	$\frac{103086300}{13} - \frac{68724200 I}{13}$	$\frac{17181050}{3} + \frac{17181050 I}{3}$	$-\frac{4689416}{25} + \frac{5578788 I}{25}$	$-\frac{54530}{221} - \frac{57810 I}{221}$
$-\frac{785}{34} - \frac{2475 I}{68}$	$-\frac{309140}{17} + \frac{77285 I}{17}$	$\frac{646816}{5} + \frac{1495762 I}{5}$	$\frac{5578788}{25} - \frac{4689416 I}{25}$	$-\frac{77285}{8} - \frac{77285 I}{8}$	$-\frac{17750}{697} + \frac{6095 I}{697}$
$\frac{1}{5}$	$-\frac{5375}{442} + \frac{13945 I}{442}$	$-\frac{145960}{377} + \frac{15580 I}{377}$	$-\frac{57810}{221} - \frac{54530 I}{221}$	$\frac{6095}{697} - \frac{17750 I}{697}$	$\frac{1}{10} + \frac{I}{10}$



$$\begin{aligned} \frac{d}{dx_{ol}} u(x_{ol}) = & \frac{1}{157661400 \Delta x_{ol}} \big( -(1042250307 + 1042250307 I) u_{ol} + (14560494000 + 22953645000 I) u_{ol+1} + (159116736000 - 44751582000 I) u_{ol+2} + (29834388000 - 106077824000 I) u_{ol+3} \\ & - (5738411250 + 3640123500 I) u_{ol+4} + 31532280 I u_{ol+5} + (22953645000 + 14560494000 I) u_{ol-1} + (6092430649500 \\ & + 6092430649500 I) u_{ol+1-1} + (-40791166440960 + 94329572394720 I) u_{ol+2-1} - (67560369417840 + 26769202976880 I) u_{ol+3-1} + (716756547000 - 2867026188000 I) u_{ol+4-1} \\ & + (4974181500 - 1917262500 I) u_{ol+5-1} + (-44751582000 + 159116736000 I) u_{ol-21} + (94329572394720 - 40791166440960 I) u_{ol+1-21} \\ & - (1354394198235000 + 1354394198235000 I) u_{ol+2-21} + (-833473352760000 + 1250210029140000 I) u_{ol+3-21} + (47164786197360 + 20395583220480 I) u_{ol+4-21} \\ & + (6515556000 - 61040472000 I) u_{ol+5-21} + (-106077824000 + 29834388000 I) u_{ol-31} - (26769202976880 + 67560369417840 I) u_{ol+1-31} + (1250210029140000 \\ & - 833473352760000 I) u_{ol+2-31} + (902929465490000 + 902929465490000 I) u_{ol+3-31} + (-29573595669696 + 35182381055328 I) u_{ol+4-31} - (38901702000 + 41241654000 I) u_{ol+5-31} \\ & - (3640123500 + 5738411250 I) u_{ol-41} + (-2867026188000 + 716756547000 I) u_{ol+1-41} + (20395583220480 + 47164786197360 I) u_{ol+2-41} \\ & + (35182381055328 - 29573595669696 I) u_{ol+3-41} - (1523107662375 + 1523107662375 I) u_{ol+4-41} + (-4015050000 + 1378689000 I) u_{ol+5-41} + 31532280 u_{ol-51} \\ & + (-1917262500 + 4974181500 I) u_{ol+1-51} + (-61040472000 + 6515556000 I) u_{ol+2-51} - (41241654000 + 38901702000 I) u_{ol+3-51} + (1378689000 \\ & - 4015050000 I) u_{ol+4-51} + (15766140 + 15766140 I) u_{ol+5-51} \big), \quad O(\Delta x_{ol}^{35}) \end{aligned}$$

Formula:, 256, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 2

Error order:, 34, Error:,  $2.3316321098153895714 \times 10^{-87}$ , New Error:,  $2.2659725743440121293 \times 10^{-121}$

Error order:, 34, Error:,  $2.2659725743440121293 \times 10^{-121}$ , New Error:,  $2.2594351792408157508 \times 10^{-155}$

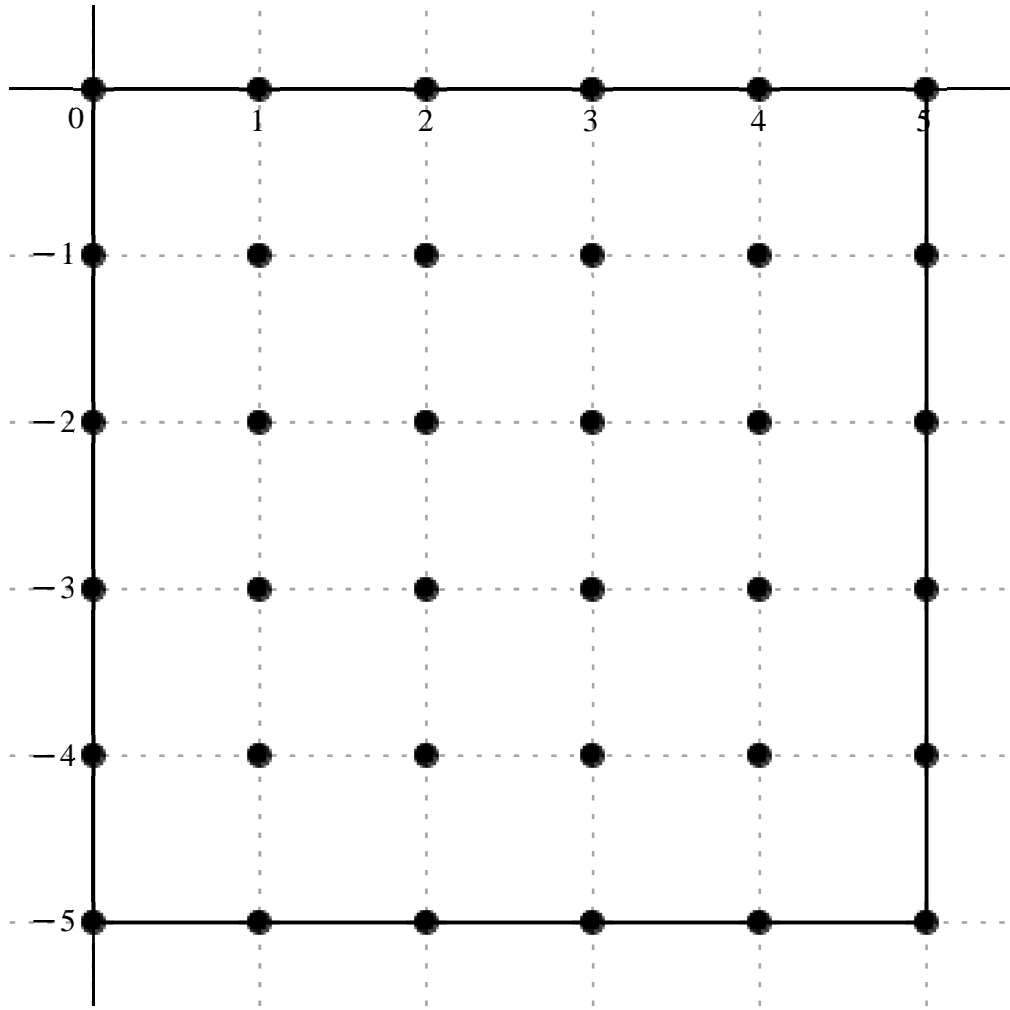
Error order:, 34, Error:,  $2.2594351792408157508 \times 10^{-155}$ , New Error:,  $2.2587817355133718505 \times 10^{-189}$

Error order:, 34, Error:,  $2.2587817355133718505 \times 10^{-189}$ , New Error:,  $2.2587163941084849160 \times 10^{-223}$

Error order:, 34, Error:,  $2.2587163941084849160 \times 10^{-223}$ , New Error:,  $2.2587098599976848090 \times 10^{-257}$

$$x_o + h \cdot , \begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \\ -1 & 1-1 & 2-1 & 3-1 & 4-1 & 5-1 \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & 3-2\text{ I} & 4-2\text{ I} & 5-2\text{ I} \\ -3\text{ I} & 1-3\text{ I} & 2-3\text{ I} & 3-3\text{ I} & 4-3\text{ I} & 5-3\text{ I} \\ -4\text{ I} & 1-4\text{ I} & 2-4\text{ I} & 3-4\text{ I} & 4-4\text{ I} & 5-4\text{ I} \\ -5\text{ I} & 1-5\text{ I} & 2-5\text{ I} & 3-5\text{ I} & 4-5\text{ I} & 5-5\text{ I} \end{bmatrix}$$

$$c = , \left[ \begin{array}{cccccc} \frac{44790771896407\text{ I}}{522647541000} & \frac{79384328389}{89341460} - \frac{255046035121\text{ I}}{89341460} & -\frac{13403226729}{833170} - \frac{8227077787\text{ I}}{833170} & -\frac{14086426129}{1249755} + \frac{22290035461\text{ I}}{3749265} & \frac{56378902439}{357365840} + \frac{276934692821\text{ I}}{357365840} & \frac{347416769}{131384500} - \frac{336906009\text{ I}}{131384500} \\ -\frac{79384328389}{89341460} - \frac{255046035121\text{ I}}{89341460} & -\frac{321139869\text{ I}}{340} & \frac{17687846317}{1625} - \frac{6686128069\text{ I}}{1625} & \frac{5196047084}{1625} + \frac{12549608413\text{ I}}{1625} & -\frac{342470529}{1156} + \frac{995879307\text{ I}}{5780} & -\frac{164007308677}{290359745} - \frac{300349711933\text{ I}}{1161438980} \\ \frac{13403226729}{833170} - \frac{8227077787\text{ I}}{833170} & -\frac{17687846317}{1625} - \frac{6686128069\text{ I}}{1625} & \frac{5682731423\text{ I}}{26} & \frac{28705734965}{169} - \frac{5562464073\text{ I}}{169} & -\frac{6990940109}{3250} - \frac{18050467537\text{ I}}{3250} & -\frac{2331855217}{416585} + \frac{1851561099\text{ I}}{416585} \\ \frac{14086426129}{1249755} + \frac{22290035461\text{ I}}{3749265} & -\frac{5196047084}{1625} + \frac{12549608413\text{ I}}{1625} & -\frac{28705734965}{169} - \frac{5562464073\text{ I}}{169} & -\frac{17271547919\text{ I}}{117} & \frac{8639816987}{1625} - \frac{721432991\text{ I}}{1625} & -\frac{1576696776}{7081945} + \frac{46742870953\text{ I}}{7081945} \\ -\frac{56378902439}{357365840} + \frac{276934692821\text{ I}}{357365840} & \frac{342470529}{1156} + \frac{995879307\text{ I}}{5780} & \frac{6990940109}{3250} - \frac{18050467537\text{ I}}{3250} & -\frac{8639816987}{1625} - \frac{721432991\text{ I}}{1625} & \frac{42605943\text{ I}}{170} & \frac{39703135721}{89341460} + \frac{19498524379\text{ I}}{89341460} \\ -\frac{347416769}{131384500} - \frac{336906009\text{ I}}{131384500} & \frac{164007308677}{290359745} - \frac{300349711933\text{ I}}{1161438980} & \frac{2331855217}{416585} + \frac{1851561099\text{ I}}{416585} & \frac{1576696776}{7081945} + \frac{46742870953\text{ I}}{7081945} & -\frac{39703135721}{89341460} + \frac{19498524379\text{ I}}{89341460} & -\frac{342161389\text{ I}}{131384500} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{1045295082000 \, \Delta x_{ol}^2} \big( 89581543792814 \, \mathbf{I} u_{ol} + (928796642151300 - 2984038610915700 \, \mathbf{I}) \, u_{ol+1} - (16815688254203400 + 10321691791570200 \, \mathbf{I}) \, u_{ol+2} + (-11781886814295600 + 6214461886526800 \, \mathbf{I}) \, u_{ol+3} + (164908289634075 + 810033976501425 \, \mathbf{I}) \, u_{ol+4} + (2764047814164 - 2680424207604 \, \mathbf{I}) \, u_{ol+5} \\ - (928796642151300 + 2984038610915700 \, \mathbf{I}) \, u_{ol-1} - 987311546175953700 \, \mathbf{I} u_{ol+1-1} + (11377857702358100304 - 4300908792706373328 \, \mathbf{I}) \, u_{ol+2-1} + (3342401515535779008 + 8072642433929061456 \, \mathbf{I}) \, u_{ol+3-1} + (-309673667555050500 + 180101685445098300 \, \mathbf{I}) \, u_{ol+4-1} - (590426311237200 + 270314740739700 \, \mathbf{I}) \, u_{ol+5-1} \\ + (16815688254203400 - 10321691791570200 \, \mathbf{I}) \, u_{ol-21} - (11377857702358100304 + 4300908792706373328 \, \mathbf{I}) \, u_{ol+1-21} + 228466584953413911000 \, \mathbf{I} u_{ol+2-21} + (177550080379348770000 - 34404830410109994000 \, \mathbf{I}) \, u_{ol+3-21} - (2248490865998228904 + 5805558444377462472 \, \mathbf{I}) \, u_{ol+4-21} + (-5851091110496400 \\ + 4645937109610800 \, \mathbf{I}) \, u_{ol+5-21} + (11781886814295600 + 6214461886526800 \, \mathbf{I}) \, u_{ol-31} + (-3342401515535779008 + 8072642433929061456 \, \mathbf{I}) \, u_{ol+1-31} - (177550080379348770000 + 34404830410109994000 \, \mathbf{I}) \, u_{ol+2-31} - 154306530754342174000 \, \mathbf{I} u_{ol+3-31} + (5557635819009943344 - 464067912298369392 \, \mathbf{I}) \, u_{ol+4-31} \\ + (-232720444137600 + 6899247752662800 \, \mathbf{I}) \, u_{ol+5-31} + (-164908289634075 + 810033976501425 \, \mathbf{I}) \, u_{ol-41} + (309673667555050500 + 180101685445098300 \, \mathbf{I}) \, u_{ol+1-41} + (2248490865998228904 - 5805558444377462472 \, \mathbf{I}) \, u_{ol+2-41} - (5557635819009943344 + 464067912298369392 \, \mathbf{I}) \, u_{ol+3-41} \\ + 261975192246307800 \, \mathbf{I} u_{ol+4-41} + (464526687935700 + 228132735234300 \, \mathbf{I}) \, u_{ol+5-41} - (2764047814164 + 2680424207604 \, \mathbf{I}) \, u_{ol-51} + (590426311237200 - 270314740739700 \, \mathbf{I}) \, u_{ol+1-51} + (5851091110496400 + 4645937109610800 \, \mathbf{I}) \, u_{ol+2-51} + (232720444137600 + 6899247752662800 \, \mathbf{I}) \, u_{ol+3-51} + (-464526687935700 \\ + 228132735234300 \, \mathbf{I}) \, u_{ol+4-51} - 2722236010884 \, \mathbf{I} u_{ol+5-51} \big), \, O( \, \Delta x_{ol}^{34} \, )$$

Formula.: 257, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 1

Error order.: 35, Error.: 1.0858426550034341052 × 10<sup>−90</sup>, New Error.: 1.1303462804067322590 × 10<sup>−125</sup>

Error order.: 35, Error.: 1.1303462804067322590 × 10<sup>−125</sup>, New Error.: 1.1348438915552713744 × 10<sup>−160</sup>

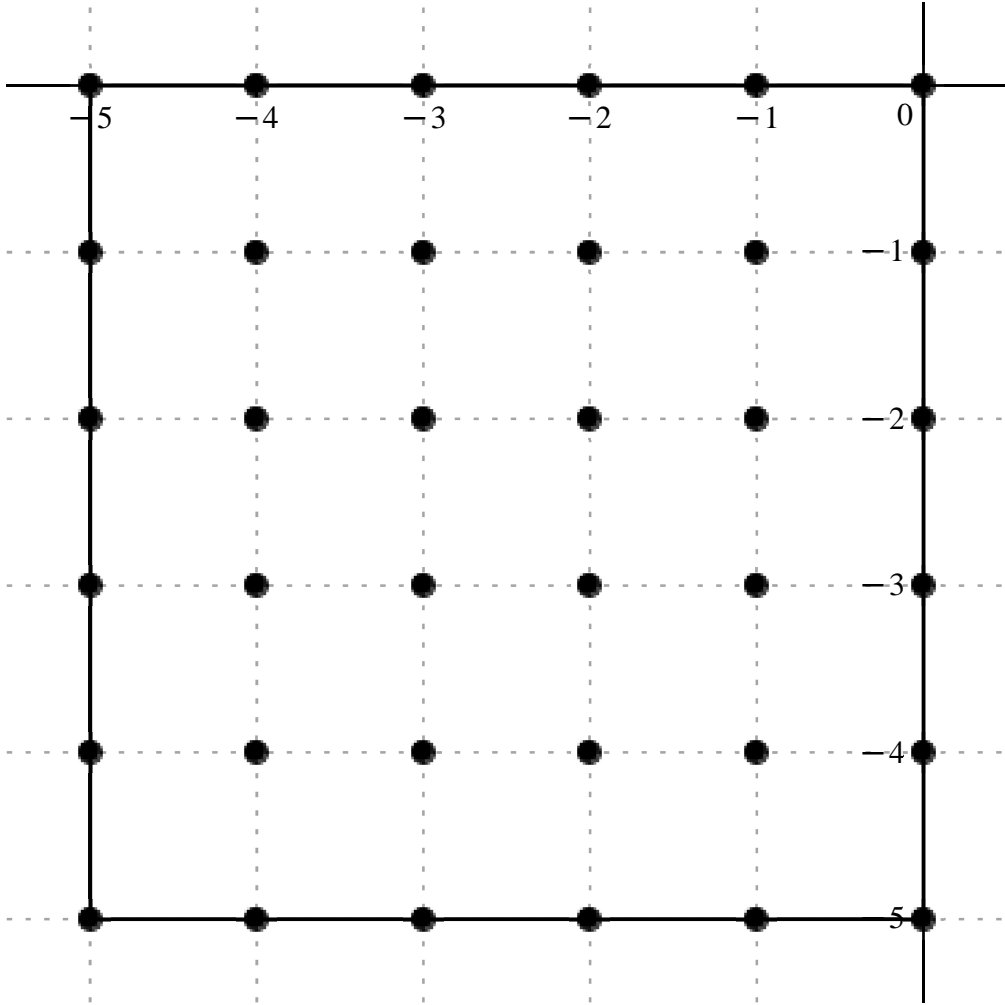
Error order.: 35, Error.: 1.1348438915552713744 × 10<sup>−160</sup>, New Error.: 1.1352941230531260574 × 10<sup>−195</sup>

Error order.: 35, Error.: 1.1352941230531260574 × 10<sup>−195</sup>, New Error.: 1.1353391509045543085 × 10<sup>−230</sup>

Error order.: 35, Error.: 1.1353391509045543085 × 10<sup>−230</sup>, New Error.: 1.1353436537367113657 × 10<sup>−265</sup>

$$x_o+h\cdot,\left[\begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ -5-I & -4-I & -3-I & -2-I & -1-I & -I \\ -5-2\,I & -4-2\,I & -3-2\,I & -2-2\,I & -1-2\,I & -2\,I \\ -5-3\,I & -4-3\,I & -3-3\,I & -2-3\,I & -1-3\,I & -3\,I \\ -5-4\,I & -4-4\,I & -3-4\,I & -2-4\,I & -1-4\,I & -4\,I \\ -5-5\,I & -4-5\,I & -3-5\,I & -2-5\,I & -1-5\,I & -5\,I \end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} \frac{I}{5} & \frac{2475}{68}-\frac{785\,I}{34} & -\frac{2460}{13}-\frac{26240\,I}{39} & -\frac{13120}{13}-\frac{3690\,I}{13} & -\frac{1570}{17}+\frac{2475\,I}{17} & \frac{347416769}{52553800}-\frac{347416769\,I}{52553800} \\ -\frac{13945}{442}-\frac{5375\,I}{442} & -\frac{77285}{17}-\frac{309140\,I}{17} & \frac{2142578}{5}-\frac{848946\,I}{5} & \frac{1293632}{5}+\frac{2991524\,I}{5} & -\frac{77285}{2}+\frac{77285\,I}{2} & -\frac{2475}{17}+\frac{1570\,I}{17} \\ -\frac{15580}{377}-\frac{145960\,I}{377} & -\frac{1495762}{5}+\frac{646816\,I}{5} & \frac{68724200}{13}+\frac{103086300\,I}{13} & 8590525-8590525\,I & -\frac{2991524}{5}-\frac{1293632\,I}{5} & \frac{3690}{13}+\frac{13120\,I}{13} \\ \frac{54530}{221}-\frac{57810\,I}{221} & \frac{4689416}{25}+\frac{5578788\,I}{25} & -\frac{17181050}{3}+\frac{17181050\,I}{3} & -\frac{103086300}{13}-\frac{68724200\,I}{13} & \frac{848946}{5}-\frac{2142578\,I}{5} & \frac{26240}{39}+\frac{2460\,I}{13} \\ \frac{17750}{697}+\frac{6095\,I}{697} & \frac{77285}{8}-\frac{77285\,I}{8} & -\frac{5578788}{25}-\frac{4689416\,I}{25} & -\frac{646816}{5}+\frac{1495762\,I}{5} & \frac{309140}{17}+\frac{77285\,I}{17} & \frac{785}{34}-\frac{2475\,I}{68} \\ -\frac{1}{10}+\frac{I}{10} & -\frac{6095}{697}-\frac{17750\,I}{697} & \frac{57810}{221}-\frac{54530\,I}{221} & \frac{145960}{377}+\frac{15580\,I}{377} & \frac{5375}{442}+\frac{13945\,I}{442} & -\frac{1}{5} \end{array}\right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{157661400\,\Delta x_{ol}}\, (31532280\,I\,u_{ol-5}+(5738411250-3640123500\,I)\,u_{ol-4}-(29834388000+106077824000\,I)\,u_{ol-3}-(159116736000+44751582000\,I)\,u_{ol-2}+(-14560494000+22953645000\,I)\,u_{ol-1}+(1042250307-1042250307\,I)\,u_{ol}-(4974181500+1917262500\,I)\,u_{ol-5-1}-(716756547000$$

$$+2867026188000\,I)\,u_{ol-4-1}+(67560369417840-26769202976880\,I)\,u_{ol-3-1}+(40791166440960+94329572394720\,I)\,u_{ol-2-1}+(-6092430649500+6092430649500\,I)\,u_{ol-1-1}+(-22953645000+14560494000\,I)\,u_{ol-1}-(6515556000+61040472000\,I)\,u_{ol-5-21}+(-47164786197360+20395583220480\,I)\,u_{ol-4-21}$$

$$+(833473352760000+1250210029140000\,I)\,u_{ol-3-21}+(1354394198235000-1354394198235000\,I)\,u_{ol-2-21}-(94329572394720+40791166440960\,I)\,u_{ol-1-21}+(44751582000+159116736000\,I)\,u_{ol-21}+(38901702000-41241654000\,I)\,u_{ol-5-31}+(29573595669696+35182381055328\,I)\,u_{ol-4-31}+(-902929465490000$$

$$+902929465490000\,I)\,u_{ol-3-31}-(1250210029140000+833473352760000\,I)\,u_{ol-2-31}+(26769202976880-67560369417840\,I)\,u_{ol-1-31}+(106077824000+29834388000\,I)\,u_{ol-31}+(4015050000+1378689000\,I)\,u_{ol-5-41}+(1523107662375-1523107662375\,I)\,u_{ol-4-41}-(35182381055328+29573595669696\,I)\,u_{ol-3-41}$$

$$+(-20395583220480+47164786197360\,I)\,u_{ol-2-41}+(2867026188000+716756547000\,I)\,u_{ol-1-41}+(3640123500-5738411250\,I)\,u_{ol-41}+(-15766140+15766140\,I)\,u_{ol-5-51}-(1378689000+4015050000\,I)\,u_{ol-4-51}+(41241654000-38901702000\,I)\,u_{ol-3-51}+(61040472000+6515556000\,I)\,u_{ol-2-51}+(1917262500$$

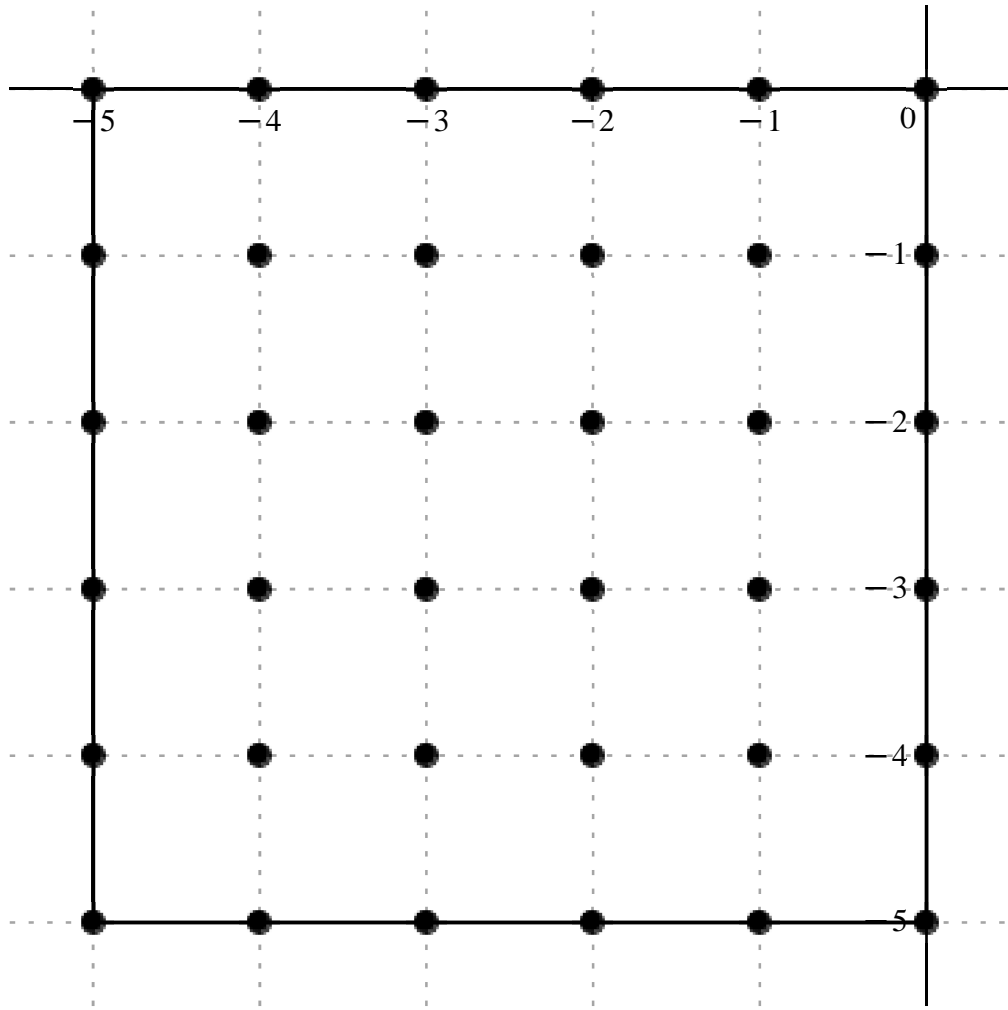
$$+4974181500\,I)\,u_{ol-1-51}-31532280\,u_{ol-51}),\,O(\,\,\Delta x_{ol}^{\,\,35}\,\,)$$

Formula.: 258, Var.: 1  
Variavel .:  $x_o$  , Derivada de Ordem .: 2

Error order.: 34, Error.:  $2.2108250487949328988 \times 10^{-87}$ , New Error.:  $2.2539490346577128874 \times 10^{-121}$   
Error order.: 34, Error.:  $2.2539490346577128874 \times 10^{-121}$ , New Error.:  $2.2582334222515042488 \times 10^{-155}$   
Error order.: 34, Error.:  $2.2582334222515042488 \times 10^{-155}$ , New Error.:  $2.2586615658095470435 \times 10^{-189}$   
Error order.: 34, Error.:  $2.2586615658095470435 \times 10^{-189}$ , New Error.:  $2.2587043771980788119 \times 10^{-223}$   
Error order.: 34, Error.:  $2.2587043771980788119 \times 10^{-223}$ , New Error.:  $2.2587086583072439876 \times 10^{-257}$

$$x_o + h \cdot \begin{bmatrix} -5 & -4 & -3 & -2 & -1 & 0 \\ -5 - I & -4 - I & -3 - I & -2 - I & -1 - I & -I \\ -5 - 2 I & -4 - 2 I & -3 - 2 I & -2 - 2 I & -1 - 2 I & -2 I \\ -5 - 3 I & -4 - 3 I & -3 - 3 I & -2 - 3 I & -1 - 3 I & -3 I \\ -5 - 4 I & -4 - 4 I & -3 - 4 I & -2 - 4 I & -1 - 4 I & -4 I \\ -5 - 5 I & -4 - 5 I & -3 - 5 I & -2 - 5 I & -1 - 5 I & -5 I \end{bmatrix}$$

$$c =, \left[ \begin{array}{cc} \frac{347416769}{131384500} + \frac{336906009 I}{131384500} & \frac{56378902439}{357365840} - \frac{276934692821 I}{357365840} - \frac{14086426129}{1249755} - \frac{22290035461 I}{3749265} - \frac{13403226729}{833170} + \frac{8227077787 I}{833170} - \frac{79384328389}{89341460} + \frac{255046035121 I}{89341460} - \frac{44790771896407 I}{522647541000} \\ - \frac{164007308677}{290359745} + \frac{300349711933 I}{1161438980} & - \frac{342470529}{1156} - \frac{995879307 I}{5780} - \frac{5196047084}{1625} - \frac{12549608413 I}{1625} - \frac{17687846317}{1625} + \frac{6686128069 I}{1625} - \frac{321139869 I}{340} - \frac{79384328389}{89341460} + \frac{255046035121 I}{89341460} \\ - \frac{2331855217}{416585} - \frac{1851561099 I}{416585} & - \frac{6990940109}{3250} + \frac{18050467537 I}{3250} - \frac{28705734965}{169} + \frac{5562464073 I}{169} - \frac{5682731423 I}{26} - \frac{17687846317}{1625} + \frac{6686128069 I}{1625} - \frac{13403226729}{833170} + \frac{8227077787 I}{833170} \\ - \frac{1576696776}{7081945} - \frac{46742870953 I}{7081945} & \frac{8639816987}{1625} + \frac{721432991 I}{1625} - \frac{17271547919 I}{117} - \frac{28705734965}{169} + \frac{5562464073 I}{169} - \frac{5196047084}{1625} - \frac{12549608413 I}{1625} - \frac{14086426129}{1249755} - \frac{22290035461 I}{3749265} \\ \frac{39703135721}{89341460} - \frac{19498524379 I}{89341460} & - \frac{42605943 I}{170} - \frac{8639816987}{1625} + \frac{721432991 I}{1625} - \frac{6990940109}{3250} + \frac{18050467537 I}{3250} - \frac{342470529}{1156} - \frac{995879307 I}{5780} - \frac{56378902439}{357365840} - \frac{276934692821 I}{357365840} \\ & \frac{342161389 I}{131384500} - \frac{39703135721}{89341460} - \frac{19498524379 I}{89341460} - \frac{1576696776}{7081945} - \frac{46742870953 I}{7081945} - \frac{2331855217}{416585} - \frac{1851561099 I}{416585} - \frac{164007308677}{290359745} + \frac{300349711933 I}{1161438980} - \frac{347416769}{131384500} + \frac{336906009 I}{131384500} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{1}{1045295082000 \Delta x_{ol}^2} \big( (2764047814164 + 2680424207604 \operatorname{I}) u_{ol-5} + (164908289634075 - 810033976501425 \operatorname{I}) u_{ol-4} - (11781886814295600 + 6214461886526800 \operatorname{I}) u_{ol-3} + (-16815688254203400 + 10321691791570200 \operatorname{I}) u_{ol-2} + (928796642151300 + 2984038610915700 \operatorname{I}) u_{ol-1} - 89581543792814 \operatorname{I} u_{ol} \\ + (-590426311237200 + 270314740739700 \operatorname{I}) u_{ol-5-1} - (309673667555050500 + 180101685445098300 \operatorname{I}) u_{ol-4-1} + (3342401515535779008 - 8072642433929061456 \operatorname{I}) u_{ol-3-1} + (11377857702358100304 + 4300908792706373328 \operatorname{I}) u_{ol-2-1} + 987311546175953700 \operatorname{I} u_{ol-1-1} + (-928796642151300 + 2984038610915700 \operatorname{I}) u_{ol-1} \\ - (5851091110496400 + 4645937109610800 \operatorname{I}) u_{ol-5-21} + (-2248490865998228904 + 5805558444377462472 \operatorname{I}) u_{ol-4-21} + (177550080379348770000 + 34404830410109994000 \operatorname{I}) u_{ol-3-21} - 228466584953413911000 \operatorname{I} u_{ol-2-21} + (-11377857702358100304 + 4300908792706373328 \operatorname{I}) u_{ol-1-21} + (16815688254203400 \\ + 10321691791570200 \operatorname{I}) u_{ol-21} - (232720444137600 + 6899247752662800 \operatorname{I}) u_{ol-5-31} + (5557635819009943344 + 464067912298369392 \operatorname{I}) u_{ol-4-31} + 154306530754342174000 \operatorname{I} u_{ol-3-31} + (-177550080379348770000 + 34404830410109994000 \operatorname{I}) u_{ol-2-31} - (3342401515535779008 + 8072642433929061456 \operatorname{I}) u_{ol-1-31} \\ + (11781886814295600 - 6214461886526800 \operatorname{I}) u_{ol-31} + (464526687935700 - 228132735234300 \operatorname{I}) u_{ol-5-41} - 261975192246307800 \operatorname{I} u_{ol-4-41} + (-5557635819009943344 + 464067912298369392 \operatorname{I}) u_{ol-3-41} + (2248490865998228904 + 5805558444377462472 \operatorname{I}) u_{ol-2-41} + (309673667555050500 \\ - 180101685445098300 \operatorname{I}) u_{ol-1-41} - (164908289634075 + 810033976501425 \operatorname{I}) u_{ol-41} + 2722236010884 \operatorname{I} u_{ol-5-51} - (464526687935700 + 228132735234300 \operatorname{I}) u_{ol-4-51} + (232720444137600 - 6899247752662800 \operatorname{I}) u_{ol-3-51} + (5851091110496400 - 4645937109610800 \operatorname{I}) u_{ol-2-51} + (590426311237200 \\ + 270314740739700 \operatorname{I}) u_{ol-1-51} + (-2764047814164 + 2680424207604 \operatorname{I}) u_{ol-51} \big), \quad O(\Delta x_{ol}^{34})$$

Square: Interval, 6

Formula.: 259, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 1

Error order.: 48, Error.:  $1.7395706058429143205 \times 10^{-126}$ , New Error.:  $1.7010533456340580452 \times 10^{-174}$

Error order.: 48, Error.:  $1.7010533456340580452 \times 10^{-174}$ , New Error.:  $1.6971667100992392592 \times 10^{-222}$

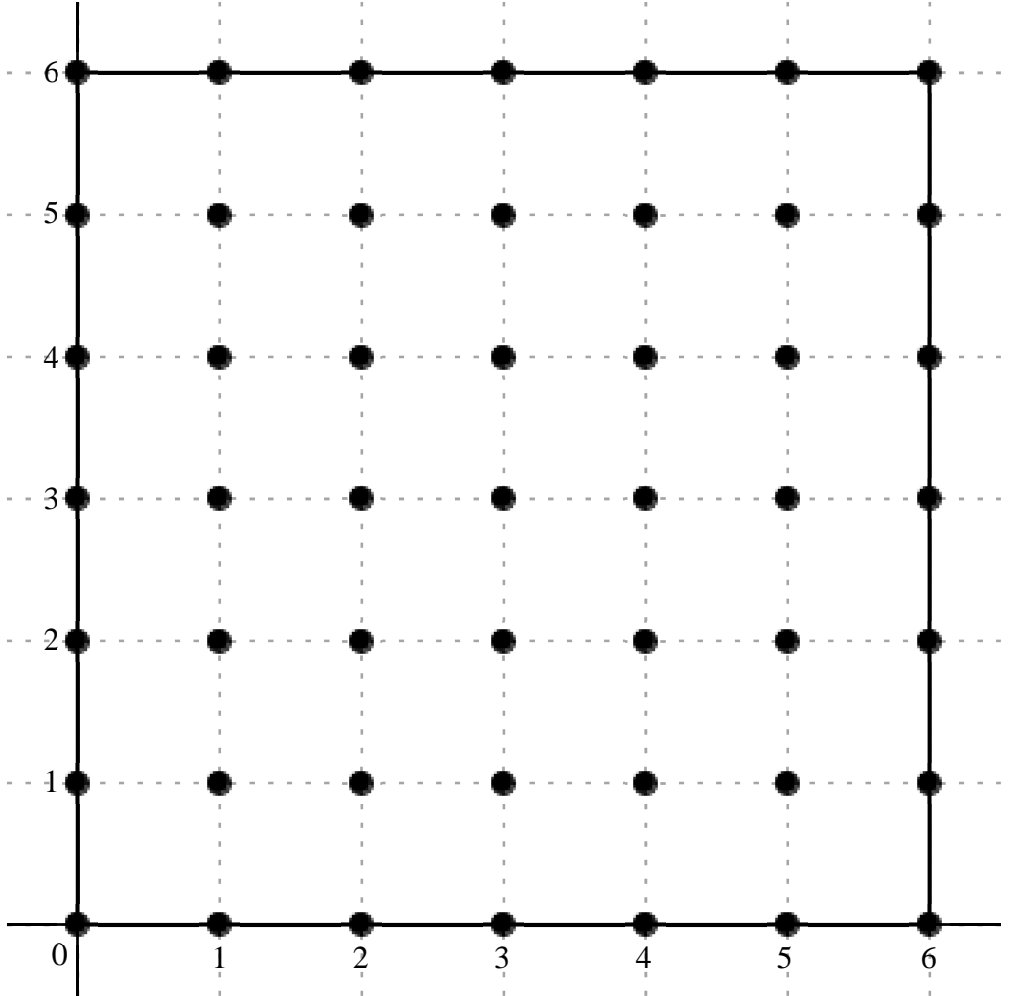
Error order.: 48, Error.:  $1.6971667100992392592 \times 10^{-222}$ , New Error.:  $1.6967777180460574841 \times 10^{-270}$

Error order.: 48, Error.:  $1.6967777180460574841 \times 10^{-270}$ , New Error.:  $1.6967388155760657121 \times 10^{-318}$

Error order.: 48, Error.:  $1.6967388155760657121 \times 10^{-318}$ , New Error.:  $1.6967349252964400952 \times 10^{-366}$

$$x_o \neq h. , \left[ \begin{array}{cccccc} 6\text{I} & 1+6\text{I} & 2+6\text{I} & 3+6\text{I} & 4+6\text{I} & 5+6\text{I} & 6+6\text{I} \\ 5\text{I} & 1+5\text{I} & 2+5\text{I} & 3+5\text{I} & 4+5\text{I} & 5+5\text{I} & 6+5\text{I} \\ 4\text{I} & 1+4\text{I} & 2+4\text{I} & 3+4\text{I} & 4+4\text{I} & 5+4\text{I} & 6+4\text{I} \\ 3\text{I} & 1+3\text{I} & 2+3\text{I} & 3+3\text{I} & 4+3\text{I} & 5+3\text{I} & 6+3\text{I} \\ 2\text{I} & 1+2\text{I} & 2+2\text{I} & 3+2\text{I} & 4+2\text{I} & 5+2\text{I} & 6+2\text{I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} & 5+\text{I} & 6+\text{I} \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} \frac{\text{I}}{6} & \frac{486216}{8177} + \frac{607176\text{I}}{8177} & \frac{406809}{340} + \frac{1200663\text{I}}{340} & -\frac{80032}{15} + \frac{160064\text{I}}{15} & -\frac{1365363}{442} + \frac{237168\text{I}}{221} & -\frac{998136}{13481} + \frac{35640\text{I}}{13481} & -\frac{1}{12} + \frac{\text{I}}{12} \\ -\frac{95256}{1105} + \frac{17064\text{I}}{221} & \frac{8775216}{221} - \frac{43876080\text{I}}{221} & -\frac{1531275192}{493} + \frac{6945583464\text{I}}{493} & \frac{479711808}{17} - \frac{799519680\text{I}}{17} & -\frac{6287442264}{697} + \frac{5655626712\text{I}}{697} & \frac{8775216}{85} - \frac{8775216\text{I}}{85} & -\frac{35640}{13481} + \frac{998136\text{I}}{13481} \\ -\frac{242109}{68} + \frac{159759\text{I}}{34} & -\frac{127240632}{17} + \frac{293969736\text{I}}{17} & -\frac{8477407107}{10} + \frac{8477407107\text{I}}{5} & -\frac{118248960672}{25} + \frac{157665280896\text{I}}{25} & -\frac{8477407107}{8} + \frac{8477407107\text{I}}{8} & -\frac{5655626712}{697} + \frac{6287442264\text{I}}{697} & -\frac{237168}{221} + \frac{1365363\text{I}}{442} \\ \frac{80032\text{I}}{3} & \frac{159903936}{5} - \frac{479711808\text{I}}{5} & -\frac{78832640448}{13} + \frac{118248960672\text{I}}{13} & \frac{1240884155200}{39} - \frac{1240884155200\text{I}}{39} & -\frac{157665280896}{25} + \frac{118248960672\text{I}}{25} & \frac{799519680}{17} - \frac{479711808\text{I}}{17} & -\frac{160064}{15} + \frac{80032\text{I}}{15} \\ \frac{242109}{34} + \frac{159759\text{I}}{17} & -\frac{873133992}{85} + \frac{2821231944\text{I}}{85} & -\frac{8477407107}{4} + \frac{8477407107\text{I}}{4} & -\frac{118248960672}{13} + \frac{78832640448\text{I}}{13} & -\frac{8477407107}{5} + \frac{8477407107\text{I}}{10} & -\frac{6945583464}{493} + \frac{1531275192\text{I}}{493} & -\frac{1200663}{340} - \frac{406809\text{I}}{340} \\ \frac{95256}{221} + \frac{85320\text{I}}{221} & \frac{8775216}{17} - \frac{8775216\text{I}}{17} & -\frac{2821231944}{85} + \frac{873133992\text{I}}{85} & \frac{479711808}{5} - \frac{159903936\text{I}}{5} & -\frac{293969736}{17} + \frac{127240632\text{I}}{17} & \frac{43876080}{221} - \frac{8775216\text{I}}{221} & -\frac{607176}{8177} - \frac{486216\text{I}}{8177} \\ -\frac{927858939623}{118613926600} + \frac{927858939623\text{I}}{118613926600} & -\frac{85320}{221} - \frac{95256\text{I}}{221} & -\frac{159759}{17} - \frac{242109\text{I}}{34} & -\frac{80032}{3} & -\frac{159759}{34} + \frac{242109\text{I}}{68} & -\frac{17064}{221} + \frac{95256\text{I}}{1105} & -\frac{1}{6} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\;u(x_{ol})=\frac{1}{355841779800\; \mathcal{A}\mathbf{x}_{ol}}\; (59306963300\; \text{I} u_{ol+6\text{I}}+(21158856158400+26422720862400\; \text{I})\; u_{ol+1+6\text{I}}+(425763642937230+1256606055470610\; \text{I})\; u_{ol+2+6\text{I}}+(-1898581954730240+3797163909460480\; \text{I})\; u_{ol+3+6\text{I}}+(-1099215384599700+381874584758400\; \text{I})\; u_{ol+4+6\text{I}}+(-26346598228800+940746312000\; \text{I})\; u_{ol+5+6\text{I}}\\ +(-29653481650+29653481650\; \text{I})\; u_{ol+6+6\text{I}}+(-30675171562560+27475493803200\; \text{I})\; u_{ol+5\text{I}}+(14129359636060800-70646798180304000\; \text{I})\; u_{ol+1+5\text{I}}+(-1105256977048411200+5013242964663710400\; \text{I})\; u_{ol+2+5\text{I}}+(10041264914693875200-16735441524489792000\; \text{I})\; u_{ol+3+5\text{I}}+(-3209949276343617600\\ +2887386334408180800\; \text{I})\; u_{ol+4+5\text{I}}+(36736335053758080-36736335053758080\; \text{I})\; u_{ol+5+5\text{I}}+(-940746312000+26346598228800\; \text{I})\; u_{ol+6+5\text{I}}+(-1266948492141150+1672027261737300\; \text{I})\; u_{ol+4\text{I}}+(-2663384291397460800+6153336121504478400\; \text{I})\; u_{ol+1+4\text{I}}+(-301661563304404903860\\ +603323126608809807720\; \text{I})\; u_{ol+2+4\text{I}}+(-1683116825000987361024+2244155766667983148032\; \text{I})\; u_{ol+3+4\text{I}}+(-377076954130506129825+377076954130506129825\; \text{I})\; u_{ol+4+4\text{I}}+(-2887386334408180800+3209949276343617600\; \text{I})\; u_{ol+5+4\text{I}}+(-381874584758400+1099215384599700\; \text{I})\; u_{ol+6+4\text{I}}$$



$$\begin{aligned}
&+ 9492909773651200 \, \text{I} u_{ol+31} + (11380100236653058560 - 34140300709959175680 \, \text{I}) u_{ol+1+31} + (-2157842083334599180800 + 3236763125001898771200 \, \text{I}) u_{ol+2+31} + (11322010931076600640000 - 11322010931076600640000 \, \text{I}) u_{ol+3+31} + (-2244155766667983148032 + 1683116825000987361024 \, \text{I}) u_{ol+4+31} \\
&+ (16735441524489792000 - 10041264914693875200 \, \text{I}) u_{ol+5+31} + (-3797163909460480 + 1898581954730240 \, \text{I}) u_{ol+6+31} + (2533896984282300 + 3344054523474600 \, \text{I}) u_{ol+21} + (-3655265337848928960 + 11810731719783222720 \, \text{I}) u_{ol+1+21} + (-754153908261012259650 + 754153908261012259650 \, \text{I}) u_{ol+2+21} \\
&+ (-3236763125001898771200 + 2157842083334599180800 \, \text{I}) u_{ol+3+21} + (-603323126608809807720 + 301661563304404903860 \, \text{I}) u_{ol+4+21} + (-5013242964663710400 + 1105256977048411200 \, \text{I}) u_{ol+5+21} - (1256606055470610 + 425763642937230 \, \text{I}) u_{ol+6+21} + (153375857812800 + 137377469016000 \, \text{I}) u_{ol+1} \\
&+ (183681675268790400 - 183681675268790400 \, \text{I}) u_{ol+1+1} + (-11810731719783222720 + 3655265337848928960 \, \text{I}) u_{ol+2+1} + (34140300709959175680 - 11380100236653058560 \, \text{I}) u_{ol+3+1} + (-6153336121504478400 + 2663384291397460800 \, \text{I}) u_{ol+4+1} + (70646798180304000 - 14129359636060800 \, \text{I}) u_{ol+5+1} \\
&- (26422720862400 + 21158856158400 \, \text{I}) u_{ol+6+1} + (-2783576818869 + 2783576818869 \, \text{I}) u_{ol} - (137377469016000 + 153375857812800 \, \text{I}) u_{ol+1} - (3344054523474600 + 2533896984282300 \, \text{I}) u_{ol+2} - 9492909773651200 u_{ol+3} + (-1672027261737300 + 1266948492141150 \, \text{I}) u_{ol+4} + (-27475493803200 \\
&+ 30675171562560 \, \text{I}) u_{ol+5} - 59306963300 u_{ol+6}), \quad O(\Delta x_{ol}^{48})
\end{aligned}$$

Formula:, 260, Var:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 1

Error order:, 48, Error:, 1.6311418579127928939 × 10<sup>−126</sup>, New Error:, 1.6901408271152207420 × 10<sup>−174</sup>

Error order:, 48, Error:, 1.6901408271152207420 × 10<sup>−174</sup>, New Error:, 1.6960747954370209924 × 10<sup>−222</sup>

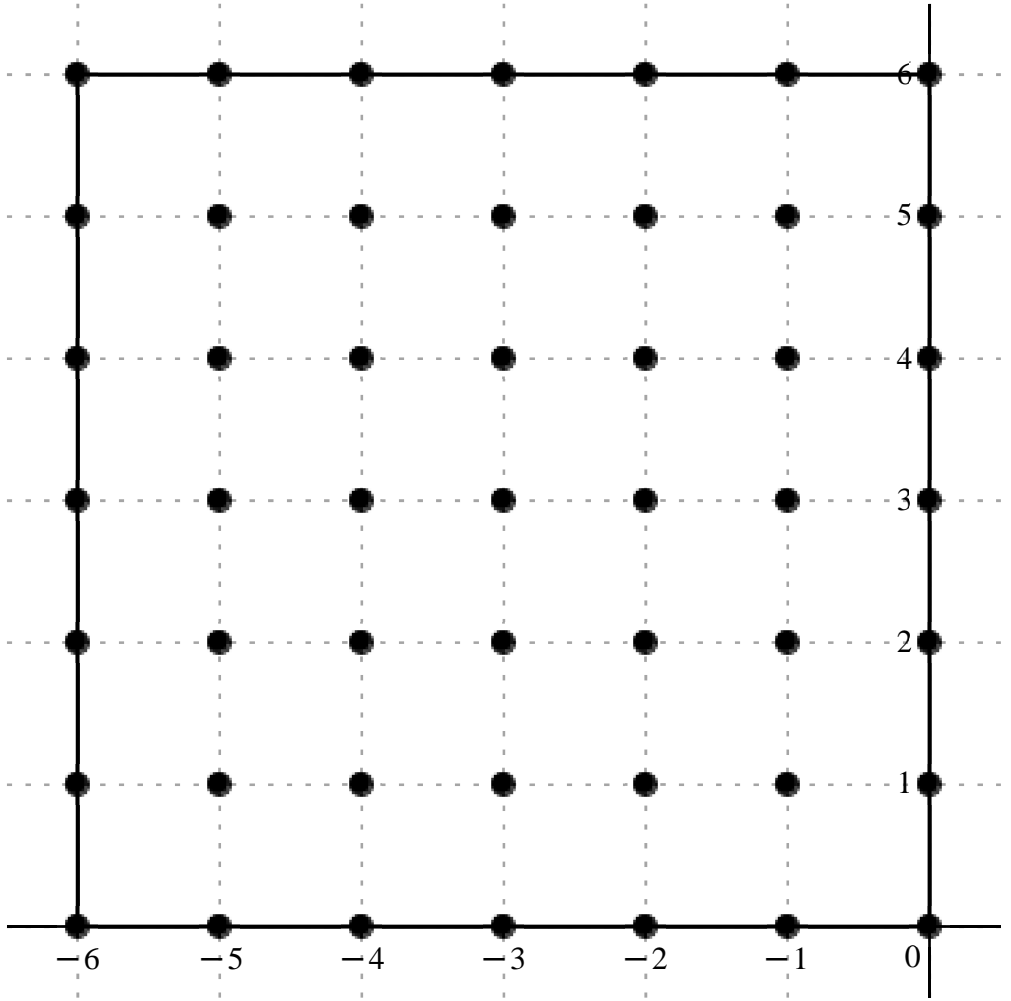
Error order:, 48, Error:, 1.6960747954370209924 × 10<sup>−222</sup>, New Error:, 1.6966685199853553701 × 10<sup>−270</sup>

Error order:, 48, Error:, 1.6966685199853553701 × 10<sup>−270</sup>, New Error:, 1.6967278957040843208 × 10<sup>−318</sup>

Error order:, 48, Error:, 1.6967278957040843208 × 10<sup>−318</sup>, New Error:, 1.6967338333085828779 × 10<sup>−366</sup>

$$x_o \rightarrow h \rightarrow \begin{bmatrix} -6+6 \, \text{I} & -5+6 \, \text{I} & -4+6 \, \text{I} & -3+6 \, \text{I} & -2+6 \, \text{I} & -1+6 \, \text{I} & 6 \, \text{I} \\ -6+5 \, \text{I} & -5+5 \, \text{I} & -4+5 \, \text{I} & -3+5 \, \text{I} & -2+5 \, \text{I} & -1+5 \, \text{I} & 5 \, \text{I} \\ -6+4 \, \text{I} & -5+4 \, \text{I} & -4+4 \, \text{I} & -3+4 \, \text{I} & -2+4 \, \text{I} & -1+4 \, \text{I} & 4 \, \text{I} \\ -6+3 \, \text{I} & -5+3 \, \text{I} & -4+3 \, \text{I} & -3+3 \, \text{I} & -2+3 \, \text{I} & -1+3 \, \text{I} & 3 \, \text{I} \\ -6+2 \, \text{I} & -5+2 \, \text{I} & -4+2 \, \text{I} & -3+2 \, \text{I} & -2+2 \, \text{I} & -1+2 \, \text{I} & 2 \, \text{I} \\ -6+1 & -5+1 & -4+1 & -3+1 & -2+1 & -1+1 & 1 \\ -6 & -5 & -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c =, \left[ \begin{array}{cccccccc} \frac{1}{12} + \frac{\text{I}}{12} & \frac{998136}{13481} + \frac{35640 \, \text{I}}{13481} & \frac{1365363}{442} + \frac{237168 \, \text{I}}{221} & \frac{80032}{15} + \frac{160064 \, \text{I}}{15} & -\frac{406809}{340} + \frac{1200663 \, \text{I}}{340} & -\frac{486216}{8177} + \frac{607176 \, \text{I}}{8177} & \frac{\text{I}}{6} \\ \frac{35640}{13481} + \frac{998136 \, \text{I}}{13481} & -\frac{8775216}{85} - \frac{8775216 \, \text{I}}{85} & \frac{6287442264}{697} + \frac{5655626712 \, \text{I}}{697} & -\frac{479711808}{17} - \frac{799519680 \, \text{I}}{17} & \frac{1531275192}{493} + \frac{6945583464 \, \text{I}}{493} & -\frac{8775216}{221} - \frac{43876080 \, \text{I}}{221} & \frac{95256}{1105} + \frac{17064 \, \text{I}}{221} \\ \frac{237168}{221} + \frac{1365363 \, \text{I}}{442} & \frac{5655626712}{697} + \frac{6287442264 \, \text{I}}{697} & \frac{8477407107}{8} + \frac{8477407107 \, \text{I}}{8} & \frac{118248960672}{25} + \frac{157665280896 \, \text{I}}{25} & \frac{8477407107}{10} + \frac{8477407107 \, \text{I}}{5} & \frac{127240632}{17} + \frac{293969736 \, \text{I}}{17} & \frac{242109}{68} + \frac{159759 \, \text{I}}{34} \\ \frac{160064}{15} + \frac{80032 \, \text{I}}{15} & -\frac{799519680}{17} - \frac{479711808 \, \text{I}}{17} & \frac{157665280896}{25} + \frac{118248960672 \, \text{I}}{25} & -\frac{1240884155200}{39} - \frac{1240884155200 \, \text{I}}{39} & \frac{78832640448}{13} + \frac{118248960672 \, \text{I}}{13} & -\frac{159903936}{5} - \frac{479711808 \, \text{I}}{5} & \frac{80032 \, \text{I}}{3} \\ \frac{1200663}{340} - \frac{406809 \, \text{I}}{340} & \frac{6945583464}{493} + \frac{1531275192 \, \text{I}}{493} & \frac{8477407107}{5} + \frac{8477407107 \, \text{I}}{10} & \frac{118248960672}{13} + \frac{78832640448 \, \text{I}}{13} & \frac{8477407107}{4} + \frac{8477407107 \, \text{I}}{4} & \frac{873133992}{85} + \frac{2821231944 \, \text{I}}{85} & -\frac{242109}{34} + \frac{159759 \, \text{I}}{17} \\ \frac{607176}{8177} - \frac{486216 \, \text{I}}{8177} & -\frac{43876080}{221} - \frac{8775216 \, \text{I}}{221} & \frac{293969736}{17} + \frac{127240632 \, \text{I}}{17} & -\frac{479711808}{5} - \frac{159903936 \, \text{I}}{5} & \frac{2821231944}{85} + \frac{873133992 \, \text{I}}{85} & -\frac{8775216}{17} - \frac{8775216 \, \text{I}}{17} & -\frac{95256}{221} + \frac{85320 \, \text{I}}{221} \\ \frac{1}{6} & \frac{17064}{221} + \frac{95256 \, \text{I}}{1105} & \frac{159759}{34} + \frac{242109 \, \text{I}}{68} & \frac{80032}{3} & \frac{159759}{17} - \frac{242109 \, \text{I}}{34} & \frac{85320}{221} - \frac{95256 \, \text{I}}{221} & \frac{927858939623}{118613926600} + \frac{927858939623 \, \text{I}}{118613926600} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{355841779800\,\Delta x_{ol}}\,((29653481650+29653481650\,\mathrm{I})\,u_{ol-6+61}+(26346598228800+940746312000\,\mathrm{I})\,u_{ol-5+61}+(1099215384599700+381874584758400\,\mathrm{I})\,u_{ol-4+61}+(1898581954730240+3797163909460480\,\mathrm{I})\,u_{ol-3+61}+( -425763642937230+1256606055470610\,\mathrm{I})\,u_{ol-2+61}+( -21158856158400$$

$$+26422720862400\,\mathrm{I})\,u_{ol-1+61}+59306963300\,\mathrm{I}u_{ol+61}+(940746312000+26346598228800\,\mathrm{I})\,u_{ol-6+51}-(36736335053758080+36736335053758080\,\mathrm{I})\,u_{ol-5+51}+(3209949276343617600+2887386334408180800\,\mathrm{I})\,u_{ol-4+51}-(10041264914693875200+16735441524489792000\,\mathrm{I})\,u_{ol-3+51}+(1105256977048411200$$

$$+5013242964663710400\,\mathrm{I})\,u_{ol-2+51}-(14129359636060800+70646798180304000\,\mathrm{I})\,u_{ol-1+51}+(30675171562560+27475493803200\,\mathrm{I})\,u_{ol+51}+(381874584758400+1099215384599700\,\mathrm{I})\,u_{ol-6+41}+(2887386334408180800+3209949276343617600\,\mathrm{I})\,u_{ol-5+41}+(377076954130506129825$$

$$+377076954130506129825\,\mathrm{I})\,u_{ol-4+41}+(1683116825000987361024+2244155766667983148032\,\mathrm{I})\,u_{ol-3+41}+(301661563304404903860+603323126608809807720\,\mathrm{I})\,u_{ol-2+41}+(2663384291397460800+6153336121504478400\,\mathrm{I})\,u_{ol-1+41}+(1266948492141150+1672027261737300\,\mathrm{I})\,u_{ol+41}+(3797163909460480$$

$$+1898581954730240\,\mathrm{I})\,u_{ol-6+31}-(16735441524489792000+10041264914693875200\,\mathrm{I})\,u_{ol-5+31}+(2244155766667983148032+1683116825000987361024\,\mathrm{I})\,u_{ol-4+31}-(11322010931076600640000+11322010931076600640000\,\mathrm{I})\,u_{ol-3+31}+(2157842083334599180800+3236763125001898771200\,\mathrm{I})\,u_{ol-2+31}$$

$$-(11380100236653058560+34140300709959175680\,\mathrm{I})\,u_{ol-1+31}+9492909773651200\,\mathrm{I}u_{ol+31}+(1256606055470610-425763642937230\,\mathrm{I})\,u_{ol-6+21}+(5013242964663710400+1105256977048411200\,\mathrm{I})\,u_{ol-5+21}+(603323126608809807720+301661563304404903860\,\mathrm{I})\,u_{ol-4+21}+(3236763125001898771200$$

$$+2157842083334599180800\,\mathrm{I})\,u_{ol-3+21}+(754153908261012259650+754153908261012259650\,\mathrm{I})\,u_{ol-2+21}+(3655265337848928960+11810731719783222720\,\mathrm{I})\,u_{ol-1+21}+(-2533896984282300+3344054523474600\,\mathrm{I})\,u_{ol+21}+(26422720862400-21158856158400\,\mathrm{I})\,u_{ol-6+1}-(70646798180304000$$

$$+14129359636060800\,\mathrm{I})\,u_{ol-5+1}+(6153336121504478400+2663384291397460800\,\mathrm{I})\,u_{ol-4+1}-(34140300709959175680+11380100236653058560\,\mathrm{I})\,u_{ol-3+1}+(11810731719783222720+3655265337848928960\,\mathrm{I})\,u_{ol-2+1}-(183681675268790400+183681675268790400\,\mathrm{I})\,u_{ol-1+1}+( -153375857812800$$

$$+137377469016000\,\mathrm{I})\,u_{ol+1}+59306963300\,u_{ol-6}+(27475493803200+30675171562560\,\mathrm{I})\,u_{ol-5}+(1672027261737300+1266948492141150\,\mathrm{I})\,u_{ol-4}+9492909773651200\,u_{ol-3}+(3344054523474600-2533896984282300\,\mathrm{I})\,u_{ol-2}+(137377469016000-153375857812800\,\mathrm{I})\,u_{ol-1}+(2783576818869+2783576818869\,\mathrm{I})\,u_{ol}),$$

$$O(\,\Delta x_{ol}^{48}\,)$$

Formula: 261, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order.: 48, Error.: 1.7630588252324237655 × 10<sup>−126</sup>, New Error.: 1.7033354819588864638 × 10<sup>−174</sup>

Error order.: 48, Error.: 1.7033354819588864638 × 10<sup>−174</sup>, New Error.: 1.6973942638790306317 × 10<sup>−222</sup>

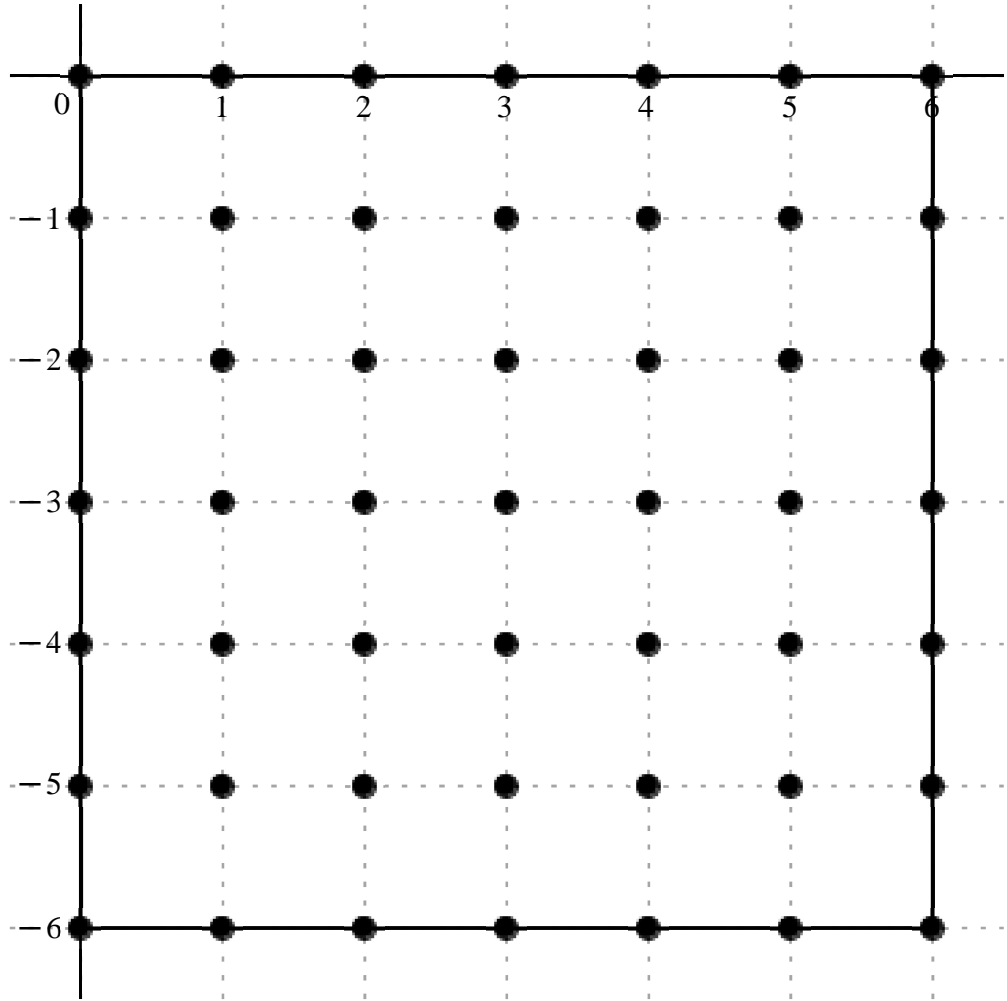
Error order.: 48, Error.: 1.6973942638790306317 × 10<sup>−222</sup>, New Error.: 1.6968004668325139724 × 10<sup>−270</sup>

Error order.: 48, Error.: 1.6968004668325139724 × 10<sup>−270</sup>, New Error.: 1.6967410903888031387 × 10<sup>−318</sup>

Error order.: 48, Error.: 1.6967410903888031387 × 10<sup>−318</sup>, New Error.: 1.6967351527770547627 × 10<sup>−366</sup>

$$x_o + h \cdot \begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 & 6 \\ -\mathbf{I} & 1-\mathbf{I} & 2-\mathbf{I} & 3-\mathbf{I} & 4-\mathbf{I} & 5-\mathbf{I} & 6-\mathbf{I} \\ -2\mathbf{I} & 1-2\mathbf{I} & 2-2\mathbf{I} & 3-2\mathbf{I} & 4-2\mathbf{I} & 5-2\mathbf{I} & 6-2\mathbf{I} \\ -3\mathbf{I} & 1-3\mathbf{I} & 2-3\mathbf{I} & 3-3\mathbf{I} & 4-3\mathbf{I} & 5-3\mathbf{I} & 6-3\mathbf{I} \\ -4\mathbf{I} & 1-4\mathbf{I} & 2-4\mathbf{I} & 3-4\mathbf{I} & 4-4\mathbf{I} & 5-4\mathbf{I} & 6-4\mathbf{I} \\ -5\mathbf{I} & 1-5\mathbf{I} & 2-5\mathbf{I} & 3-5\mathbf{I} & 4-5\mathbf{I} & 5-5\mathbf{I} & 6-5\mathbf{I} \\ -6\mathbf{I} & 1-6\mathbf{I} & 2-6\mathbf{I} & 3-6\mathbf{I} & 4-6\mathbf{I} & 5-6\mathbf{I} & 6-6\mathbf{I} \end{bmatrix}$$

$$c = , \begin{bmatrix} -\frac{927858939623}{118613926600} - \frac{927858939623\,\mathrm{I}}{118613926600} & -\frac{85320}{221} + \frac{95256\,\mathrm{I}}{221} & -\frac{159759}{17} + \frac{242109\,\mathrm{I}}{34} & -\frac{80032}{3} & -\frac{159759}{34} - \frac{242109\,\mathrm{I}}{68} & -\frac{17064}{221} - \frac{95256\,\mathrm{I}}{1105} & -\frac{1}{6} \\ \frac{95256}{221} - \frac{85320\,\mathrm{I}}{221} & \frac{8775216}{17} + \frac{8775216\,\mathrm{I}}{17} & -\frac{2821231944}{85} - \frac{873133992\,\mathrm{I}}{85} & \frac{479711808}{5} + \frac{159903936\,\mathrm{I}}{5} & -\frac{293969736}{17} - \frac{127240632\,\mathrm{I}}{17} & \frac{43876080}{221} + \frac{8775216\,\mathrm{I}}{221} & -\frac{607176}{8177} + \frac{486216\,\mathrm{I}}{8177} \\ \frac{242109}{34} - \frac{159759\,\mathrm{I}}{17} & -\frac{873133992}{85} - \frac{2821231944\,\mathrm{I}}{85} & -\frac{8477407107}{4} - \frac{8477407107\,\mathrm{I}}{4} & -\frac{118248960672}{13} - \frac{78832640448\,\mathrm{I}}{13} & -\frac{8477407107}{5} - \frac{8477407107\,\mathrm{I}}{10} & -\frac{6945583464}{493} - \frac{1531275192\,\mathrm{I}}{493} & -\frac{1200663}{340} + \frac{406809\,\mathrm{I}}{340} \\ -\frac{80032\,\mathrm{I}}{3} & \frac{159903936}{5} + \frac{479711808\,\mathrm{I}}{5} & -\frac{78832640448}{13} - \frac{118248960672\,\mathrm{I}}{13} & \frac{1240884155200}{39} + \frac{1240884155200\,\mathrm{I}}{39} & -\frac{157665280896}{25} - \frac{118248960672\,\mathrm{I}}{25} & \frac{799519680}{17} + \frac{479711808\,\mathrm{I}}{17} & -\frac{160064}{15} - \frac{80032\,\mathrm{I}}{15} \\ -\frac{242109}{68} - \frac{159759\,\mathrm{I}}{34} & -\frac{127240632}{17} - \frac{293969736\,\mathrm{I}}{17} & -\frac{8477407107}{10} - \frac{8477407107\,\mathrm{I}}{5} & -\frac{118248960672}{25} - \frac{157665280896\,\mathrm{I}}{25} & -\frac{8477407107}{8} - \frac{8477407107\,\mathrm{I}}{8} & -\frac{5655626712}{697} - \frac{6287442264\,\mathrm{I}}{697} & -\frac{237168}{221} - \frac{1365363\,\mathrm{I}}{442} \\ -\frac{95256}{1105} - \frac{17064\,\mathrm{I}}{221} & \frac{8775216}{221} + \frac{43876080\,\mathrm{I}}{221} & -\frac{1531275192}{493} - \frac{6945583464\,\mathrm{I}}{493} & \frac{479711808}{17} + \frac{799519680\,\mathrm{I}}{17} & -\frac{6287442264}{697} - \frac{5655626712\,\mathrm{I}}{697} & \frac{8775216}{85} + \frac{8775216\,\mathrm{I}}{85} & -\frac{35640}{13481} - \frac{998136\,\mathrm{I}}{13481} \\ -\frac{1}{6} & \frac{486216}{8177} - \frac{607176\,\mathrm{I}}{8177} & \frac{406809}{340} - \frac{1200663\,\mathrm{I}}{340} & -\frac{80032}{15} - \frac{160064\,\mathrm{I}}{15} & -\frac{1365363}{442} - \frac{237168\,\mathrm{I}}{221} & -\frac{998136}{13481} - \frac{35640\,\mathrm{I}}{13481} & -\frac{1}{12} - \frac{1}{12} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol}) = \frac{1}{355841779800\,\mathcal{A}\mathbf{x}_{ol}}\, \big( -(2783576818869 + 2783576818869\,\mathrm{I})\,u_{ol} + (-137377469016000 + 153375857812800\,\mathrm{I})\,u_{ol+1} + (-3344054523474600 + 2533896984282300\,\mathrm{I})\,u_{ol+2} - 9492909773651200\,u_{ol+3} - (1672027261737300 + 1266948492141150\,\mathrm{I})\,u_{ol+4} - (27475493803200 + 30675171562560\,\mathrm{I})\,u_{ol+5} \\ - 59306963300\,u_{ol+6} + (153375857812800 - 137377469016000\,\mathrm{I})\,u_{ol-1} + (183681675268790400 + 183681675268790400\,\mathrm{I})\,u_{ol+1-1} - (11810731719783222720 + 3655265337848928960\,\mathrm{I})\,u_{ol+2-1} + (34140300709959175680 + 11380100236653058560\,\mathrm{I})\,u_{ol+3-1} - (6153336121504478400 + 2663384291397460800\,\mathrm{I})\,u_{ol+4-1} \\ + (70646798180304000 + 14129359636060800\,\mathrm{I})\,u_{ol+5-1} + (-26422720862400 + 21158856158400\,\mathrm{I})\,u_{ol+6-1} + (2533896984282300 - 3344054523474600\,\mathrm{I})\,u_{ol-21} - (3655265337848928960 + 11810731719783222720\,\mathrm{I})\,u_{ol+1-21} - (754153908261012259650 + 754153908261012259650\,\mathrm{I})\,u_{ol+2-21} - (3236763125001898771200 \\ + 2157842083334599180800\,\mathrm{I})\,u_{ol+3-21} - (603323126608809807720 + 301661563304404903860\,\mathrm{I})\,u_{ol+4-21} - (5013242964663710400 + 1105256977048411200\,\mathrm{I})\,u_{ol+5-21} + (-1256606055470610 + 425763642937230\,\mathrm{I})\,u_{ol+6-21} - 9492909773651200\,\mathrm{I}\,u_{ol-31} + (11380100236653058560 + 34140300709959175680\,\mathrm{I})\,u_{ol+1-31}$$

$$\begin{aligned}
 &-(2157842083334599180800 + 3236763125001898771200 \, \text{I}) \, u_{ol+2-31} + (11322010931076600640000 + 11322010931076600640000 \, \text{I}) \, u_{ol+3-31} - (2244155766667983148032 + 1683116825000987361024 \, \text{I}) \, u_{ol+4-31} + (16735441524489792000 + 10041264914693875200 \, \text{I}) \, u_{ol+5-31} - (3797163909460480 \\
 &+ 1898581954730240 \, \text{I}) \, u_{ol+6-31} - (1266948492141150 + 1672027261737300 \, \text{I}) \, u_{ol-41} - (2663384291397460800 + 6153336121504478400 \, \text{I}) \, u_{ol+1-41} - (301661563304404903860 + 603323126608809807720 \, \text{I}) \, u_{ol+2-41} - (1683116825000987361024 + 2244155766667983148032 \, \text{I}) \, u_{ol+3-41} - (377076954130506129825 \\
 &+ 377076954130506129825 \, \text{I}) \, u_{ol+4-41} - (2887386334408180800 + 3209949276343617600 \, \text{I}) \, u_{ol+5-41} - (381874584758400 + 1099215384599700 \, \text{I}) \, u_{ol+6-41} - (30675171562560 + 27475493803200 \, \text{I}) \, u_{ol-51} + (14129359636060800 + 70646798180304000 \, \text{I}) \, u_{ol+1-51} - (1105256977048411200 + 5013242964663710400 \, \text{I}) \, u_{ol+2-51} \\
 &+ (10041264914693875200 + 16735441524489792000 \, \text{I}) \, u_{ol+3-51} - (3209949276343617600 + 2887386334408180800 \, \text{I}) \, u_{ol+4-51} + (36736335053758080 + 36736335053758080 \, \text{I}) \, u_{ol+5-51} - (940746312000 + 26346598228800 \, \text{I}) \, u_{ol+6-51} - 59306963300 \, \text{I} \, u_{ol-61} + (21158856158400 - 26422720862400 \, \text{I}) \, u_{ol+1-61} \\
 &+ (425763642937230 - 1256606055470610 \, \text{I}) \, u_{ol+2-61} - (1898581954730240 + 3797163909460480 \, \text{I}) \, u_{ol+3-61} - (1099215384599700 + 381874584758400 \, \text{I}) \, u_{ol+4-61} - (26346598228800 + 940746312000 \, \text{I}) \, u_{ol+5-61} - (29653481650 + 29653481650 \, \text{I}) \, u_{ol+6-61}), \, O( \, \mathcal{A}_{ol}^{48} \, )
 \end{aligned}$$

Formula:, 262, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 48, Error:, 1.6531654674539948233 × 10<sup>−126</sup>, New Error:, 1.6924083173413906686 × 10<sup>−174</sup>

Error order:, 48, Error:, 1.6924083173413906686 × 10<sup>−174</sup>, New Error:, 1.6963022027558257797 × 10<sup>−222</sup>

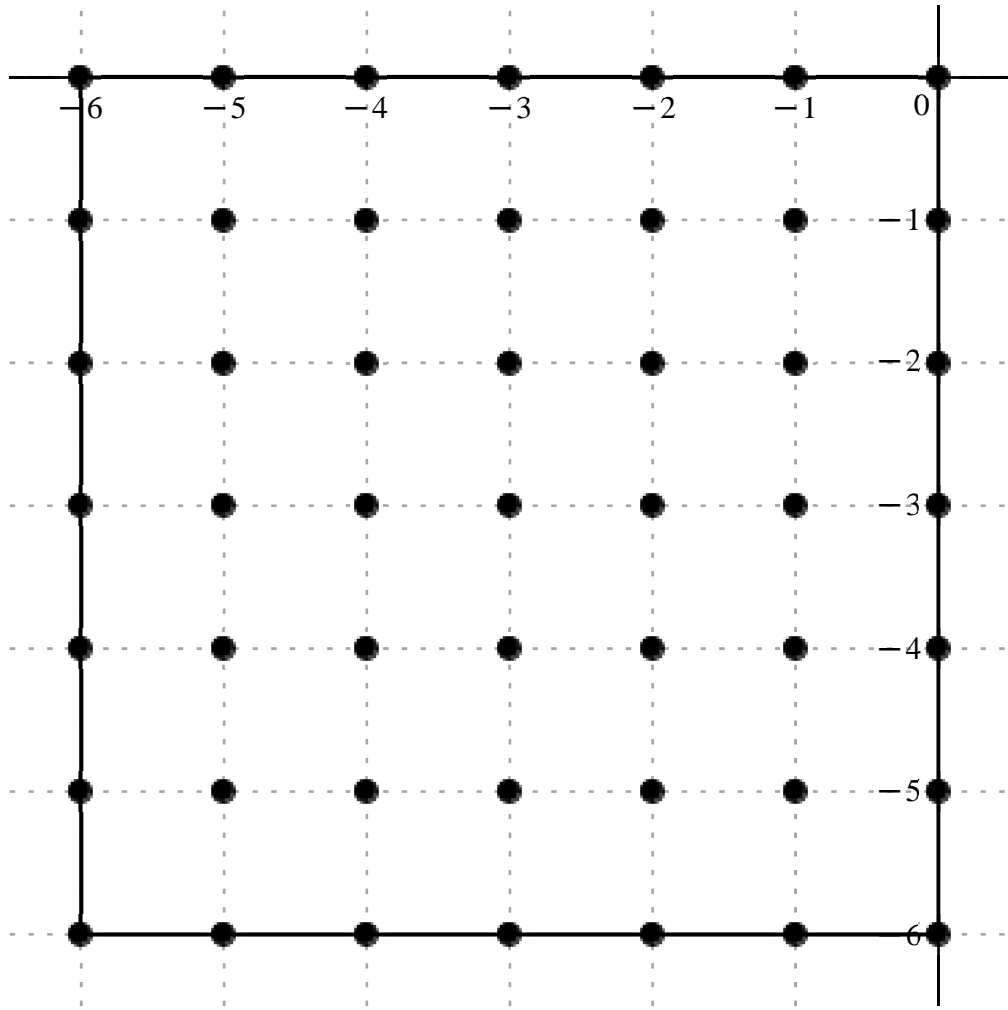
Error order:, 48, Error:, 1.6963022027558257797 × 10<sup>−222</sup>, New Error:, 1.6966912673072019925 × 10<sup>−270</sup>

Error order:, 48, Error:, 1.6966912673072019925 × 10<sup>−270</sup>, New Error:, 1.6967301705021756487 × 10<sup>−318</sup>

Error order:, 48, Error:, 1.6967301705021756487 × 10<sup>−318</sup>, New Error:, 1.6967340607890510844 × 10<sup>−366</sup>

$$x_o \neq h \, , \qquad \left[ \begin{array}{ccccccc} -6 & -5 & -4 & -3 & -2 & -1 & 0 \\ -6-1 & -5-1 & -4-1 & -3-1 & -2-1 & -1-1 & -1 \\ -6-2 \, \text{I} & -5-2 \, \text{I} & -4-2 \, \text{I} & -3-2 \, \text{I} & -2-2 \, \text{I} & -1-2 \, \text{I} & -2 \, \text{I} \\ -6-3 \, \text{I} & -5-3 \, \text{I} & -4-3 \, \text{I} & -3-3 \, \text{I} & -2-3 \, \text{I} & -1-3 \, \text{I} & -3 \, \text{I} \\ -6-4 \, \text{I} & -5-4 \, \text{I} & -4-4 \, \text{I} & -3-4 \, \text{I} & -2-4 \, \text{I} & -1-4 \, \text{I} & -4 \, \text{I} \\ -6-5 \, \text{I} & -5-5 \, \text{I} & -4-5 \, \text{I} & -3-5 \, \text{I} & -2-5 \, \text{I} & -1-5 \, \text{I} & -5 \, \text{I} \\ -6-6 \, \text{I} & -5-6 \, \text{I} & -4-6 \, \text{I} & -3-6 \, \text{I} & -2-6 \, \text{I} & -1-6 \, \text{I} & -6 \, \text{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccc} \frac{1}{6} & \frac{17064}{221} - \frac{95256 \, \text{I}}{1105} & \frac{159759}{34} - \frac{242109 \, \text{I}}{68} & \frac{80032}{3} & \frac{159759}{17} + \frac{242109 \, \text{I}}{34} & \frac{85320}{221} + \frac{95256 \, \text{I}}{221} & \frac{927858939623}{118613926600} - \frac{927858939623 \, \text{I}}{118613926600} \\ \frac{607176}{8177} + \frac{486216 \, \text{I}}{8177} & - \frac{43876080}{221} + \frac{8775216 \, \text{I}}{221} & \frac{293969736}{17} - \frac{127240632 \, \text{I}}{17} & - \frac{479711808}{5} + \frac{159903936 \, \text{I}}{5} & \frac{2821231944}{85} - \frac{873133992 \, \text{I}}{85} & - \frac{8775216}{17} + \frac{8775216 \, \text{I}}{17} & - \frac{95256}{221} - \frac{85320 \, \text{I}}{221} \\ \frac{1200663}{340} + \frac{406809 \, \text{I}}{340} & \frac{6945583464}{493} - \frac{1531275192 \, \text{I}}{493} & \frac{8477407107}{5} - \frac{8477407107 \, \text{I}}{10} & \frac{118248960672}{13} - \frac{78832640448 \, \text{I}}{13} & \frac{8477407107}{4} - \frac{8477407107 \, \text{I}}{4} & \frac{873133992}{85} - \frac{2821231944 \, \text{I}}{85} & - \frac{242109}{34} - \frac{159759 \, \text{I}}{17} \\ \frac{160064}{15} - \frac{80032 \, \text{I}}{15} & - \frac{799519680}{17} + \frac{479711808 \, \text{I}}{17} & \frac{157665280896}{25} - \frac{118248960672 \, \text{I}}{25} & - \frac{1240884155200}{39} + \frac{1240884155200 \, \text{I}}{39} & \frac{78832640448}{13} - \frac{118248960672 \, \text{I}}{13} & - \frac{159903936}{5} + \frac{479711808 \, \text{I}}{5} & - \frac{80032 \, \text{I}}{3} \\ \frac{237168}{221} - \frac{1365363 \, \text{I}}{442} & \frac{5655626712}{697} - \frac{6287442264 \, \text{I}}{697} & \frac{8477407107}{8} - \frac{8477407107 \, \text{I}}{8} & \frac{118248960672}{25} - \frac{157665280896 \, \text{I}}{25} & \frac{8477407107}{10} - \frac{8477407107 \, \text{I}}{5} & \frac{127240632}{17} - \frac{293969736 \, \text{I}}{17} & \frac{242109}{68} - \frac{159759 \, \text{I}}{34} \\ \frac{35640}{13481} - \frac{998136 \, \text{I}}{13481} & - \frac{8775216}{85} + \frac{8775216 \, \text{I}}{85} & \frac{6287442264}{697} - \frac{5655626712 \, \text{I}}{697} & - \frac{479711808}{17} + \frac{799519680 \, \text{I}}{17} & \frac{1531275192}{493} - \frac{6945583464 \, \text{I}}{493} & - \frac{8775216}{221} + \frac{43876080 \, \text{I}}{221} & \frac{95256}{1105} - \frac{17064 \, \text{I}}{221} \\ \frac{1}{12} - \frac{1}{12} & \frac{998136}{13481} - \frac{35640 \, \text{I}}{13481} & \frac{1365363}{442} - \frac{237168 \, \text{I}}{221} & \frac{80032}{15} - \frac{160064 \, \text{I}}{15} & - \frac{406809}{340} - \frac{1200663 \, \text{I}}{340} & - \frac{486216}{8177} - \frac{607176 \, \text{I}}{8177} & - \frac{1}{6} \end{array} \right]$$



$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{355841779800 \Delta x_{ol}} (59306963300 u_{ol-6} + (27475493803200 - 30675171562560 I) u_{ol-5} + (1672027261737300 - 1266948492141150 I) u_{ol-4} + 9492909773651200 u_{ol-3} + (3344054523474600 + 2533896984282300 I) u_{ol-2} + (137377469016000 + 153375857812800 I) u_{ol-1} + (2783576818869 - 2783576818869 I) u_{ol} + (26422720862400 + 21158856158400 I) u_{ol-6-1} + (-70646798180304000 + 14129359636060800 I) u_{ol-5-1} + (6153336121504478400 - 2663384291397460800 I) u_{ol-4-1} + (-34140300709959175680 + 11380100236653058560 I) u_{ol-3-1} + (11810731719783222720 - 3655265337848928960 I) u_{ol-2-1} + (-183681675268790400 + 183681675268790400 I) u_{ol-1-1} - (153375857812800 + 137377469016000 I) u_{ol-1} + (1256606055470610 + 425763642937230 I) u_{ol-6-21} + (5013242964663710400 - 1105256977048411200 I) u_{ol-5-21} + (603323126608809807720 - 301661563304404903860 I) u_{ol-4-21} + (3236763125001898771200 - 2157842083334599180800 I) u_{ol-3-21} + (754153908261012259650 - 754153908261012259650 I) u_{ol-2-21} + (3655265337848928960 - 11810731719783222720 I) u_{ol-1-21} - (2533896984282300 + 3344054523474600 I) u_{ol-21} + (3797163909460480 - 1898581954730240 I) u_{ol-6-31} + (-16735441524489792000 + 10041264914693875200 I) u_{ol-5-31} + (2244155766667983148032 - 1683116825000987361024 I) u_{ol-4-31} + (-11322010931076600640000 + 11322010931076600640000 I) u_{ol-3-31} + (2157842083334599180800 - 3236763125001898771200 I) u_{ol-2-31} + (-11380100236653058560 + 34140300709959175680 I) u_{ol-1-31} - 9492909773651200 I u_{ol-31} + (381874584758400 - 1099215384599700 I) u_{ol-6-41} + (2887386334408180800 - 3209949276343617600 I) u_{ol-5-41} + (377076954130506129825 - 377076954130506129825 I) u_{ol-4-41} + (1683116825000987361024 - 2244155766667983148032 I) u_{ol-3-41} + (301661563304404903860 - 603323126608809807720 I) u_{ol-2-41} + (2663384291397460800 - 6153336121504478400 I) u_{ol-1-41} + (1266948492141150 - 1672027261737300 I) u_{ol-41} + (940746312000 - 26346598228800 I) u_{ol-6-51} + (-36736335053758080 + 36736335053758080 I) u_{ol-5-51} + (3209949276343617600 - 2887386334408180800 I) u_{ol-4-51} + (-10041264914693875200 + 16735441524489792000 I) u_{ol-3-51} + (1105256977048411200 - 5013242964663710400 I) u_{ol-2-51} + (-14129359636060800 + 70646798180304000 I) u_{ol-1-51} + (30675171562560 - 27475493803200 I) u_{ol-51} + (29653481650 - 29653481650 I) u_{ol-6-61} + (26346598228800 - 940746312000 I) u_{ol-5-61} + (1099215384599700 - 381874584758400 I) u_{ol-4-61} + (1898581954730240 - 3797163909460480 I) u_{ol-3-61} - (425763642937230 + 1256606055470610 I) u_{ol-2-61} - (21158856158400 + 26422720862400 I) u_{ol-1-61} - 59306963300 I u_{ol-61}), O(\Delta x_{ol}^{48})$$

Formula: 263, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 1

Error order.: 27, Error.:  $3.7026495642287754261 \times 10^{-72}$ , New Error.:  $3.6502189948194948692 \times 10^{-99}$

Error order.: 27, Error.:  $3.6502189948194948692 \times 10^{-99}$ , New Error.:  $3.6450152729977006074 \times 10^{-126}$

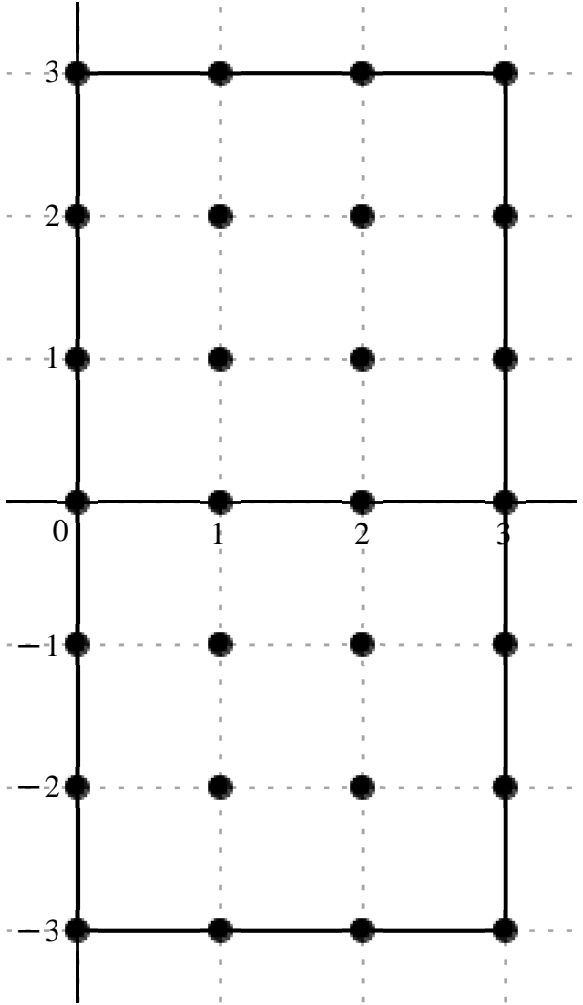
Error order.: 27, Error.:  $3.6450152729977006074 \times 10^{-126}$ , New Error.:  $3.6444952922716697898 \times 10^{-153}$

Error order.: 27, Error.:  $3.6444952922716697898 \times 10^{-153}$ , New Error.:  $3.6444432981117396293 \times 10^{-180}$

Error order.: 27, Error.:  $3.6444432981117396293 \times 10^{-180}$ , New Error.:  $3.6444380987348714545 \times 10^{-207}$

$$x_o \neq h., \left[ \begin{array}{cccc} 3 \text{ I} & 1+3 \text{ I} & 2+3 \text{ I} & 3+3 \text{ I} \\ 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} & 3+2 \text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & 3-2 \text{ I} \\ -3 \text{ I} & 1-3 \text{ I} & 2-3 \text{ I} & 3-3 \text{ I} \end{array} \right]$$

$$c=,\left[\begin{array}{cccc} -\frac{77}{1824100}-\frac{32 \text{ I}}{1368075} & \frac{27}{145928}+\frac{729 \text{ I}}{729640} & \frac{3753}{4742660}-\frac{486 \text{ I}}{1185665} & -\frac{359}{10944600}-\frac{103 \text{ I}}{10944600} \\ \frac{63}{49300}+\frac{549 \text{ I}}{49300} & -\frac{2187}{4930}+\frac{81 \text{ I}}{986} & -\frac{243}{4930}-\frac{3483 \text{ I}}{9860} & \frac{1773}{320450}-\frac{909 \text{ I}}{320450} \\ \frac{63}{1700}-\frac{333 \text{ I}}{850} & -\frac{3159}{680}-\frac{11583 \text{ I}}{680} & -\frac{3159}{340}-\frac{1053 \text{ I}}{170} & -\frac{387}{3400}+\frac{171 \text{ I}}{3400} \\ -\frac{251}{39} & \frac{351}{5} & -\frac{351}{10} & \frac{1}{3} \\ \frac{63}{1700}+\frac{333 \text{ I}}{850} & -\frac{3159}{680}+\frac{11583 \text{ I}}{680} & -\frac{3159}{340}+\frac{1053 \text{ I}}{170} & -\frac{387}{3400}-\frac{171 \text{ I}}{3400} \\ \frac{63}{49300}-\frac{549 \text{ I}}{49300} & -\frac{2187}{4930}-\frac{81 \text{ I}}{986} & -\frac{243}{4930}+\frac{3483 \text{ I}}{9860} & \frac{1773}{320450}+\frac{909 \text{ I}}{320450} \\ -\frac{77}{1824100}+\frac{32 \text{ I}}{1368075} & \frac{27}{145928}-\frac{729 \text{ I}}{729640} & \frac{3753}{4742660}+\frac{486 \text{ I}}{1185665} & -\frac{359}{10944600}+\frac{103 \text{ I}}{10944600} \end{array}\right]$$



$$\frac{\mathrm{d}}{\mathrm{d} x_{o l}} u\left(x_{o l}\right)=\frac{1}{142279800 \Delta \kappa_{o l}}\left(\begin{array}{l} -\left(6006+3328 \text{ I}\right) u_{o l+3 \text{ I}}+\left(26325+142155 \text{ I}\right) u_{o l+1+3 \text{ I}}+\left(112590-58320 \text{ I}\right) u_{o l+2+3 \text{ I}}-\left(4667+1339 \text{ I}\right) u_{o l+3+3 \text{ I}}+\left(181818+1584414 \text{ I}\right) u_{o l+2 \text{ I}}+\left(-63116820+11688300 \text{ I}\right) u_{o l+1+2 \text{ I}}-\left(7012980+50259690 \text{ I}\right) u_{o l+2+2 \text{ I}}+\left(787212-403596 \text{ I}\right) u_{o l+3+2 \text{ I}}+\left(5272722-55740204 \text{ I}\right) u_{o l+1} \\ -\left(660973365\right. \\ \left.+2423569005 \text{ I}\right) u_{o l+1+1}-\left(1321946730+881297820 \text{ I}\right) u_{o l+2+1}+\left(-16194789+7155837 \text{ I}\right) u_{o l+3+1}-915698200 u_{o l}+9988041960 u_{o l+1}-4994020980 u_{o l+2}+47426600 u_{o l+3}+\left(5272722+55740204 \text{ I}\right) u_{o l-1}+\left(-660973365+2423569005 \text{ I}\right) u_{o l+1-1}+\left(-1321946730+881297820 \text{ I}\right) u_{o l+2-1}-\left(16194789\right. \\ \left.+7155837 \text{ I}\right) u_{o l+3-1}+\left(181818-1584414 \text{ I}\right) u_{o l-2 \text{ I}}-\left(63116820+11688300 \text{ I}\right) u_{o l+1-2 \text{ I}}+\left(-7012980+50259690 \text{ I}\right) u_{o l+2-2 \text{ I}}+\left(787212+403596 \text{ I}\right) u_{o l+3-2 \text{ I}}+\left(-6006+3328 \text{ I}\right) u_{o l-3 \text{ I}}+\left(26325-142155 \text{ I}\right) u_{o l+1-3 \text{ I}}+\left(112590+58320 \text{ I}\right) u_{o l+2-3 \text{ I}}+\left(-4667+1339 \text{ I}\right) u_{o l+3-3 \text{ I}}\left.\right), \quad O\left(\Delta \kappa_{o l}^{27}\right) \end{array}\right)$$

Formula:, 264, Var.: 1

Variavel :,  $x_o$  , Derivada de Ordem :, 2

Error order:, 26, Error:,  $4.3324502014659314094 \times 10^{-69}$ , New Error:,  $4.2713267834105044401 \times 10^{-95}$

Error order:, 26, Error:,  $4.2713267834105044401 \times 10^{-95}$ , New Error:,  $4.2652601258602282024 \times 10^{-121}$

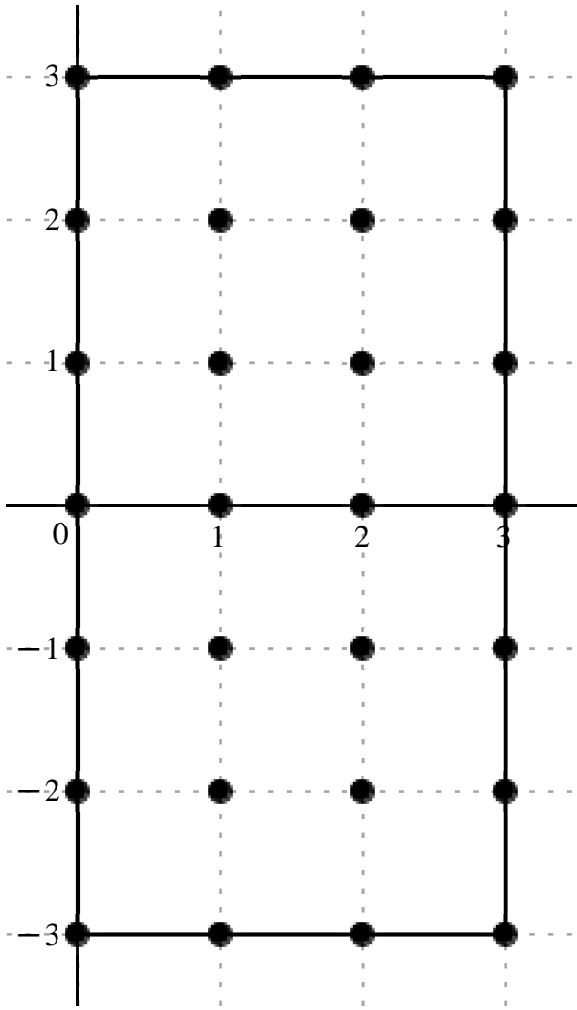
Error order:, 26, Error:,  $4.2652601258602282024 \times 10^{-121}$ , New Error:,  $4.2646539147554659101 \times 10^{-147}$

Error order:, 26, Error:,  $4.2646539147554659101 \times 10^{-147}$ , New Error:,  $4.2645932981893075092 \times 10^{-173}$

Error order:, 26, Error:,  $4.2645932981893075092 \times 10^{-173}$ , New Error:,  $4.2645872365781326633 \times 10^{-199}$

$$x_o + h \cdot \begin{bmatrix} 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & 3 + 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} \\ 1 & 1 + 1 & 2 + 1 & 3 + 1 \\ 0 & 1 & 2 & 3 \\ -1 & 1 - 1 & 2 - 1 & 3 - 1 \\ -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} & 3 - 2 \text{ I} \\ -3 \text{ I} & 1 - 3 \text{ I} & 2 - 3 \text{ I} & 3 - 3 \text{ I} \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{56317}{106709850} + \frac{35131 \text{ I}}{106709850} & -\frac{20691}{11856650} - \frac{302859 \text{ I}}{23713300} & -\frac{312327}{30827290} + \frac{147501 \text{ I}}{30827290} & \frac{43553}{106709850} + \frac{27517 \text{ I}}{213419700} \\ -\frac{681}{128180} - \frac{18537 \text{ I}}{128180} & \frac{896994}{160225} - \frac{107298 \text{ I}}{160225} & \frac{111051}{256360} + \frac{1126683 \text{ I}}{256360} & -\frac{1704}{24505} + \frac{13956 \text{ I}}{416585} \\ -\frac{13929}{11050} + \frac{54903 \text{ I}}{11050} & \frac{648}{17} + \frac{14067 \text{ I}}{68} & \frac{93231}{850} + \frac{66717 \text{ I}}{850} & \frac{7773}{5525} - \frac{13137 \text{ I}}{22100} \\ \frac{260285}{6084} & -\frac{3816}{5} & \frac{4167}{10} & -\frac{476}{117} \\ -\frac{13929}{11050} - \frac{54903 \text{ I}}{11050} & \frac{648}{17} - \frac{14067 \text{ I}}{68} & \frac{93231}{850} - \frac{66717 \text{ I}}{850} & \frac{7773}{5525} + \frac{13137 \text{ I}}{22100} \\ -\frac{681}{128180} + \frac{18537 \text{ I}}{128180} & \frac{896994}{160225} + \frac{107298 \text{ I}}{160225} & \frac{111051}{256360} - \frac{1126683 \text{ I}}{256360} & -\frac{1704}{24505} - \frac{13956 \text{ I}}{416585} \\ \frac{56317}{106709850} - \frac{35131 \text{ I}}{106709850} & -\frac{20691}{11856650} + \frac{302859 \text{ I}}{23713300} & -\frac{312327}{30827290} - \frac{147501 \text{ I}}{30827290} & \frac{43553}{106709850} - \frac{27517 \text{ I}}{213419700} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{5548912200 \, \Delta x_{ol}^2} \big( (2928484 + 1826812 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (9683388 + 70869006 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (-56218860 + 26550180 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} + (2264756 + 715442 \, \mathrm{I}) \, u_{ol+3+3\mathrm{I}} - (29480490 + 802466730 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (31064696208 - 3715944336 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (2403698895 + 24387053535 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (-385853760 + 185893920 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (-6994642356 + 27570310092 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} + (211511476800 + 1147890410550 \, \mathrm{I}) \, u_{ol+1+1\mathrm{I}} + (608624274492 + 435537382644 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} + (7806641544 - 3298464234 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} + 237392934250 \, u_{ol} - 4234929791040 \, u_{ol+1} + 2312231713740 \, u_{ol+2} - 22575061600 \, u_{ol+3} - (6994642356 + 27570310092 \, \mathrm{I}) \, u_{ol-1} + (211511476800 - 1147890410550 \, \mathrm{I}) \, u_{ol+1-1\mathrm{I}} + (608624274492 - 435537382644 \, \mathrm{I}) \, u_{ol+2-1\mathrm{I}} + (7806641544 + 3298464234 \, \mathrm{I}) \, u_{ol+3-1\mathrm{I}} + (-29480490 + 802466730 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (31064696208 + 3715944336 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (2403698895 - 24387053535 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} - (385853760 + 185893920 \, \mathrm{I}) \, u_{ol+3-2\mathrm{I}} + (2928484 - 1826812 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + (-9683388 + 70869006 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} - (56218860 + 26550180 \, \mathrm{I}) \, u_{ol+2-3\mathrm{I}} + (2264756 - 715442 \, \mathrm{I}) \, u_{ol+3-3\mathrm{I}} \big), \, O( \, \Delta x_{ol}^{26} \, )$$

Formula:, 265, Var:., 1

Variavel :., x\_{ol}, Derivada de Ordem :., 3

Error order:., 25, Error:., 3.9269840718765739448 × 10<sup>−66</sup>, New Error:., 3.8717723068373411973 × 10<sup>−91</sup>

Error order:., 25, Error:., 3.8717723068373411973 × 10<sup>−91</sup>, New Error:., 3.8662922514132972831 × 10<sup>−116</sup>

Error order:., 25, Error:., 3.8662922514132972831 × 10<sup>−116</sup>, New Error:., 3.8657446551155443021 × 10<sup>−141</sup>

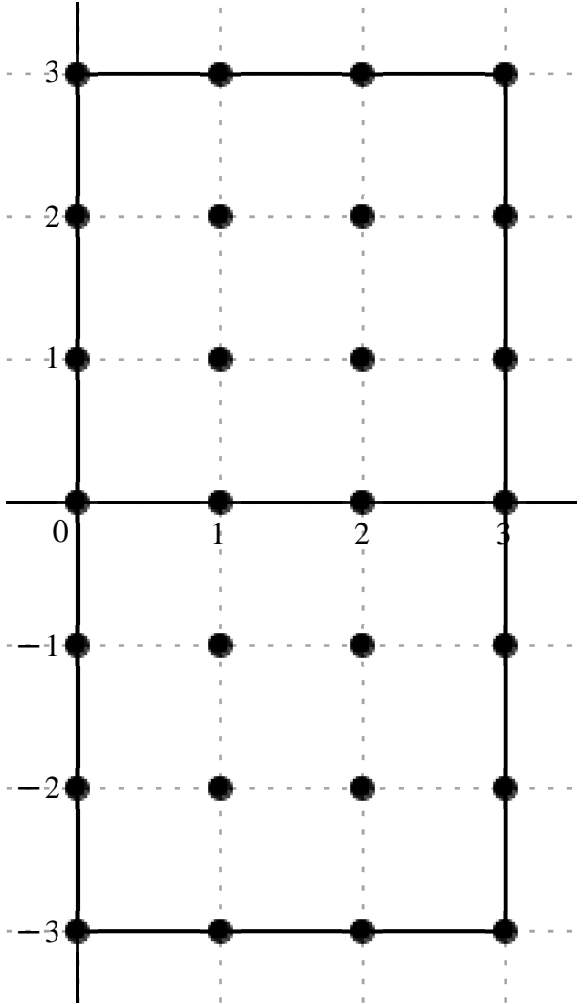
Error order:., 25, Error:., 3.8657446551155443021 × 10<sup>−141</sup>, New Error:., 3.8656898995762560375 × 10<sup>−166</sup>

Error order:., 25, Error:., 3.8656898995762560375 × 10<sup>−166</sup>, New Error:., 3.8656844240632301225 × 10<sup>−191</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccc} 3 \, \mathrm{I} & 1 + 3 \, \mathrm{I} & 2 + 3 \, \mathrm{I} & 3 + 3 \, \mathrm{I} \\ 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & 2 + 2 \, \mathrm{I} & 3 + 2 \, \mathrm{I} \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & 3 + \mathrm{I} \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & 3 - \mathrm{I} \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & 2 - 2 \, \mathrm{I} & 3 - 2 \, \mathrm{I} \\ -3 \, \mathrm{I} & 1 - 3 \, \mathrm{I} & 2 - 3 \, \mathrm{I} & 3 - 3 \, \mathrm{I} \end{array} \right]$$



$$c = , \left[ \begin{array}{cccccc} -\frac{56472211}{11097824400} - \frac{1632227 \text{ I}}{462409350} & \frac{144627021}{12330916000} + \frac{1553352147 \text{ I}}{12330916000} & \frac{24711147}{246618320} - \frac{668736 \text{ I}}{15413645} & -\frac{87481919}{22195648800} - \frac{29907983 \text{ I}}{22195648800} \\ -\frac{352689}{6665360} + \frac{9579549 \text{ I}}{6665360} & -\frac{4530785949}{83317000} + \frac{285260643 \text{ I}}{83317000} & -\frac{18030357}{6665360} - \frac{282386061 \text{ I}}{6665360} & \frac{2257683}{3332680} - \frac{205815 \text{ I}}{666536} \\ \frac{22595721}{1149200} - \frac{26718711 \text{ I}}{574600} & -\frac{1617813}{7072} - \frac{13670829 \text{ I}}{7072} & -\frac{448085277}{442000} - \frac{169420707 \text{ I}}{221000} & -\frac{155382141}{11492000} + \frac{63182757 \text{ I}}{11492000} \\ -\frac{89313631}{304200} & \frac{1747269}{260} & -\frac{2017539}{520} & \frac{78511}{2028} \\ \frac{22595721}{1149200} + \frac{26718711 \text{ I}}{574600} & -\frac{1617813}{7072} + \frac{13670829 \text{ I}}{7072} & -\frac{448085277}{442000} + \frac{169420707 \text{ I}}{221000} & -\frac{155382141}{11492000} - \frac{63182757 \text{ I}}{11492000} \\ -\frac{352689}{6665360} - \frac{9579549 \text{ I}}{6665360} & -\frac{4530785949}{83317000} - \frac{285260643 \text{ I}}{83317000} & -\frac{18030357}{6665360} + \frac{282386061 \text{ I}}{6665360} & \frac{2257683}{3332680} + \frac{205815 \text{ I}}{666536} \\ -\frac{56472211}{11097824400} + \frac{1632227 \text{ I}}{462409350} & \frac{144627021}{12330916000} - \frac{1553352147 \text{ I}}{12330916000} & \frac{24711147}{246618320} + \frac{668736 \text{ I}}{15413645} & -\frac{87481919}{22195648800} + \frac{29907983 \text{ I}}{22195648800} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{110978244000 \, \Delta x_{ol}^3} \big( -(564722110 + 391734480 \, \text{I}) \, u_{ol+3\text{I}} + (1301643189 + 13980169323 \, \text{I}) \, u_{ol+1+3\text{I}} + (11120016150 - 4814899200 \, \text{I}) \, u_{ol+2+3\text{I}} - (437409595 + 149539915 \, \text{I}) \, u_{ol+3+3\text{I}} + (-5872271850 + 159499490850 \, \text{I}) \, u_{ol+2\text{I}} + (-6035006884068 + 379967176476 \, \text{I}) \, u_{ol+1+2\text{I}} - (300205444050 \\ + 4701727915650 \, \text{I}) \, u_{ol+2+2\text{I}} + (75180843900 - 34268197500 \, \text{I}) \, u_{ol+3+2\text{I}} + (2182068776970 - 5160451842540 \, \text{I}) \, u_{ol+1\text{I}} - (25387732729125 + 214531192936125 \, \text{I}) \, u_{ol+1+1\text{I}} - (112506147519714 + 85076979909948 \, \text{I}) \, u_{ol+2+1\text{I}} + (-1500525335637 + 610155884349 \, \text{I}) \, u_{ol+3+1\text{I}} - 32583398861420 \, u_{ol} + 745803251598600 \, u_{ol+1} \\ - 430582568118300 \, u_{ol+2} + 4296357453000 \, u_{ol+3} + (2182068776970 + 5160451842540 \, \text{I}) \, u_{ol-1\text{I}} + (-25387732729125 + 214531192936125 \, \text{I}) \, u_{ol+1-1\text{I}} + (-112506147519714 + 85076979909948 \, \text{I}) \, u_{ol+2-1\text{I}} - (1500525335637 + 610155884349 \, \text{I}) \, u_{ol+3-1\text{I}} - (5872271850 + 159499490850 \, \text{I}) \, u_{ol-2\text{I}} - (6035006884068 \\ + 379967176476 \, \text{I}) \, u_{ol+1-2\text{I}} + (-300205444050 + 4701727915650 \, \text{I}) \, u_{ol+2-2\text{I}} + (75180843900 + 34268197500 \, \text{I}) \, u_{ol+3-2\text{I}} + (-564722110 + 391734480 \, \text{I}) \, u_{ol-3\text{I}} + (1301643189 - 13980169323 \, \text{I}) \, u_{ol+1-3\text{I}} + (11120016150 + 4814899200 \, \text{I}) \, u_{ol+2-3\text{I}} + (-437409595 + 149539915 \, \text{I}) \, u_{ol+3-3\text{I}} \big), \, O( \, \Delta x_{ol}^{25} \, )$$

$$\text{Variavel : } x_o, \text{ Derivada de Ordem : } 4$$

$$\text{Error order: } 24, \text{ Error: } 3.2664910216887411979 \times 10^{-63}, \text{ New Error: } 3.2207144937974450825 \times 10^{-87}$$

$$\text{Error order: } 24, \text{ Error: } 3.2207144937974450825 \times 10^{-87}, \text{ New Error: } 3.2161708232893974247 \times 10^{-111}$$

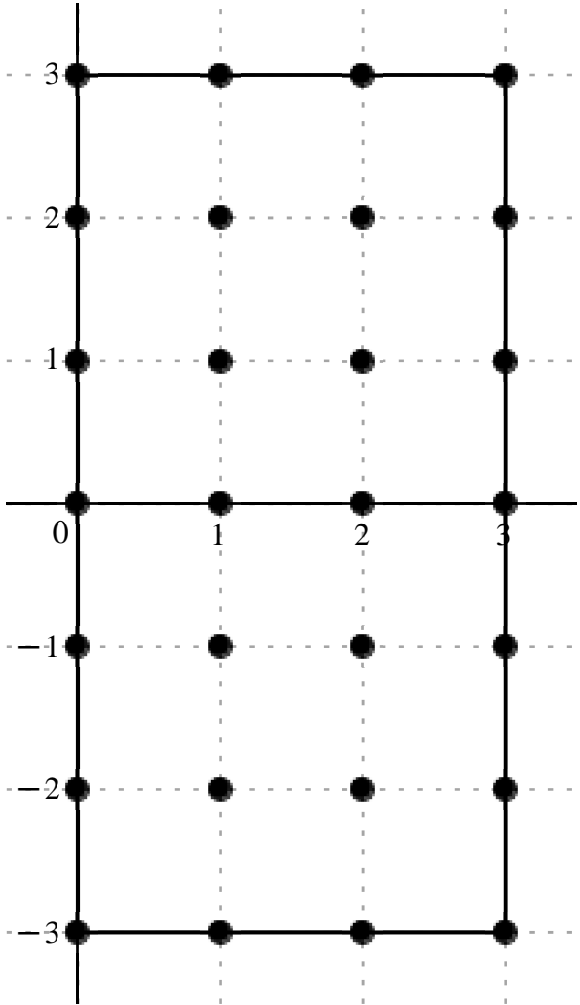
$$\text{Error order: } 24, \text{ Error: } 3.2161708232893974247 \times 10^{-111}, \text{ New Error: } 3.2157167944420482841 \times 10^{-135}$$

$$\text{Error order: } 24, \text{ Error: } 3.2157167944420482841 \times 10^{-135}, \text{ New Error: } 3.2156713949377340424 \times 10^{-159}$$

$$\text{Error order: } 24, \text{ Error: } 3.2156713949377340424 \times 10^{-159}, \text{ New Error: } 3.2156668550211052116 \times 10^{-183}$$

$$x_o + h \cdot \begin{bmatrix} 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & 3 + 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ 0 & 1 & 2 & 3 \\ -\text{I} & 1 - \text{I} & 2 - \text{I} & 3 - \text{I} \\ -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} & 3 - 2 \text{ I} \\ -3 \text{ I} & 1 - 3 \text{ I} & 2 - 3 \text{ I} & 3 - 3 \text{ I} \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{2074752929}{46240935000} + \frac{7127877659 \text{ I}}{208084207500} & -\frac{1893838863}{30827290000} - \frac{35052549471 \text{ I}}{30827290000} & -\frac{12661899}{13949000} + \frac{42944067 \text{ I}}{118566500} & \frac{29128845979}{832336830000} + \frac{10638652393 \text{ I}}{832336830000} \\ \frac{71531026}{52073125} - \frac{2702022683 \text{ I}}{208292500} & \frac{100595532339}{208292500} - \frac{1401901893 \text{ I}}{208292500} & \frac{62807697}{4901000} + \frac{31259928897 \text{ I}}{83317000} & -\frac{5713909}{942500} + \frac{42130349 \text{ I}}{16022500} \\ -\frac{3297066517}{14365000} + \frac{1369855661 \text{ I}}{3591250} & \frac{500387787}{442000} + \frac{7335422469 \text{ I}}{442000} & \frac{9587316249}{1105000} + \frac{947378961 \text{ I}}{138125} & \frac{3437522467}{28730000} - \frac{1352028577 \text{ I}}{28730000} \\ \frac{603364993}{292500} & -\frac{180577443}{3250} & \frac{108751209}{3250} & -\frac{77536981}{228150} \\ -\frac{3297066517}{14365000} - \frac{1369855661 \text{ I}}{3591250} & \frac{500387787}{442000} - \frac{7335422469 \text{ I}}{442000} & \frac{9587316249}{1105000} - \frac{947378961 \text{ I}}{138125} & \frac{3437522467}{28730000} + \frac{1352028577 \text{ I}}{28730000} \\ \frac{71531026}{52073125} + \frac{2702022683 \text{ I}}{208292500} & \frac{100595532339}{208292500} + \frac{1401901893 \text{ I}}{208292500} & \frac{62807697}{4901000} - \frac{31259928897 \text{ I}}{83317000} & -\frac{5713909}{942500} - \frac{42130349 \text{ I}}{16022500} \\ \frac{2074752929}{46240935000} - \frac{7127877659 \text{ I}}{208084207500} & -\frac{1893838863}{30827290000} + \frac{35052549471 \text{ I}}{30827290000} & -\frac{12661899}{13949000} - \frac{42944067 \text{ I}}{118566500} & \frac{29128845979}{832336830000} - \frac{10638652393 \text{ I}}{832336830000} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4}u(x_{ol})=\frac{1}{832336830000\,\mathcal{A}x_{ol}^4}\big((37345552722+28511510636\,\mathrm{I})\,u_{ol+31}- (51133649301+946418835717\,\mathrm{I})\,u_{ol+1+31}+(-755535513330+301467350340\,\mathrm{I})\,u_{ol+2+31}+(29128845979+10638652393\,\mathrm{I})\,u_{ol+3+31}+(1143351919584-10797282641268\,\mathrm{I})\,u_{ol+21}+(401979747226644-5601999964428\,\mathrm{I})\,u_{ol+1+21}+(10666631181510+312286689681030\,\mathrm{I})\,u_{ol+2+21}+(-5046044460444+2188587369852\,\mathrm{I})\,u_{ol+3+21}+(-191038628128014+317488706838648\,\mathrm{I})\,u_{ol+1}+(942287747516505+13813444082710935\,\mathrm{I})\,u_{ol+1+1}+(7221607615294254+5708875302859248\,\mathrm{I})\,u_{ol+2+1}+(99588463391457-39169619904267\,\mathrm{I})\,u_{ol+3+1}+1716933010620828\,u_{ol}-46246540454192520\,u_{ol+1}+27851580479300760\,u_{ol+2}-282870414084200\,u_{ol+3}-(191038628128014+317488706838648\,\mathrm{I})\,u_{ol-1}+(942287747516505-13813444082710935\,\mathrm{I})\,u_{ol+1-1}+(7221607615294254-5708875302859248\,\mathrm{I})\,u_{ol+2-1}+(99588463391457+39169619904267\,\mathrm{I})\,u_{ol+3-1}+(1143351919584+10797282641268\,\mathrm{I})\,u_{ol-21}+(401979747226644+5601999964428\,\mathrm{I})\,u_{ol+1-21}+(10666631181510-312286689681030\,\mathrm{I})\,u_{ol+2-21}-(5046044460444+2188587369852\,\mathrm{I})\,u_{ol+3-21}+(37345552722-28511510636\,\mathrm{I})\,u_{ol-31}+(-51133649301+946418835717\,\mathrm{I})\,u_{ol+1-31}-(755535513330+301467350340\,\mathrm{I})\,u_{ol+2-31}+(29128845979-10638652393\,\mathrm{I})\,u_{ol+3-31}\big),\,\,O(\,\mathcal{A}x_{ol}^{24}\,)$$

Formula.: 267, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 5

Error order.: 23, Error.: 2.6077913845410251559 × 10<sup>−60</sup>, New Error.: 2.5713612299014839271 × 10<sup>−83</sup>

Error order.: 23, Error.: 2.5713612299014839271 × 10<sup>−83</sup>, New Error.: 2.5677451728659094773 × 10<sup>−106</sup>

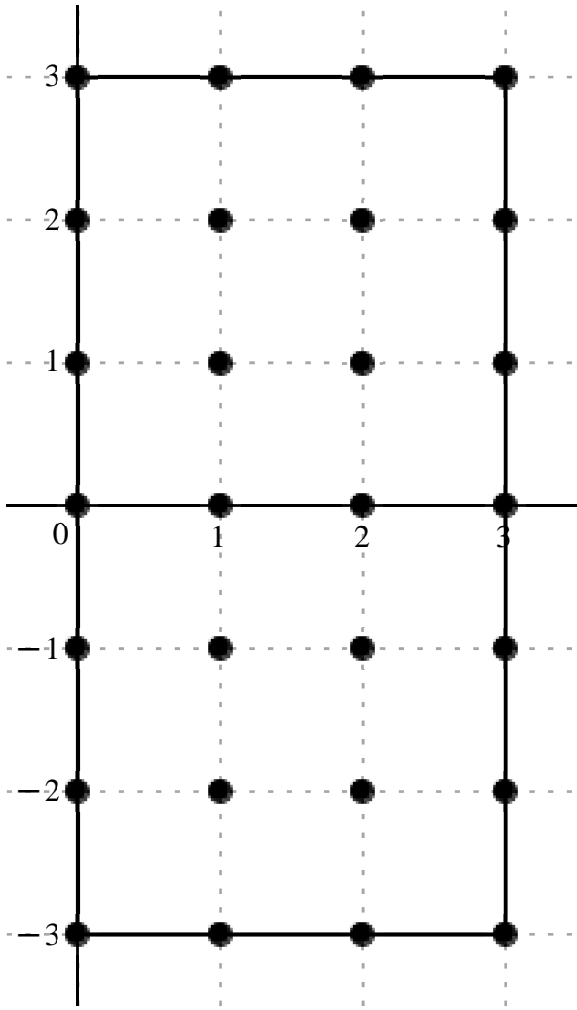
Error order.: 23, Error.: 2.5677451728659094773 × 10<sup>−106</sup>, New Error.: 2.5673838354661368632 × 10<sup>−129</sup>

Error order.: 23, Error.: 2.5673838354661368632 × 10<sup>−129</sup>, New Error.: 2.5673477044079212628 × 10<sup>−152</sup>

Error order.: 23, Error.: 2.5673477044079212628 × 10<sup>−152</sup>, New Error.: 2.5673440913289160436 × 10<sup>−175</sup>

$$x_o\neq h.\, , \left[\begin{array}{cccc} 3\,\mathrm{I} & 1+3\,\mathrm{I} & 2+3\,\mathrm{I} & 3+3\,\mathrm{I} \\ 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & 3+2\,\mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & 3-2\,\mathrm{I} \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & 2-3\,\mathrm{I} & 3-3\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{cccccccc} -\frac{127646688001}{337433850000}-\frac{17773139023\,\mathrm{I}}{56238975000}&-\frac{10604686359}{61654580000}+\frac{35645429691\,\mathrm{I}}{3626740000}&\frac{242961193881}{30827290000}-\frac{44725091319\,\mathrm{I}}{15413645000}&-\frac{7453525807693}{24970104900000}-\frac{961990672177\,\mathrm{I}}{8323368300000} \\ -\frac{80194919787}{4165850000}+\frac{464162234249\,\mathrm{I}}{4165850000}&-\frac{1710446555781}{416585000}-\frac{52217412237\,\mathrm{I}}{416585000}&-\frac{19466478261}{833170000}-\frac{2658126804183\,\mathrm{I}}{833170000}&\frac{108505470571}{2082925000}-\frac{44906666643\,\mathrm{I}}{2082925000} \\ \frac{328877346563}{143650000}-\frac{51947974677\,\mathrm{I}}{17956250}&-\frac{15885856143}{4420000}-\frac{605654878941\,\mathrm{I}}{4420000}&-\frac{158273784171}{2210000}-\frac{32511478527\,\mathrm{I}}{552500}&-\frac{292478336967}{287300000}+\frac{111563112281\,\mathrm{I}}{287300000} \\ -\frac{200903789471}{13689000}&\frac{14502362577}{32500}&-\frac{18093674277}{65000}&\frac{19654385677}{6844500} \\ \frac{328877346563}{143650000}+\frac{51947974677\,\mathrm{I}}{17956250}&-\frac{15885856143}{4420000}+\frac{605654878941\,\mathrm{I}}{4420000}&-\frac{158273784171}{2210000}+\frac{32511478527\,\mathrm{I}}{552500}&-\frac{292478336967}{287300000}-\frac{111563112281\,\mathrm{I}}{287300000} \\ -\frac{80194919787}{4165850000}-\frac{464162234249\,\mathrm{I}}{4165850000}&-\frac{1710446555781}{416585000}+\frac{52217412237\,\mathrm{I}}{416585000}&-\frac{19466478261}{833170000}+\frac{2658126804183\,\mathrm{I}}{833170000}&\frac{108505470571}{2082925000}+\frac{44906666643\,\mathrm{I}}{2082925000} \\ -\frac{127646688001}{337433850000}+\frac{17773139023\,\mathrm{I}}{56238975000}&\frac{10604686359}{61654580000}-\frac{35645429691\,\mathrm{I}}{3626740000}&\frac{242961193881}{30827290000}+\frac{44725091319\,\mathrm{I}}{15413645000}&-\frac{7453525807693}{24970104900000}+\frac{961990672177\,\mathrm{I}}{8323368300000} \end{array}\right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{24970104900000 \, \mathcal{A}x_{ol}^5} \, \big( \begin{aligned} &-(9445854912074 + 7891273726212 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (4294897975395 + 245418783422535 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (196798567043610 - 72454647936780 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} - (7453525807693 + 2885972016531 \, \mathrm{I}) \, u_{ol+3+3\mathrm{I}} + ( -480688349203278 + 2782188432088506 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} - (102524166553513140 \\ &+ 3129911689485780 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} - (583410353482170 + 79664060321364510 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (1300763581205148 - 538341119716284 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (57167433643660038 - 72239269169633616 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} - (89744681972176335 + 3421553362070943645 \, \mathrm{I}) \, u_{ol+1+1\mathrm{I}} - (1788286422475035990 + 1469348469272918520 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} \\ &+ ( -25420169700812871 + 9696284777678553 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} - 366468602374051100 \, u_{ol} + 11142323533708440840 \, u_{ol+1} - 6950783764971102420 \, u_{ol+2} + 71703129826831400 \, u_{ol+3} + (57167433643660038 + 72239269169633616 \, \mathrm{I}) \, u_{ol-1} + ( -89744681972176335 + 3421553362070943645 \, \mathrm{I}) \, u_{ol+1-1\mathrm{I}} + ( -1788286422475035990 \\ &+ 1469348469272918520 \, \mathrm{I}) \, u_{ol+2-1\mathrm{I}} - (25420169700812871 + 9696284777678553 \, \mathrm{I}) \, u_{ol+3-1\mathrm{I}} - (480688349203278 + 2782188432088506 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + ( -102524166553513140 + 3129911689485780 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + ( -583410353482170 + 79664060321364510 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} + (1300763581205148 + 538341119716284 \, \mathrm{I}) \, u_{ol+3-2\mathrm{I}} \\ &+ ( -9445854912074 + 7891273726212 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + (4294897975395 - 245418783422535 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} + (196798567043610 + 72454647936780 \, \mathrm{I}) \, u_{ol+2-3\mathrm{I}} + ( -7453525807693 + 2885972016531 \, \mathrm{I}) \, u_{ol+3-3\mathrm{I}} \big), \, O(\, \mathcal{A}x_{ol}^{23} \, ) \end{aligned}$$

Formula.: 268, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 6

Error order.: 22, Error.: 2.0239590337668200107 × 10<sup>−57</sup>, New Error.: 1.9957752470156728252 × 10<sup>−79</sup>

Error order.: 22, Error.: 1.9957752470156728252 × 10<sup>−79</sup>, New Error.: 1.9929776579922561704 × 10<sup>−101</sup>

Error order.: 22, Error.: 1.9929776579922561704 × 10<sup>−101</sup>, New Error.: 1.9926981060021377972 × 10<sup>−123</sup>

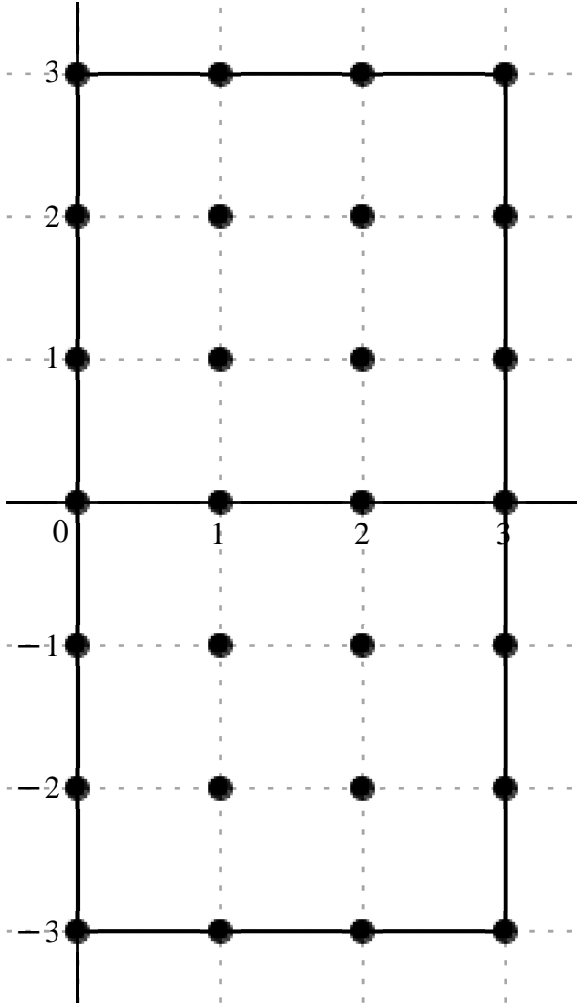
Error order.: 22, Error.: 1.9926981060021377972 × 10<sup>−123</sup>, New Error.: 1.9926701528712672022 × 10<sup>−145</sup>

Error order.: 22, Error.: 1.9926701528712672022 × 10<sup>−145</sup>, New Error.: 1.9926673575788605745 × 10<sup>−167</sup>

$$x_o \neq h. \, , \qquad \left[ \begin{array}{cccc} 3\mathrm{I} & 1+3\mathrm{I} & 2+3\mathrm{I} & 3+3\mathrm{I} \\ 2\mathrm{I} & 1+2\mathrm{I} & 2+2\mathrm{I} & 3+2\mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} \\ -2\mathrm{I} & 1-2\mathrm{I} & 2-2\mathrm{I} & 3-2\mathrm{I} \\ -3\mathrm{I} & 1-3\mathrm{I} & 2-3\mathrm{I} & 3-3\mathrm{I} \end{array} \right]$$

$c=,$ 

$\frac{4279722404621}{1387228050000}+\frac{1953418886909\text{ I}}{693614025000}$	$\frac{1424523277}{948532000}-\frac{78152421051\text{ I}}{948532000}$	$-\frac{2047707361337}{30827290000}+\frac{346860352323\text{ I}}{15413645000}$	$\frac{457666389599}{184963740000}+\frac{112269529363\text{ I}}{110978244000}$
$\frac{26645515211}{120168750}-\frac{55448927306\text{ I}}{60084375}$	$\frac{2819069858169}{83317000}+\frac{8230831977\text{ I}}{3332680}$	$-\frac{5884142841}{12252500}+\frac{5489649588219\text{ I}}{208292500}$	$-\frac{2718107008777}{6248775000}+\frac{63167990033\text{ I}}{367575000}$
$-\frac{1777366975957}{86190000}+\frac{111838602284\text{ I}}{5386875}$	$-\frac{56488100013}{4420000}+\frac{285912822597\text{ I}}{260000}$	$\frac{1272221926299}{2210000}+\frac{270810270993\text{ I}}{552500}$	$\frac{7260293529737}{861900000}-\frac{2688270187091\text{ I}}{861900000}$
$\frac{39785237923}{380250}$	$-\frac{113889614009}{32500}$	$\frac{3665569166}{1625}$	$-\frac{460384667}{19500}$
$-\frac{1777366975957}{86190000}-\frac{111838602284\text{ I}}{5386875}$	$-\frac{56488100013}{4420000}-\frac{285912822597\text{ I}}{260000}$	$\frac{1272221926299}{2210000}-\frac{270810270993\text{ I}}{552500}$	$\frac{7260293529737}{861900000}+\frac{2688270187091\text{ I}}{861900000}$
$\frac{26645515211}{120168750}+\frac{55448927306\text{ I}}{60084375}$	$\frac{2819069858169}{83317000}-\frac{8230831977\text{ I}}{3332680}$	$-\frac{5884142841}{12252500}-\frac{5489649588219\text{ I}}{208292500}$	$-\frac{2718107008777}{6248775000}-\frac{63167990033\text{ I}}{367575000}$
$\frac{4279722404621}{1387228050000}-\frac{1953418886909\text{ I}}{693614025000}$	$\frac{1424523277}{948532000}+\frac{78152421051\text{ I}}{948532000}$	$-\frac{2047707361337}{30827290000}-\frac{346860352323\text{ I}}{15413645000}$	$\frac{457666389599}{184963740000}-\frac{112269529363\text{ I}}{110978244000}$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{2774456100000 \, \Delta x_{ol}^6} \big( (8559444809242 + 7813675547636 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (4166730585225 - 228595831574175 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (-184293662520330 + 62434863418140 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} + (6864995843985 + 2806738234075 \, \mathrm{I}) \, u_{ol+3+3\mathrm{I}} + (615191655191568 - 2560409667281856 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (93875026277027700 \\ + 6852167620852500 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (-1332405304916040 + 73122132515077080 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (-1206839511896988 + 476791988769084 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (-57213442956055830 + 57601353720351360 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} + (-35457862818660165 + 3050971441240248045 \, \mathrm{I}) \, u_{ol+1+1\mathrm{I}} + (1597160128495027590 \\ + 1359911689229288520 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} + (23370884872223403 - 8653541732245929 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} + 290289009981377200 \, u_{ol} - 9722514901966630920 \, u_{ol+1} + 6258437373895761600 \, u_{ol+2} - 65503438343826600 \, u_{ol+3} - (57213442956055830 + 57601353720351360 \, \mathrm{I}) \, u_{ol-1\mathrm{I}} - (35457862818660165 + 3050971441240248045 \, \mathrm{I}) \, u_{ol+1-1\mathrm{I}} \\ + (1597160128495027590 - 1359911689229288520 \, \mathrm{I}) \, u_{ol+2-1\mathrm{I}} + (23370884872223403 + 8653541732245929 \, \mathrm{I}) \, u_{ol+3-1\mathrm{I}} + (615191655191568 + 2560409667281856 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (93875026277027700 - 6852167620852500 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} - (1332405304916040 + 73122132515077080 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} - (1206839511896988 \\ + 476791988769084 \, \mathrm{I}) \, u_{ol+3-2\mathrm{I}} + (8559444809242 - 7813675547636 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + (4166730585225 + 228595831574175 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} - (184293662520330 + 62434863418140 \, \mathrm{I}) \, u_{ol+2-3\mathrm{I}} + (6864995843985 - 2806738234075 \, \mathrm{I}) \, u_{ol+3-3\mathrm{I}} \big) , \, O(\Delta x_{ol}^{.22} \, )$$

Formula.: 269, Var.: 1

Variavel :  $x_o$  , Derivada de Ordem : 7

Error order.: 21, Error.:  $1.5302747438632823350 \times 10^{-54}$ , New Error.:  $1.5090366662582984974 \times 10^{-75}$

Error order.: 21, Error.:  $1.5090366662582984974 \times 10^{-75}$ , New Error.:  $1.5069284728607646649 \times 10^{-96}$

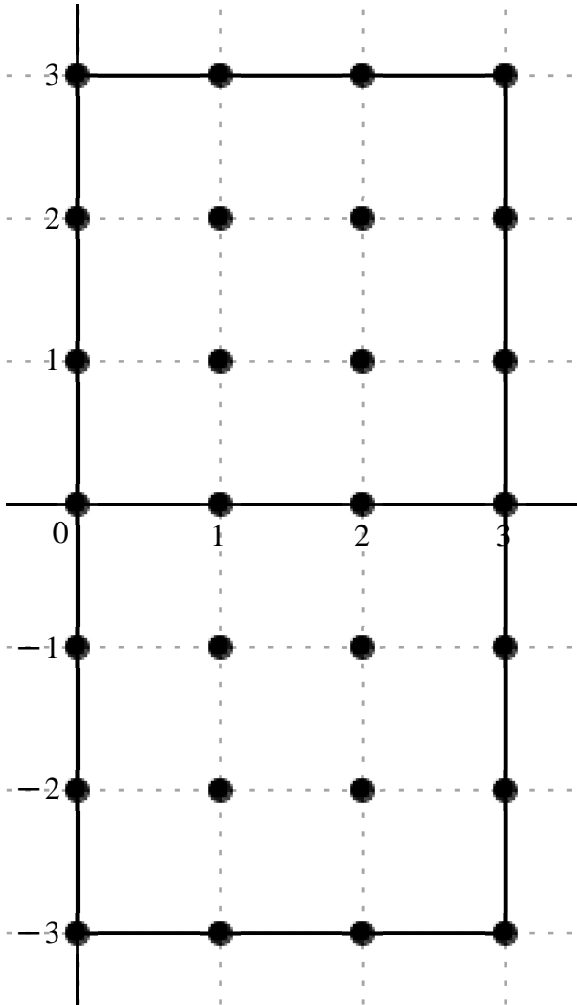
Error order.: 21, Error.:  $1.5069284728607646649 \times 10^{-96}$ , New Error.:  $1.5067178089278432504 \times 10^{-117}$

Error order.: 21, Error.:  $1.5067178089278432504 \times 10^{-117}$ , New Error.:  $1.5066967440878850949 \times 10^{-138}$

Error order.: 21, Error.:  $1.5066967440878850949 \times 10^{-138}$ , New Error.:  $1.5066946376194218851 \times 10^{-159}$

$$x_o + h., \begin{bmatrix} 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & 3 + 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ 0 & 1 & 2 & 3 \\ -\text{I} & 1 - \text{I} & 2 - \text{I} & 3 - \text{I} \\ -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} & 3 - 2 \text{ I} \\ -3 \text{ I} & 1 - 3 \text{ I} & 2 - 3 \text{ I} & 3 - 3 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{171144586193}{7029871875} - \frac{912191019733 \text{ I}}{37492650000} - \frac{140505606283}{3853411250} + \frac{41366077219551 \text{ I}}{61654580000} & \frac{8391017335897}{15413645000} - \frac{5199739617387 \text{ I}}{30827290000} & -\frac{41527384131947}{2080842075000} - \frac{23858071573217 \text{ I}}{2774456100000} \\ -\frac{14334979564703}{6248775000} + \frac{46115406010961 \text{ I}}{6248775000} & -\frac{112735099214913}{416585000} - \frac{762463678053 \text{ I}}{24505000} & \frac{3824847124833}{416585000} - \frac{88214329475601 \text{ I}}{416585000} & \frac{22087445616803}{6248775000} - \frac{8320346823439 \text{ I}}{6248775000} \\ \frac{37163238614201}{215475000} - \frac{61444675306189 \text{ I}}{430950000} & \frac{887642329791}{2210000} - \frac{37932818466711 \text{ I}}{4420000} & -\frac{622503813981}{138125} - \frac{516112683429 \text{ I}}{130000} & -\frac{29243656203727}{430950000} + \frac{21021046998847 \text{ I}}{861900000} \\ -\frac{1690272671423}{2281500} & \frac{873752694703}{32500} & -\frac{578900154763}{32500} & \frac{431308316831}{2281500} \\ \frac{37163238614201}{215475000} + \frac{61444675306189 \text{ I}}{430950000} & \frac{887642329791}{2210000} + \frac{37932818466711 \text{ I}}{4420000} & -\frac{622503813981}{138125} + \frac{516112683429 \text{ I}}{130000} & -\frac{29243656203727}{430950000} - \frac{21021046998847 \text{ I}}{861900000} \\ -\frac{14334979564703}{6248775000} - \frac{46115406010961 \text{ I}}{6248775000} & -\frac{112735099214913}{416585000} + \frac{762463678053 \text{ I}}{24505000} & \frac{3824847124833}{416585000} + \frac{88214329475601 \text{ I}}{416585000} & \frac{22087445616803}{6248775000} + \frac{8320346823439 \text{ I}}{6248775000} \\ -\frac{171144586193}{7029871875} + \frac{912191019733 \text{ I}}{37492650000} & -\frac{140505606283}{3853411250} - \frac{41366077219551 \text{ I}}{61654580000} & \frac{8391017335897}{15413645000} + \frac{5199739617387 \text{ I}}{30827290000} & -\frac{41527384131947}{2080842075000} + \frac{23858071573217 \text{ I}}{2774456100000} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u(x_{ol})=\frac{1}{8323368300000\,\mathcal{A}\mathfrak{x}_{ol}^7}\big(7\,\big(- (28947884293216+28929486625818\,\mathrm{I})\,u_{ol+31}+(-43356015653040+797774346377055\,\mathrm{I})\,u_{ol+1+31}+(647307051626340-200561385242070\,\mathrm{I})\,u_{ol+2+31}-(23729933789684+10224887817093\,\mathrm{I})\,u_{ol+3+31}+(-2727741825740628+8775102972371436\,\mathrm{I})\,u_{ol+21}-(321778183187708820+36996916126783140\,\mathrm{I})\,u_{ol+1+21}+(10917206507737620-251788900417501140\,\mathrm{I})\,u_{ol+2+21}+(4202925365940228-1583243138402964\,\mathrm{I})\,u_{ol+3+21}+(205077368741336604-169534636980533478\,\mathrm{I})\,u_{ol+1}+(477580738818393990-10204551349562926395\,\mathrm{I})\,u_{ol+1+1}-(5358840089896369440+4720654888440520770\,\mathrm{I})\,u_{ol+2+1}+(-80687425131254754+29000035838266497\,\mathrm{I})\,u_{ol+3+1}-880921822840769800\,u_{ol}+31967320796178145560\,u_{ol+1}-21179776690195376760\,u_{ol+2}+224785571637550600\,u_{ol+3}+(205077368741336604+169534636980533478\,\mathrm{I})\,u_{ol-1}+(477580738818393990+10204551349562926395\,\mathrm{I})\,u_{ol+1-1}+(-5358840089896369440+4720654888440520770\,\mathrm{I})\,u_{ol+2-1}-(80687425131254754+29000035838266497\,\mathrm{I})\,u_{ol+3-1}-(2727741825740628+8775102972371436\,\mathrm{I})\,u_{ol-21}+(-321778183187708820+36996916126783140\,\mathrm{I})\,u_{ol+1-21}+(10917206507737620+251788900417501140\,\mathrm{I})\,u_{ol+2-21}+(4202925365940228+1583243138402964\,\mathrm{I})\,u_{ol+3-21}+(-28947884293216+28929486625818\,\mathrm{I})\,u_{ol-31}-(43356015653040+797774346377055\,\mathrm{I})\,u_{ol+1-31}+(647307051626340+200561385242070\,\mathrm{I})\,u_{ol+2-31}+(-23729933789684+10224887817093\,\mathrm{I})\,u_{ol+3-31}\big)\big),\,\,O(\,\mathcal{A}\mathfrak{x}_{ol}^{21}\,)\,$$

Formula.: 270, Var.: 1

Variavel .: x<sub>ol</sub> , Derivada de Ordem .: 8

Error order.: 20, Error.: 1.1257142430806189930 × 10<sup>−51</sup>, New Error.: 1.1101462727447530120 × 10<sup>−71</sup>

Error order.: 20, Error.: 1.1101462727447530120 × 10<sup>−71</sup>, New Error.: 1.1086008814147427730 × 10<sup>−91</sup>

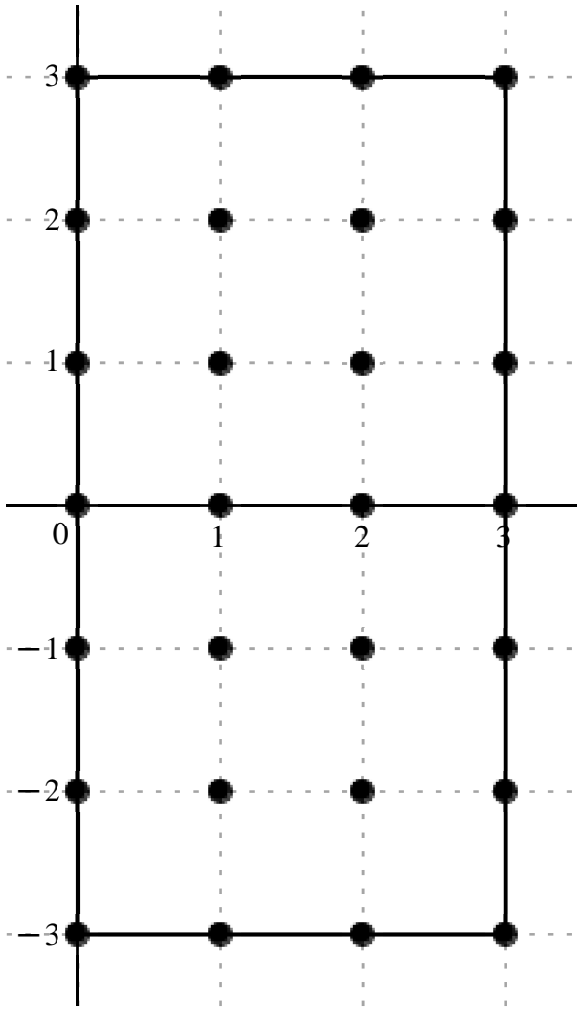
Error order.: 20, Error.: 1.1086008814147427730 × 10<sup>−91</sup>, New Error.: 1.1084464558024621445 × 10<sup>−111</sup>

Error order.: 20, Error.: 1.1084464558024621445 × 10<sup>−111</sup>, New Error.: 1.1084310143759067572 × 10<sup>−131</sup>

Error order.: 20, Error.: 1.1084310143759067572 × 10<sup>−131</sup>, New Error.: 1.1084294702445974108 × 10<sup>−151</sup>

$$x_o\neq h\,.\,,\left[\begin{array}{cccc}3\,\mathrm{I}&1+3\,\mathrm{I}&2+3\,\mathrm{I}&3+3\,\mathrm{I}\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&3+2\,\mathrm{I}\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}\\0&1&2&3\\-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}&3-\mathrm{I}\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}&3-2\,\mathrm{I}\\-3\,\mathrm{I}&1-3\,\mathrm{I}&2-3\,\mathrm{I}&3-3\,\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} \frac{642666186463}{3468070125}+\frac{705938882152\,\mathrm{I}}{3468070125} & \frac{1493460335479}{3082729000}-\frac{16330530998523\,\mathrm{I}}{3082729000} & -\frac{128392337773}{29641625}+\frac{7213496934\,\mathrm{I}}{5928325} & \frac{4337475674819}{27744561000}+\frac{1967695520539\,\mathrm{I}}{27744561000} \\ \frac{45711329748}{2082925}-\frac{591811022614\,\mathrm{I}}{10414625} & \frac{21836062706304}{10414625}+\frac{3429514621848\,\mathrm{I}}{10414625} & -\frac{1176983308977}{10414625}+\frac{3440511726267\,\mathrm{I}}{2082925} & -\frac{22355982096}{801125}+\frac{8014328056\,\mathrm{I}}{801125} \\ -\frac{488510560041}{359125}+\frac{338358003046\,\mathrm{I}}{359125} & -\frac{1146525144303}{221000}+\frac{574799145501\,\mathrm{I}}{8840} & \frac{947364650967}{27625}+\frac{862408198596\,\mathrm{I}}{27625} & \frac{1526336955969}{2873000}-\frac{532270277777\,\mathrm{I}}{2873000} \\ \frac{15135898358}{2925} & -\frac{326607990688}{1625} & \frac{222274503332}{1625} & -\frac{279769856576}{190125} \\ -\frac{488510560041}{359125}-\frac{338358003046\,\mathrm{I}}{359125} & -\frac{1146525144303}{221000}-\frac{574799145501\,\mathrm{I}}{8840} & \frac{947364650967}{27625}-\frac{862408198596\,\mathrm{I}}{27625} & \frac{1526336955969}{2873000}+\frac{532270277777\,\mathrm{I}}{2873000} \\ \frac{45711329748}{2082925}+\frac{591811022614\,\mathrm{I}}{10414625} & \frac{21836062706304}{10414625}-\frac{3429514621848\,\mathrm{I}}{10414625} & -\frac{1176983308977}{10414625}-\frac{3440511726267\,\mathrm{I}}{2082925} & -\frac{22355982096}{801125}-\frac{8014328056\,\mathrm{I}}{801125} \\ \frac{642666186463}{3468070125}-\frac{705938882152\,\mathrm{I}}{3468070125} & \frac{1493460335479}{3082729000}+\frac{16330530998523\,\mathrm{I}}{3082729000} & -\frac{128392337773}{29641625}-\frac{7213496934\,\mathrm{I}}{5928325} & \frac{4337475674819}{27744561000}-\frac{1967695520539\,\mathrm{I}}{27744561000} \end{array}\right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{27744561000 \, \mathcal{A}x_{ol}^8} \, (7 \, ((734475641672 + 806787293888 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (1920163288473 - 20996396998101 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (-17167889736504 + 4822737950160 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} + (619639382117 + 281099360077 \, \mathrm{I}) \, u_{ol+3+3\mathrm{I}} + (86982130320480 - 225226366320528 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (8310181578513408$$

$$+ 1305175278943296 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (-447926219302104 + 6546802313410920 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (-110604624564096 + 39650315605056 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (-5391481689503928 + 3734312269045968 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} + (-20562273305848989 + 257717355447646575 \, \mathrm{I}) \, u_{ol+1+1\mathrm{I}} + (135923549310912168 + 123734385897074784 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}}$$

$$+ (2105690854827519 - 734304867498927 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} + 20509834201872080 \, u_{ol} - 796623764459837184 \, u_{ol+1} + 542145803643022176 \, u_{ol+2} - 5832322232917504 \, u_{ol+3} - (5391481689503928 + 3734312269045968 \, \mathrm{I}) \, u_{ol-1} - (20562273305848989 + 257717355447646575 \, \mathrm{I}) \, u_{ol+1-1\mathrm{I}} + (135923549310912168$$

$$- 123734385897074784 \, \mathrm{I}) \, u_{ol+2-1\mathrm{I}} + (2105690854827519 + 734304867498927 \, \mathrm{I}) \, u_{ol+3-1\mathrm{I}} + (86982130320480 + 225226366320528 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (8310181578513408 - 1305175278943296 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} - (447926219302104 + 6546802313410920 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} - (110604624564096 + 39650315605056 \, \mathrm{I}) \, u_{ol+3-2\mathrm{I}} + (734475641672$$

$$- 806787293888 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + (1920163288473 + 20996396998101 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} - (17167889736504 + 4822737950160 \, \mathrm{I}) \, u_{ol+2-3\mathrm{I}} + (619639382117 - 281099360077 \, \mathrm{I}) \, u_{ol+3-3\mathrm{I}})), \, O(\, \mathcal{A}x_{ol}^{20} \, )$$

Formula.: 271, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 9

Error order.: 19, Error.: 8.0409684285381239648 × 10<sup>−49</sup>, New Error.: 7.9301884599540515781 × 10<sup>−68</sup>

Error order.: 19, Error.: 7.9301884599540515781 × 10<sup>−68</sup>, New Error.: 7.9191913234806990036 × 10<sup>−87</sup>

Error order.: 19, Error.: 7.9191913234806990036 × 10<sup>−87</sup>, New Error.: 7.9180924146491144922 × 10<sup>−106</sup>

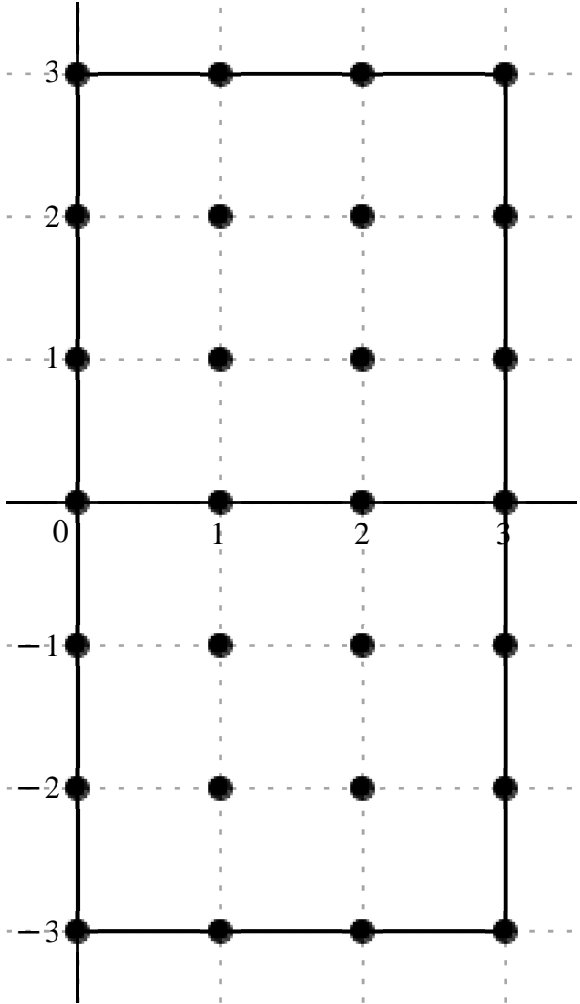
Error order.: 19, Error.: 7.9180924146491144922 × 10<sup>−106</sup>, New Error.: 7.9179825318103380222 × 10<sup>−125</sup>

Error order.: 19, Error.: 7.9179825318103380222 × 10<sup>−125</sup>, New Error.: 7.9179715436069004207 × 10<sup>−144</sup>

$$x_o \neq h. \, , \qquad \left[ \begin{array}{cccc} 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & 2+3 \, \mathrm{I} & 3+3 \, \mathrm{I} \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & 3+2 \, \mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} \\ -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} & 3-2 \, \mathrm{I} \\ -3 \, \mathrm{I} & 1-3 \, \mathrm{I} & 2-3 \, \mathrm{I} & 3-3 \, \mathrm{I} \end{array} \right]$$



$$c = , \left[ \begin{array}{cccccccc} -\frac{15667162563017}{11560233750} & -\frac{3169954883081\text{ I}}{1926705625} & -\frac{16184817775791}{3082729000} & +\frac{62356543967151\text{ I}}{1541364500} & \frac{25728033281139}{770682250} & -\frac{3240238758057\text{ I}}{385341125} & -\frac{54876309648391}{46240935000} & -\frac{4365236381177\text{ I}}{7706822500} \\ -\frac{1201961508237}{6126250} & +\frac{43727404097223\text{ I}}{104146250} & -\frac{163513197598149}{10414625} & -\frac{32591446995933\text{ I}}{10414625} & \frac{1429458002217}{1225250} & -\frac{259961232144537\text{ I}}{20829250} & \frac{11121205836447}{52073125} & -\frac{3785293127511\text{ I}}{52073125} \\ \frac{36650370651741}{3591250} & -\frac{10778676794046\text{ I}}{1795625} & \frac{11691237806577}{221000} & -\frac{13186855457811\text{ I}}{27625} & -\frac{13981456454553}{55250} & -\frac{6569637342282\text{ I}}{27625} & -\frac{57938371983513}{14365000} & +\frac{2449117124748\text{ I}}{1795625} \\ & -\frac{449455301071}{12675} & & \frac{2373228407466}{1625} & & -\frac{331222979367}{325} & & \frac{704063536694}{63375} \\ \frac{36650370651741}{3591250} & +\frac{10778676794046\text{ I}}{1795625} & \frac{11691237806577}{221000} & +\frac{13186855457811\text{ I}}{27625} & -\frac{13981456454553}{55250} & +\frac{6569637342282\text{ I}}{27625} & -\frac{57938371983513}{14365000} & -\frac{2449117124748\text{ I}}{1795625} \\ -\frac{1201961508237}{6126250} & -\frac{43727404097223\text{ I}}{104146250} & -\frac{163513197598149}{10414625} & +\frac{32591446995933\text{ I}}{10414625} & \frac{1429458002217}{1225250} & +\frac{259961232144537\text{ I}}{20829250} & \frac{11121205836447}{52073125} & +\frac{3785293127511\text{ I}}{52073125} \\ -\frac{15667162563017}{11560233750} & +\frac{3169954883081\text{ I}}{1926705625} & -\frac{16184817775791}{3082729000} & -\frac{62356543967151\text{ I}}{1541364500} & \frac{25728033281139}{770682250} & +\frac{3240238758057\text{ I}}{385341125} & -\frac{54876309648391}{46240935000} & +\frac{4365236381177\text{ I}}{7706822500} \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{46240935000 \, \Delta x_{ol}^9} \big( 7 \, \big( -(8952664321724 + 10868416741992 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (-34681752376695 + 267242331287790 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (220525999552620 - 55546950138120 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} - (7839472806913 + 3741631183866 \, \mathrm{I}) \, u_{ol+3+3\mathrm{I}} + (-1296057923453268 + 2773566774166716 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} - (103714085333683080 \\ + 20672289237420360 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (7706820714809940 - 82444847908696020 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (1410804397537848 - 480191471032824 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (67415738930259588 - 39653212114324656 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} + (349459448922734085 - 3153316230531525240 \, \mathrm{I}) \, u_{ol+1+1\mathrm{I}} - (1671662880724798260 + 1570969222071284880 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} \\ + (-26643374202132621 + 9009952028072928 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} - 234243261338174600 \, u_{ol} + 9647498947673742480 \, u_{ol+1} - 6732334179962983800 \, u_{ol+2} + 73387559844772880 \, u_{ol+3} + (67415738930259588 + 39653212114324656 \, \mathrm{I}) \, u_{ol-1\mathrm{I}} + (349459448922734085 + 3153316230531525240 \, \mathrm{I}) \, u_{ol+1-1\mathrm{I}} + (-1671662880724798260 \\ + 1570969222071284880 \, \mathrm{I}) \, u_{ol+2-1\mathrm{I}} - (26643374202132621 + 9009952028072928 \, \mathrm{I}) \, u_{ol+3-1\mathrm{I}} - (1296057923453268 + 2773566774166716 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (-103714085333683080 + 20672289237420360 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (7706820714809940 + 82444847908696020 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} + (1410804397537848 + 480191471032824 \, \mathrm{I}) \, u_{ol+3-2\mathrm{I}} \\ + (-8952664321724 + 10868416741992 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} - (34681752376695 + 267242331287790 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} + (220525999552620 + 55546950138120 \, \mathrm{I}) \, u_{ol+2-3\mathrm{I}} + (-7839472806913 + 3741631183866 \, \mathrm{I}) \, u_{ol+3-3\mathrm{I}} \big) \big) , \, O(\, \Delta x_{ol}^{19} \, )$$

Formula:, 272, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 10

Error order:, 18, Error:,  $5.5654701191636199130 \times 10^{-46}$ , New Error:,  $5.4891078903064916247 \times 10^{-64}$

Error order:, 18, Error:,  $5.4891078903064916247 \times 10^{-64}$ , New Error:,  $5.4815271846643245223 \times 10^{-82}$

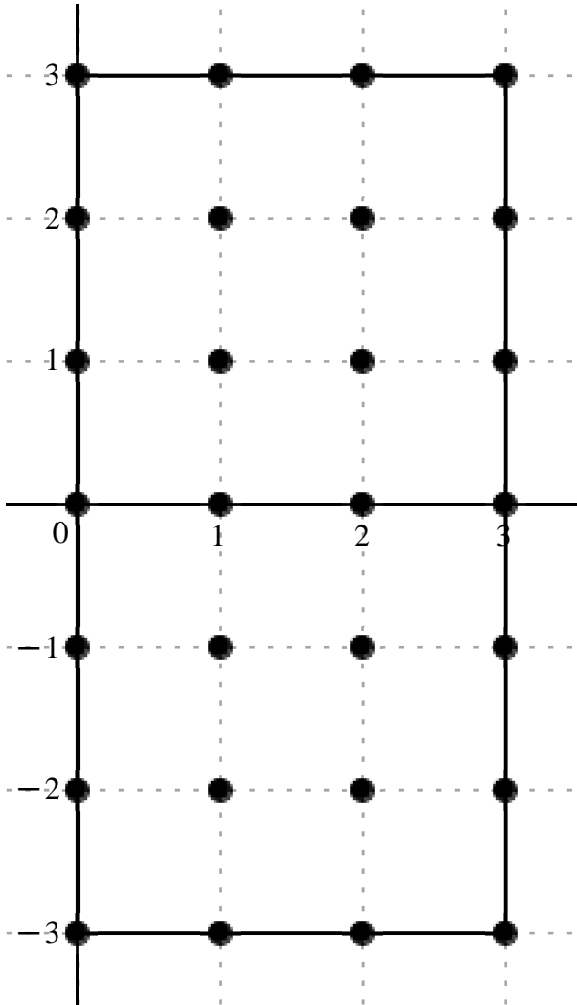
Error order:, 18, Error:,  $5.4815271846643245223 \times 10^{-82}$ , New Error:,  $5.4807696666819258100 \times 10^{-100}$

Error order:, 18, Error:,  $5.4807696666819258100 \times 10^{-100}$ , New Error:,  $5.4806939204069220654 \times 10^{-118}$

Error order:, 18, Error:,  $5.4806939204069220654 \times 10^{-118}$ , New Error:,  $5.4806863458346514710 \times 10^{-136}$

$$x_o + h \cdot , \begin{bmatrix} 3\text{ I} & 1+3\text{ I} & 2+3\text{ I} & 3+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & 3-2\text{ I} \\ -3\text{ I} & 1-3\text{ I} & 2-3\text{ I} & 3-3\text{ I} \end{bmatrix}$$

$$c = , \left[ \begin{array}{cccccccc} \frac{7309412883381}{770682250} + \frac{4936922425729\text{ I}}{385341125} & \frac{2395377854541}{47426600} - \frac{14137059082167\text{ I}}{47426600} & -\frac{38326101047073}{154136450} + \frac{4267574051643\text{ I}}{77068225} & \frac{1073960792149}{123309160} + \frac{2694948519599\text{ I}}{616545800} \\ \frac{1318801645182}{801125} - \frac{2377575940614\text{ I}}{801125} & \frac{13892616343809}{122525} + \frac{57097513635561\text{ I}}{2082925} & -\frac{22509232139961}{2082925} + \frac{189843297726159\text{ I}}{2082925} & -\frac{16464770801871}{10414625} + \frac{5306798008743\text{ I}}{10414625} \\ -\frac{2102130739947}{28730} + \frac{2647833553428\text{ I}}{71825} & -\frac{20991847082409}{44200} + \frac{149790367367109\text{ I}}{44200} & \frac{19965004349283}{11050} + \frac{9675874546002\text{ I}}{5525} & \frac{85115031885807}{2873000} - \frac{27894467726601\text{ I}}{2873000} \\ -\frac{200532179442}{845} & -\frac{3343738604346}{325} & \frac{2388982812804}{325} & -\frac{26379708866}{325} \\ -\frac{2102130739947}{28730} - \frac{2647833553428\text{ I}}{71825} & -\frac{20991847082409}{44200} - \frac{149790367367109\text{ I}}{44200} & \frac{19965004349283}{11050} - \frac{9675874546002\text{ I}}{5525} & \frac{85115031885807}{2873000} + \frac{27894467726601\text{ I}}{2873000} \\ \frac{1318801645182}{801125} + \frac{2377575940614\text{ I}}{801125} & \frac{13892616343809}{122525} - \frac{57097513635561\text{ I}}{2082925} & -\frac{22509232139961}{2082925} - \frac{189843297726159\text{ I}}{2082925} & -\frac{16464770801871}{10414625} - \frac{5306798008743\text{ I}}{10414625} \\ \frac{7309412883381}{770682250} - \frac{4936922425729\text{ I}}{385341125} & \frac{2395377854541}{47426600} + \frac{14137059082167\text{ I}}{47426600} & -\frac{38326101047073}{154136450} - \frac{4267574051643\text{ I}}{77068225} & \frac{1073960792149}{123309160} - \frac{2694948519599\text{ I}}{616545800} \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\,u(x_{ol})=\frac{1}{3082729000\,\mathcal{A}\mathfrak{x}_{ol}^{10}}\Big(7\Big((4176807361932+5642197057976\,\mathrm{I})\,u_{ol+31}+(22242794363595-131272691477265\,\mathrm{I})\,u_{ol+1+31}+(-109503145848780+24386137437960\,\mathrm{I})\,u_{ol+2+31}+(3835574257675+1924963228285\,\mathrm{I})\,u_{ol+3+31}+(724964104380048-1306987459926096\,\mathrm{I})\,u_{ol+21}+(49934032458604920+12072045740090040\,\mathrm{I})\,u_{ol+1+21}+(-4759094795306040+40138297233530760\,\mathrm{I})\,u_{ol+2+21}+(-696224593907688+224401744369704\,\mathrm{I})\,u_{ol+3+21}+(-32222661199473300+16235002301875680\,\mathrm{I})\,u_{ol+1}+(-209153767823230815+1492447024574145315\,\mathrm{I})\,u_{ol+1+1}+(795690987623281620+771250137383896560\,\mathrm{I})\,u_{ol+2+1}+(13046918459067273-4275823410091839\,\mathrm{I})\,u_{ol+3+1}+104511642434329200\,u_{ol}-4530918665510742960\,u_{ol+1}+3237180921992291040\,u_{ol+2}-35745711442978160\,u_{ol+3}-(32222661199473300+16235002301875680\,\mathrm{I})\,u_{ol-1}-(209153767823230815+1492447024574145315\,\mathrm{I})\,u_{ol+1-1}+(795690987623281620-771250137383896560\,\mathrm{I})\,u_{ol+2-1}+(13046918459067273+4275823410091839\,\mathrm{I})\,u_{ol+3-1}+(724964104380048+1306987459926096\,\mathrm{I})\,u_{ol-21}+(49934032458604920-12072045740090040\,\mathrm{I})\,u_{ol+1-21}-(4759094795306040+40138297233530760\,\mathrm{I})\,u_{ol+2-21}-(696224593907688+224401744369704\,\mathrm{I})\,u_{ol+3-21}+(4176807361932-5642197057976\,\mathrm{I})\,u_{ol-31}+(22242794363595+131272691477265\,\mathrm{I})\,u_{ol+1-31}-(109503145848780+24386137437960\,\mathrm{I})\,u_{ol+2-31}+(3835574257675-1924963228285\,\mathrm{I})\,u_{ol+3-31})\Big)\,,\,\,O(\,\mathcal{A}\mathfrak{x}_{ol}^{18}\,)\,$$

Formula.: 273, Var.: 1

Variavel :, x\_{o\_l}, Derivada de Ordem :, 12

Error order.: 16, Error.: 2.4040251135612784163 × 10<sup>−40</sup>, New Error.: 2.3713431860325792240 × 10<sup>−56</sup>

Error order.: 16, Error.: 2.3713431860325792240 × 10<sup>−56</sup>, New Error.: 2.3680985444289544030 × 10<sup>−72</sup>

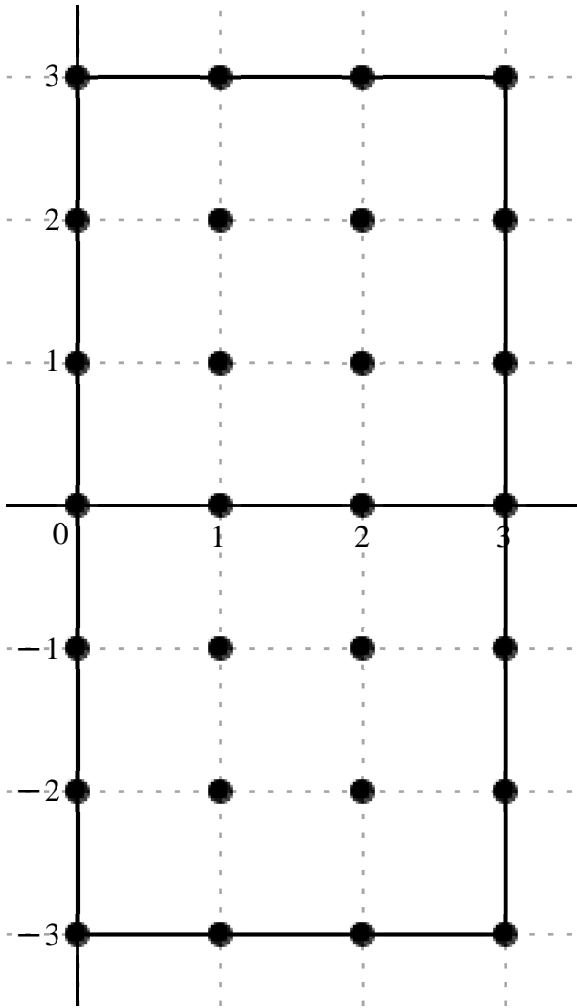
Error order.: 16, Error.: 2.3680985444289544030 × 10<sup>−72</sup>, New Error.: 2.3677743146906018062 × 10<sup>−88</sup>

Error order.: 16, Error.: 2.3677743146906018062 × 10<sup>−88</sup>, New Error.: 2.3677418940599007329 × 10<sup>−104</sup>

Error order.: 16, Error.: 2.3677418940599007329 × 10<sup>−104</sup>, New Error.: 2.3677386520202608819 × 10<sup>−120</sup>

$$x_o\neq h\,.,\left[\begin{array}{cccc}3\,\mathrm{I}&1+3\,\mathrm{I}&2+3\,\mathrm{I}&3+3\,\mathrm{I}\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&3+2\,\mathrm{I}\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}\\0&1&2&3\\-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}&3-\mathrm{I}\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}&3-2\,\mathrm{I}\\-3\,\mathrm{I}&1-3\,\mathrm{I}&2-3\,\mathrm{I}&3-3\,\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{cccccc}\frac{1809377262231}{4533425}+\frac{3111956309154\,\mathrm{I}}{4533425}&\frac{66102223375881}{18133700}-\frac{260785340010657\,\mathrm{I}}{18133700}&-\frac{116188393167}{9425}+\frac{140626624446\,\mathrm{I}}{69745}&\frac{7610412454029}{18133700}+\frac{4219655812449\,\mathrm{I}}{18133700}\\ \frac{2362494219624}{24505}-\frac{15744024459702\,\mathrm{I}}{122525}&\frac{643977063585702}{122525}+\frac{210935971571094\,\mathrm{I}}{122525}&-\frac{90046308558591}{122525}+\frac{106492849388541\,\mathrm{I}}{24505}&-\frac{731664677898}{9425}+\frac{209400751098\,\mathrm{I}}{9425}\\ -\frac{13946768437833}{4225}+\frac{5216939922348\,\mathrm{I}}{4225}&-\frac{38715231602817}{1300}+\frac{7958798612919\,\mathrm{I}}{52}&\frac{26845785834021}{325}+\frac{27622879803288\,\mathrm{I}}{325}&\frac{24229292047191}{16900}-\frac{7439735339883\,\mathrm{I}}{16900}\\ \frac{633022024866}{65}&-\frac{149582176845948}{325}&\frac{111614945241492}{325}&-\frac{16429307664924}{4225}\\ -\frac{13946768437833}{4225}-\frac{5216939922348\,\mathrm{I}}{4225}&-\frac{38715231602817}{1300}-\frac{7958798612919\,\mathrm{I}}{52}&\frac{26845785834021}{325}-\frac{27622879803288\,\mathrm{I}}{325}&\frac{24229292047191}{16900}+\frac{7439735339883\,\mathrm{I}}{16900}\\ \frac{2362494219624}{24505}+\frac{15744024459702\,\mathrm{I}}{122525}&\frac{643977063585702}{122525}-\frac{210935971571094\,\mathrm{I}}{122525}&-\frac{90046308558591}{122525}-\frac{106492849388541\,\mathrm{I}}{24505}&-\frac{731664677898}{9425}-\frac{209400751098\,\mathrm{I}}{9425}\\ \frac{1809377262231}{4533425}-\frac{3111956309154\,\mathrm{I}}{4533425}&\frac{66102223375881}{18133700}+\frac{260785340010657\,\mathrm{I}}{18133700}&-\frac{116188393167}{9425}-\frac{140626624446\,\mathrm{I}}{69745}&\frac{7610412454029}{18133700}-\frac{4219655812449\,\mathrm{I}}{18133700}\end{array}\right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\;u(x_{ol})=\frac{1}{18133700\,\mathcal{A}x_{ol}^{12}}\left(231\left((31331208004+53886689336\,\mathrm{I})\,u_{ol+3\mathrm{I}}+(286156811151-1128940865847\,\mathrm{I})\,u_{ol+1+3\mathrm{I}}+(-967733629668+158281049160\,\mathrm{I})\,u_{ol+2+3\mathrm{I}}+(32945508459+18266908279\,\mathrm{I})\,u_{ol+3+3\mathrm{I}}+(7568163300960-10087080606216\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(412591365414216+135145124642952\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}\right.\\ \left. +(-57692007215028+341145924448140\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}+(-6094038269592+1744099762392\,\mathrm{I})\,u_{ol+3+2\mathrm{I}}+(-259132165087356+96931195440336\,\mathrm{I})\,u_{ol+1\mathrm{I}}+(-2337830154232443+12014857343247525\,\mathrm{I})\,u_{ol+1+1\mathrm{I}}+(6484361326385436+6672061478373408\,\mathrm{I})\,u_{ol+2+1\mathrm{I}}+(112545586002753-34557731686989\,\mathrm{I})\,u_{ol+3+1\mathrm{I}}\right.\\ \left. +764504261892280\,u_{ol}-36130247356261968\,u_{ol+1}+26959599500841072\,u_{ol+2}-305257958865168\,u_{ol+3}-(259132165087356+96931195440336\,\mathrm{I})\,u_{ol-1}-(2337830154232443+12014857343247525\,\mathrm{I})\,u_{ol+1-1\mathrm{I}}+(6484361326385436-6672061478373408\,\mathrm{I})\,u_{ol+2-1\mathrm{I}}+(112545586002753+34557731686989\,\mathrm{I})\,u_{ol+3-1\mathrm{I}}\right.\\ \left. + (7568163300960+10087080606216\,\mathrm{I})\,u_{ol-2\mathrm{I}}+(412591365414216-135145124642952\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}-(57692007215028+341145924448140\,\mathrm{I})\,u_{ol+2-2\mathrm{I}}-(6094038269592+1744099762392\,\mathrm{I})\,u_{ol+3-2\mathrm{I}}+(31331208004-53886689336\,\mathrm{I})\,u_{ol-3\mathrm{I}}+(286156811151+1128940865847\,\mathrm{I})\,u_{ol+1-3\mathrm{I}}-(967733629668\right.\\ \left. +158281049160\,\mathrm{I})\,u_{ol+2-3\mathrm{I}}+(32945508459-18266908279\,\mathrm{I})\,u_{ol+3-3\mathrm{I}}\right)\Big),\;O(\,\mathcal{A}x_{ol}^{16}\,)\;$$

Formula.: 274, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 13

Error order.: 15, Error.: 1.4925794822851838460 × 10<sup>−37</sup>, New Error.: 1.4723949507942874444 × 10<sup>−52</sup>

Error order.: 15, Error.: 1.4723949507942874444 × 10<sup>−52</sup>, New Error.: 1.4703909706420497505 × 10<sup>−67</sup>

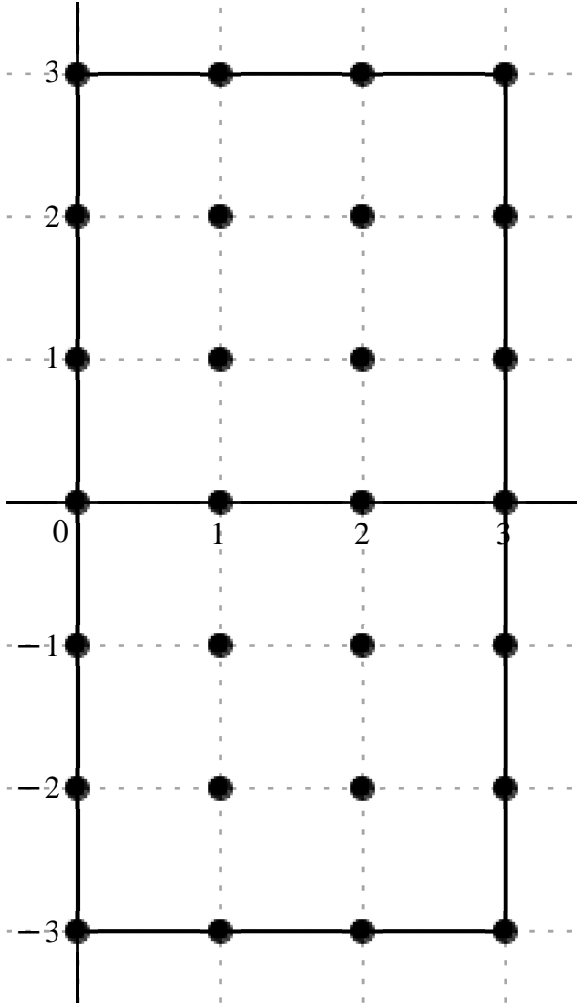
Error order.: 15, Error.: 1.4703909706420497505 × 10<sup>−67</sup>, New Error.: 1.4701907166904909122 × 10<sup>−82</sup>

Error order.: 15, Error.: 1.4701907166904909122 × 10<sup>−82</sup>, New Error.: 1.4701706927353075470 × 10<sup>−97</sup>

Error order.: 15, Error.: 1.4701706927353075470 × 10<sup>−97</sup>, New Error.: 1.4701686903541882718 × 10<sup>−112</sup>

$$x_o\neq h.\,,\left[\begin{array}{cccc}3\,\mathrm{I}&1+3\,\mathrm{I}&2+3\,\mathrm{I}&3+3\,\mathrm{I}\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&3+2\,\mathrm{I}\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}\\0&1&2&3\\-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}&3-\mathrm{I}\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}&3-2\,\mathrm{I}\\-3\,\mathrm{I}&1-3\,\mathrm{I}&2-3\,\mathrm{I}&3-3\,\mathrm{I}\end{array}\right]$$

$$c =, \left[ \begin{array}{ccccccc} -\frac{8263725446669}{3487250} - \frac{8179102541841 \text{ I}}{1743625} & -\frac{19475136102807}{697450} + \frac{130536379270143 \text{ I}}{1394900} & \frac{56897377112961}{697450} - \frac{3793804707231 \text{ I}}{348725} & -\frac{4776367616174}{1743625} - \frac{11135596135587 \text{ I}}{6974500} \\ -\frac{63471738817179}{94250} + \frac{73816414846713 \text{ I}}{94250} & -\frac{316166939506341}{9425} - \frac{117378308740077 \text{ I}}{9425} & \frac{4143143293443}{754} - \frac{531762494717223 \text{ I}}{18850} & \frac{24129274109787}{47125} - \frac{6466371972291 \text{ I}}{47125} \\ \frac{67417782704811}{3250} - \frac{10864756212156 \text{ I}}{1625} & \frac{5328043358022}{25} - \frac{96813110773071 \text{ I}}{100} & -\frac{26289412839459}{50} - \frac{13925069721486 \text{ I}}{25} & -\frac{30522285492237}{3250} + \frac{18114220415907 \text{ I}}{6500} \\ & -\frac{3849438308639}{65} & \frac{72608553882018}{25} & -\frac{55287892743237}{25} \\ \frac{67417782704811}{3250} + \frac{10864756212156 \text{ I}}{1625} & \frac{5328043358022}{25} + \frac{96813110773071 \text{ I}}{100} & -\frac{26289412839459}{50} + \frac{13925069721486 \text{ I}}{25} & -\frac{30522285492237}{3250} - \frac{18114220415907 \text{ I}}{6500} \\ -\frac{63471738817179}{94250} - \frac{73816414846713 \text{ I}}{94250} & -\frac{316166939506341}{9425} + \frac{117378308740077 \text{ I}}{9425} & \frac{4143143293443}{754} + \frac{531762494717223 \text{ I}}{18850} & \frac{24129274109787}{47125} + \frac{6466371972291 \text{ I}}{47125} \\ -\frac{8263725446669}{3487250} + \frac{8179102541841 \text{ I}}{1743625} & -\frac{19475136102807}{697450} - \frac{130536379270143 \text{ I}}{1394900} & \frac{56897377112961}{697450} + \frac{3793804707231 \text{ I}}{348725} & -\frac{4776367616174}{1743625} + \frac{11135596135587 \text{ I}}{6974500} \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\;u(x_{ol})=\frac{1}{6974500\,\mathcal{A}x_{ol}^{13}}\Big(77\left(-(214642219394+424888443732\text{ I})\,u_{ol+3\text{I}}+(-2529238454910+8476388264295\text{ I})\,u_{ol+1+3\text{I}}+(7389269754930-985403820060\text{ I})\,u_{ol+2+3\text{I}}-(248122993048+144618131631\text{ I})\,u_{ol+3+3\text{I}}+(-60998813928198+70940450631906\text{ I})\,u_{ol+2\text{I}}-(3038487470580420+1128051278800740\text{ I})\,u_{ol+1+2\text{I}}\right.\\ \left.+(497715265770750-2555222377212630\text{ I})\,u_{ol+2+2\text{I}}+(46378345042188-12428870803884\text{ I})\,u_{ol+3+2\text{I}}+(1878942359539278-605604333280176\text{ I})\,u_{ol+1\text{I}}+(19304123844428280-87691304037244635\text{ I})\,u_{ol+1+\text{I}}-(47624807752936830+50452155206495640\text{ I})\,u_{ol+2+1\text{I}}+(-850660060601826+252422837743743\text{ I})\,u_{ol+3+1\text{I}}\right.\\ \left.-5364217279441100\,u_{ol}+263069277428641320\,u_{ol+1}-200314497629977380\,u_{ol+2}+2296231515135560\,u_{ol+3}+(1878942359539278+605604333280176\text{ I})\,u_{ol-1\text{I}}+(19304123844428280+87691304037244635\text{ I})\,u_{ol+1-1\text{I}}+(-47624807752936830+50452155206495640\text{ I})\,u_{ol+2-1\text{I}}-(850660060601826\right.\\ \left.+252422837743743\text{ I})\,u_{ol+3-1\text{I}}-(60998813928198+70940450631906\text{ I})\,u_{ol-2\text{I}}+(-3038487470580420+1128051278800740\text{ I})\,u_{ol+1-2\text{I}}+(497715265770750+2555222377212630\text{ I})\,u_{ol+2-2\text{I}}+(46378345042188+12428870803884\text{ I})\,u_{ol+3-2\text{I}}+(-214642219394+424888443732\text{ I})\,u_{ol-3\text{I}}-(2529238454910\right.\\ \left.+8476388264295\text{ I})\,u_{ol+1-3\text{I}}+(7389269754930+985403820060\text{ I})\,u_{ol+2-3\text{I}}+(-248122993048+144618131631\text{ I})\,u_{ol+3-3\text{I}}\Big)\Big),\;O(\mathcal{A}x_{ol}^{15})$$

Formula:, 275, Var:, 1

Variavel :,  $x_{oi}$  , Derivada de Ordem :, 1

Error order:, 27, Error:,  $3.5871037107810615057 \times 10^{-72}$ , New Error:,  $3.6386648294199028061 \times 10^{-99}$

Error order:, 27, Error:,  $3.6386648294199028061 \times 10^{-99}$ , New Error:,  $3.6438598568776829173 \times 10^{-126}$

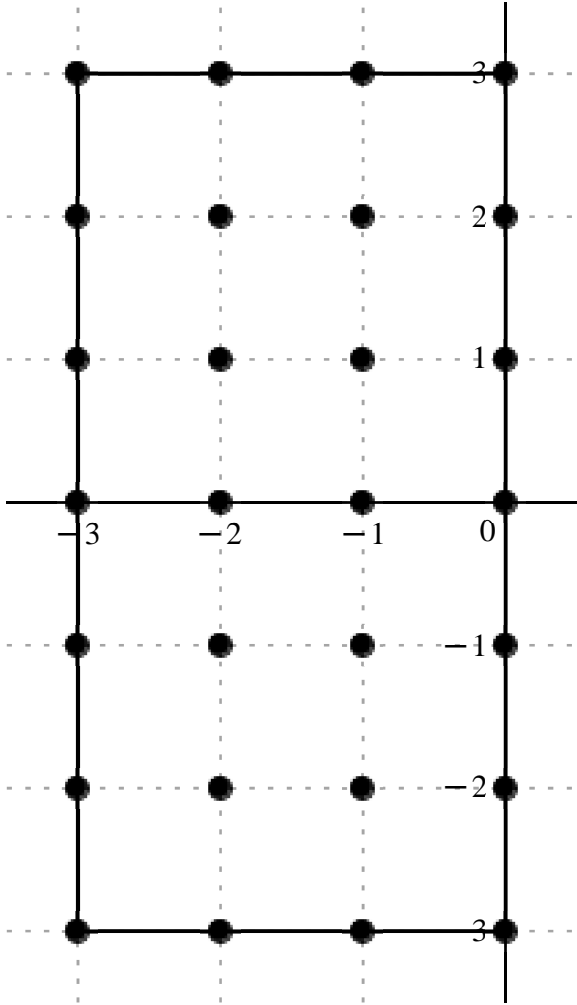
Error order:, 27, Error:,  $3.6438598568776829173 \times 10^{-126}$ , New Error:,  $3.6443797506600879623 \times 10^{-153}$

Error order:, 27, Error:,  $3.6443797506600879623 \times 10^{-153}$ , New Error:,  $3.6444317439505818665 \times 10^{-180}$

Error order:, 27, Error:,  $3.6444317439505818665 \times 10^{-180}$ , New Error:,  $3.6444369433187556787 \times 10^{-207}$

$$x_o + h \cdot , \left[ \begin{array}{cccc} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \\ -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ -3 - 2 \text{ I} & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \\ -3 - 3 \text{ I} & -2 - 3 \text{ I} & -1 - 3 \text{ I} & -3 \text{ I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} \frac{359}{10944600} - \frac{103 \text{ I}}{10944600} & - \frac{3753}{4742660} - \frac{486 \text{ I}}{1185665} & - \frac{27}{145928} + \frac{729 \text{ I}}{729640} & \frac{77}{1824100} - \frac{32 \text{ I}}{1368075} \\ - \frac{1773}{320450} - \frac{909 \text{ I}}{320450} & \frac{243}{4930} - \frac{3483 \text{ I}}{9860} & \frac{2187}{4930} + \frac{81 \text{ I}}{986} & - \frac{63}{49300} + \frac{549 \text{ I}}{49300} \\ \frac{387}{3400} + \frac{171 \text{ I}}{3400} & \frac{3159}{340} - \frac{1053 \text{ I}}{170} & \frac{3159}{680} - \frac{11583 \text{ I}}{680} & - \frac{63}{1700} - \frac{333 \text{ I}}{850} \\ - \frac{1}{3} & \frac{351}{10} & - \frac{351}{5} & \frac{251}{39} \\ \frac{387}{3400} - \frac{171 \text{ I}}{3400} & \frac{3159}{340} + \frac{1053 \text{ I}}{170} & \frac{3159}{680} + \frac{11583 \text{ I}}{680} & - \frac{63}{1700} + \frac{333 \text{ I}}{850} \\ - \frac{1773}{320450} + \frac{909 \text{ I}}{320450} & \frac{243}{4930} + \frac{3483 \text{ I}}{9860} & \frac{2187}{4930} - \frac{81 \text{ I}}{986} & - \frac{63}{49300} - \frac{549 \text{ I}}{49300} \\ \frac{359}{10944600} + \frac{103 \text{ I}}{10944600} & - \frac{3753}{4742660} + \frac{486 \text{ I}}{1185665} & - \frac{27}{145928} - \frac{729 \text{ I}}{729640} & \frac{77}{1824100} + \frac{32 \text{ I}}{1368075} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u\big(x_{ol}\big)=\frac{1}{142279800\,\mathcal{A}_{ol}}\,\big((4667-1339\,\mathrm{I})\,u_{ol-3+3\,\mathrm{I}}-(112590+58320\,\mathrm{I})\,u_{ol-2+3\,\mathrm{I}}+(-26325+142155\,\mathrm{I})\,u_{ol-1+3\,\mathrm{I}}+(6006-3328\,\mathrm{I})\,u_{ol+3\,\mathrm{I}}-(787212+403596\,\mathrm{I})\,u_{ol-3+2\,\mathrm{I}}+(7012980-50259690\,\mathrm{I})\,u_{ol-2+2\,\mathrm{I}}+(63116820+11688300\,\mathrm{I})\,u_{ol-1+2\,\mathrm{I}}+(-181818+1584414\,\mathrm{I})\,u_{ol+2\,\mathrm{I}}+(16194789+7155837\,\mathrm{I})\,u_{ol-3+1}$$

$$+(1321946730-881297820\,\mathrm{I})\,u_{ol-2+1}+(660973365-2423569005\,\mathrm{I})\,u_{ol-1+1}-(5272722+55740204\,\mathrm{I})\,u_{ol+1}-47426600\,u_{ol-3}+4994020980\,u_{ol-2}-9988041960\,u_{ol-1}+915698200\,u_{ol}+(16194789-7155837\,\mathrm{I})\,u_{ol-3-1}+(1321946730+881297820\,\mathrm{I})\,u_{ol-2-1}+(660973365+2423569005\,\mathrm{I})\,u_{ol-1-1}+(-5272722$$

$$+55740204\,\mathrm{I})\,u_{ol-1}+(-787212+403596\,\mathrm{I})\,u_{ol-3-2\,\mathrm{I}}+(7012980+50259690\,\mathrm{I})\,u_{ol-2-2\,\mathrm{I}}+(63116820-11688300\,\mathrm{I})\,u_{ol-1-2\,\mathrm{I}}-(181818+1584414\,\mathrm{I})\,u_{ol-2\,\mathrm{I}}+(4667+1339\,\mathrm{I})\,u_{ol-3-3\,\mathrm{I}}+(-112590+58320\,\mathrm{I})\,u_{ol-2-3\,\mathrm{I}}-(26325+142155\,\mathrm{I})\,u_{ol-1-3\,\mathrm{I}}+(6006+3328\,\mathrm{I})\,u_{ol-3\,\mathrm{I}}\big),\,\,O(\,\mathcal{A}_{ol}^{-27}\,)\,$$

Formula.: 276, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 2

Error order.: 26, Error.: 4.1977429358112876863 × 10<sup>−69</sup>, New Error.: 4.2578565426679755065 × 10<sup>−95</sup>

Error order.: 26, Error.: 4.2578565426679755065 × 10<sup>−95</sup>, New Error.: 4.2639131022717940447 × 10<sup>−121</sup>

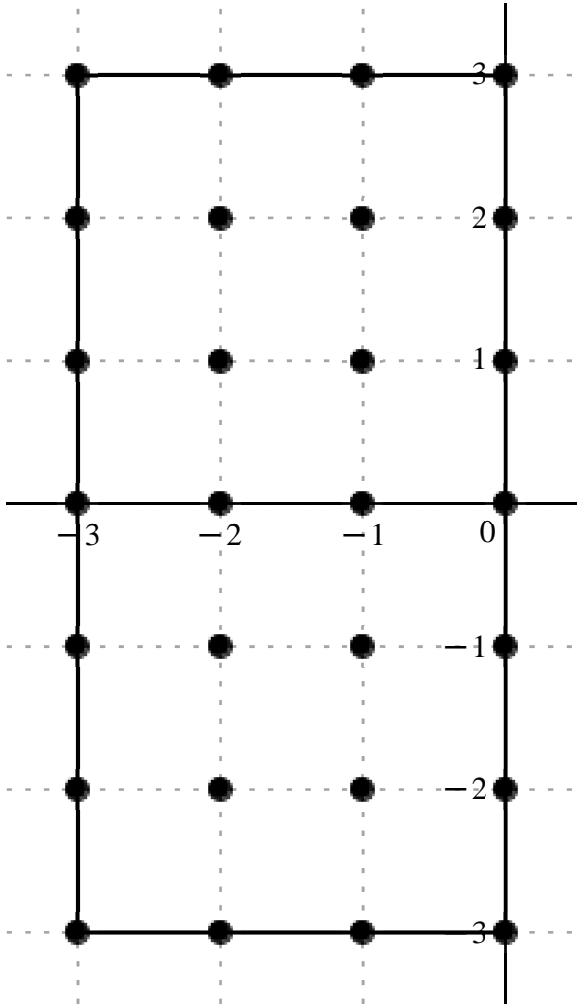
Error order.: 26, Error.: 4.2639131022717940447 × 10<sup>−121</sup>, New Error.: 4.2645192123971083130 × 10<sup>−147</sup>

Error order.: 26, Error.: 4.2645192123971083130 × 10<sup>−147</sup>, New Error.: 4.2645798279534722353 × 10<sup>−173</sup>

Error order.: 26, Error.: 4.2645798279534722353 × 10<sup>−173</sup>, New Error.: 4.2645858895545491364 × 10<sup>−199</sup>

$$x_o\neq h\,.,\left[\begin{array}{cccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} \frac{43553}{106709850}-\frac{27517\,\mathrm{I}}{213419700} & -\frac{312327}{30827290}-\frac{147501\,\mathrm{I}}{30827290} & -\frac{20691}{11856650}+\frac{302859\,\mathrm{I}}{23713300} & \frac{56317}{106709850}-\frac{35131\,\mathrm{I}}{106709850} \\ -\frac{1704}{24505}-\frac{13956\,\mathrm{I}}{416585} & \frac{111051}{256360}-\frac{1126683\,\mathrm{I}}{256360} & \frac{896994}{160225}+\frac{107298\,\mathrm{I}}{160225} & -\frac{681}{128180}+\frac{18537\,\mathrm{I}}{128180} \\ \frac{7773}{5525}+\frac{13137\,\mathrm{I}}{22100} & \frac{93231}{850}-\frac{66717\,\mathrm{I}}{850} & \frac{648}{17}-\frac{14067\,\mathrm{I}}{68} & -\frac{13929}{11050}-\frac{54903\,\mathrm{I}}{11050} \\ -\frac{476}{117} & \frac{4167}{10} & -\frac{3816}{5} & \frac{260285}{6084} \\ \frac{7773}{5525}-\frac{13137\,\mathrm{I}}{22100} & \frac{93231}{850}+\frac{66717\,\mathrm{I}}{850} & \frac{648}{17}+\frac{14067\,\mathrm{I}}{68} & -\frac{13929}{11050}+\frac{54903\,\mathrm{I}}{11050} \\ -\frac{1704}{24505}+\frac{13956\,\mathrm{I}}{416585} & \frac{111051}{256360}+\frac{1126683\,\mathrm{I}}{256360} & \frac{896994}{160225}-\frac{107298\,\mathrm{I}}{160225} & -\frac{681}{128180}-\frac{18537\,\mathrm{I}}{128180} \\ \frac{43553}{106709850}+\frac{27517\,\mathrm{I}}{213419700} & -\frac{312327}{30827290}+\frac{147501\,\mathrm{I}}{30827290} & -\frac{20691}{11856650}-\frac{302859\,\mathrm{I}}{23713300} & \frac{56317}{106709850}+\frac{35131\,\mathrm{I}}{106709850} \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{5548912200 \, \Delta x_{ol}^2} \big( (2264756 - 715442 \, \mathrm{I}) \, u_{ol-3+3\mathrm{I}} - (56218860 + 26550180 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (-9683388 + 70869006 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (2928484 - 1826812 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (385853760 + 185893920 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + (2403698895 - 24387053535 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (31064696208 + 3715944336 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (-29480490$$

$$+ 802466730 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (7806641544 + 3298464234 \, \mathrm{I}) \, u_{ol-3+1\mathrm{I}} + (608624274492 - 435537382644 \, \mathrm{I}) \, u_{ol-2+1\mathrm{I}} + (211511476800 - 1147890410550 \, \mathrm{I}) \, u_{ol-1+1\mathrm{I}} - (6994642356 + 27570310092 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} - 22575061600 \, u_{ol-3} + 2312231713740 \, u_{ol-2} - 4234929791040 \, u_{ol-1} + 237392934250 \, u_{ol} + (7806641544 - 3298464234 \, \mathrm{I}) \, u_{ol-3-1}$$

$$+ (608624274492 + 435537382644 \, \mathrm{I}) \, u_{ol-2-1} + (211511476800 + 1147890410550 \, \mathrm{I}) \, u_{ol-1-1} + (-6994642356 + 27570310092 \, \mathrm{I}) \, u_{ol-1} + (-385853760 + 185893920 \, \mathrm{I}) \, u_{ol-3-2\mathrm{I}} + (2403698895 + 24387053535 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (31064696208 - 3715944336 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} - (29480490 + 802466730 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (2264756$$

$$+ 715442 \, \mathrm{I}) \, u_{ol-3-3\mathrm{I}} + (-56218860 + 26550180 \, \mathrm{I}) \, u_{ol-2-3\mathrm{I}} - (9683388 + 70869006 \, \mathrm{I}) \, u_{ol-1-3\mathrm{I}} + (2928484 + 1826812 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} \big), \, O(\, \Delta x_{ol}^{26} \, )$$

Formula:, 277, Var:., 1

Variavel :., x<sub>ol</sub>., Derivada de Ordem :., 3

Error order:., 25, Error:., 3.8053017044626085085 × 10<sup>-66</sup>, New Error:., 3.8596045058113928225 × 10<sup>-91</sup>

Error order:., 25, Error:., 3.8596045058113928225 × 10<sup>-91</sup>, New Error:., 3.8650754717464141580 × 10<sup>-116</sup>

Error order:., 25, Error:., 3.8650754717464141580 × 10<sup>-116</sup>, New Error:., 3.8656229771492917013 × 10<sup>-141</sup>

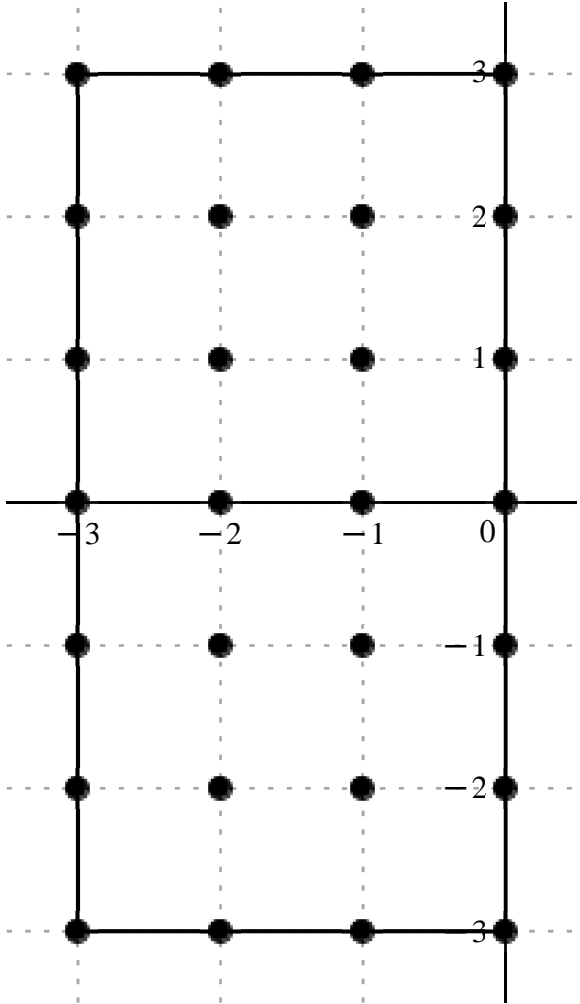
Error order:., 25, Error:., 3.8656229771492917013 × 10<sup>-141</sup>, New Error:., 3.8656777317796312131 × 10<sup>-166</sup>

Error order:., 25, Error:., 3.8656777317796312131 × 10<sup>-166</sup>, New Error:., 3.8656832072835676405 × 10<sup>-191</sup>

$$x_o \neq h., \left[ \begin{array}{cccc} -3+3\mathrm{I} & -2+3\mathrm{I} & -1+3\mathrm{I} & 3\mathrm{I} \\ -3+2\mathrm{I} & -2+2\mathrm{I} & -1+2\mathrm{I} & 2\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -3-2\mathrm{I} & -2-2\mathrm{I} & -1-2\mathrm{I} & -2\mathrm{I} \\ -3-3\mathrm{I} & -2-3\mathrm{I} & -1-3\mathrm{I} & -3\mathrm{I} \end{array} \right]$$



$$c = , \left[ \begin{array}{cccccccc} \frac{87481919}{22195648800} - \frac{29907983 \text{ I}}{22195648800} & - \frac{24711147}{246618320} - \frac{668736 \text{ I}}{15413645} & - \frac{144627021}{12330916000} + \frac{1553352147 \text{ I}}{12330916000} & \frac{56472211}{11097824400} - \frac{1632227 \text{ I}}{462409350} \\ - \frac{2257683}{3332680} - \frac{205815 \text{ I}}{666536} & \frac{18030357}{6665360} - \frac{282386061 \text{ I}}{6665360} & \frac{4530785949}{83317000} + \frac{285260643 \text{ I}}{83317000} & \frac{352689}{6665360} + \frac{9579549 \text{ I}}{6665360} \\ \frac{155382141}{11492000} + \frac{63182757 \text{ I}}{11492000} & \frac{448085277}{442000} - \frac{169420707 \text{ I}}{221000} & \frac{1617813}{7072} - \frac{13670829 \text{ I}}{7072} & - \frac{22595721}{1149200} - \frac{26718711 \text{ I}}{574600} \\ - \frac{78511}{2028} & \frac{2017539}{520} & - \frac{1747269}{260} & \frac{89313631}{304200} \\ \frac{155382141}{11492000} - \frac{63182757 \text{ I}}{11492000} & \frac{448085277}{442000} + \frac{169420707 \text{ I}}{221000} & \frac{1617813}{7072} + \frac{13670829 \text{ I}}{7072} & - \frac{22595721}{1149200} + \frac{26718711 \text{ I}}{574600} \\ - \frac{2257683}{3332680} + \frac{205815 \text{ I}}{666536} & \frac{18030357}{6665360} + \frac{282386061 \text{ I}}{6665360} & \frac{4530785949}{83317000} - \frac{285260643 \text{ I}}{83317000} & \frac{352689}{6665360} - \frac{9579549 \text{ I}}{6665360} \\ \frac{87481919}{22195648800} + \frac{29907983 \text{ I}}{22195648800} & - \frac{24711147}{246618320} + \frac{668736 \text{ I}}{15413645} & - \frac{144627021}{12330916000} - \frac{1553352147 \text{ I}}{12330916000} & \frac{56472211}{11097824400} + \frac{1632227 \text{ I}}{462409350} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{110978244000 \, \Delta x_{ol}^3} \big( (437409595 - 149539915 \, \mathrm{I}) \, u_{ol-3+3\mathrm{I}} - (11120016150 + 4814899200 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (-1301643189 + 13980169323 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (564722110 - 391734480 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (75180843900 + 34268197500 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + (300205444050 - 4701727915650 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (6035006884068 \\ + 379967176476 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (5872271850 + 159499490850 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (1500525335637 + 610155884349 \, \mathrm{I}) \, u_{ol-3+1\mathrm{I}} + (112506147519714 - 85076979909948 \, \mathrm{I}) \, u_{ol-2+1\mathrm{I}} + (25387732729125 - 214531192936125 \, \mathrm{I}) \, u_{ol-1+1\mathrm{I}} - (2182068776970 + 5160451842540 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} - 4296357453000 \, u_{ol-3} + 430582568118300 \, u_{ol-2} \\ - 745803251598600 \, u_{ol-1} + 32583398861420 \, u_{ol} + (1500525335637 - 610155884349 \, \mathrm{I}) \, u_{ol-3-1\mathrm{I}} + (112506147519714 + 85076979909948 \, \mathrm{I}) \, u_{ol-2-1\mathrm{I}} + (25387732729125 + 214531192936125 \, \mathrm{I}) \, u_{ol-1-1\mathrm{I}} + (-2182068776970 + 5160451842540 \, \mathrm{I}) \, u_{ol-1\mathrm{I}} + (-75180843900 + 34268197500 \, \mathrm{I}) \, u_{ol-3-2\mathrm{I}} + (300205444050 \\ + 4701727915650 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (6035006884068 - 379967176476 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + (5872271850 - 159499490850 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (437409595 + 149539915 \, \mathrm{I}) \, u_{ol-3-3\mathrm{I}} + (-11120016150 + 4814899200 \, \mathrm{I}) \, u_{ol-2-3\mathrm{I}} - (1301643189 + 13980169323 \, \mathrm{I}) \, u_{ol-1-3\mathrm{I}} + (564722110 + 391734480 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} \big), \, O( \, \Delta x_{ol}^{25} \, )$$

$$Variavel\;:, x_{oi},\; Derivada\;de\;Ordem\;:, 4$$

$$Error\;order:., 24,\; Error:., 3.1656004440255894342 \times 10^{-63},\; New\;Error:., 3.2106257948992010663 \times 10^{-87}$$

$$Error\;order:., 24,\; Error:., 3.2106257948992010663 \times 10^{-87},\; New\;Error:., 3.2151619537584380404 \times 10^{-111}$$

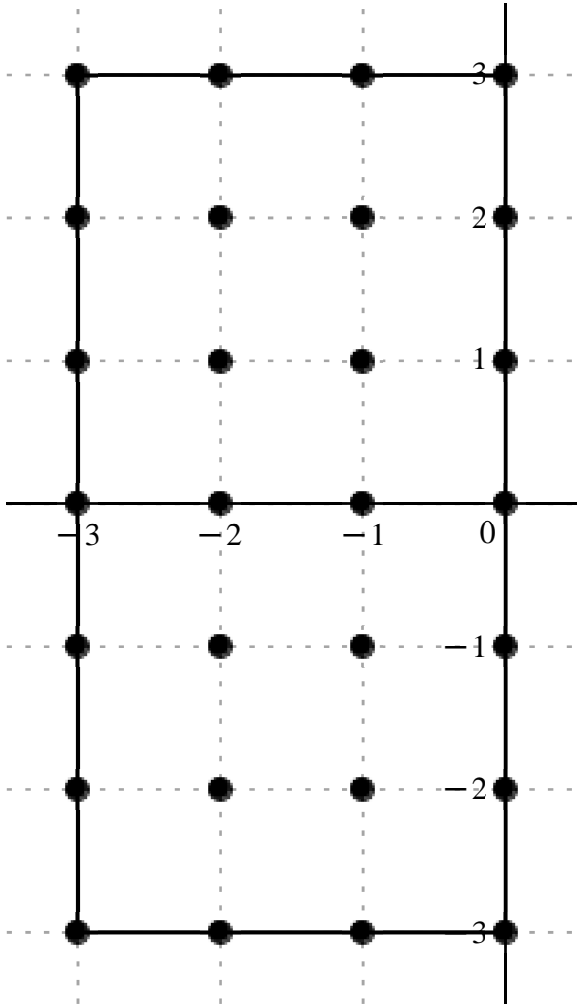
$$Error\;order:., 24,\; Error:., 3.2151619537584380404 \times 10^{-111},\; New\;Error:., 3.2156159074893112107 \times 10^{-135}$$

$$Error\;order:., 24,\; Error:., 3.2156159074893112107 \times 10^{-135},\; New\;Error:., 3.2156613062424606939 \times 10^{-159}$$

$$Error\;order:., 24,\; Error:., 3.2156613062424606939 \times 10^{-159},\; New\;Error:., 3.2156658461515778771 \times 10^{-183}$$

$$x_o\neq h.,\left[\begin{array}{cccc} -3+3\;I & -2+3\;I & -1+3\;I & 3\;I \\ -3+2\;I & -2+2\;I & -1+2\;I & 2\;I \\ -3+I & -2+I & -1+I & I \\ -3 & -2 & -1 & 0 \\ -3-I & -2-I & -1-I & -I \\ -3-2\;I & -2-2\;I & -1-2\;I & -2\;I \\ -3-3\;I & -2-3\;I & -1-3\;I & -3\;I \end{array}\right]$$

$$c=,\left[\begin{array}{ccccccccc} \frac{29128845979}{832336830000}-\frac{10638652393\;I}{832336830000}-\frac{12661899}{13949000}-\frac{42944067\;I}{118566500}-\frac{1893838863}{30827290000}+\frac{35052549471\;I}{30827290000} & \frac{2074752929}{46240935000}-\frac{7127877659\;I}{208084207500} \\ -\frac{5713909}{942500}-\frac{42130349\;I}{16022500}-\frac{62807697}{4901000}-\frac{31259928897\;I}{83317000}-\frac{100595532339}{208292500}+\frac{1401901893\;I}{208292500} & \frac{71531026}{52073125}+\frac{2702022683\;I}{208292500} \\ \frac{3437522467}{28730000}+\frac{1352028577\;I}{28730000}-\frac{9587316249}{1105000}-\frac{947378961\;I}{138125}-\frac{500387787}{442000}-\frac{7335422469\;I}{442000} & -\frac{3297066517}{14365000}-\frac{1369855661\;I}{3591250} \\ -\frac{77536981}{228150} & \frac{108751209}{3250} & -\frac{180577443}{3250} & \frac{603364993}{292500} \\ \frac{3437522467}{28730000}-\frac{1352028577\;I}{28730000}-\frac{9587316249}{1105000}+\frac{947378961\;I}{138125}-\frac{500387787}{442000}+\frac{7335422469\;I}{442000} & -\frac{3297066517}{14365000}+\frac{1369855661\;I}{3591250} \\ -\frac{5713909}{942500}+\frac{42130349\;I}{16022500}-\frac{62807697}{4901000}+\frac{31259928897\;I}{83317000}-\frac{100595532339}{208292500}-\frac{1401901893\;I}{208292500} & \frac{71531026}{52073125}-\frac{2702022683\;I}{208292500} \\ \frac{29128845979}{832336830000}+\frac{10638652393\;I}{832336830000}-\frac{12661899}{13949000}+\frac{42944067\;I}{118566500}-\frac{1893838863}{30827290000}-\frac{35052549471\;I}{30827290000} & \frac{2074752929}{46240935000}+\frac{7127877659\;I}{208084207500} \end{array}\right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4}u(x_{ol})=\frac{1}{832336830000\,\Delta x_{ol}^4}\big((29128845979-10638652393\,\mathrm{I})\,u_{ol-3+31}-(755535513330+301467350340\,\mathrm{I})\,u_{ol-2+31}+(-51133649301+946418835717\,\mathrm{I})\,u_{ol-1+31}+(37345552722-28511510636\,\mathrm{I})\,u_{ol+31}-(5046044460444+2188587369852\,\mathrm{I})\,u_{ol-3+21}+(10666631181510-312286689681030\,\mathrm{I})\,u_{ol-2+21}+(401979747226644+5601999964428\,\mathrm{I})\,u_{ol-1+21}+(1143351919584+10797282641268\,\mathrm{I})\,u_{ol+21}+(99588463391457+39169619904267\,\mathrm{I})\,u_{ol-3+1}+(7221607615294254-5708875302859248\,\mathrm{I})\,u_{ol-2+1}+(942287747516505-13813444082710935\,\mathrm{I})\,u_{ol-1+1}-(191038628128014+317488706838648\,\mathrm{I})\,u_{ol+1}-282870414084200\,u_{ol-3}+27851580479300760\,u_{ol-2}-46246540454192520\,u_{ol-1}+1716933010620828\,u_{ol}+(99588463391457-39169619904267\,\mathrm{I})\,u_{ol-3-1}+(7221607615294254+5708875302859248\,\mathrm{I})\,u_{ol-2-1}+(942287747516505+13813444082710935\,\mathrm{I})\,u_{ol-1-1}+(-191038628128014+317488706838648\,\mathrm{I})\,u_{ol-1}+(-5046044460444+2188587369852\,\mathrm{I})\,u_{ol-3-21}+(10666631181510+312286689681030\,\mathrm{I})\,u_{ol-2-21}+(401979747226644-5601999964428\,\mathrm{I})\,u_{ol-1-21}+(1143351919584-10797282641268\,\mathrm{I})\,u_{ol-21}+(29128845979+10638652393\,\mathrm{I})\,u_{ol-3-31}+(-755535513330+301467350340\,\mathrm{I})\,u_{ol-2-31}-(51133649301+946418835717\,\mathrm{I})\,u_{ol-1-31}+(37345552722+28511510636\,\mathrm{I})\,u_{ol-31}\big)\,O(\,\Delta x_{ol}^{24}\,)$$

Formula.: 279, Var.: 1

Variavel .: x<sub>ol</sub> , Derivada de Ordem .: 5

Error order.: 23, Error.: 2.5274979397575479302 × 10<sup>−60</sup>, New Error.: 2.5633321692003162614 × 10<sup>−83</sup>

Error order.: 23, Error.: 2.5633321692003162614 × 10<sup>−83</sup>, New Error.: 2.5669422670795674933 × 10<sup>−106</sup>

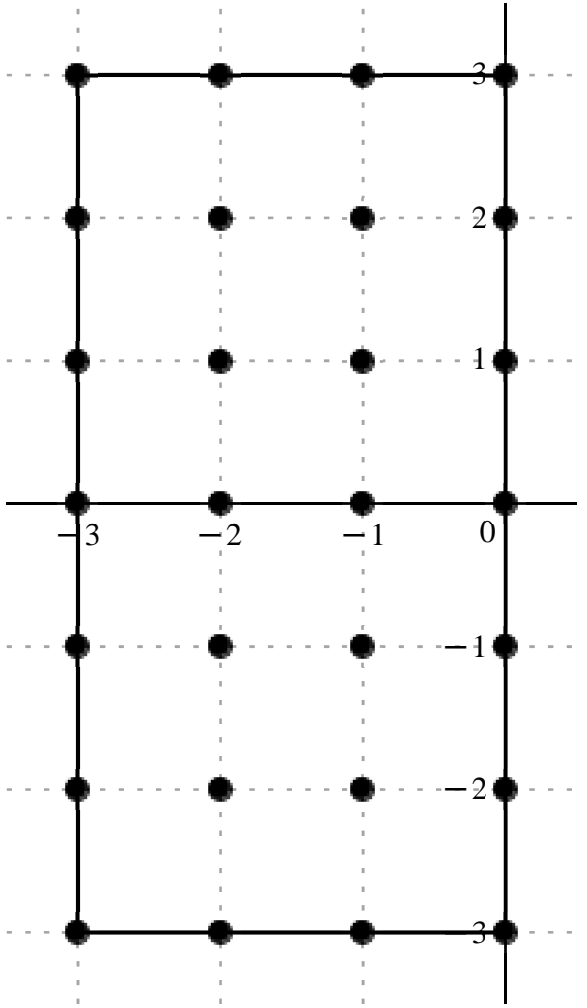
Error order.: 23, Error.: 2.5669422670795674933 × 10<sup>−106</sup>, New Error.: 2.5673035448877864396 × 10<sup>−129</sup>

Error order.: 23, Error.: 2.5673035448877864396 × 10<sup>−129</sup>, New Error.: 2.5673396753500865042 × 10<sup>−152</sup>

Error order.: 23, Error.: 2.5673396753500865042 × 10<sup>−152</sup>, New Error.: 2.5673432884231325681 × 10<sup>−175</sup>

$$x_o\;+\;h\;.\;,\;\left[\begin{array}{cccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \end{array}\right]$$

$$c\;=\;,\left[\begin{array}{cccccccc} \frac{7453525807693}{24970104900000}-\frac{961990672177\,\mathrm{I}}{8323368300000} & -\frac{242961193881}{30827290000}-\frac{44725091319\,\mathrm{I}}{15413645000} & -\frac{10604686359}{61654580000}+\frac{35645429691\,\mathrm{I}}{3626740000} & \frac{127646688001}{337433850000}-\frac{17773139023\,\mathrm{I}}{56238975000} \\ -\frac{108505470571}{2082925000}-\frac{44906666643\,\mathrm{I}}{2082925000} & \frac{19466478261}{833170000}-\frac{2658126804183\,\mathrm{I}}{833170000} & \frac{1710446555781}{416585000}-\frac{52217412237\,\mathrm{I}}{416585000} & \frac{80194919787}{4165850000}+\frac{464162234249\,\mathrm{I}}{4165850000} \\ \frac{292478336967}{287300000}+\frac{111563112281\,\mathrm{I}}{287300000} & \frac{158273784171}{2210000}-\frac{32511478527\,\mathrm{I}}{552500} & \frac{15885856143}{4420000}-\frac{605654878941\,\mathrm{I}}{4420000} & -\frac{328877346563}{143650000}-\frac{51947974677\,\mathrm{I}}{17956250} \\ -\frac{19654385677}{6844500} & \frac{18093674277}{65000} & -\frac{14502362577}{32500} & \frac{200903789471}{13689000} \\ \frac{292478336967}{287300000}-\frac{111563112281\,\mathrm{I}}{287300000} & \frac{158273784171}{2210000}+\frac{32511478527\,\mathrm{I}}{552500} & \frac{15885856143}{4420000}+\frac{605654878941\,\mathrm{I}}{4420000} & -\frac{328877346563}{143650000}+\frac{51947974677\,\mathrm{I}}{17956250} \\ -\frac{108505470571}{2082925000}+\frac{44906666643\,\mathrm{I}}{2082925000} & \frac{19466478261}{833170000}+\frac{2658126804183\,\mathrm{I}}{833170000} & \frac{1710446555781}{416585000}+\frac{52217412237\,\mathrm{I}}{416585000} & \frac{80194919787}{4165850000}-\frac{464162234249\,\mathrm{I}}{4165850000} \\ \frac{7453525807693}{24970104900000}+\frac{961990672177\,\mathrm{I}}{8323368300000} & -\frac{242961193881}{30827290000}+\frac{44725091319\,\mathrm{I}}{15413645000} & -\frac{10604686359}{61654580000}-\frac{35645429691\,\mathrm{I}}{3626740000} & \frac{127646688001}{337433850000}+\frac{17773139023\,\mathrm{I}}{56238975000} \end{array}\right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{24970104900000 \, \Delta x_{ol}^5} \big( (7453525807693 - 2885972016531 \, \mathrm{I}) \, u_{ol-3+3\mathrm{I}} - (196798567043610 + 72454647936780 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (-4294897975395 + 245418783422535 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (9445854912074 - 7891273726212 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (1300763581205148 + 538341119716284 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + (583410353482170 - 79664060321364510 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (102524166553513140 - 3129911689485780 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (480688349203278 + 2782188432088506 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (25420169700812871 + 9696284777678553 \, \mathrm{I}) \, u_{ol-3+\mathrm{I}} + (1788286422475035990 - 1469348469272918520 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} + (89744681972176335 - 3421553362070943645 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} - (57167433643660038 + 72239269169633616 \, \mathrm{I}) \, u_{ol+\mathrm{I}} - 71703129826831400 \, u_{ol-3} + 6950783764971102420 \, u_{ol-2} - 11142323533708440840 \, u_{ol-1} + 366468602374051100 \, u_{ol} + (25420169700812871 - 9696284777678553 \, \mathrm{I}) \, u_{ol-3-\mathrm{I}} + (1788286422475035990 + 1469348469272918520 \, \mathrm{I}) \, u_{ol-2-\mathrm{I}} + (89744681972176335 + 3421553362070943645 \, \mathrm{I}) \, u_{ol-1-\mathrm{I}} + (-57167433643660038 + 72239269169633616 \, \mathrm{I}) \, u_{ol-\mathrm{I}} + (-1300763581205148 + 538341119716284 \, \mathrm{I}) \, u_{ol-3-2\mathrm{I}} + (583410353482170 + 79664060321364510 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (102524166553513140 + 3129911689485780 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + (480688349203278 - 2782188432088506 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (7453525807693 + 2885972016531 \, \mathrm{I}) \, u_{ol-3-3\mathrm{I}} + (-196798567043610 + 72454647936780 \, \mathrm{I}) \, u_{ol-2-3\mathrm{I}} - (4294897975395 + 245418783422535 \, \mathrm{I}) \, u_{ol-1-3\mathrm{I}} + (9445854912074 + 7891273726212 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} \big) \cdot \, O(\, \Delta x_{ol}^{23} \, )$$

Formula.: 280, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 6

Error order.: 22, Error.: 1.9618392723939158933 × 10<sup>-57</sup>, New Error.: 1.9895634890149296341 × 10<sup>-79</sup>

Error order.: 22, Error.: 1.9895634890149296341 × 10<sup>-79</sup>, New Error.: 1.9923564824103165686 × 10<sup>-101</sup>

Error order.: 22, Error.: 1.9923564824103165686 × 10<sup>-101</sup>, New Error.: 1.9926359884441619717 × 10<sup>-123</sup>

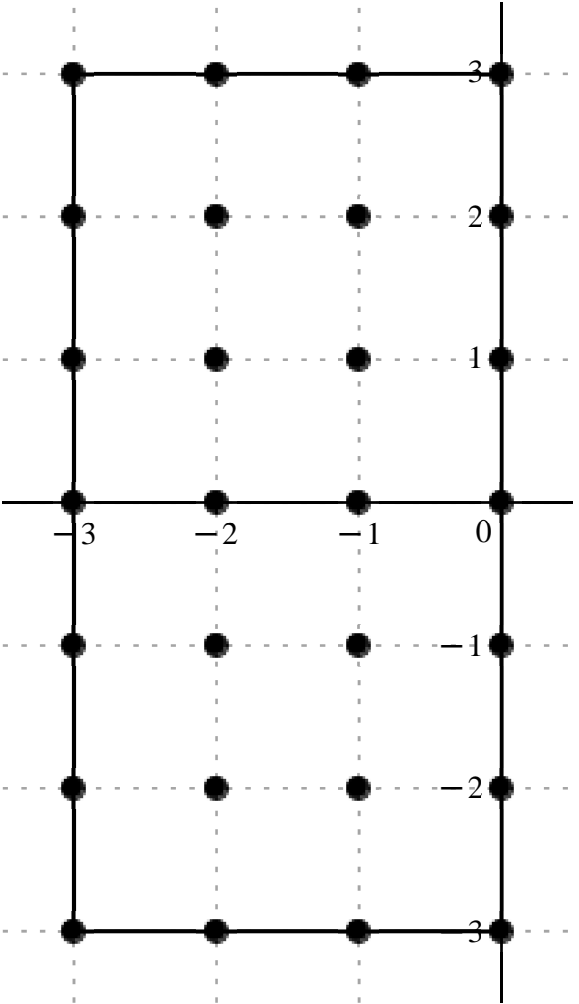
Error order.: 22, Error.: 1.9926359884441619717 × 10<sup>-123</sup>, New Error.: 1.9926639411154698378 × 10<sup>-145</sup>

Error order.: 22, Error.: 1.9926639411154698378 × 10<sup>-145</sup>, New Error.: 1.9926667364032808382 × 10<sup>-167</sup>

$$x_o \neq h., \left[ \begin{array}{cccc} -3+3\mathrm{I} & -2+3\mathrm{I} & -1+3\mathrm{I} & 3\mathrm{I} \\ -3+2\mathrm{I} & -2+2\mathrm{I} & -1+2\mathrm{I} & 2\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -3-2\mathrm{I} & -2-2\mathrm{I} & -1-2\mathrm{I} & -2\mathrm{I} \\ -3-3\mathrm{I} & -2-3\mathrm{I} & -1-3\mathrm{I} & -3\mathrm{I} \end{array} \right]$$

$c = ,$ 

$\frac{457666389599}{184963740000} - \frac{112269529363 \text{ I}}{110978244000}$	$-\frac{2047707361337}{30827290000} - \frac{346860352323 \text{ I}}{15413645000}$	$\frac{1424523277}{948532000} + \frac{78152421051 \text{ I}}{948532000}$	$\frac{4279722404621}{1387228050000} - \frac{1953418886909 \text{ I}}{693614025000}$
$-\frac{2718107008777}{6248775000} - \frac{63167990033 \text{ I}}{367575000}$	$-\frac{5884142841}{12252500} - \frac{5489649588219 \text{ I}}{208292500}$	$\frac{2819069858169}{83317000} - \frac{8230831977 \text{ I}}{3332680}$	$\frac{26645515211}{120168750} + \frac{55448927306 \text{ I}}{60084375}$
$\frac{7260293529737}{861900000} + \frac{2688270187091 \text{ I}}{861900000}$	$\frac{1272221926299}{2210000} - \frac{270810270993 \text{ I}}{552500}$	$-\frac{56488100013}{4420000} - \frac{285912822597 \text{ I}}{260000}$	$-\frac{1777366975957}{86190000} - \frac{111838602284 \text{ I}}{5386875}$
$-\frac{460384667}{19500}$	$\frac{3665569166}{1625}$	$-\frac{113889614009}{32500}$	$\frac{39785237923}{380250}$
$\frac{7260293529737}{861900000} - \frac{2688270187091 \text{ I}}{861900000}$	$\frac{1272221926299}{2210000} + \frac{270810270993 \text{ I}}{552500}$	$-\frac{56488100013}{4420000} + \frac{285912822597 \text{ I}}{260000}$	$-\frac{1777366975957}{86190000} + \frac{111838602284 \text{ I}}{5386875}$
$-\frac{2718107008777}{6248775000} + \frac{63167990033 \text{ I}}{367575000}$	$-\frac{5884142841}{12252500} + \frac{5489649588219 \text{ I}}{208292500}$	$\frac{2819069858169}{83317000} + \frac{8230831977 \text{ I}}{3332680}$	$\frac{26645515211}{120168750} - \frac{55448927306 \text{ I}}{60084375}$
$\frac{457666389599}{184963740000} + \frac{112269529363 \text{ I}}{110978244000}$	$-\frac{2047707361337}{30827290000} + \frac{346860352323 \text{ I}}{15413645000}$	$\frac{1424523277}{948532000} - \frac{78152421051 \text{ I}}{948532000}$	$\frac{4279722404621}{1387228050000} + \frac{1953418886909 \text{ I}}{693614025000}$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{2774456100000 \, \Delta x_{ol}^6} \Big( (6864995843985 - 2806738234075 \, \mathrm{I}) \, u_{ol-3+3\mathrm{I}} - (184293662520330 + 62434863418140 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (4166730585225 + 228595831574175 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (8559444809242 - 7813675547636 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (1206839511896988 + 476791988769084 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} - (1332405304916040$$

$$+ 73122132515077080 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (93875026277027700 - 6852167620852500 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (615191655191568 + 2560409667281856 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (23370884872223403 + 8653541732245929 \, \mathrm{I}) \, u_{ol-3+1\mathrm{I}} + (1597160128495027590 - 1359911689229288520 \, \mathrm{I}) \, u_{ol-2+1\mathrm{I}} - (35457862818660165 + 3050971441240248045 \, \mathrm{I}) \, u_{ol-1+1\mathrm{I}}$$

$$- (57213442956055830 + 57601353720351360 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} - 65503438343826600 \, u_{ol-3} + 6258437373895761600 \, u_{ol-2} - 9722514901966630920 \, u_{ol-1} + 290289009981377200 \, u_{ol} + (23370884872223403 - 8653541732245929 \, \mathrm{I}) \, u_{ol-3-1\mathrm{I}} + (1597160128495027590 + 1359911689229288520 \, \mathrm{I}) \, u_{ol-2-1\mathrm{I}} + (-35457862818660165$$

$$+ 3050971441240248045 \, \mathrm{I}) \, u_{ol-1-1\mathrm{I}} + (-57213442956055830 + 57601353720351360 \, \mathrm{I}) \, u_{ol-1\mathrm{I}} + (-1206839511896988 + 476791988769084 \, \mathrm{I}) \, u_{ol-3-2\mathrm{I}} + (-1332405304916040 + 73122132515077080 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (93875026277027700 + 6852167620852500 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + (615191655191568 - 2560409667281856 \, \mathrm{I}) \, u_{ol-2\mathrm{I}}$$

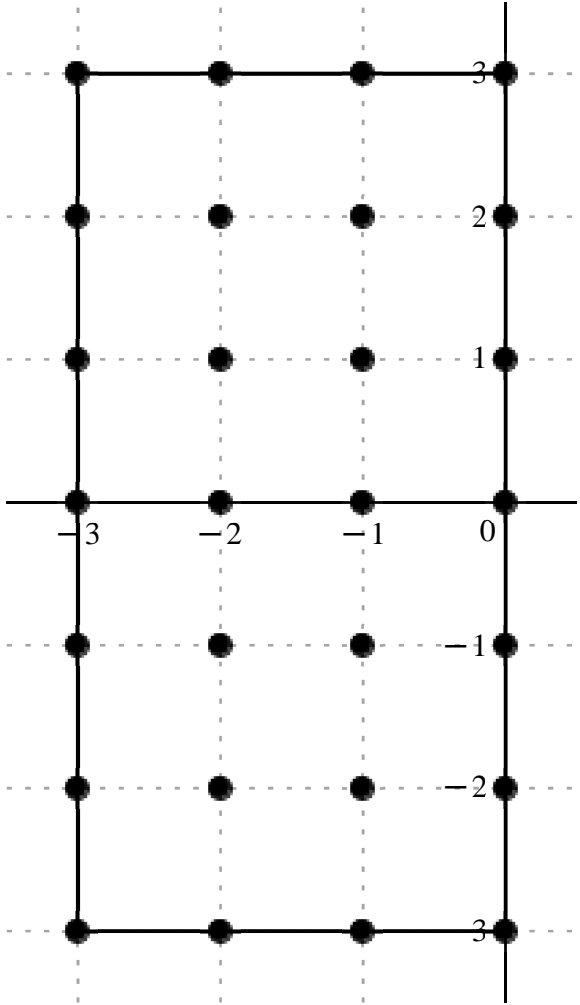
$$+ (6864995843985 + 2806738234075 \, \mathrm{I}) \, u_{ol-3-3\mathrm{I}} + (-184293662520330 + 62434863418140 \, \mathrm{I}) \, u_{ol-2-3\mathrm{I}} + (4166730585225 - 228595831574175 \, \mathrm{I}) \, u_{ol-1-3\mathrm{I}} + (8559444809242 + 7813675547636 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} \Big), \, O(\, \Delta x_{ol}^{22} \, )$$

Formula:, 281, Var:, 1  
Variavel :,  $x_{oi}$  , Derivada de Ordem :, 7

Error order:, 21, Error:,  $1.4834627225353602238 \times 10^{-54}$ , New Error:,  $1.5043556274147637204 \times 10^{-75}$   
Error order:, 21, Error:,  $1.5043556274147637204 \times 10^{-75}$ , New Error:,  $1.5064603691396990848 \times 10^{-96}$   
Error order:, 21, Error:,  $1.5064603691396990848 \times 10^{-96}$ , New Error:,  $1.5066709985558999803 \times 10^{-117}$   
Error order:, 21, Error:,  $1.5066709985558999803 \times 10^{-117}$ , New Error:,  $1.5066920630506909312 \times 10^{-138}$   
Error order:, 21, Error:,  $1.5066920630506909312 \times 10^{-138}$ , New Error:,  $1.5066941695157024689 \times 10^{-159}$

$$x_o + h., \begin{bmatrix} -3 + 3 I & -2 + 3 I & -1 + 3 I & 3 I \\ -3 + 2 I & -2 + 2 I & -1 + 2 I & 2 I \\ -3 + I & -2 + I & -1 + I & I \\ -3 & -2 & -1 & 0 \\ -3 - I & -2 - I & -1 - I & -I \\ -3 - 2 I & -2 - 2 I & -1 - 2 I & -2 I \\ -3 - 3 I & -2 - 3 I & -1 - 3 I & -3 I \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{41527384131947}{2080842075000} - \frac{23858071573217 I}{2774456100000} - \frac{8391017335897}{15413645000} - \frac{5199739617387 I}{30827290000} & \frac{140505606283}{3853411250} + \frac{41366077219551 I}{61654580000} & \frac{171144586193}{7029871875} - \frac{912191019733 I}{37492650000} \\ - \frac{22087445616803}{6248775000} - \frac{8320346823439 I}{6248775000} - \frac{3824847124833}{416585000} - \frac{88214329475601 I}{416585000} & \frac{112735099214913}{416585000} - \frac{762463678053 I}{24505000} & \frac{14334979564703}{6248775000} + \frac{46115406010961 I}{6248775000} \\ \frac{29243656203727}{430950000} + \frac{21021046998847 I}{861900000} & \frac{622503813981}{138125} - \frac{516112683429 I}{130000} - \frac{887642329791}{2210000} - \frac{37932818466711 I}{4420000} & - \frac{37163238614201}{215475000} - \frac{61444675306189 I}{430950000} \\ - \frac{431308316831}{2281500} & - \frac{578900154763}{32500} & - \frac{873752694703}{32500} & \frac{1690272671423}{2281500} \\ \frac{29243656203727}{430950000} - \frac{21021046998847 I}{861900000} & \frac{622503813981}{138125} + \frac{516112683429 I}{130000} - \frac{887642329791}{2210000} + \frac{37932818466711 I}{4420000} & - \frac{37163238614201}{215475000} + \frac{61444675306189 I}{430950000} \\ - \frac{22087445616803}{6248775000} + \frac{8320346823439 I}{6248775000} & - \frac{3824847124833}{416585000} + \frac{88214329475601 I}{416585000} & \frac{112735099214913}{416585000} + \frac{762463678053 I}{24505000} & \frac{14334979564703}{6248775000} - \frac{46115406010961 I}{6248775000} \\ \frac{41527384131947}{2080842075000} + \frac{23858071573217 I}{2774456100000} & - \frac{8391017335897}{15413645000} + \frac{5199739617387 I}{30827290000} & \frac{140505606283}{3853411250} - \frac{41366077219551 I}{61654580000} & \frac{171144586193}{7029871875} + \frac{912191019733 I}{37492650000} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u(x_{ol})=\frac{1}{8323368300000\,\mathcal{A}x_{ol}^7}\big(7\big(\big(23729933789684-10224887817093\,\mathrm{I}\big)\,u_{ol-3+3\mathrm{I}}-(647307051626340+200561385242070\,\mathrm{I})\,u_{ol-2+3\mathrm{I}}+(43356015653040+797774346377055\,\mathrm{I})\,u_{ol-1+3\mathrm{I}}+(28947884293216-28929486625818\,\mathrm{I})\,u_{ol+3\mathrm{I}}-(4202925365940228+1583243138402964\,\mathrm{I})\,u_{ol-3+2\mathrm{I}}-(10917206507737620$$

$$+251788900417501140\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(321778183187708820-36996916126783140\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+(2727741825740628+8775102972371436\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(80687425131254754+29000035838266497\,\mathrm{I})\,u_{ol-3+1\mathrm{I}}+(5358840089896369440-4720654888440520770\,\mathrm{I})\,u_{ol-2+1\mathrm{I}}-(477580738818393990$$

$$+10204551349562926395\,\mathrm{I})\,u_{ol-1+1\mathrm{I}}-(205077368741336604+169534636980533478\,\mathrm{I})\,u_{ol+1\mathrm{I}}-224785571637550600\,u_{ol-3\mathrm{I}}+21179776690195376760\,u_{ol-2\mathrm{I}}-31967320796178145560\,u_{ol-1\mathrm{I}}+880921822840769800\,u_{ol\mathrm{I}}+(80687425131254754-29000035838266497\,\mathrm{I})\,u_{ol-3-1\mathrm{I}}+(5358840089896369440$$

$$+4720654888440520770\,\mathrm{I})\,u_{ol-2-1\mathrm{I}}+(-477580738818393990+10204551349562926395\,\mathrm{I})\,u_{ol-1-1\mathrm{I}}+(-205077368741336604+169534636980533478\,\mathrm{I})\,u_{ol-1\mathrm{I}}+(-4202925365940228+1583243138402964\,\mathrm{I})\,u_{ol-3-2\mathrm{I}}+(-10917206507737620+251788900417501140\,\mathrm{I})\,u_{ol-2-2\mathrm{I}}+(321778183187708820$$

$$+36996916126783140\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}+(2727741825740628-8775102972371436\,\mathrm{I})\,u_{ol-2\mathrm{I}}+(23729933789684+10224887817093\,\mathrm{I})\,u_{ol-3-3\mathrm{I}}+(-647307051626340+200561385242070\,\mathrm{I})\,u_{ol-2-3\mathrm{I}}+(43356015653040-797774346377055\,\mathrm{I})\,u_{ol-1-3\mathrm{I}}+(28947884293216+28929486625818\,\mathrm{I})\,u_{ol-3\mathrm{I}}\big)\big),\,O(\,\mathcal{A}x_{ol}^{21}\,)$$

Formula.: 282, Var.: 1

Variavel .: x<sub>ol</sub> , Derivada de Ordem .: 8

Error order.: 20, Error.: 1.0913990413939413457 × 10<sup>−51</sup>, New Error.: 1.1067148714360147470 × 10<sup>−71</sup>

Error order.: 20, Error.: 1.1067148714360147470 × 10<sup>−71</sup>, New Error.: 1.1082577414027278938 × 10<sup>−91</sup>

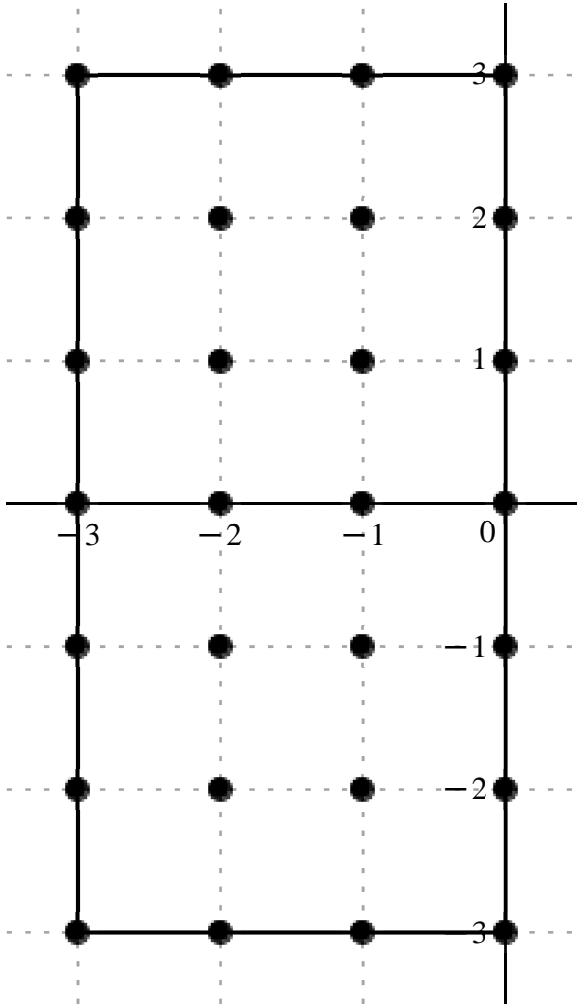
Error order.: 20, Error.: 1.1082577414027278938 × 10<sup>−91</sup>, New Error.: 1.1084121418013795155 × 10<sup>−111</sup>

Error order.: 20, Error.: 1.1084121418013795155 × 10<sup>−111</sup>, New Error.: 1.1084275829757986131 × 10<sup>−131</sup>

Error order.: 20, Error.: 1.1084275829757986131 × 10<sup>−131</sup>, New Error.: 1.1084291271045865966 × 10<sup>−151</sup>

$$x_o\neq h\,.,\left[\begin{array}{cccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -3+1 & -2+1 & -1+1 & 1 \\ -3 & -2 & -1 & 0 \\ -3-1 & -2-1 & -1-1 & -1 \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{ccccccccc} \frac{4337475674819}{27744561000}-\frac{1967695520539\,\mathrm{I}}{27744561000} & -\frac{128392337773}{29641625}-\frac{7213496934\,\mathrm{I}}{5928325} & \frac{1493460335479}{3082729000}+\frac{16330530998523\,\mathrm{I}}{3082729000} & \frac{642666186463}{3468070125}-\frac{705938882152\,\mathrm{I}}{3468070125} \\ -\frac{22355982096}{801125}-\frac{8014328056\,\mathrm{I}}{801125} & -\frac{1176983308977}{10414625}-\frac{3440511726267\,\mathrm{I}}{2082925} & \frac{21836062706304}{10414625}-\frac{3429514621848\,\mathrm{I}}{10414625} & \frac{45711329748}{2082925}+\frac{591811022614\,\mathrm{I}}{10414625} \\ \frac{1526336955969}{2873000}+\frac{532270277777\,\mathrm{I}}{2873000} & \frac{947364650967}{27625}-\frac{862408198596\,\mathrm{I}}{27625} & -\frac{1146525144303}{221000}-\frac{574799145501\,\mathrm{I}}{8840} & -\frac{488510560041}{359125}-\frac{338358003046\,\mathrm{I}}{359125} \\ -\frac{279769856576}{190125} & \frac{222274503332}{1625} & -\frac{326607990688}{1625} & \frac{15135898358}{2925} \\ \frac{1526336955969}{2873000}-\frac{532270277777\,\mathrm{I}}{2873000} & \frac{947364650967}{27625}+\frac{862408198596\,\mathrm{I}}{27625} & -\frac{1146525144303}{221000}+\frac{574799145501\,\mathrm{I}}{8840} & -\frac{488510560041}{359125}+\frac{338358003046\,\mathrm{I}}{359125} \\ -\frac{22355982096}{801125}+\frac{8014328056\,\mathrm{I}}{801125} & -\frac{1176983308977}{10414625}+\frac{3440511726267\,\mathrm{I}}{2082925} & \frac{21836062706304}{10414625}+\frac{3429514621848\,\mathrm{I}}{10414625} & \frac{45711329748}{2082925}-\frac{591811022614\,\mathrm{I}}{10414625} \\ \frac{4337475674819}{27744561000}+\frac{1967695520539\,\mathrm{I}}{27744561000} & -\frac{128392337773}{29641625}+\frac{7213496934\,\mathrm{I}}{5928325} & \frac{1493460335479}{3082729000}-\frac{16330530998523\,\mathrm{I}}{3082729000} & \frac{642666186463}{3468070125}+\frac{705938882152\,\mathrm{I}}{3468070125} \end{array}\right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} u(x_{ol}) = \frac{1}{27744561000 \Delta x_{ol}^8} (7 \left( (619639382117 - 281099360077 \, \mathrm{I}) u_{ol-3+3\mathrm{I}} - (17167889736504 + 4822737950160 \, \mathrm{I}) u_{ol-2+3\mathrm{I}} + (1920163288473 + 20996396998101 \, \mathrm{I}) u_{ol-1+3\mathrm{I}} + (734475641672 - 806787293888 \, \mathrm{I}) u_{ol+3\mathrm{I}} - (110604624564096 + 39650315605056 \, \mathrm{I}) u_{ol-3+2\mathrm{I}} - (447926219302104 \right. \\ \left. + 6546802313410920 \, \mathrm{I}) u_{ol-2+2\mathrm{I}} + (8310181578513408 - 1305175278943296 \, \mathrm{I}) u_{ol-1+2\mathrm{I}} + (86982130320480 + 225226366320528 \, \mathrm{I}) u_{ol+2\mathrm{I}} + (2105690854827519 + 734304867498927 \, \mathrm{I}) u_{ol-3+\mathrm{I}} + (135923549310912168 - 123734385897074784 \, \mathrm{I}) u_{ol-2+\mathrm{I}} - (20562273305848989 + 257717355447646575 \, \mathrm{I}) u_{ol-1+\mathrm{I}} \right. \\ \left. - (5391481689503928 + 3734312269045968 \, \mathrm{I}) u_{ol+1} - 5832322232917504 u_{ol-3} + 542145803643022176 u_{ol-2} - 796623764459837184 u_{ol-1} + 20509834201872080 u_{ol} + (2105690854827519 - 734304867498927 \, \mathrm{I}) u_{ol-3-\mathrm{I}} + (135923549310912168 + 123734385897074784 \, \mathrm{I}) u_{ol-2-\mathrm{I}} + (-20562273305848989 \right. \\ \left. + 257717355447646575 \, \mathrm{I}) u_{ol-1-\mathrm{I}} + (-5391481689503928 + 3734312269045968 \, \mathrm{I}) u_{ol-1} + (-110604624564096 + 39650315605056 \, \mathrm{I}) u_{ol-3-2\mathrm{I}} + (-447926219302104 + 6546802313410920 \, \mathrm{I}) u_{ol-2-2\mathrm{I}} + (8310181578513408 + 1305175278943296 \, \mathrm{I}) u_{ol-1-2\mathrm{I}} + (86982130320480 - 225226366320528 \, \mathrm{I}) u_{ol-2\mathrm{I}} + (619639382117 \right. \\ \left. + 281099360077 \, \mathrm{I}) u_{ol-3-3\mathrm{I}} + (-17167889736504 + 4822737950160 \, \mathrm{I}) u_{ol-2-3\mathrm{I}} + (1920163288473 - 20996396998101 \, \mathrm{I}) u_{ol-1-3\mathrm{I}} + (734475641672 + 806787293888 \, \mathrm{I}) u_{ol-3\mathrm{I}} \right), O(\Delta x_{ol}^{20})$$

Formula.: 283, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 9

Error order.: 19, Error.: 7.7967778483129489801 × 10<sup>-49</sup>, New Error.: 7.9057702414742010657 × 10<sup>-68</sup>

Error order.: 19, Error.: 7.9057702414742010657 × 10<sup>-68</sup>, New Error.: 7.9167495024722497365 × 10<sup>-87</sup>

Error order.: 19, Error.: 7.9167495024722497365 × 10<sup>-87</sup>, New Error.: 7.9178482325491091012 × 10<sup>-106</sup>

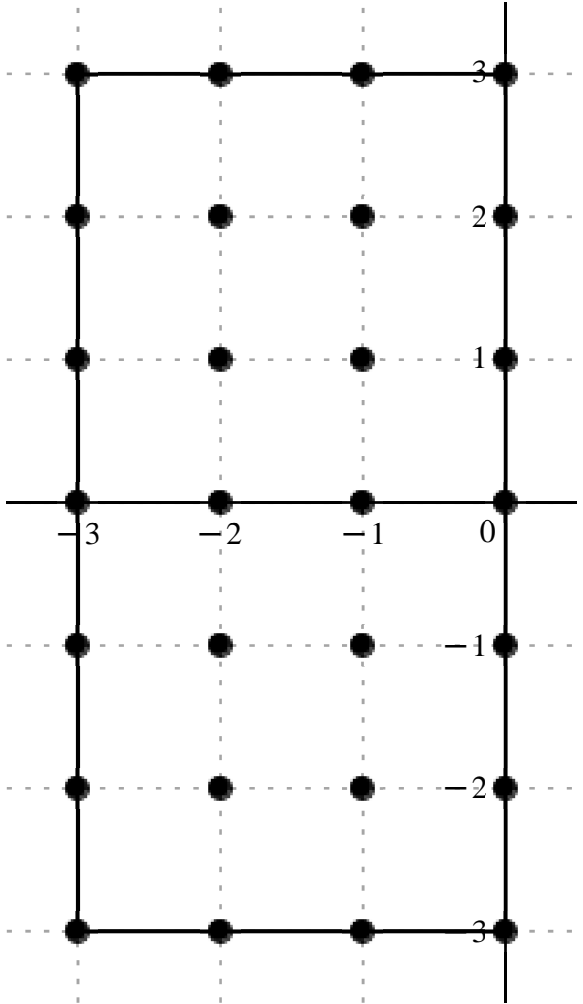
Error order.: 19, Error.: 7.9178482325491091012 × 10<sup>-106</sup>, New Error.: 7.9179581136003383226 × 10<sup>-125</sup>

Error order.: 19, Error.: 7.9179581136003383226 × 10<sup>-125</sup>, New Error.: 7.9179691017859004516 × 10<sup>-144</sup>

$$x_o \neq h., \left[ \begin{array}{cccc} -3+3\mathrm{I} & -2+3\mathrm{I} & -1+3\mathrm{I} & 3\mathrm{I} \\ -3+2\mathrm{I} & -2+2\mathrm{I} & -1+2\mathrm{I} & 2\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -3-2\mathrm{I} & -2-2\mathrm{I} & -1-2\mathrm{I} & -2\mathrm{I} \\ -3-3\mathrm{I} & -2-3\mathrm{I} & -1-3\mathrm{I} & -3\mathrm{I} \end{array} \right]$$



$$c = , \begin{array}{cccccc} \frac{54876309648391}{46240935000} - \frac{4365236381177 \text{ I}}{7706822500} & - \frac{25728033281139}{770682250} - \frac{3240238758057 \text{ I}}{385341125} & \frac{16184817775791}{3082729000} + \frac{62356543967151 \text{ I}}{1541364500} & \frac{15667162563017}{11560233750} - \frac{3169954883081 \text{ I}}{1926705625} \\ - \frac{11121205836447}{52073125} - \frac{3785293127511 \text{ I}}{52073125} & - \frac{1429458002217}{1225250} - \frac{259961232144537 \text{ I}}{20829250} & \frac{163513197598149}{10414625} - \frac{32591446995933 \text{ I}}{10414625} & \frac{1201961508237}{6126250} + \frac{43727404097223 \text{ I}}{104146250} \\ \frac{57938371983513}{14365000} + \frac{2449117124748 \text{ I}}{1795625} & \frac{13981456454553}{55250} - \frac{6569637342282 \text{ I}}{27625} & - \frac{11691237806577}{221000} - \frac{13186855457811 \text{ I}}{27625} & - \frac{36650370651741}{3591250} - \frac{10778676794046 \text{ I}}{1795625} \\ & - \frac{704063536694}{63375} & - \frac{331222979367}{325} & - \frac{2373228407466}{1625} & - \frac{449455301071}{12675} \\ \frac{57938371983513}{14365000} - \frac{2449117124748 \text{ I}}{1795625} & \frac{13981456454553}{55250} + \frac{6569637342282 \text{ I}}{27625} & - \frac{11691237806577}{221000} + \frac{13186855457811 \text{ I}}{27625} & - \frac{36650370651741}{3591250} + \frac{10778676794046 \text{ I}}{1795625} \\ - \frac{11121205836447}{52073125} + \frac{3785293127511 \text{ I}}{52073125} & - \frac{1429458002217}{1225250} + \frac{259961232144537 \text{ I}}{20829250} & \frac{163513197598149}{10414625} + \frac{32591446995933 \text{ I}}{10414625} & \frac{1201961508237}{6126250} - \frac{43727404097223 \text{ I}}{104146250} \\ \frac{54876309648391}{46240935000} + \frac{4365236381177 \text{ I}}{7706822500} & - \frac{25728033281139}{770682250} + \frac{3240238758057 \text{ I}}{385341125} & \frac{16184817775791}{3082729000} - \frac{62356543967151 \text{ I}}{1541364500} & \frac{15667162563017}{11560233750} + \frac{3169954883081 \text{ I}}{1926705625} \end{array}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{46240935000 \, \mathcal{A}x_{ol}^9} \big( 7 \, \big( ( (7839472806913 - 3741631183866 \, \mathrm{I}) \, u_{ol-3+31} - (220525999552620 + 55546950138120 \, \mathrm{I}) \, u_{ol-2+31} + (34681752376695 + 267242331287790 \, \mathrm{I}) \, u_{ol-1+31} + (8952664321724 - 10868416741992 \, \mathrm{I}) \, u_{ol+31} - (1410804397537848 + 480191471032824 \, \mathrm{I}) \, u_{ol-3+21} - (7706820714809940 + 82444847908696020 \, \mathrm{I}) \, u_{ol-2+21} + (103714085333683080 - 20672289237420360 \, \mathrm{I}) \, u_{ol-1+21} + (1296057923453268 + 2773566774166716 \, \mathrm{I}) \, u_{ol+21} + (26643374202132621 + 9009952028072928 \, \mathrm{I}) \, u_{ol-3+1} + (1671662880724798260 - 1570969222071284880 \, \mathrm{I}) \, u_{ol-2+1} - (349459448922734085 + 3153316230531525240 \, \mathrm{I}) \, u_{ol-1+1} - (67415738930259588 + 39653212114324656 \, \mathrm{I}) \, u_{ol+1} - 73387559844772880 \, u_{ol-3} + 6732334179962983800 \, u_{ol-2} - 9647498947673742480 \, u_{ol-1} + 234243261338174600 \, u_{ol} + (26643374202132621 - 9009952028072928 \, \mathrm{I}) \, u_{ol-3-1} + (1671662880724798260 + 1570969222071284880 \, \mathrm{I}) \, u_{ol-2-1} + (-349459448922734085 + 3153316230531525240 \, \mathrm{I}) \, u_{ol-1-1} + (-67415738930259588 + 39653212114324656 \, \mathrm{I}) \, u_{ol-1} + (-1410804397537848 + 480191471032824 \, \mathrm{I}) \, u_{ol-3-21} + (-7706820714809940 + 82444847908696020 \, \mathrm{I}) \, u_{ol-2-21} + (103714085333683080 + 20672289237420360 \, \mathrm{I}) \, u_{ol-1-21} + (1296057923453268 - 2773566774166716 \, \mathrm{I}) \, u_{ol-21} + (7839472806913 + 3741631183866 \, \mathrm{I}) \, u_{ol-3-31} + (-220525999552620 + 55546950138120 \, \mathrm{I}) \, u_{ol-2-31} + (34681752376695 - 267242331287790 \, \mathrm{I}) \, u_{ol-1-31} + (8952664321724 + 10868416741992 \, \mathrm{I}) \, u_{ol-31} \big) \big) , \, O( \, \mathcal{A}x_{ol}^{19} \, )$$

Formula:, 284, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

Error order:, 18, Error:,  $5.3971406277265402042 \times 10^{-46}$ , New Error:,  $5.4722755153203427430 \times 10^{-64}$

Error order:, 18, Error:,  $5.4722755153203427430 \times 10^{-64}$ , New Error:,  $5.4798439477398625255 \times 10^{-82}$

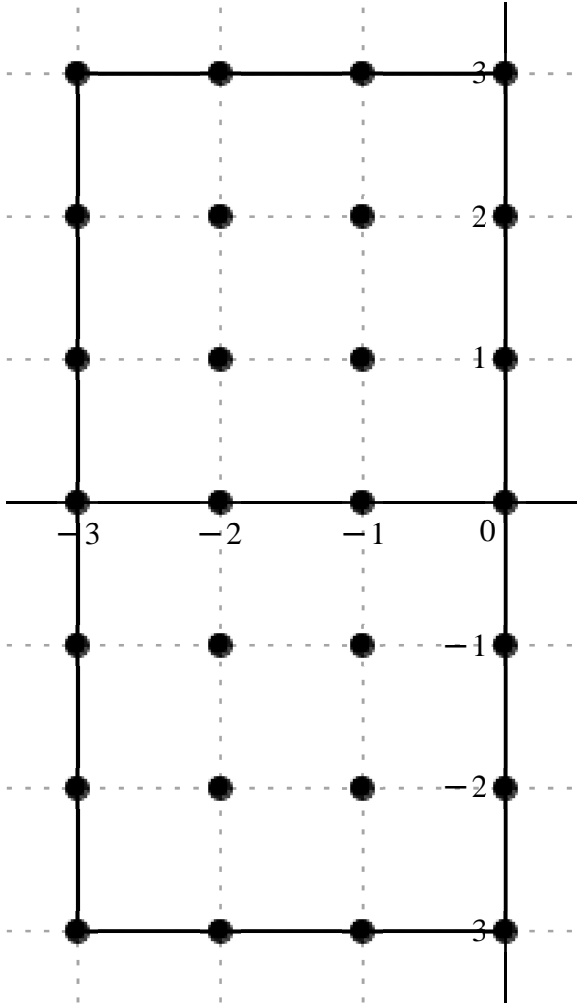
Error order:, 18, Error:,  $5.4798439477398625255 \times 10^{-82}$ , New Error:,  $5.4806013429900537631 \times 10^{-100}$

Error order:, 18, Error:,  $5.4806013429900537631 \times 10^{-100}$ , New Error:,  $5.4806770880377354349 \times 10^{-118}$

Error order:, 18, Error:,  $5.4806770880377354349 \times 10^{-118}$ , New Error:,  $5.4806846625977328085 \times 10^{-136}$

$$x_o + h., \begin{bmatrix} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \\ -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ -3 - 2 \text{ I} & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \\ -3 - 3 \text{ I} & -2 - 3 \text{ I} & -1 - 3 \text{ I} & -3 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{1073960792149}{123309160} - \frac{2694948519599 \text{ I}}{616545800} - \frac{38326101047073}{154136450} - \frac{4267574051643 \text{ I}}{77068225} & \frac{2395377854541}{47426600} + \frac{14137059082167 \text{ I}}{47426600} & \frac{7309412883381}{770682250} - \frac{4936922425729 \text{ I}}{385341125} \\ -\frac{16464770801871}{10414625} - \frac{5306798008743 \text{ I}}{10414625} - \frac{22509232139961}{2082925} - \frac{189843297726159 \text{ I}}{2082925} & \frac{13892616343809}{122525} - \frac{57097513635561 \text{ I}}{2082925} & \frac{1318801645182}{801125} + \frac{2377575940614 \text{ I}}{801125} \\ \frac{85115031885807}{2873000} + \frac{27894467726601 \text{ I}}{2873000} & \frac{19965004349283}{11050} - \frac{9675874546002 \text{ I}}{5525} - \frac{20991847082409}{44200} - \frac{149790367367109 \text{ I}}{44200} & -\frac{2102130739947}{28730} - \frac{2647833553428 \text{ I}}{71825} \\ -\frac{26379708866}{325} & -\frac{2388982812804}{325} & -\frac{3343738604346}{325} & \frac{200532179442}{845} \\ \frac{85115031885807}{2873000} - \frac{27894467726601 \text{ I}}{2873000} & \frac{19965004349283}{11050} + \frac{9675874546002 \text{ I}}{5525} - \frac{20991847082409}{44200} + \frac{149790367367109 \text{ I}}{44200} & -\frac{2102130739947}{28730} + \frac{2647833553428 \text{ I}}{71825} \\ -\frac{16464770801871}{10414625} + \frac{5306798008743 \text{ I}}{10414625} - \frac{22509232139961}{2082925} + \frac{189843297726159 \text{ I}}{2082925} & \frac{13892616343809}{122525} + \frac{57097513635561 \text{ I}}{2082925} & \frac{1318801645182}{801125} - \frac{2377575940614 \text{ I}}{801125} \\ \frac{1073960792149}{123309160} + \frac{2694948519599 \text{ I}}{616545800} - \frac{38326101047073}{154136450} + \frac{4267574051643 \text{ I}}{77068225} & \frac{2395377854541}{47426600} - \frac{14137059082167 \text{ I}}{47426600} & \frac{7309412883381}{770682250} + \frac{4936922425729 \text{ I}}{385341125} \end{bmatrix}$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\,u(x_{ol})=\frac{1}{3082729000\,\mathcal{A}_{ol}^{10}}\Big(7\Big((3835574257675-1924963228285\,\mathrm{I})\,u_{ol-3+31}-(109503145848780+24386137437960\,\mathrm{I})\,u_{ol-2+31}+(22242794363595+131272691477265\,\mathrm{I})\,u_{ol-1+31}+(4176807361932-5642197057976\,\mathrm{I})\,u_{ol+31}-(696224593907688+224401744369704\,\mathrm{I})\,u_{ol-3+21}-(4759094795306040$$

$$+40138297233530760\,\mathrm{I})\,u_{ol-2+21}+(49934032458604920-12072045740090040\,\mathrm{I})\,u_{ol-1+21}+(724964104380048+1306987459926096\,\mathrm{I})\,u_{ol+21}+(13046918459067273+4275823410091839\,\mathrm{I})\,u_{ol-3+1}+(795690987623281620-771250137383896560\,\mathrm{I})\,u_{ol-2+1}-(209153767823230815+1492447024574145315\,\mathrm{I})\,u_{ol-1+1}$$

$$-(32222661199473300+16235002301875680\,\mathrm{I})\,u_{ol+1}-35745711442978160\,u_{ol-3}+3237180921992291040\,u_{ol-2}-4530918665510742960\,u_{ol-1}+104511642434329200\,u_{ol}+(13046918459067273-4275823410091839\,\mathrm{I})\,u_{ol-3-1}+(795690987623281620+771250137383896560\,\mathrm{I})\,u_{ol-2-1}+(-209153767823230815$$

$$+1492447024574145315\,\mathrm{I})\,u_{ol-1-1}+(-32222661199473300+16235002301875680\,\mathrm{I})\,u_{ol-1}+(-696224593907688+224401744369704\,\mathrm{I})\,u_{ol-3-21}+(-4759094795306040+40138297233530760\,\mathrm{I})\,u_{ol-2-21}+(49934032458604920+12072045740090040\,\mathrm{I})\,u_{ol-1-21}+(724964104380048-1306987459926096\,\mathrm{I})\,u_{ol-21}$$

$$+(3835574257675+1924963228285\,\mathrm{I})\,u_{ol-3-31}+(-109503145848780+24386137437960\,\mathrm{I})\,u_{ol-2-31}+(22242794363595-131272691477265\,\mathrm{I})\,u_{ol-1-31}+(4176807361932+5642197057976\,\mathrm{I})\,u_{ol-31}\Big)\Big),\,O(\,\mathcal{A}_{ol}^{18}\,)\,$$

Formula.: 285, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 12

Error order.: 16, Error.: 2.3319774069992455780 × 10<sup>−40</sup>, New Error.: 2.3641386568457334090 × 10<sup>−56</sup>

Error order.: 16, Error.: 2.3641386568457334090 × 10<sup>−56</sup>, New Error.: 2.3673780917517372513 × 10<sup>−72</sup>

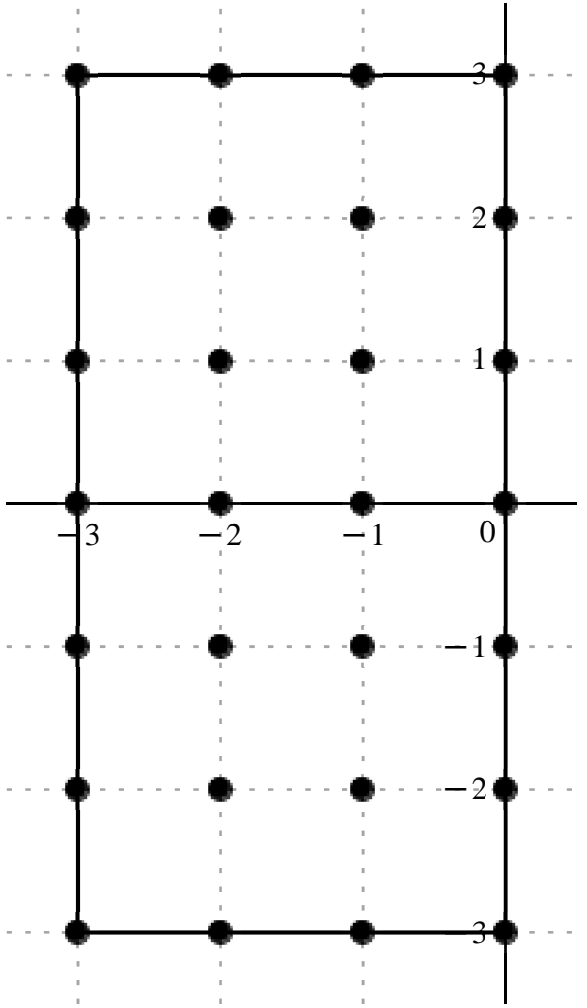
Error order.: 16, Error.: 2.3673780917517372513 × 10<sup>−72</sup>, New Error.: 2.3677022694231215584 × 10<sup>−88</sup>

Error order.: 16, Error.: 2.3677022694231215584 × 10<sup>−88</sup>, New Error.: 2.3677346895331529496 × 10<sup>−104</sup>

Error order.: 16, Error.: 2.3677346895331529496 × 10<sup>−104</sup>, New Error.: 2.3677379315675861038 × 10<sup>−120</sup>

$$x_o\neq h\,.,\left[\begin{array}{cccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} \frac{7610412454029}{18133700}-\frac{4219655812449\,\mathrm{I}}{18133700} & -\frac{116188393167}{9425}-\frac{140626624446\,\mathrm{I}}{69745} & \frac{66102223375881}{18133700}+\frac{260785340010657\,\mathrm{I}}{18133700} & \frac{1809377262231}{4533425}-\frac{3111956309154\,\mathrm{I}}{4533425} \\ -\frac{731664677898}{9425}-\frac{209400751098\,\mathrm{I}}{9425} & -\frac{90046308558591}{122525}-\frac{106492849388541\,\mathrm{I}}{24505} & \frac{643977063585702}{122525}-\frac{210935971571094\,\mathrm{I}}{122525} & \frac{2362494219624}{24505}+\frac{15744024459702\,\mathrm{I}}{122525} \\ \frac{24229292047191}{16900}+\frac{7439735339883\,\mathrm{I}}{16900} & \frac{26845785834021}{325}-\frac{27622879803288\,\mathrm{I}}{325} & -\frac{38715231602817}{1300}-\frac{7958798612919\,\mathrm{I}}{52} & -\frac{13946768437833}{4225}-\frac{5216939922348\,\mathrm{I}}{4225} \\ -\frac{16429307664924}{4225} & \frac{111614945241492}{325} & -\frac{149582176845948}{325} & \frac{633022024866}{65} \\ \frac{24229292047191}{16900}-\frac{7439735339883\,\mathrm{I}}{16900} & \frac{26845785834021}{325}+\frac{27622879803288\,\mathrm{I}}{325} & -\frac{38715231602817}{1300}+\frac{7958798612919\,\mathrm{I}}{52} & -\frac{13946768437833}{4225}+\frac{5216939922348\,\mathrm{I}}{4225} \\ -\frac{731664677898}{9425}+\frac{209400751098\,\mathrm{I}}{9425} & -\frac{90046308558591}{122525}+\frac{106492849388541\,\mathrm{I}}{24505} & \frac{643977063585702}{122525}+\frac{210935971571094\,\mathrm{I}}{122525} & \frac{2362494219624}{24505}-\frac{15744024459702\,\mathrm{I}}{122525} \\ \frac{7610412454029}{18133700}+\frac{4219655812449\,\mathrm{I}}{18133700} & -\frac{116188393167}{9425}+\frac{140626624446\,\mathrm{I}}{69745} & \frac{66102223375881}{18133700}-\frac{260785340010657\,\mathrm{I}}{18133700} & \frac{1809377262231}{4533425}+\frac{3111956309154\,\mathrm{I}}{4533425} \end{array}\right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\, u(x_{ol}) = \frac{1}{18133700\, \mathcal{A}x_{ol}^{12}}\, \Big( 231\, \Big( (32945508459 - 18266908279\, \mathrm{I})\, u_{ol-3+3\mathrm{I}} - (967733629668 + 158281049160\, \mathrm{I})\, u_{ol-2+3\mathrm{I}} + (286156811151 + 1128940865847\, \mathrm{I})\, u_{ol-1+3\mathrm{I}} + (31331208004 - 53886689336\, \mathrm{I})\, u_{ol+3\mathrm{I}} - (6094038269592 + 1744099762392\, \mathrm{I})\, u_{ol-3+2\mathrm{I}} - (57692007215028 + 341145924448140\, \mathrm{I})\, u_{ol-2+2\mathrm{I}}$$
$$+ (412591365414216 - 135145124642952\, \mathrm{I})\, u_{ol-1+2\mathrm{I}} + (7568163300960 + 10087080606216\, \mathrm{I})\, u_{ol+2\mathrm{I}} + (112545586002753 + 34557731686989\, \mathrm{I})\, u_{ol-3+\mathrm{I}} + (6484361326385436 - 6672061478373408\, \mathrm{I})\, u_{ol-2+\mathrm{I}} - (2337830154232443 + 12014857343247525\, \mathrm{I})\, u_{ol-1+\mathrm{I}} - (259132165087356 + 96931195440336\, \mathrm{I})\, u_{ol+\mathrm{I}}$$
$$- 305257958865168\, u_{ol-3} + 26959599500841072\, u_{ol-2} - 36130247356261968\, u_{ol-1} + 764504261892280\, u_{ol} + (112545586002753 - 34557731686989\, \mathrm{I})\, u_{ol-3-\mathrm{I}} + (6484361326385436 + 6672061478373408\, \mathrm{I})\, u_{ol-2-\mathrm{I}} + (-2337830154232443 + 12014857343247525\, \mathrm{I})\, u_{ol-1-\mathrm{I}} + (-259132165087356 + 96931195440336\, \mathrm{I})\, u_{ol-\mathrm{I}}$$
$$+ (-6094038269592 + 1744099762392\, \mathrm{I})\, u_{ol-3-2\mathrm{I}} + (-57692007215028 + 341145924448140\, \mathrm{I})\, u_{ol-2-2\mathrm{I}} + (412591365414216 + 135145124642952\, \mathrm{I})\, u_{ol-1-2\mathrm{I}} + (7568163300960 - 10087080606216\, \mathrm{I})\, u_{ol-2\mathrm{I}} + (32945508459 + 18266908279\, \mathrm{I})\, u_{ol-3-3\mathrm{I}} + (-967733629668 + 158281049160\, \mathrm{I})\, u_{ol-2-3\mathrm{I}} + (286156811151$$
$$- 1128940865847\, \mathrm{I})\, u_{ol-1-3\mathrm{I}} + (31331208004 + 53886689336\, \mathrm{I})\, u_{ol-3\mathrm{I}} \Big) \Big),\, O(\, \mathcal{A}x_{ol}^{16}\, )$$

Formula.: 286, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 13

Error order.: 15, Error.:  $1.4480806679156962609 \times 10^{-37}$ , New Error.:  $1.4679452170372782213 \times 10^{-52}$

Error order.: 15, Error.:  $1.4679452170372782213 \times 10^{-52}$ , New Error.:  $1.4699459974140276004 \times 10^{-67}$

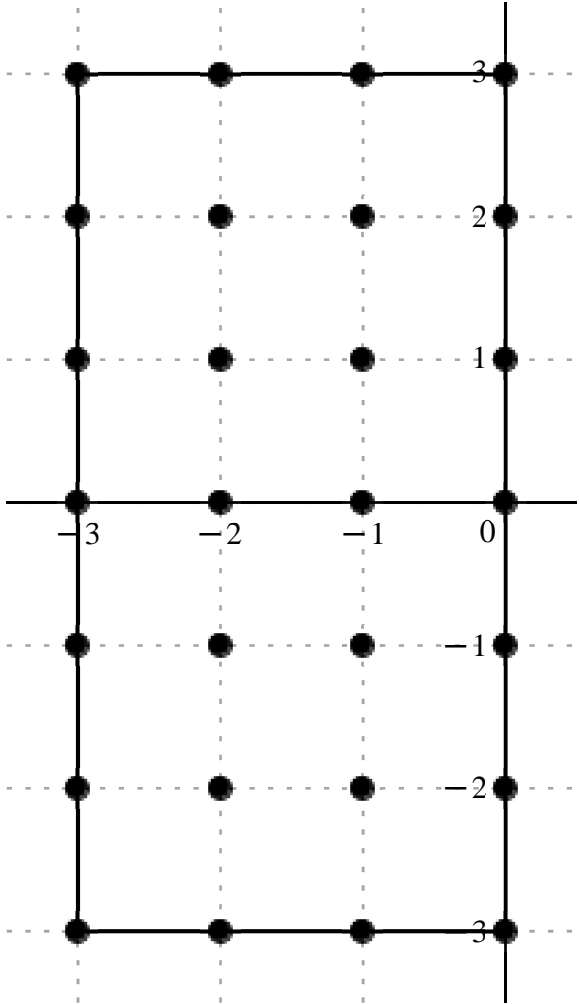
Error order.: 15, Error.:  $1.4699459974140276004 \times 10^{-67}$ , New Error.:  $1.4701462193678363760 \times 10^{-82}$

Error order.: 15, Error.:  $1.4701462193678363760 \times 10^{-82}$ , New Error.:  $1.4701662430030422411 \times 10^{-97}$

Error order.: 15, Error.:  $1.4701662430030422411 \times 10^{-97}$ , New Error.:  $1.4701682453809617413 \times 10^{-112}$

$$x_o \neq h., \left[ \begin{array}{cccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{4776367616174}{1743625} - \frac{11135596135587 \text{ I}}{6974500} & - \frac{56897377112961}{697450} - \frac{3793804707231 \text{ I}}{348725} & \frac{19475136102807}{697450} + \frac{130536379270143 \text{ I}}{1394900} & \frac{8263725446669}{3487250} - \frac{8179102541841 \text{ I}}{1743625} \\ - \frac{24129274109787}{47125} - \frac{6466371972291 \text{ I}}{47125} & - \frac{4143143293443}{754} - \frac{531762494717223 \text{ I}}{18850} & \frac{316166939506341}{9425} - \frac{117378308740077 \text{ I}}{9425} & \frac{63471738817179}{94250} + \frac{73816414846713 \text{ I}}{94250} \\ \frac{30522285492237}{3250} + \frac{18114220415907 \text{ I}}{6500} & \frac{26289412839459}{50} - \frac{13925069721486 \text{ I}}{25} & - \frac{5328043358022}{25} - \frac{96813110773071 \text{ I}}{100} & - \frac{67417782704811}{3250} - \frac{10864756212156 \text{ I}}{1625} \\ & - \frac{8239041317122}{325} & \frac{55287892743237}{25} & - \frac{72608553882018}{25} & \frac{3849438308639}{65} \\ \frac{30522285492237}{3250} - \frac{18114220415907 \text{ I}}{6500} & \frac{26289412839459}{50} + \frac{13925069721486 \text{ I}}{25} & - \frac{5328043358022}{25} + \frac{96813110773071 \text{ I}}{100} & - \frac{67417782704811}{3250} + \frac{10864756212156 \text{ I}}{1625} \\ - \frac{24129274109787}{47125} + \frac{6466371972291 \text{ I}}{47125} & - \frac{4143143293443}{754} + \frac{531762494717223 \text{ I}}{18850} & \frac{316166939506341}{9425} + \frac{117378308740077 \text{ I}}{9425} & \frac{63471738817179}{94250} - \frac{73816414846713 \text{ I}}{94250} \\ \frac{4776367616174}{1743625} + \frac{11135596135587 \text{ I}}{6974500} & - \frac{56897377112961}{697450} + \frac{3793804707231 \text{ I}}{348725} & \frac{19475136102807}{697450} - \frac{130536379270143 \text{ I}}{1394900} & \frac{8263725446669}{3487250} + \frac{8179102541841 \text{ I}}{1743625} \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\;u(x_{ol})=\frac{1}{6974500\;\Delta x_{ol}^{13}}\Big(77\Big(\big((248122993048-144618131631\text{ I})\;u_{ol-3+3\text{I}}-(7389269754930+985403820060\text{ I})\;u_{ol-2+3\text{I}}+(2529238454910+8476388264295\text{ I})\;u_{ol-1+3\text{I}}+(214642219394-424888443732\text{ I})\;u_{ol+3\text{I}}-(46378345042188+12428870803884\text{ I})\;u_{ol-3+2\text{I}}-(497715265770750+2555222377212630\text{ I})\;u_{ol-2+2\text{I}}\\ +(3038487470580420-1128051278800740\text{ I})\;u_{ol-1+2\text{I}}+(60998813928198+70940450631906\text{ I})\;u_{ol+2\text{I}}+(850660060601826+252422837743743\text{ I})\;u_{ol-3+1\text{I}}+(47624807752936830-50452155206495640\text{ I})\;u_{ol-2+1\text{I}}-(19304123844428280+87691304037244635\text{ I})\;u_{ol-1+1\text{I}}-(1878942359539278+605604333280176\text{ I})\;u_{ol+1\text{I}}\\ -2296231515135560\;u_{ol-3}+200314497629977380\;u_{ol-2}-263069277428641320\;u_{ol-1}+5364217279441100\;u_{ol}+(850660060601826-252422837743743\text{ I})\;u_{ol-3-1\text{I}}+(47624807752936830+50452155206495640\text{ I})\;u_{ol-2-1\text{I}}+(-19304123844428280+87691304037244635\text{ I})\;u_{ol-1-1\text{I}}+(-1878942359539278\\ +605604333280176\text{ I})\;u_{ol-1\text{I}}+(-46378345042188+12428870803884\text{ I})\;u_{ol-3-2\text{I}}+(-497715265770750+2555222377212630\text{ I})\;u_{ol-2-2\text{I}}+(3038487470580420+1128051278800740\text{ I})\;u_{ol-1-2\text{I}}+(60998813928198-70940450631906\text{ I})\;u_{ol-2\text{I}}+(248122993048+144618131631\text{ I})\;u_{ol-3-3\text{I}}+(-7389269754930\\ +985403820060\text{ I})\;u_{ol-2-3\text{I}}+(2529238454910-8476388264295\text{ I})\;u_{ol-1-3\text{I}}+(214642219394+424888443732\text{ I})\;u_{ol-3\text{I}}\Big)\Big)\cdot\;O(\;\Delta x_{ol}^{15}\;)$$

Formula:, 287, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 1

Error order:., 27, Error:.,  $3.6319641727592139784 \times 10^{-72}$ , New Error:.,  $3.6432296615645361859 \times 10^{-99}$

Error order:., 27, Error:.,  $3.6432296615645361859 \times 10^{-99}$ , New Error:.,  $3.6443171302350314678 \times 10^{-126}$

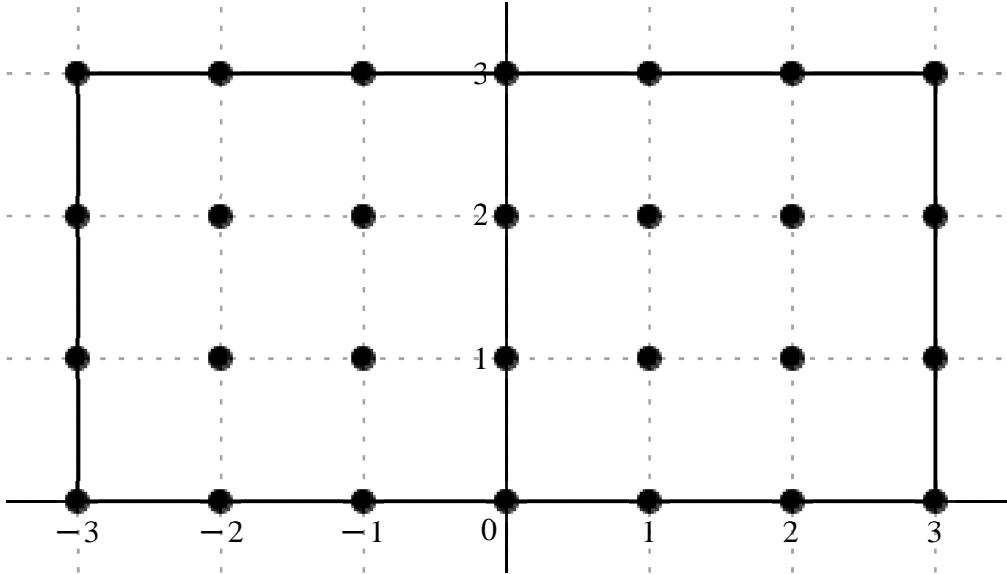
Error order:., 27, Error:.,  $3.6443171302350314678 \times 10^{-126}$ , New Error:.,  $3.6444254858995350721 \times 10^{-153}$

Error order:., 27, Error:.,  $3.6444254858995350721 \times 10^{-153}$ , New Error:.,  $3.6444363175535659834 \times 10^{-180}$

Error order:., 27, Error:.,  $3.6444363175535659834 \times 10^{-180}$ , New Error:.,  $3.6444374006798444867 \times 10^{-207}$

$$x_o \neq h. , \left[ \begin{array}{ccccccccc} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & 3 + 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} -\frac{103}{10944600} + \frac{359 \text{ I}}{10944600} & -\frac{909}{320450} - \frac{1773 \text{ I}}{320450} & \frac{171}{3400} + \frac{387 \text{ I}}{3400} & -\frac{\text{I}}{3} & -\frac{171}{3400} + \frac{387 \text{ I}}{3400} & \frac{909}{320450} - \frac{1773 \text{ I}}{320450} & \frac{103}{10944600} + \frac{359 \text{ I}}{10944600} \\ -\frac{486}{1185665} - \frac{3753 \text{ I}}{4742660} & -\frac{3483}{9860} + \frac{243 \text{ I}}{4930} & -\frac{1053}{170} + \frac{3159 \text{ I}}{340} & \frac{351 \text{ I}}{10} & \frac{1053}{170} + \frac{3159 \text{ I}}{340} & \frac{3483}{9860} + \frac{243 \text{ I}}{4930} & \frac{486}{1185665} - \frac{3753 \text{ I}}{4742660} \\ \frac{729}{729640} - \frac{27 \text{ I}}{145928} & \frac{81}{986} + \frac{2187 \text{ I}}{4930} & -\frac{11583}{680} + \frac{3159 \text{ I}}{680} & -\frac{351 \text{ I}}{5} & \frac{11583}{680} + \frac{3159 \text{ I}}{680} & -\frac{81}{986} + \frac{2187 \text{ I}}{4930} & -\frac{729}{729640} - \frac{27 \text{ I}}{145928} \\ -\frac{32}{1368075} + \frac{77 \text{ I}}{1824100} & \frac{549}{49300} - \frac{63 \text{ I}}{49300} & -\frac{333}{850} - \frac{63 \text{ I}}{1700} & \frac{251 \text{ I}}{39} & \frac{333}{850} - \frac{63 \text{ I}}{1700} & -\frac{549}{49300} - \frac{63 \text{ I}}{49300} & \frac{32}{1368075} + \frac{77 \text{ I}}{1824100} \end{array} \right]$$



$$\frac{\text{d}}{\text{d}x_{ol}} u(x_{ol}) = \frac{1}{142279800 \Delta x_{ol}} \big( (-1339 + 4667 \text{ I}) u_{ol-3+3\text{I}} - (403596 + 787212 \text{ I}) u_{ol-2+3\text{I}} + (7155837 + 16194789 \text{ I}) u_{ol-1+3\text{I}} - 47426600 \text{ I} u_{ol+3\text{I}} + (-7155837 + 16194789 \text{ I}) u_{ol+1+3\text{I}} + (403596 - 787212 \text{ I}) u_{ol+2+3\text{I}} + (1339 + 4667 \text{ I}) u_{ol+3+3\text{I}} - (58320 + 112590 \text{ I}) u_{ol-3+2\text{I}} + (-50259690 + 7012980 \text{ I}) u_{ol-2+2\text{I}} + (-881297820$$

$$+ 1321946730 \text{ I}) u_{ol-1+2\text{I}} + 4994020980 \text{ I} u_{ol+2\text{I}} + (881297820 + 1321946730 \text{ I}) u_{ol+1+2\text{I}} + (50259690 + 7012980 \text{ I}) u_{ol+2+2\text{I}} + (58320 - 112590 \text{ I}) u_{ol+3+2\text{I}} + (142155 - 26325 \text{ I}) u_{ol-3+\text{I}} + (11688300 + 63116820 \text{ I}) u_{ol-2+\text{I}} + (-2423569005 + 660973365 \text{ I}) u_{ol-1+\text{I}} - 9988041960 \text{ I} u_{ol+1} + (2423569005 + 660973365 \text{ I}) u_{ol+1+1}$$

$$+ (-11688300 + 63116820 \text{ I}) u_{ol+2+1} - (142155 + 26325 \text{ I}) u_{ol+3+1} + (-3328 + 6006 \text{ I}) u_{ol-3} + (1584414 - 181818 \text{ I}) u_{ol-2} - (55740204 + 5272722 \text{ I}) u_{ol-1} + 915698200 \text{ I} u_{ol} + (55740204 - 5272722 \text{ I}) u_{ol+1} - (1584414 + 181818 \text{ I}) u_{ol+2} + (3328 + 6006 \text{ I}) u_{ol+3} \big), \quad O(\Delta x_{ol}^{27})$$

Formula:, 288, Var.: 1

Variavel :,  $x_o$  , Derivada de Ordem :, 2

Error order:, 26, Error:,  $4.2500466347538848817 \times 10^{-69}$ , New Error:,  $4.2631784185469245197 \times 10^{-95}$

Error order:, 26, Error:,  $4.2631784185469245197 \times 10^{-95}$ , New Error:,  $4.2644462075611577552 \times 10^{-121}$

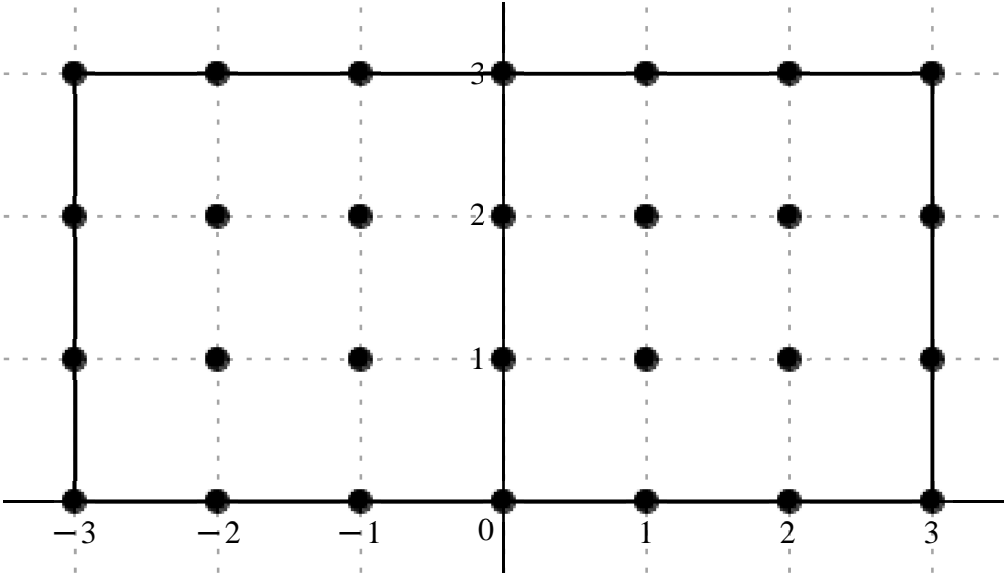
Error order:, 26, Error:,  $4.2644462075611577552 \times 10^{-121}$ , New Error:,  $4.2645725321057009775 \times 10^{-147}$

Error order:, 26, Error:,  $4.2645725321057009775 \times 10^{-147}$ , New Error:,  $4.2645851600161307063 \times 10^{-173}$

Error order:, 26, Error:,  $4.2645851600161307063 \times 10^{-173}$ , New Error:,  $4.2645864227617329782 \times 10^{-199}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & 3 + 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} \\ -3 + \text{ I} & -2 + \text{ I} & -1 + \text{ I} & \text{ I} & 1 + \text{ I} & 2 + \text{ I} & 3 + \text{ I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{43553}{106709850} - \frac{27517 \text{ I}}{213419700} & \frac{1704}{24505} - \frac{13956 \text{ I}}{416585} & -\frac{7773}{5525} + \frac{13137 \text{ I}}{22100} & \frac{476}{117} & -\frac{7773}{5525} - \frac{13137 \text{ I}}{22100} & \frac{1704}{24505} + \frac{13956 \text{ I}}{416585} & -\frac{43553}{106709850} + \frac{27517 \text{ I}}{213419700} \\ \frac{312327}{30827290} - \frac{147501 \text{ I}}{30827290} & -\frac{111051}{256360} - \frac{1126683 \text{ I}}{256360} & -\frac{93231}{850} - \frac{66717 \text{ I}}{850} & -\frac{4167}{10} & -\frac{93231}{850} + \frac{66717 \text{ I}}{850} & -\frac{111051}{256360} + \frac{1126683 \text{ I}}{256360} & \frac{312327}{30827290} + \frac{147501 \text{ I}}{30827290} \\ \frac{20691}{11856650} + \frac{302859 \text{ I}}{23713300} & -\frac{896994}{160225} + \frac{107298 \text{ I}}{160225} & -\frac{648}{17} - \frac{14067 \text{ I}}{68} & \frac{3816}{5} & -\frac{648}{17} + \frac{14067 \text{ I}}{68} & -\frac{896994}{160225} - \frac{107298 \text{ I}}{160225} & \frac{20691}{11856650} - \frac{302859 \text{ I}}{23713300} \\ -\frac{56317}{106709850} - \frac{35131 \text{ I}}{106709850} & \frac{681}{128180} + \frac{18537 \text{ I}}{128180} & \frac{13929}{11050} - \frac{54903 \text{ I}}{11050} & -\frac{260285}{6084} & \frac{13929}{11050} + \frac{54903 \text{ I}}{11050} & \frac{681}{128180} - \frac{18537 \text{ I}}{128180} & -\frac{56317}{106709850} + \frac{35131 \text{ I}}{106709850} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{5548912200 \, \Delta x_{ol}^2} \big( -(2264756 + 715442 \, \mathrm{I}) \, u_{ol-3+3\mathrm{I}} + (385853760 - 185893920 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (-7806641544 + 3298464234 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + 22575061600 \, u_{ol+3\mathrm{I}} - (7806641544 + 3298464234 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (385853760 + 185893920 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} + (-2264756 + 715442 \, \mathrm{I}) \, u_{ol+3+3\mathrm{I}} + (56218860 - 26550180 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} - (2403698895 + 24387053535 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} - (608624274492 + 435537382644 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 2312231713740 \, u_{ol+2\mathrm{I}} + (-608624274492 + 435537382644 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (-2403698895 + 24387053535 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (56218860 + 26550180 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (9683388 + 70869006 \, \mathrm{I}) \, u_{ol-3+1\mathrm{I}} + (-31064696208 + 3715944336 \, \mathrm{I}) \, u_{ol-2+1\mathrm{I}} - (211511476800 + 1147890410550 \, \mathrm{I}) \, u_{ol-1+1\mathrm{I}} + 4234929791040 \, u_{ol+1\mathrm{I}} + (-211511476800 + 1147890410550 \, \mathrm{I}) \, u_{ol+1+1\mathrm{I}} - (31064696208 + 3715944336 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} + (9683388 - 70869006 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} - (2928484 + 1826812 \, \mathrm{I}) \, u_{ol-3} + (29480490 + 802466730 \, \mathrm{I}) \, u_{ol-2} + (6994642356 - 27570310092 \, \mathrm{I}) \, u_{ol-1} - 237392934250 \, u_{ol} + (6994642356 + 27570310092 \, \mathrm{I}) \, u_{ol+1} + (29480490 - 802466730 \, \mathrm{I}) \, u_{ol+2} + (-2928484 + 1826812 \, \mathrm{I}) \, u_{ol+3} \big), \, \mathcal{O}(\, \Delta x_{ol}^{26} \,)$$

Formula.: 289, Var.: 1

Variavel .:  $x_{ol}$  , Derivada de Ordem .: 3

Error order.: 25, Error.: 3.8525513723995889066 × 10<sup>−66</sup>, New Error.: 3.8644118410693221915 × 10<sup>−91</sup>

Error order.: 25, Error.: 3.8644118410693221915 × 10<sup>−91</sup>, New Error.: 3.8655570313260160657 × 10<sup>−116</sup>

Error order.: 25, Error.: 3.8655570313260160657 × 10<sup>−116</sup>, New Error.: 3.8656711413701591337 × 10<sup>−141</sup>

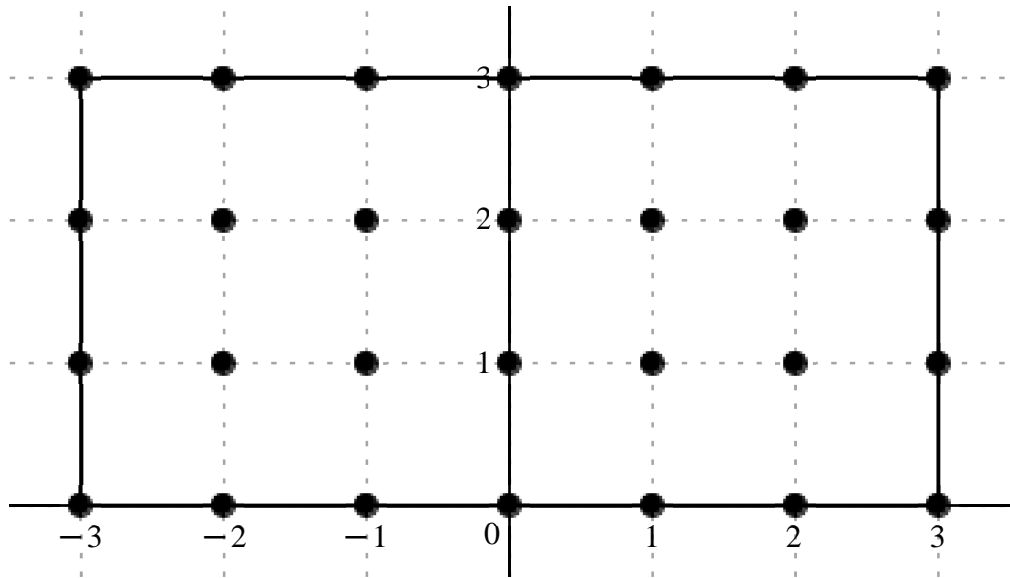
Error order.: 25, Error.: 3.8656711413701591337 × 10<sup>−141</sup>, New Error.: 3.8656825482843493979 × 10<sup>−166</sup>

Error order.: 25, Error.: 3.8656825482843493979 × 10<sup>−166</sup>, New Error.: 3.8656836889348657758 × 10<sup>−191</sup>

$$x_o \neq h \, . \, , \left[ \begin{array}{cccccc} -3+3 \, \mathrm{I} & -2+3 \, \mathrm{I} & -1+3 \, \mathrm{I} & 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & 2+3 \, \mathrm{I} & 3+3 \, \mathrm{I} \\ -3+2 \, \mathrm{I} & -2+2 \, \mathrm{I} & -1+2 \, \mathrm{I} & 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & 3+2 \, \mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} \frac{29907983}{22195648800} - \frac{87481919 \, \mathrm{I}}{22195648800} & \frac{205815}{666536} + \frac{2257683 \, \mathrm{I}}{3332680} & -\frac{63182757}{11492000} - \frac{155382141 \, \mathrm{I}}{11492000} & \frac{78511 \, \mathrm{I}}{2028} & \frac{63182757}{11492000} - \frac{155382141 \, \mathrm{I}}{11492000} & -\frac{205815}{666536} + \frac{2257683 \, \mathrm{I}}{3332680} & -\frac{29907983}{22195648800} - \frac{87481919 \, \mathrm{I}}{22195648800} \\ \frac{668736}{15413645} + \frac{24711147 \, \mathrm{I}}{246618320} & \frac{282386061}{6665360} - \frac{18030357 \, \mathrm{I}}{6665360} & \frac{169420707}{221000} - \frac{448085277 \, \mathrm{I}}{442000} & -\frac{2017539 \, \mathrm{I}}{520} & -\frac{169420707}{221000} - \frac{448085277 \, \mathrm{I}}{442000} & -\frac{282386061}{6665360} - \frac{18030357 \, \mathrm{I}}{6665360} & -\frac{668736}{15413645} + \frac{24711147 \, \mathrm{I}}{246618320} \\ -\frac{1553352147}{12330916000} + \frac{144627021 \, \mathrm{I}}{12330916000} & -\frac{285260643}{83317000} - \frac{4530785949 \, \mathrm{I}}{83317000} & \frac{13670829}{7072} - \frac{1617813 \, \mathrm{I}}{7072} & \frac{1747269 \, \mathrm{I}}{260} & -\frac{13670829}{7072} - \frac{1617813 \, \mathrm{I}}{7072} & \frac{285260643}{83317000} - \frac{4530785949 \, \mathrm{I}}{83317000} & \frac{1553352147}{12330916000} + \frac{144627021 \, \mathrm{I}}{12330916000} \\ \frac{1632227}{462409350} - \frac{56472211 \, \mathrm{I}}{11097824400} & -\frac{9579549}{6665360} - \frac{352689 \, \mathrm{I}}{6665360} & \frac{26718711}{574600} + \frac{22595721 \, \mathrm{I}}{1149200} & -\frac{89313631 \, \mathrm{I}}{304200} & -\frac{26718711}{574600} + \frac{22595721 \, \mathrm{I}}{1149200} & \frac{9579549}{6665360} - \frac{352689 \, \mathrm{I}}{6665360} & -\frac{1632227}{462409350} - \frac{56472211 \, \mathrm{I}}{11097824400} \end{array} \right]$$





$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{1}{110978244000 \Delta x_{ol}^3} \left( (149539915 - 437409595 \operatorname{I}) u_{ol-3+3\operatorname{I}} + (34268197500 + 75180843900 \operatorname{I}) u_{ol-2+3\operatorname{I}} - (610155884349 + 1500525335637 \operatorname{I}) u_{ol-1+3\operatorname{I}} + 4296357453000 \operatorname{I} u_{ol+3\operatorname{I}} + (610155884349 - 1500525335637 \operatorname{I}) u_{ol+1+3\operatorname{I}} + (-34268197500 + 75180843900 \operatorname{I}) u_{ol+2+3\operatorname{I}} - (149539915 + 437409595 \operatorname{I}) u_{ol+3+3\operatorname{I}} \right. \\ + (4814899200 + 11120016150 \operatorname{I}) u_{ol-3+2\operatorname{I}} + (4701727915650 - 300205444050 \operatorname{I}) u_{ol-2+2\operatorname{I}} + (85076979909948 - 112506147519714 \operatorname{I}) u_{ol-1+2\operatorname{I}} - 430582568118300 \operatorname{I} u_{ol+2\operatorname{I}} - (85076979909948 + 112506147519714 \operatorname{I}) u_{ol+1+2\operatorname{I}} - (4701727915650 + 300205444050 \operatorname{I}) u_{ol+2+2\operatorname{I}} + (-4814899200 + 11120016150 \operatorname{I}) u_{ol+3+2\operatorname{I}} \\ + (-13980169323 + 1301643189 \operatorname{I}) u_{ol-3+1\operatorname{I}} - (379967176476 + 6035006884068 \operatorname{I}) u_{ol-2+1\operatorname{I}} + (214531192936125 - 25387732729125 \operatorname{I}) u_{ol-1+1\operatorname{I}} + 745803251598600 \operatorname{I} u_{ol+1\operatorname{I}} - (214531192936125 + 25387732729125 \operatorname{I}) u_{ol+1+1\operatorname{I}} + (379967176476 - 6035006884068 \operatorname{I}) u_{ol+2+1\operatorname{I}} + (13980169323 + 1301643189 \operatorname{I}) u_{ol+3+1\operatorname{I}} + (391734480 \\ - 564722110 \operatorname{I}) u_{ol-3} - (159499490850 + 5872271850 \operatorname{I}) u_{ol-2} + (5160451842540 + 2182068776970 \operatorname{I}) u_{ol-1} - 32583398861420 \operatorname{I} u_{ol} + (-5160451842540 + 2182068776970 \operatorname{I}) u_{ol+1} + (159499490850 - 5872271850 \operatorname{I}) u_{ol+2} - (391734480 + 564722110 \operatorname{I}) u_{ol+3} \Big), \mathcal{O}(\Delta x_{ol}^{25})$$

Formula: 290, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 4

Error order: 24, Error:  $3.2047790832791040629 \times 10^{-63}$ , New Error:  $3.2146117297171749529 \times 10^{-87}$

Error order: 24, Error:  $3.2146117297171749529 \times 10^{-87}$ , New Error:  $3.2155612299004770992 \times 10^{-111}$

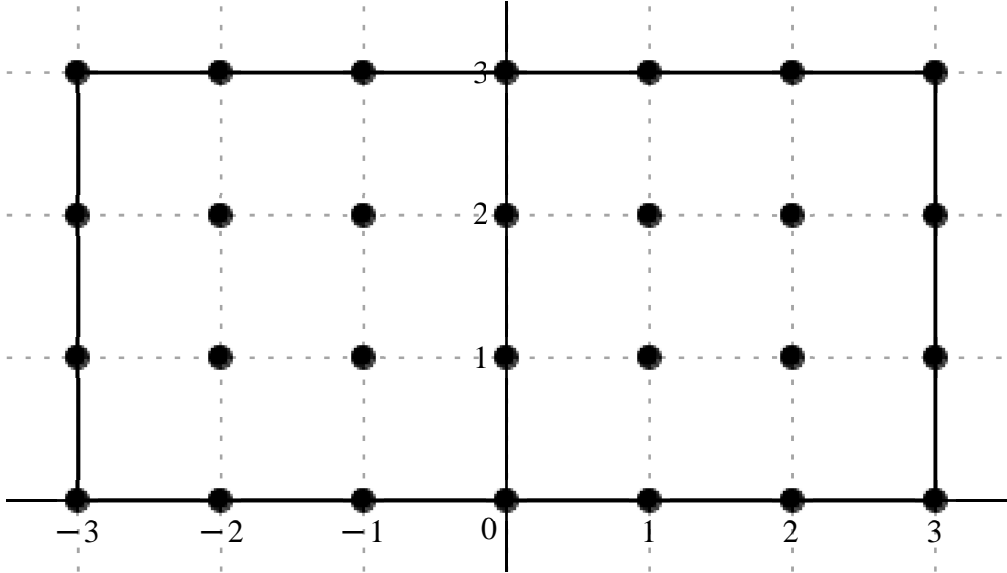
Error order: 24, Error:  $3.2155612299004770992 \times 10^{-111}$ , New Error:  $3.2156558419320688367 \times 10^{-135}$

Error order: 24, Error:  $3.2156558419320688367 \times 10^{-135}$ , New Error:  $3.2156652997550239450 \times 10^{-159}$

Error order: 24, Error:  $3.2156652997550239450 \times 10^{-159}$ , New Error:  $3.2156662455035170791 \times 10^{-183}$

$$x_o \neq h., \left[ \begin{array}{cccccc} -3+3\operatorname{I} & -2+3\operatorname{I} & -1+3\operatorname{I} & 3\operatorname{I} & 1+3\operatorname{I} & 2+3\operatorname{I} & 3+3\operatorname{I} \\ -3+2\operatorname{I} & -2+2\operatorname{I} & -1+2\operatorname{I} & 2\operatorname{I} & 1+2\operatorname{I} & 2+2\operatorname{I} & 3+2\operatorname{I} \\ -3+\operatorname{I} & -2+\operatorname{I} & -1+\operatorname{I} & \operatorname{I} & 1+\operatorname{I} & 2+\operatorname{I} & 3+\operatorname{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} \frac{29128845979}{832336830000} + \frac{10638652393 \text{ I}}{832336830000} & -\frac{5713909}{942500} + \frac{42130349 \text{ I}}{16022500} & \frac{3437522467}{28730000} - \frac{1352028577 \text{ I}}{28730000} & -\frac{77536981}{228150} & \frac{3437522467}{28730000} + \frac{1352028577 \text{ I}}{28730000} & -\frac{5713909}{942500} - \frac{42130349 \text{ I}}{16022500} & \frac{29128845979}{832336830000} - \frac{10638652393 \text{ I}}{832336830000} \\ -\frac{12661899}{13949000} + \frac{42944067 \text{ I}}{118566500} & \frac{62807697}{4901000} + \frac{31259928897 \text{ I}}{83317000} & \frac{9587316249}{1105000} + \frac{947378961 \text{ I}}{138125} & \frac{108751209}{3250} & \frac{9587316249}{1105000} - \frac{947378961 \text{ I}}{138125} & \frac{62807697}{4901000} - \frac{31259928897 \text{ I}}{83317000} & -\frac{12661899}{13949000} - \frac{42944067 \text{ I}}{118566500} \\ -\frac{1893838863}{30827290000} - \frac{35052549471 \text{ I}}{30827290000} & \frac{100595532339}{208292500} - \frac{1401901893 \text{ I}}{208292500} & \frac{500387787}{442000} + \frac{7335422469 \text{ I}}{442000} & -\frac{180577443}{3250} & \frac{500387787}{442000} - \frac{7335422469 \text{ I}}{442000} & \frac{100595532339}{208292500} + \frac{1401901893 \text{ I}}{208292500} & -\frac{1893838863}{30827290000} + \frac{35052549471 \text{ I}}{30827290000} \\ \frac{2074752929}{46240935000} + \frac{7127877659 \text{ I}}{208084207500} & \frac{71531026}{52073125} - \frac{2702022683 \text{ I}}{208292500} & -\frac{3297066517}{14365000} + \frac{1369855661 \text{ I}}{3591250} & \frac{603364993}{292500} & -\frac{3297066517}{14365000} - \frac{1369855661 \text{ I}}{3591250} & \frac{71531026}{52073125} + \frac{2702022683 \text{ I}}{208292500} & \frac{2074752929}{46240935000} - \frac{7127877659 \text{ I}}{208084207500} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \; u(x_{ol}) = \frac{1}{832336830000 \; \mathcal{A}x_{ol}^4} \Big( (29128845979 + 10638652393 \; \mathrm{I}) \; u_{ol-3+3\mathrm{I}} + (-5046044460444 + 2188587369852 \; \mathrm{I}) \; u_{ol-2+3\mathrm{I}} + (99588463391457 - 39169619904267 \; \mathrm{I}) \; u_{ol-1+3\mathrm{I}} - 282870414084200 \; u_{ol+3\mathrm{I}} + (99588463391457 + 39169619904267 \; \mathrm{I}) \; u_{ol+1+3\mathrm{I}} - (5046044460444 + 2188587369852 \; \mathrm{I}) \; u_{ol+2+3\mathrm{I}} + (29128845979 \\ - 10638652393 \; \mathrm{I}) \; u_{ol+3+3\mathrm{I}} + (-755535513330 + 301467350340 \; \mathrm{I}) \; u_{ol-3+2\mathrm{I}} + (10666631181510 + 312286689681030 \; \mathrm{I}) \; u_{ol-2+2\mathrm{I}} + (7221607615294254 + 5708875302859248 \; \mathrm{I}) \; u_{ol-1+2\mathrm{I}} + 27851580479300760 \; u_{ol+2\mathrm{I}} + (7221607615294254 - 5708875302859248 \; \mathrm{I}) \; u_{ol+1+2\mathrm{I}} + (10666631181510 - 312286689681030 \; \mathrm{I}) \; u_{ol+2+2\mathrm{I}} \\ - (755535513330 + 301467350340 \; \mathrm{I}) \; u_{ol+3+2\mathrm{I}} - (51133649301 + 946418835717 \; \mathrm{I}) \; u_{ol-3+1\mathrm{I}} + (401979747226644 - 5601999964428 \; \mathrm{I}) \; u_{ol-2+1\mathrm{I}} + (942287747516505 + 13813444082710935 \; \mathrm{I}) \; u_{ol-1+1\mathrm{I}} - 46246540454192520 \; u_{ol+1\mathrm{I}} + (942287747516505 - 13813444082710935 \; \mathrm{I}) \; u_{ol+1+1\mathrm{I}} + (401979747226644 \\ + 5601999964428 \; \mathrm{I}) \; u_{ol+2+1\mathrm{I}} + (-51133649301 + 946418835717 \; \mathrm{I}) \; u_{ol+3+1\mathrm{I}} + (37345552722 + 28511510636 \; \mathrm{I}) \; u_{ol-3} + (1143351919584 - 10797282641268 \; \mathrm{I}) \; u_{ol-2} + (-191038628128014 + 317488706838648 \; \mathrm{I}) \; u_{ol-1} + 1716933010620828 \; u_{ol} - (191038628128014 + 317488706838648 \; \mathrm{I}) \; u_{ol+1} + (1143351919584 \\ + 10797282641268 \; \mathrm{I}) \; u_{ol+2} + (37345552722 - 28511510636 \; \mathrm{I}) \; u_{ol+3} \Big), \; O(\; \mathcal{A}x_{ol}^{24} \; )$$

Formula:; 291, Var:; 1

Variavel :; x<sub>ol</sub>, Derivada de Ordem :; 5

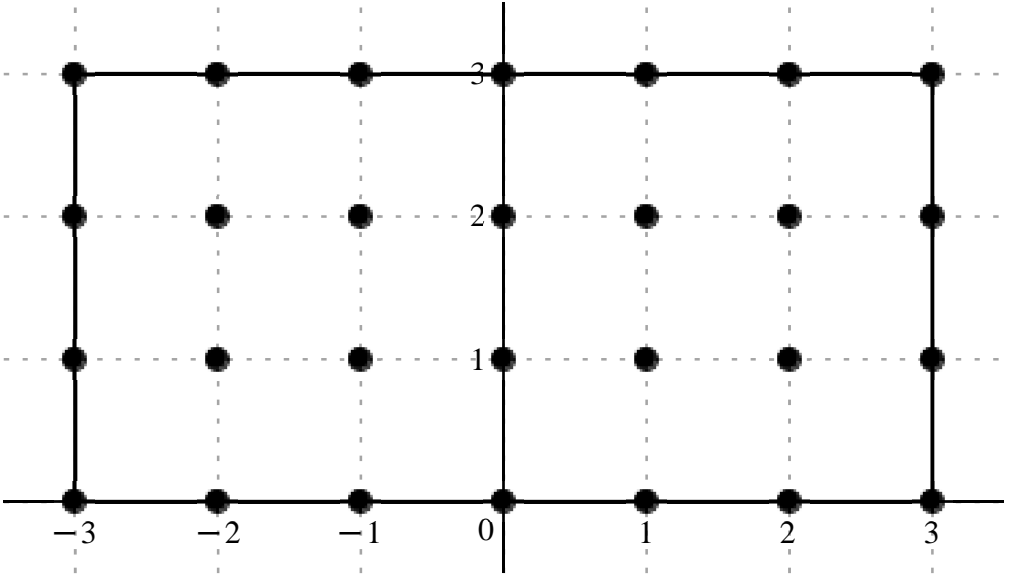
Error order:; 23, Error:; 2.5586800468365576541 × 10<sup>−60</sup>, New Error:; 2.5665043826018251490 × 10<sup>−83</sup>

Error order:; 23, Error:; 2.5665043826018251490 × 10<sup>−83</sup>, New Error:; 2.5672600299896694257 × 10<sup>−106</sup>

Error order:; 23, Error:; 2.5672600299896694257 × 10<sup>−106</sup>, New Error:; 2.5673353265960391488 × 10<sup>−129</sup>

*Error order: 23,    Error:  $2.5673353265960391488 \times 10^{-129}$ ,    New Error:  $2.5673428535750857433 \times 10^{-152}$*   
*Error order: 23,    Error:  $2.5673428535750857433 \times 10^{-152}$ ,    New Error:  $2.5673436062461742332 \times 10^{-175}$*

$$c = \left[ \begin{array}{cccccccc} -\frac{961990672177}{8323368300000} + \frac{7453525807693 \text{ I}}{24970104900000} & -\frac{449066666643}{2082925000} - \frac{108505470571 \text{ I}}{2082925000} & \frac{111563112281}{287300000} + \frac{292478336967 \text{ I}}{287300000} & -\frac{19654385677 \text{ I}}{6844500} - \frac{111563112281}{287300000} + \frac{292478336967 \text{ I}}{287300000} & \frac{449066666643}{2082925000} - \frac{108505470571 \text{ I}}{2082925000} & \frac{961990672177}{8323368300000} + \frac{7453525807693 \text{ I}}{24970104900000} \\ -\frac{44725091319}{15413645000} - \frac{242961193881 \text{ I}}{30827290000} & -\frac{2658126804183}{833170000} + \frac{19466478261 \text{ I}}{833170000} & -\frac{32511478527}{552500} + \frac{158273784171 \text{ I}}{2210000} & \frac{18093674277 \text{ I}}{65000} - \frac{32511478527}{552500} + \frac{158273784171 \text{ I}}{2210000} & \frac{2658126804183}{833170000} + \frac{19466478261 \text{ I}}{833170000} & \frac{44725091319}{15413645000} - \frac{242961193881 \text{ I}}{30827290000} \\ \frac{35645429691}{3626740000} - \frac{10604686359 \text{ I}}{61654580000} & -\frac{52217412237}{416585000} + \frac{1710446555781 \text{ I}}{416585000} & -\frac{605654878941}{4420000} + \frac{15885856143 \text{ I}}{4420000} & -\frac{14502362577 \text{ I}}{32500} - \frac{605654878941}{4420000} + \frac{15885856143 \text{ I}}{4420000} & \frac{52217412237}{416585000} + \frac{1710446555781 \text{ I}}{416585000} & -\frac{35645429691}{3626740000} - \frac{10604686359 \text{ I}}{61654580000} \\ -\frac{17773139023}{56238975000} + \frac{127646688001 \text{ I}}{337433850000} & \frac{464162234249}{4165850000} + \frac{80194919787 \text{ I}}{4165850000} & -\frac{51947974677}{17956250} - \frac{328877346563 \text{ I}}{143650000} & \frac{200903789471 \text{ I}}{13689000} - \frac{51947974677}{17956250} - \frac{328877346563 \text{ I}}{143650000} & -\frac{464162234249}{4165850000} + \frac{80194919787 \text{ I}}{4165850000} & \frac{17773139023}{56238975000} + \frac{127646688001 \text{ I}}{337433850000} \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^5} u(x_{ol}) = \frac{1}{24970104900000 \Delta x_{ol}^5} \Big( (-2885972016531 + 7453525807693 \text{ I}) u_{ol-3+3\text{I}} - (538341119716284 + 1300763581205148 \text{ I}) u_{ol-2+3\text{I}} + (9696284777678553 + 25420169700812871 \text{ I}) u_{ol-1+3\text{I}} - 71703129826831400 \text{ I} u_{ol+3\text{I}} + (-9696284777678553 + 25420169700812871 \text{ I}) u_{ol+1+3\text{I}} + (538341119716284$$

$$- 1300763581205148 \text{ I}) u_{ol+2+3\text{I}} + (2885972016531 + 7453525807693 \text{ I}) u_{ol+3+3\text{I}} - (72454647936780 + 196798567043610 \text{ I}) u_{ol-3+2\text{I}} + (-79664060321364510 + 583410353482170 \text{ I}) u_{ol-2+2\text{I}} + (-1469348469272918520 + 1788286422475035990 \text{ I}) u_{ol-1+2\text{I}} + 6950783764971102420 \text{ I} u_{ol+2\text{I}} + (1469348469272918520$$

$$+ 1788286422475035990 \text{ I}) u_{ol+1+2\text{I}} + (79664060321364510 + 583410353482170 \text{ I}) u_{ol+2+2\text{I}} + (72454647936780 - 196798567043610 \text{ I}) u_{ol+3+2\text{I}} + (245418783422535 - 4294897975395 \text{ I}) u_{ol-3+1\text{I}} + (-3129911689485780 + 102524166553513140 \text{ I}) u_{ol-2+1\text{I}} + (-3421553362070943645 + 89744681972176335 \text{ I}) u_{ol-1+1\text{I}}$$

$$- 11142323533708440840 \text{ I} u_{ol+1\text{I}} + (3421553362070943645 + 89744681972176335 \text{ I}) u_{ol+1+1\text{I}} + (3129911689485780 + 102524166553513140 \text{ I}) u_{ol+2+1\text{I}} - (245418783422535 + 4294897975395 \text{ I}) u_{ol+3+1\text{I}} + (-7891273726212 + 9445854912074 \text{ I}) u_{ol-3\text{I}} + (2782188432088506 + 480688349203278 \text{ I}) u_{ol-2\text{I}} - (72239269169633616$$

$$+ 57167433643660038 \text{ I}) u_{ol-1\text{I}} + 366468602374051100 \text{ I} u_{ol\text{I}} + (72239269169633616 - 57167433643660038 \text{ I}) u_{ol+1\text{I}} + (-2782188432088506 + 480688349203278 \text{ I}) u_{ol+2\text{I}} + (7891273726212 + 9445854912074 \text{ I}) u_{ol+3\text{I}} \Big), \quad O(\Delta x_{ol}^{23})$$

Formula.: 292, Var.: 1

Variavel .:  $x_{oi}$  , Derivada de Ordem .: 6

Error order.: 22, Error.:  $1.9859650807782683535 \times 10^{-57}$ , New Error.:  $1.9920177164945206813 \times 10^{-79}$

Error order.: 22, Error.:  $1.9920177164945206813 \times 10^{-79}$ , New Error.:  $1.9926023228107866996 \times 10^{-101}$

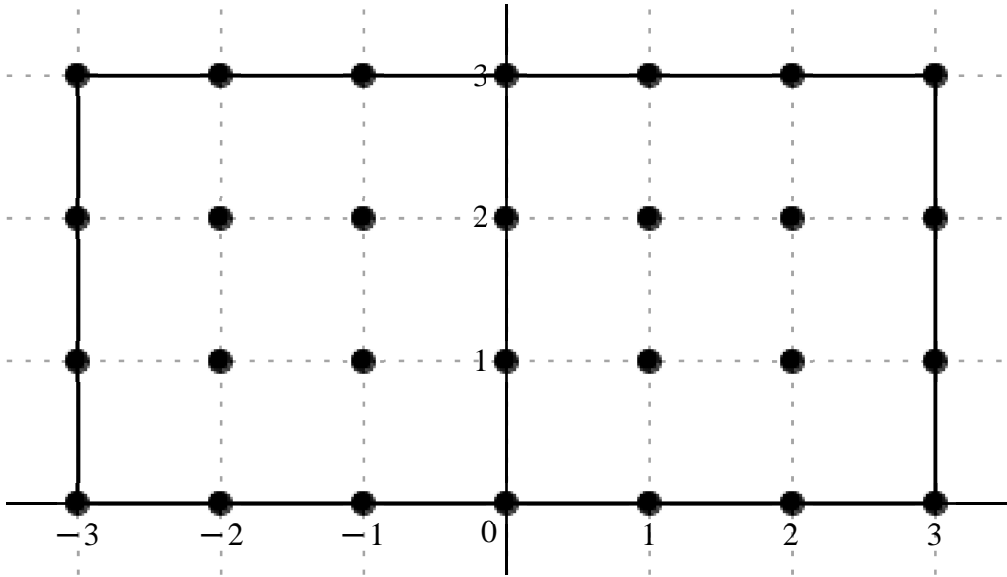
Error order.: 22, Error.:  $1.9926023228107866996 \times 10^{-101}$ , New Error.:  $1.9926605766619201874 \times 10^{-123}$

Error order.: 22, Error.:  $1.9926605766619201874 \times 10^{-123}$ , New Error.:  $1.9926663999790239575 \times 10^{-145}$

Error order.: 22, Error.:  $1.9926663999790239575 \times 10^{-145}$ , New Error.:  $1.9926669822900540344 \times 10^{-167}$

$$x_o + h . , \left[ \begin{array}{cccccc} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & 3 + 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{457666389599}{184963740000} - \frac{112269529363 \text{ I}}{110978244000} & \frac{2718107008777}{6248775000} - \frac{63167990033 \text{ I}}{367575000} & -\frac{7260293529737}{861900000} + \frac{2688270187091 \text{ I}}{861900000} & \frac{460384667}{19500} & -\frac{7260293529737}{861900000} - \frac{2688270187091 \text{ I}}{861900000} & \frac{2718107008777}{6248775000} + \frac{63167990033 \text{ I}}{367575000} & -\frac{457666389599}{184963740000} + \frac{112269529363 \text{ I}}{110978244000} \\ \frac{2047707361337}{30827290000} - \frac{346860352323 \text{ I}}{15413645000} & \frac{5884142841}{12252500} - \frac{5489649588219 \text{ I}}{208292500} & -\frac{1272221926299}{2210000} - \frac{270810270993 \text{ I}}{552500} & -\frac{3665569166}{1625} & -\frac{1272221926299}{2210000} + \frac{270810270993 \text{ I}}{552500} & \frac{5884142841}{12252500} + \frac{5489649588219 \text{ I}}{208292500} & \frac{2047707361337}{30827290000} + \frac{346860352323 \text{ I}}{15413645000} \\ -\frac{1424523277}{948532000} + \frac{78152421051 \text{ I}}{948532000} & -\frac{2819069858169}{83317000} - \frac{8230831977 \text{ I}}{3332680} & \frac{56488100013}{4420000} - \frac{285912822597 \text{ I}}{260000} & \frac{113889614009}{32500} & \frac{56488100013}{4420000} + \frac{285912822597 \text{ I}}{260000} & -\frac{2819069858169}{83317000} + \frac{8230831977 \text{ I}}{3332680} & -\frac{1424523277}{948532000} - \frac{78152421051 \text{ I}}{948532000} \\ -\frac{4279722404621}{1387228050000} - \frac{1953418886909 \text{ I}}{693614025000} & -\frac{26645515211}{120168750} + \frac{55448927306 \text{ I}}{60084375} & \frac{1777366975957}{86190000} - \frac{111838602284 \text{ I}}{5386875} & -\frac{39785237923}{380250} & \frac{1777366975957}{86190000} + \frac{111838602284 \text{ I}}{5386875} & -\frac{26645515211}{120168750} - \frac{55448927306 \text{ I}}{60084375} & -\frac{4279722404621}{1387228050000} + \frac{1953418886909 \text{ I}}{693614025000} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{oi}^6} u(x_{oi}) = \frac{1}{2774456100000 \Delta x_{oi}^6} \big( (-6864995843985 + 2806738234075 \text{ I}) u_{oi-3+31} + (1206839511896988 - 476791988769084 \text{ I}) u_{oi-2+31} + (-23370884872223403 + 8653541732245929 \text{ I}) u_{oi-1+31} + 65503438343826600 u_{oi+31} - (23370884872223403 + 8653541732245929 \text{ I}) u_{oi+1+31} + (1206839511896988$$

$$+ 476791988769084 \text{ I}) u_{oi+2+31} + (-6864995843985 + 2806738234075 \text{ I}) u_{oi+3+31} + (184293662520330 - 62434863418140 \text{ I}) u_{oi-3+21} + (1332405304916040 - 73122132515077080 \text{ I}) u_{oi-2+21} - (1597160128495027590 + 1359911689229288520 \text{ I}) u_{oi-1+21} - 6258437373895761600 u_{oi+21} + (-1597160128495027590$$

$$+ 1359911689229288520 \text{ I}) u_{oi+1+21} + (1332405304916040 + 73122132515077080 \text{ I}) u_{oi+2+21} + (184293662520330 + 62434863418140 \text{ I}) u_{oi+3+21} + (-4166730585225 + 228595831574175 \text{ I}) u_{oi-3+1} - (93875026277027700 + 6852167620852500 \text{ I}) u_{oi-2+1} + (35457862818660165 - 3050971441240248045 \text{ I}) u_{oi-1+1}$$

$$+ 9722514901966630920 \, u_{ol+1} + (35457862818660165 + 3050971441240248045 \, \text{I}) \, u_{ol+1+1} + ( -93875026277027700 + 6852167620852500 \, \text{I}) \, u_{ol+2+1} - (4166730585225 + 228595831574175 \, \text{I}) \, u_{ol+3+1} - (8559444809242 + 7813675547636 \, \text{I}) \, u_{ol-3} + ( -615191655191568 + 2560409667281856 \, \text{I}) \, u_{ol-2} + (57213442956055830 - 57601353720351360 \, \text{I}) \, u_{ol-1} - 290289009981377200 \, u_{ol} + (57213442956055830 + 57601353720351360 \, \text{I}) \, u_{ol+1} - (615191655191568 + 2560409667281856 \, \text{I}) \, u_{ol+2} + ( -8559444809242 + 7813675547636 \, \text{I}) \, u_{ol+3}), \, O( \, \Delta x_{ol}^{22} \, )$$

Formula:, 293, Var:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 7

Error order:, 21, Error:, 1.5016445340138283047 × 10<sup>−54</sup>, New Error:, 1.5062050887470249558 × 10<sup>−75</sup>

Error order:, 21, Error:, 1.5062050887470249558 × 10<sup>−75</sup>, New Error:, 1.5066456289626412257 × 10<sup>−96</sup>

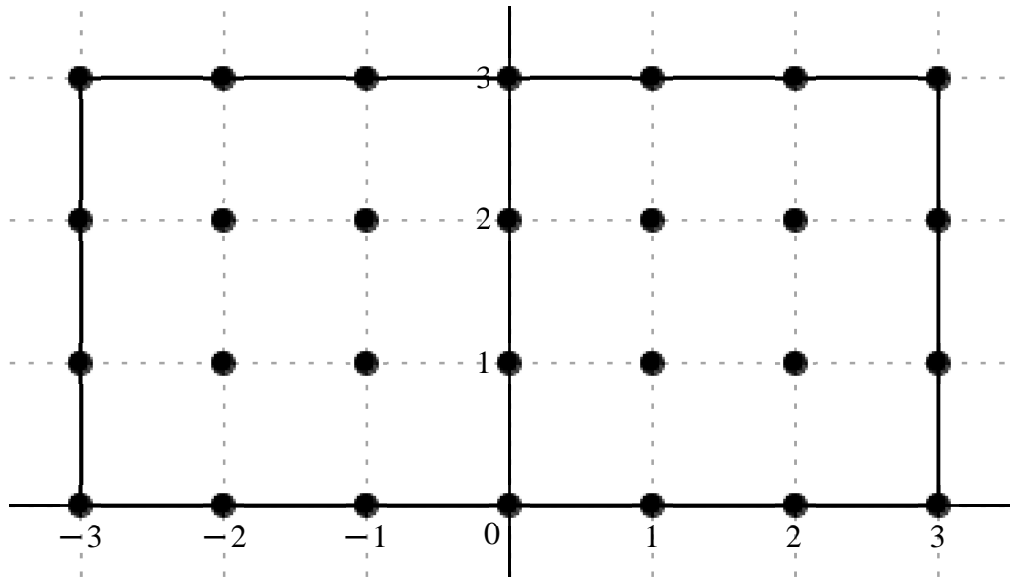
Error order:, 21, Error:, 1.5066456289626412257 × 10<sup>−96</sup>, New Error:, 1.5066895276759792211 × 10<sup>−117</sup>

Error order:, 21, Error:, 1.5066895276759792211 × 10<sup>−117</sup>, New Error:, 1.5066939159940775934 × 10<sup>−138</sup>

Error order:, 21, Error:, 1.5066939159940775934 × 10<sup>−138</sup>, New Error:, 1.5066943548103549234 × 10<sup>−159</sup>

$$x_o \, + h \, . \, , \left[ \begin{array}{cccccc} -3 + 3 \, \text{I} & -2 + 3 \, \text{I} & -1 + 3 \, \text{I} & 3 \, \text{I} & 1 + 3 \, \text{I} & 2 + 3 \, \text{I} & 3 + 3 \, \text{I} \\ -3 + 2 \, \text{I} & -2 + 2 \, \text{I} & -1 + 2 \, \text{I} & 2 \, \text{I} & 1 + 2 \, \text{I} & 2 + 2 \, \text{I} & 3 + 2 \, \text{I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccccccc} \frac{23858071573217}{2774456100000} - \frac{41527384131947 \, \text{I}}{2080842075000} & \frac{8320346823439}{6248775000} + \frac{22087445616803 \, \text{I}}{6248775000} & - \frac{21021046998847}{861900000} - \frac{29243656203727 \, \text{I}}{430950000} & \frac{431308316831 \, \text{I}}{2281500} & \frac{21021046998847}{861900000} - \frac{29243656203727 \, \text{I}}{430950000} & - \frac{8320346823439}{6248775000} + \frac{22087445616803 \, \text{I}}{6248775000} & - \frac{23858071573217}{2774456100000} - \frac{41527384131947 \, \text{I}}{2080842075000} \\ \frac{5199739617387}{30827290000} + \frac{8391017335897 \, \text{I}}{15413645000} & \frac{88214329475601}{416585000} + \frac{3824847124833 \, \text{I}}{416585000} & \frac{516112683429}{130000} - \frac{622503813981 \, \text{I}}{138125} & - \frac{578900154763 \, \text{I}}{32500} & - \frac{516112683429}{130000} - \frac{622503813981 \, \text{I}}{138125} & - \frac{88214329475601}{416585000} + \frac{3824847124833 \, \text{I}}{416585000} & - \frac{5199739617387}{30827290000} + \frac{8391017335897 \, \text{I}}{15413645000} \\ - \frac{41366077219551}{61654580000} - \frac{140505606283 \, \text{I}}{3853411250} & \frac{762463678053}{24505000} - \frac{112735099214913 \, \text{I}}{416585000} & \frac{37932818466711}{4420000} + \frac{887642329791 \, \text{I}}{2210000} & \frac{873752694703 \, \text{I}}{32500} & - \frac{37932818466711}{4420000} + \frac{887642329791 \, \text{I}}{2210000} & - \frac{762463678053}{24505000} - \frac{112735099214913 \, \text{I}}{416585000} & \frac{41366077219551}{61654580000} - \frac{140505606283 \, \text{I}}{3853411250} \\ \frac{912191019733}{37492650000} - \frac{171144586193 \, \text{I}}{7029871875} & - \frac{46115406010961}{6248775000} - \frac{14334979564703 \, \text{I}}{6248775000} & \frac{61444675306189}{430950000} + \frac{37163238614201 \, \text{I}}{215475000} & - \frac{1690272671423 \, \text{I}}{2281500} & - \frac{61444675306189}{430950000} + \frac{37163238614201 \, \text{I}}{215475000} & \frac{46115406010961}{6248775000} - \frac{14334979564703 \, \text{I}}{6248775000} & - \frac{912191019733}{37492650000} - \frac{171144586193 \, \text{I}}{7029871875} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{8323368300000 \, \Delta x_{ol}^7} \big( 7 \, \big( (10224887817093 - 23729933789684 \, \mathrm{I}) \, u_{ol-3+3\mathrm{I}} + (1583243138402964 + 4202925365940228 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} - (29000035838266497 + 80687425131254754 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + 224785571637550600 \, \mathrm{I} u_{ol+3\mathrm{I}} + (29000035838266497 - 80687425131254754 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + ( -1583243138402964$$

$$+ 4202925365940228 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} - (10224887817093 + 23729933789684 \, \mathrm{I}) \, u_{ol+3+3\mathrm{I}} + (200561385242070 + 647307051626340 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + (251788900417501140 + 10917206507737620 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (4720654888440520770 - 5358840089896369440 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 21179776690195376760 \, \mathrm{I} u_{ol+2\mathrm{I}} - (4720654888440520770$$

$$+ 5358840089896369440 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + ( -251788900417501140 + 10917206507737620 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + ( -200561385242070 + 647307051626340 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} - (797774346377055 + 43356015653040 \, \mathrm{I}) \, u_{ol-3+\mathrm{I}} + (36996916126783140 - 321778183187708820 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} + (10204551349562926395 + 477580738818393990 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}}$$

$$+ 31967320796178145560 \, \mathrm{I} u_{ol+\mathrm{I}} + ( -10204551349562926395 + 477580738818393990 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} - (36996916126783140 + 321778183187708820 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} + (797774346377055 - 43356015653040 \, \mathrm{I}) \, u_{ol+3+\mathrm{I}} + (28929486625818 - 28947884293216 \, \mathrm{I}) \, u_{ol-3} - (8775102972371436 + 2727741825740628 \, \mathrm{I}) \, u_{ol-2}$$

$$+ (169534636980533478 + 205077368741336604 \, \mathrm{I}) \, u_{ol-1} - 880921822840769800 \, \mathrm{I} u_{ol} + ( -169534636980533478 + 205077368741336604 \, \mathrm{I}) \, u_{ol+1} + (8775102972371436 - 2727741825740628 \, \mathrm{I}) \, u_{ol+2} - (28929486625818 + 28947884293216 \, \mathrm{I}) \, u_{ol+3} \big) \big) , \, O( \, \Delta x_{ol}^{21} \, )$$

Formula.: 294, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 8

Error order.: 20, Error.: 1.1047279752758067475 × 10<sup>−51</sup>, New Error.: 1.1080706144950035034 × 10<sup>−71</sup>

Error order.: 20, Error.: 1.1080706144950035034 × 10<sup>−71</sup>, New Error.: 1.1083935448516258689 × 10<sup>−91</sup>

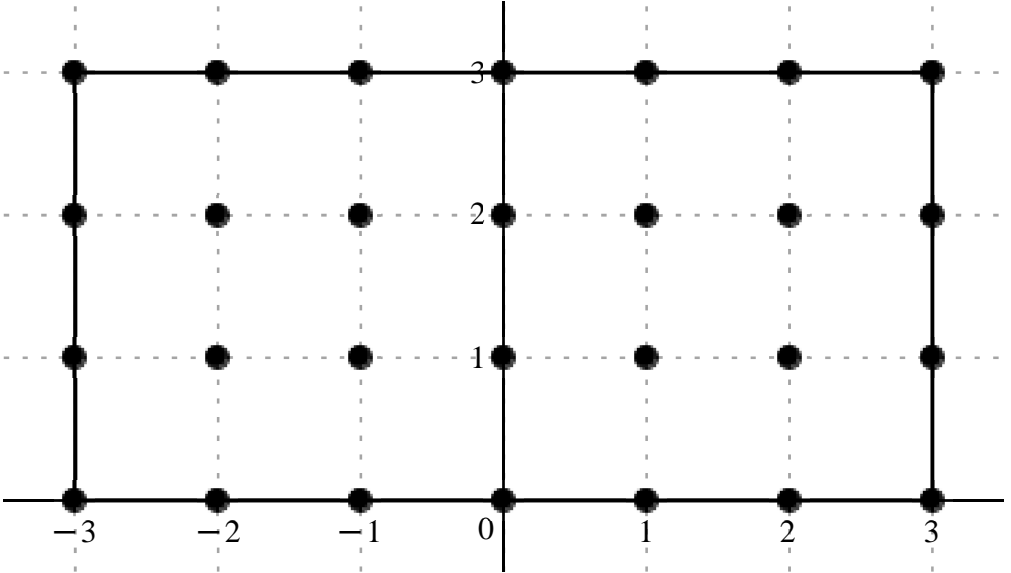
Error order.: 20, Error.: 1.1083935448516258689 × 10<sup>−91</sup>, New Error.: 1.1084257244383455912 × 10<sup>−111</sup>

Error order.: 20, Error.: 1.1084257244383455912 × 10<sup>−111</sup>, New Error.: 1.1084289412624166298 × 10<sup>−131</sup>

Error order.: 20, Error.: 1.1084289412624166298 × 10<sup>−131</sup>, New Error.: 1.1084292629334776130 × 10<sup>−151</sup>

$$x_o \neq h. . \left[ \begin{array}{cccccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} & 1+3\,\mathrm{I} & 2+3\,\mathrm{I} & 3+3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & 3+2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cc} \frac{4337475674819}{27744561000} + \frac{1967695520539 \text{ I}}{27744561000} & -\frac{22355982096}{801125} + \frac{8014328056 \text{ I}}{801125} & \frac{1526336955969}{2873000} - \frac{532270277777 \text{ I}}{2873000} & -\frac{279769856576}{190125} & \frac{1526336955969}{2873000} + \frac{532270277777 \text{ I}}{2873000} & -\frac{22355982096}{801125} - \frac{8014328056 \text{ I}}{801125} & \frac{4337475674819}{27744561000} - \frac{1967695520539 \text{ I}}{27744561000} \\ -\frac{128392337773}{29641625} + \frac{7213496934 \text{ I}}{5928325} & -\frac{1176983308977}{10414625} + \frac{3440511726267 \text{ I}}{2082925} & \frac{947364650967}{27625} + \frac{862408198596 \text{ I}}{27625} & \frac{222274503332}{1625} & \frac{947364650967}{27625} - \frac{862408198596 \text{ I}}{27625} & -\frac{1176983308977}{10414625} - \frac{3440511726267 \text{ I}}{2082925} & -\frac{128392337773}{29641625} - \frac{7213496934 \text{ I}}{5928325} \\ \frac{1493460335479}{3082729000} - \frac{16330530998523 \text{ I}}{3082729000} & \frac{21836062706304}{10414625} + \frac{3429514621848 \text{ I}}{10414625} & -\frac{1146525144303}{221000} + \frac{574799145501 \text{ I}}{8840} & -\frac{326607990688}{1625} & -\frac{1146525144303}{221000} - \frac{574799145501 \text{ I}}{8840} & \frac{21836062706304}{10414625} - \frac{3429514621848 \text{ I}}{10414625} & \frac{1493460335479}{3082729000} + \frac{16330530998523 \text{ I}}{3082729000} \\ \frac{642666186463}{3468070125} + \frac{705938882152 \text{ I}}{3468070125} & \frac{45711329748}{2082925} - \frac{591811022614 \text{ I}}{10414625} & -\frac{488510560041}{359125} + \frac{338358003046 \text{ I}}{359125} & \frac{15135898358}{2925} & -\frac{488510560041}{359125} - \frac{338358003046 \text{ I}}{359125} & \frac{45711329748}{2082925} + \frac{591811022614 \text{ I}}{10414625} & \frac{642666186463}{3468070125} - \frac{705938882152 \text{ I}}{3468070125} \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{27744561000 \, \Delta x_{ol}^8} \, (7 \, ((619639382117 + 281099360077 \, \text{I}) \, u_{ol-3+3\text{I}} + (-110604624564096 + 39650315605056 \, \text{I}) \, u_{ol-2+3\text{I}} + (2105690854827519 - 734304867498927 \, \text{I}) \, u_{ol-1+3\text{I}} - 5832322232917504 \, u_{ol+3\text{I}} + (2105690854827519 + 734304867498927 \, \text{I}) \, u_{ol+1+3\text{I}} - (110604624564096 + 39650315605056 \, \text{I}) \, u_{ol+2+3\text{I}}$$

$$+ (619639382117 - 281099360077 \, \text{I}) \, u_{ol+3+3\text{I}} + (-17167889736504 + 4822737950160 \, \text{I}) \, u_{ol-3+2\text{I}} + (-447926219302104 + 6546802313410920 \, \text{I}) \, u_{ol-2+2\text{I}} + (135923549310912168 + 123734385897074784 \, \text{I}) \, u_{ol-1+2\text{I}} + 542145803643022176 \, u_{ol+2\text{I}} + (135923549310912168 - 123734385897074784 \, \text{I}) \, u_{ol+1+2\text{I}}$$

$$- (447926219302104 + 6546802313410920 \, \text{I}) \, u_{ol+2+2\text{I}} - (17167889736504 + 4822737950160 \, \text{I}) \, u_{ol+3+2\text{I}} + (1920163288473 - 20996396998101 \, \text{I}) \, u_{ol-3+1\text{I}} + (8310181578513408 + 1305175278943296 \, \text{I}) \, u_{ol-2+1\text{I}} + (-20562273305848989 + 257717355447646575 \, \text{I}) \, u_{ol-1+1\text{I}} - 796623764459837184 \, u_{ol+1\text{I}} - (20562273305848989$$

$$+ 257717355447646575 \, \text{I}) \, u_{ol+1+1\text{I}} + (8310181578513408 - 1305175278943296 \, \text{I}) \, u_{ol+2+1\text{I}} + (1920163288473 + 20996396998101 \, \text{I}) \, u_{ol+3+1\text{I}} + (734475641672 + 806787293888 \, \text{I}) \, u_{ol-3\text{I}} + (86982130320480 - 225226366320528 \, \text{I}) \, u_{ol-2\text{I}} + (-5391481689503928 + 3734312269045968 \, \text{I}) \, u_{ol-1\text{I}} + 20509834201872080 \, u_{ol}$$

$$- (5391481689503928 + 3734312269045968 \, \text{I}) \, u_{ol+1\text{I}} + (86982130320480 + 225226366320528 \, \text{I}) \, u_{ol+2\text{I}} + (734475641672 - 806787293888 \, \text{I}) \, u_{ol+3\text{I}})), \, O(\, \Delta x_{ol}^{20} \, )$$

Formula:; 295, Var:; 1

Variavel :; x<sub>ol</sub>, Derivada de Ordem :; 9

Error order:; 19, Error:; 7.8916346774572997415 × 10<sup>−49</sup>, New Error:; 7.9154179214682479886 × 10<sup>−68</sup>

Error order:; 19, Error:; 7.9154179214682479886 × 10<sup>−68</sup>, New Error:; 7.9177158950073947386 × 10<sup>−87</sup>

Error order:; 19, Error:; 7.9177158950073947386 × 10<sup>−87</sup>, New Error:; 7.9179448880525459216 × 10<sup>−106</sup>

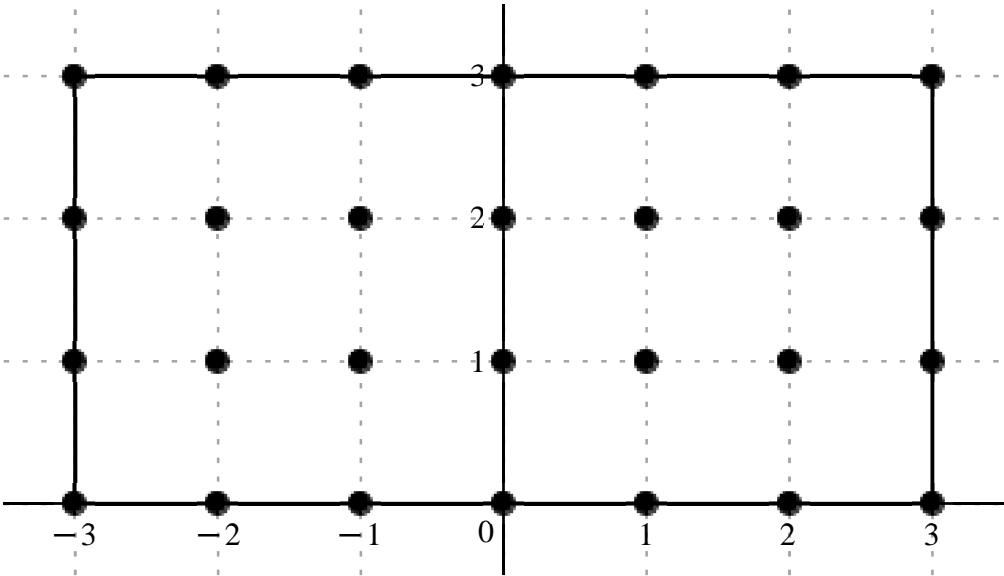
*Error order:.* 19, *Error:.*  $7.9179448880525459216 \times 10^{-106}$ , *New Error:.*  $7.9179677793131857928 \times 10^{-125}$   
*Error order:.* 19, *Error:.*  $7.9179677793131857928 \times 10^{-125}$ , *New Error:.*  $7.9179700683588102410 \times 10^{-144}$

$$x_o + h.$$

$$\begin{bmatrix} -3+3\text{ I} & -2+3\text{ I} & -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & 2+3\text{ I} & 3+3\text{ I} \\ -3+2\text{ I} & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I} \\ -3+\text{ I} & -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} & 3+\text{ I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{bmatrix}$$

$$c =,$$

$$\begin{bmatrix} -\frac{4365236381177}{7706822500} + \frac{54876309648391\text{ I}}{46240935000} & -\frac{3785293127511}{52073125} - \frac{11121205836447\text{ I}}{52073125} & \frac{2449117124748}{1795625} + \frac{57938371983513\text{ I}}{14365000} & -\frac{704063536694\text{ I}}{63375} & -\frac{2449117124748}{1795625} + \frac{57938371983513\text{ I}}{14365000} & \frac{3785293127511}{52073125} - \frac{11121205836447\text{ I}}{52073125} & \frac{4365236381177}{7706822500} + \frac{54876309648391\text{ I}}{46240935000} \\ -\frac{3240238758057}{385341125} - \frac{25728033281139\text{ I}}{770682250} & -\frac{259961232144537}{20829250} - \frac{1429458002217\text{ I}}{1225250} & -\frac{6569637342282}{27625} + \frac{13981456454553\text{ I}}{55250} & \frac{331222979367\text{ I}}{325} & -\frac{6569637342282}{27625} + \frac{13981456454553\text{ I}}{55250} & \frac{259961232144537}{20829250} - \frac{1429458002217\text{ I}}{1225250} & \frac{3240238758057}{385341125} - \frac{25728033281139\text{ I}}{770682250} \\ \frac{62356543967151}{1541364500} + \frac{16184817775791\text{ I}}{3082729000} & -\frac{32591446995933}{10414625} + \frac{163513197598149\text{ I}}{10414625} & -\frac{13186855457811}{27625} - \frac{11691237806577\text{ I}}{221000} & -\frac{2373228407466\text{ I}}{1625} & \frac{13186855457811}{27625} - \frac{11691237806577\text{ I}}{221000} & \frac{32591446995933}{10414625} + \frac{163513197598149\text{ I}}{10414625} & -\frac{62356543967151}{1541364500} + \frac{16184817775791\text{ I}}{3082729000} \\ -\frac{3169954883081}{1926705625} + \frac{15667162563017\text{ I}}{11560233750} & \frac{43727404097223}{104146250} + \frac{1201961508237\text{ I}}{6126250} & -\frac{10778676794046}{1795625} - \frac{36650370651741\text{ I}}{3591250} & \frac{449455301071\text{ I}}{12675} & \frac{10778676794046}{1795625} - \frac{36650370651741\text{ I}}{3591250} & -\frac{43727404097223}{104146250} + \frac{1201961508237\text{ I}}{6126250} & \frac{3169954883081}{1926705625} + \frac{15667162563017\text{ I}}{11560233750} \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{46240935000 \, \Delta x_{ol}^9} \, \big( 7 \, \big( (-3741631183866 + 7839472806913 \, \mathrm{I}) \, u_{ol-3+3\mathrm{I}} - (480191471032824 + 1410804397537848 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (9009952028072928 + 26643374202132621 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} - 73387559844772880 \, \mathrm{I} u_{ol+3\mathrm{I}} + (-9009952028072928 + 26643374202132621 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (480191471032824$$

$$- 1410804397537848 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} + (3741631183866 + 7839472806913 \, \mathrm{I}) \, u_{ol+3+3\mathrm{I}} - (55546950138120 + 220525999552620 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} - (82444847908696020 + 7706820714809940 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (-1570969222071284880 + 1671662880724798260 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + 6732334179962983800 \, \mathrm{I} u_{ol+2\mathrm{I}} + (1570969222071284880$$

$$+ 1671662880724798260 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (82444847908696020 - 7706820714809940 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (55546950138120 - 220525999552620 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (267242331287790 + 34681752376695 \, \mathrm{I}) \, u_{ol-3+\mathrm{I}} + (-20672289237420360 + 103714085333683080 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} - (3153316230531525240 + 349459448922734085 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}}$$

$$- 9647498947673742480 \, \mathrm{I} u_{ol+\mathrm{I}} + (3153316230531525240 - 349459448922734085 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} + (20672289237420360 + 103714085333683080 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} + (-267242331287790 + 34681752376695 \, \mathrm{I}) \, u_{ol+3+\mathrm{I}} + (-10868416741992 + 8952664321724 \, \mathrm{I}) \, u_{ol-3} + (2773566774166716 + 1296057923453268 \, \mathrm{I}) \, u_{ol-2}$$

$$- (39653212114324656 + 67415738930259588 \, \mathrm{I}) \, u_{ol-1} + 234243261338174600 \, \mathrm{I} u_{ol} + (39653212114324656 - 67415738930259588 \, \mathrm{I}) \, u_{ol+1} + (-2773566774166716 + 1296057923453268 \, \mathrm{I}) \, u_{ol+2} + (10868416741992 + 8952664321724 \, \mathrm{I}) \, u_{ol+3} \big) \big) , \, \mathcal{O}( \, \Delta x_{ol}^{19} \, )$$



Formula:, 296, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

Error order.: 18, Error.:  $5.4625338462598768247 \times 10^{-46}$ , New Error.:  $5.4789260650261566546 \times 10^{-64}$

Error order.: 18, Error.:  $5.4789260650261566546 \times 10^{-64}$ , New Error.:  $5.4805101181109032769 \times 10^{-82}$

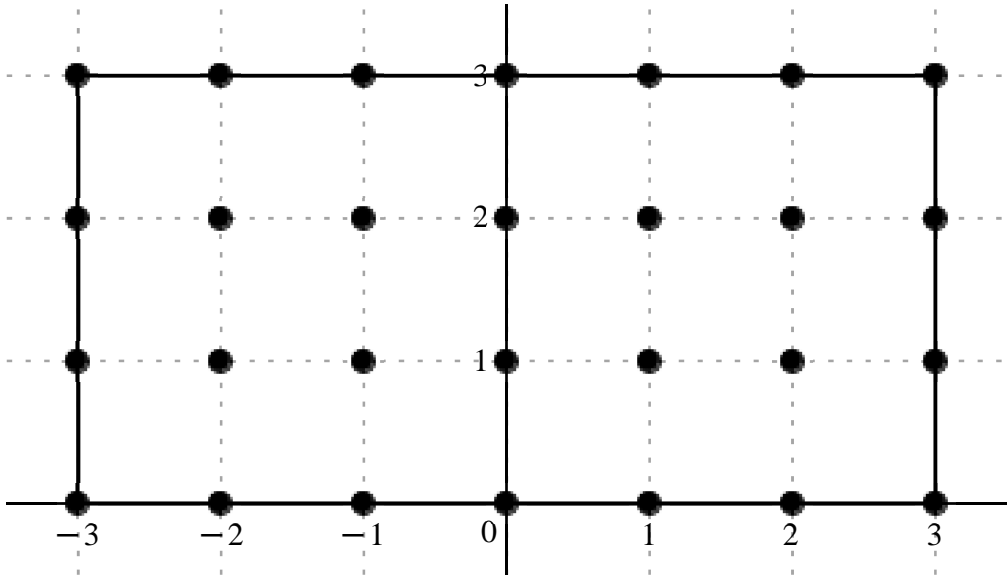
Error order.: 18, Error.:  $5.4805101181109032769 \times 10^{-82}$ , New Error.:  $5.4806679711842843481 \times 10^{-100}$

Error order.: 18, Error.:  $5.4806679711842843481 \times 10^{-100}$ , New Error.:  $5.4806837509687328804 \times 10^{-118}$

Error order.: 18, Error.:  $5.4806837509687328804 \times 10^{-118}$ , New Error.:  $5.4806853288919483001 \times 10^{-136}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & 3 + 3 \text{ I} \\ -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} -\frac{1073960792149}{123309160} & -\frac{2694948519599 \text{ I}}{616545800} & \frac{16464770801871}{10414625} & -\frac{5306798008743 \text{ I}}{10414625} & -\frac{85115031885807}{2873000} & +\frac{27894467726601 \text{ I}}{2873000} & \frac{26379708866}{325} & -\frac{85115031885807}{2873000} & -\frac{27894467726601 \text{ I}}{2873000} & \frac{16464770801871}{10414625} & +\frac{5306798008743 \text{ I}}{10414625} & -\frac{1073960792149}{123309160} & +\frac{2694948519599 \text{ I}}{616545800} \\ \frac{38326101047073}{154136450} & -\frac{4267574051643 \text{ I}}{77068225} & \frac{22509232139961}{2082925} & -\frac{189843297726159 \text{ I}}{2082925} & -\frac{19965004349283}{11050} & -\frac{9675874546002 \text{ I}}{5525} & -\frac{2388982812804}{325} & -\frac{19965004349283}{11050} & +\frac{9675874546002 \text{ I}}{5525} & \frac{22509232139961}{2082925} & +\frac{189843297726159 \text{ I}}{2082925} & \frac{38326101047073}{154136450} & +\frac{4267574051643 \text{ I}}{77068225} \\ -\frac{2395377854541}{47426600} & +\frac{14137059082167 \text{ I}}{47426600} & -\frac{13892616343809}{122525} & -\frac{57097513635561 \text{ I}}{2082925} & \frac{20991847082409}{44200} & -\frac{149790367367109 \text{ I}}{44200} & \frac{3343738604346}{325} & \frac{20991847082409}{44200} & +\frac{149790367367109 \text{ I}}{44200} & -\frac{13892616343809}{122525} & +\frac{57097513635561 \text{ I}}{2082925} & -\frac{2395377854541}{47426600} & -\frac{14137059082167 \text{ I}}{47426600} \\ -\frac{7309412883381}{770682250} & -\frac{4936922425729 \text{ I}}{385341125} & -\frac{1318801645182}{801125} & +\frac{2377575940614 \text{ I}}{801125} & \frac{2102130739947}{28730} & -\frac{2647833553428 \text{ I}}{71825} & -\frac{200532179442}{845} & \frac{2102130739947}{28730} & +\frac{2647833553428 \text{ I}}{71825} & -\frac{1318801645182}{801125} & -\frac{2377575940614 \text{ I}}{801125} & -\frac{7309412883381}{770682250} & +\frac{4936922425729 \text{ I}}{385341125} \end{array} \right]$$



$$\frac{d^{10}}{dx_{ol}^{10}} u(x_{ol}) = \frac{1}{3082729000 \Delta x_{ol}^{10}} (7 (-(3835574257675 + 1924963228285 \text{ I}) u_{ol-3+31} + (696224593907688 - 224401744369704 \text{ I}) u_{ol-2+31} + (-13046918459067273 + 4275823410091839 \text{ I}) u_{ol-1+31} + 35745711442978160 u_{ol+31} - (13046918459067273 + 4275823410091839 \text{ I}) u_{ol+1+31} + (696224593907688$$
$$+ 224401744369704 \text{ I}) u_{ol+2+31} + (-3835574257675 + 1924963228285 \text{ I}) u_{ol+3+31} + (109503145848780 - 24386137437960 \text{ I}) u_{ol-3+21} + (4759094795306040 - 40138297233530760 \text{ I}) u_{ol-2+21} - (795690987623281620 + 771250137383896560 \text{ I}) u_{ol-1+21} - 3237180921992291040 u_{ol+21} + (-795690987623281620$$
$$+ 771250137383896560 \text{ I}) u_{ol+1+21} + (4759094795306040 + 40138297233530760 \text{ I}) u_{ol+2+21} + (109503145848780 + 24386137437960 \text{ I}) u_{ol+3+21} + (-22242794363595 + 131272691477265 \text{ I}) u_{ol-3+1} - (49934032458604920 + 12072045740090040 \text{ I}) u_{ol-2+1} + (209153767823230815 - 1492447024574145315 \text{ I}) u_{ol-1+1}$$

$$+4530918665510742960\,u_{oI+1}+(209153767823230815+1492447024574145315\,\mathrm{I})\,u_{oI+1+1}+(\,-49934032458604920+12072045740090040\,\mathrm{I})\,u_{oI+2+1}-(22242794363595+131272691477265\,\mathrm{I})\,u_{oI+3+1}-(4176807361932+5642197057976\,\mathrm{I})\,u_{oI-3}+(\,-724964104380048+1306987459926096\,\mathrm{I})\,u_{oI-2}+(32222661199473300-16235002301875680\,\mathrm{I})\,u_{oI-1}-104511642434329200\,u_{oI}+(32222661199473300+16235002301875680\,\mathrm{I})\,u_{oI+1}-(724964104380048+1306987459926096\,\mathrm{I})\,u_{oI+2}+(\,-4176807361932+5642197057976\,\mathrm{I})\,u_{oI+3}\Big),\,O(\,\Delta\mathfrak{x}_{oI}^{\,18}\,)$$

Formula.: 297, Var.: 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 12

Error order.: 16, Error.: 2.3599714289476223488 × 10<sup>−40</sup>, New Error.: 2.3669852467625802355 × 10<sup>−56</sup>

Error order.: 16, Error.: 2.3669852467625802355 × 10<sup>−56</sup>, New Error.: 2.3676632239336118729 × 10<sup>−72</sup>

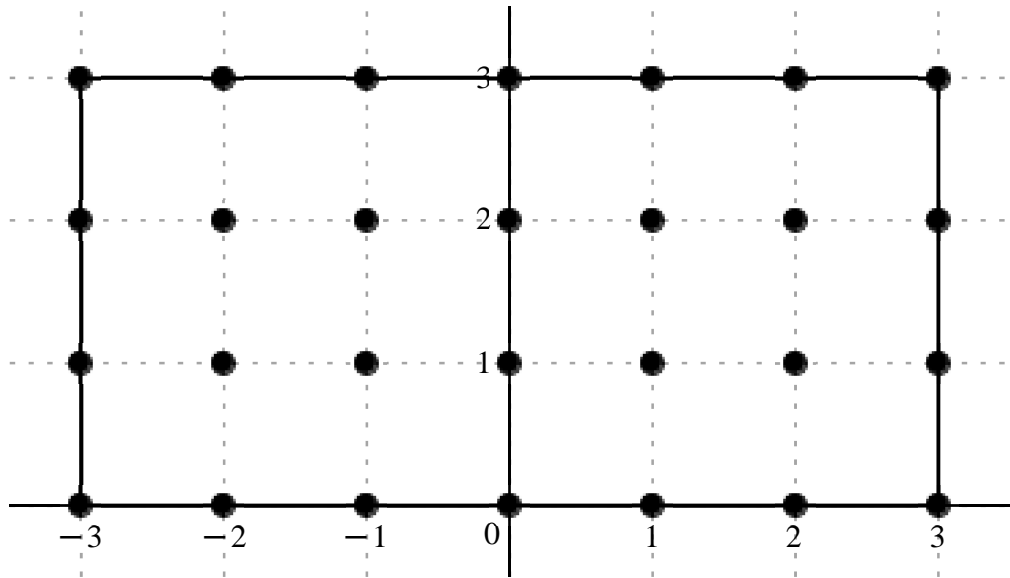
Error order.: 16, Error.: 2.3676632239336118729 × 10<sup>−72</sup>, New Error.: 2.3677307873745238822 × 10<sup>−88</sup>

Error order.: 16, Error.: 2.3677307873745238822 × 10<sup>−88</sup>, New Error.: 2.3677375413756266436 × 10<sup>−104</sup>

Error order.: 16, Error.: 2.3677375413756266436 × 10<sup>−104</sup>, New Error.: 2.3677382167523068091 × 10<sup>−120</sup>

$$x_o+h.\,,\left[\begin{array}{cccccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} & 1+3\,\mathrm{I} & 2+3\,\mathrm{I} & 3+3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & 3+2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array}\right]$$

$$c=\,,\left[\begin{array}{cccccccccccc} \frac{7610412454029}{18133700}+\frac{4219655812449\,\mathrm{I}}{18133700} & -\frac{731664677898}{9425}+\frac{209400751098\,\mathrm{I}}{9425} & \frac{24229292047191}{16900}-\frac{7439735339883\,\mathrm{I}}{16900} & -\frac{16429307664924}{4225} & \frac{24229292047191}{16900}+\frac{7439735339883\,\mathrm{I}}{16900} & -\frac{731664677898}{9425}-\frac{209400751098\,\mathrm{I}}{9425} & \frac{7610412454029}{18133700}-\frac{4219655812449\,\mathrm{I}}{18133700} \\ -\frac{116188393167}{9425}+\frac{140626624446\,\mathrm{I}}{69745} & -\frac{90046308558591}{122525}+\frac{106492849388541\,\mathrm{I}}{24505} & \frac{26845785834021}{325}+\frac{27622879803288\,\mathrm{I}}{325} & \frac{111614945241492}{325} & \frac{26845785834021}{325}-\frac{27622879803288\,\mathrm{I}}{325} & -\frac{90046308558591}{122525}-\frac{106492849388541\,\mathrm{I}}{24505} & -\frac{116188393167}{9425}-\frac{140626624446\,\mathrm{I}}{69745} \\ \frac{66102223375881}{18133700}-\frac{260785340010657\,\mathrm{I}}{18133700} & \frac{643977063585702}{122525}+\frac{210935971571094\,\mathrm{I}}{122525} & -\frac{38715231602817}{1300}+\frac{7958798612919\,\mathrm{I}}{52} & -\frac{149582176845948}{325} & -\frac{38715231602817}{1300}-\frac{7958798612919\,\mathrm{I}}{52} & \frac{643977063585702}{122525}-\frac{210935971571094\,\mathrm{I}}{122525} & \frac{66102223375881}{18133700}+\frac{260785340010657\,\mathrm{I}}{18133700} \\ \frac{1809377262231}{4533425}+\frac{3111956309154\,\mathrm{I}}{4533425} & \frac{2362494219624}{24505}-\frac{15744024459702\,\mathrm{I}}{122525} & -\frac{13946768437833}{4225}+\frac{5216939922348\,\mathrm{I}}{4225} & \frac{633022024866}{65} & -\frac{13946768437833}{4225}-\frac{5216939922348\,\mathrm{I}}{4225} & \frac{2362494219624}{24505}+\frac{15744024459702\,\mathrm{I}}{122525} & \frac{1809377262231}{4533425}-\frac{3111956309154\,\mathrm{I}}{4533425} \end{array}\right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\,u(x_{ol})=\frac{1}{18133700\,\Delta x_{ol}^{12}}\left(231\left((32945508459+18266908279\,\mathrm{I})\,u_{ol-3+3\mathrm{I}}+(-6094038269592+1744099762392\,\mathrm{I})\,u_{ol-2+3\mathrm{I}}+(112545586002753-34557731686989\,\mathrm{I})\,u_{ol-1+3\mathrm{I}}-305257958865168\,u_{ol+3\mathrm{I}}+(112545586002753+34557731686989\,\mathrm{I})\,u_{ol+1+3\mathrm{I}}-(6094038269592+1744099762392\,\mathrm{I})\,u_{ol+2+3\mathrm{I}}+(32945508459-18266908279\,\mathrm{I})\,u_{ol+3+3\mathrm{I}}+(-967733629668+158281049160\,\mathrm{I})\,u_{ol-3+2\mathrm{I}}+(-57692007215028+341145924448140\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(6484361326385436+6672061478373408\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+26959599500841072\,u_{ol+2\mathrm{I}}+(6484361326385436-6672061478373408\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}-(57692007215028+341145924448140\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}-(967733629668+158281049160\,\mathrm{I})\,u_{ol+3+2\mathrm{I}}+(286156811151-1128940865847\,\mathrm{I})\,u_{ol-3+\mathrm{I}}+(412591365414216+135145124642952\,\mathrm{I})\,u_{ol-2+\mathrm{I}}+(-2337830154232443+12014857343247525\,\mathrm{I})\,u_{ol-1+\mathrm{I}}-36130247356261968\,u_{ol+\mathrm{I}}-(2337830154232443+12014857343247525\,\mathrm{I})\,u_{ol+1+\mathrm{I}}+(412591365414216-135145124642952\,\mathrm{I})\,u_{ol+2+\mathrm{I}}+(286156811151+1128940865847\,\mathrm{I})\,u_{ol+3+\mathrm{I}}+(31331208004+53886689336\,\mathrm{I})\,u_{ol-3}+(7568163300960-10087080606216\,\mathrm{I})\,u_{ol-2}+(-259132165087356+96931195440336\,\mathrm{I})\,u_{ol-1}+764504261892280\,u_{ol}-(259132165087356+96931195440336\,\mathrm{I})\,u_{ol+1}+(7568163300960+10087080606216\,\mathrm{I})\,u_{ol+2}+(31331208004-53886689336\,\mathrm{I})\,u_{ol+3}\right),\,O(\,\Delta x_{ol}^{16}\,)$$

Formula.: 298, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 13

Error order.: 15, Error.:  $1.4653722283273489107 \times 10^{-37}$ , New Error.:  $1.4697033727201892792 \times 10^{-52}$

Error order.: 15, Error.:  $1.4697033727201892792 \times 10^{-52}$ , New Error.:  $1.4701221037817337537 \times 10^{-67}$

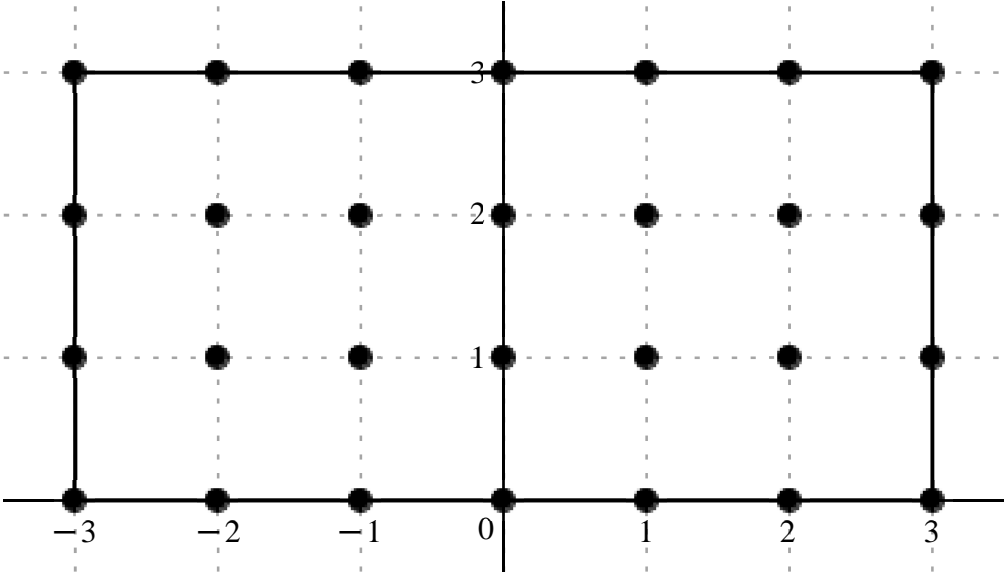
Error order.: 15, Error.:  $1.4701221037817337537 \times 10^{-67}$ , New Error.:  $1.4701638329134041348 \times 10^{-82}$

Error order.: 15, Error.:  $1.4701638329134041348 \times 10^{-82}$ , New Error.:  $1.4701680043866877914 \times 10^{-97}$

Error order.: 15, Error.:  $1.4701680043866877914 \times 10^{-97}$ , New Error.:  $1.4701684215196171849 \times 10^{-112}$

$$x_o \neq h., \left[ \begin{array}{cccccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} & 1+3\,\mathrm{I} & 2+3\,\mathrm{I} & 3+3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & 3+2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccccccc} -\frac{11135596135587}{6974500} + \frac{4776367616174 \text{ I}}{1743625} & -\frac{6466371972291}{47125} - \frac{24129274109787 \text{ I}}{47125} & \frac{18114220415907}{6500} + \frac{30522285492237 \text{ I}}{3250} & -\frac{8239041317122 \text{ I}}{325} & -\frac{18114220415907}{6500} + \frac{30522285492237 \text{ I}}{3250} & \frac{6466371972291}{47125} - \frac{24129274109787 \text{ I}}{47125} & \frac{11135596135587}{6974500} + \frac{4776367616174 \text{ I}}{1743625} \\ -\frac{3793804707231}{348725} - \frac{56897377112961 \text{ I}}{697450} & -\frac{531762494717223}{18850} - \frac{4143143293443 \text{ I}}{754} & -\frac{13925069721486}{25} + \frac{26289412839459 \text{ I}}{50} & \frac{55287892743237 \text{ I}}{25} & \frac{13925069721486}{25} + \frac{26289412839459 \text{ I}}{50} & \frac{531762494717223}{18850} - \frac{4143143293443 \text{ I}}{754} & \frac{3793804707231}{348725} - \frac{56897377112961 \text{ I}}{697450} \\ \frac{130536379270143}{1394900} + \frac{19475136102807 \text{ I}}{697450} & -\frac{117378308740077}{9425} + \frac{316166939506341 \text{ I}}{9425} & -\frac{96813110773071}{100} - \frac{5328043358022 \text{ I}}{25} & -\frac{72608553882018 \text{ I}}{25} & \frac{96813110773071}{100} - \frac{5328043358022 \text{ I}}{25} & \frac{117378308740077}{9425} + \frac{316166939506341 \text{ I}}{9425} & -\frac{130536379270143}{1394900} + \frac{19475136102807 \text{ I}}{697450} \\ -\frac{8179102541841}{1743625} + \frac{8263725446669 \text{ I}}{3487250} & \frac{73816414846713}{94250} + \frac{63471738817179 \text{ I}}{94250} & -\frac{10864756212156}{1625} - \frac{67417782704811 \text{ I}}{3250} & \frac{3849438308639 \text{ I}}{65} & \frac{10864756212156}{1625} - \frac{67417782704811 \text{ I}}{3250} & -\frac{73816414846713}{94250} + \frac{63471738817179 \text{ I}}{94250} & \frac{8179102541841}{1743625} + \frac{8263725446669 \text{ I}}{3487250} \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}} \; u(x_{ol}) = \frac{1}{6974500 \; \Delta x_{ol}^{13}} \Big( 77 \Big( ( -144618131631 + 248122993048 \; \text{I} ) \; u_{ol-3+31} - ( 12428870803884 + 46378345042188 \; \text{I} ) \; u_{ol-2+31} + ( 252422837743743 + 850660060601826 \; \text{I} ) \; u_{ol-1+31} - 2296231515135560 \; \text{I} u_{ol+31} + ( -252422837743743 + 850660060601826 \; \text{I} ) \; u_{ol+1+31} + ( 12428870803884 - 46378345042188 \; \text{I} ) \; u_{ol+2+31} \\ + ( 144618131631 + 248122993048 \; \text{I} ) \; u_{ol+3+31} - ( 985403820060 + 7389269754930 \; \text{I} ) \; u_{ol-3+21} - ( 2555222377212630 + 497715265770750 \; \text{I} ) \; u_{ol-2+21} + ( -50452155206495640 + 47624807752936830 \; \text{I} ) \; u_{ol-1+21} + 200314497629977380 \; \text{I} u_{ol+21} + ( 50452155206495640 + 47624807752936830 \; \text{I} ) \; u_{ol+1+21} + ( 2555222377212630 \\ - 497715265770750 \; \text{I} ) \; u_{ol+2+21} + ( 985403820060 - 7389269754930 \; \text{I} ) \; u_{ol+3+21} + ( 8476388264295 + 2529238454910 \; \text{I} ) \; u_{ol-3+1} + ( -1128051278800740 + 3038487470580420 \; \text{I} ) \; u_{ol-2+1} - ( 87691304037244635 + 19304123844428280 \; \text{I} ) \; u_{ol-1+1} - 263069277428641320 \; \text{I} u_{ol+1} + ( 87691304037244635 \\ - 19304123844428280 \; \text{I} ) \; u_{ol+1+1} + ( 1128051278800740 + 3038487470580420 \; \text{I} ) \; u_{ol+2+1} + ( -8476388264295 + 2529238454910 \; \text{I} ) \; u_{ol+3+1} + ( -424888443732 + 214642219394 \; \text{I} ) \; u_{ol-3} + ( 70940450631906 + 60998813928198 \; \text{I} ) \; u_{ol-2} - ( 605604333280176 + 1878942359539278 \; \text{I} ) \; u_{ol-1} + 5364217279441100 \; \text{I} u_{ol} \\ + ( 605604333280176 - 1878942359539278 \; \text{I} ) \; u_{ol+1} + ( -70940450631906 + 60998813928198 \; \text{I} ) \; u_{ol+2} + ( 424888443732 + 214642219394 \; \text{I} ) \; u_{ol+3} \Big) \Big), \; O( \; \Delta x_{ol}^{15} \; )$$

Formula.: 299, Var.: 1

Variavel .:, x<sub>ol</sub>., Derivada de Ordem .:, 1

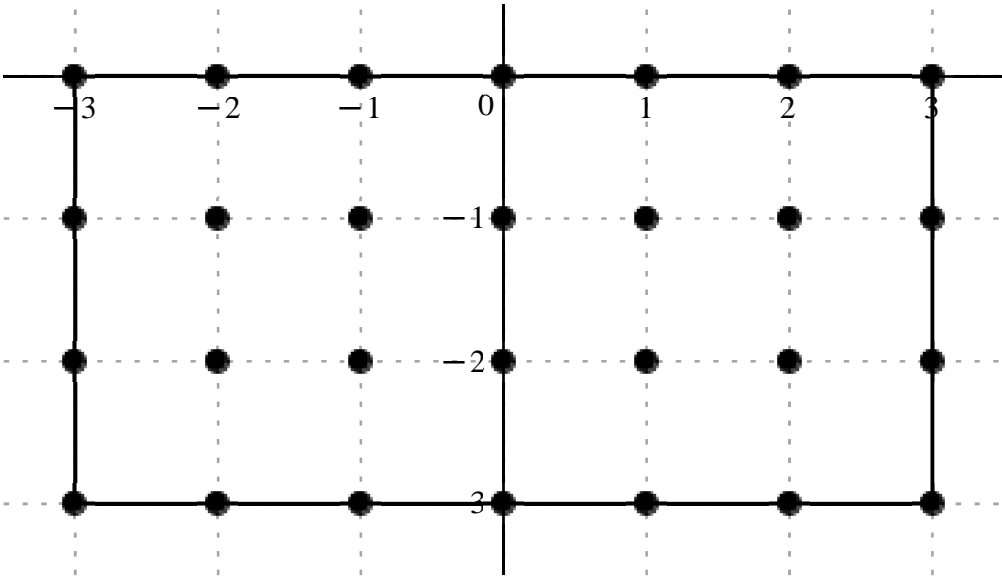
Error order.: 27, Error.: 3.6560326653691183048 × 10<sup>−72</sup>, New Error.: 3.6456365983060478706 × 10<sup>−99</sup>

Error order.: 27, Error.: 3.6456365983060478706 × 10<sup>−99</sup>, New Error.: 3.6445578239966639206 × 10<sup>−126</sup>

Error order.: 27, Error.: 3.6445578239966639206 × 10<sup>−126</sup>, New Error.: 3.6444495552757857986 × 10<sup>−153</sup>

*Error order: 27,    Error:  $3.6444495552757857986 \times 10^{-153}$ ,    New Error:  $3.6444387244911911436 \times 10^{-180}$*   
*Error order: 27,    Error:  $3.6444387244911911436 \times 10^{-180}$ ,    New Error:  $3.6444376413736070028 \times 10^{-207}$*

$$\begin{aligned}
& x_o + h, \begin{bmatrix} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I \\ -3-2I & -2-2I & -1-2I & -2I & 1-2I & 2-2I & 3-2I \\ -3-3I & -2-3I & -1-3I & -3I & 1-3I & 2-3I & 3-3I \end{bmatrix} \\
c =, & \begin{bmatrix} -\frac{32}{1368075} - \frac{77I}{1824100} & \frac{549}{49300} + \frac{63I}{49300} & -\frac{333}{850} + \frac{63I}{1700} & -\frac{251I}{39} & \frac{333}{850} + \frac{63I}{1700} & -\frac{549}{49300} + \frac{63I}{49300} & \frac{32}{1368075} - \frac{77I}{1824100} \\ \frac{729}{729640} + \frac{27I}{145928} & \frac{81}{986} - \frac{2187I}{4930} & -\frac{11583}{680} - \frac{3159I}{680} & \frac{351I}{5} & \frac{11583}{680} - \frac{3159I}{680} & -\frac{81}{986} - \frac{2187I}{4930} & -\frac{729}{729640} + \frac{27I}{145928} \\ -\frac{486}{1185665} + \frac{3753I}{4742660} & -\frac{3483}{9860} - \frac{243I}{4930} & -\frac{1053}{170} - \frac{3159I}{340} & -\frac{351I}{10} & \frac{1053}{170} - \frac{3159I}{340} & \frac{3483}{9860} - \frac{243I}{4930} & \frac{486}{1185665} + \frac{3753I}{4742660} \\ -\frac{103}{10944600} - \frac{359I}{10944600} & -\frac{909}{320450} + \frac{1773I}{320450} & \frac{171}{3400} - \frac{387I}{3400} & \frac{I}{3} & -\frac{171}{3400} - \frac{387I}{3400} & \frac{909}{320450} + \frac{1773I}{320450} & \frac{103}{10944600} - \frac{359I}{10944600} \end{bmatrix}
\end{aligned}$$

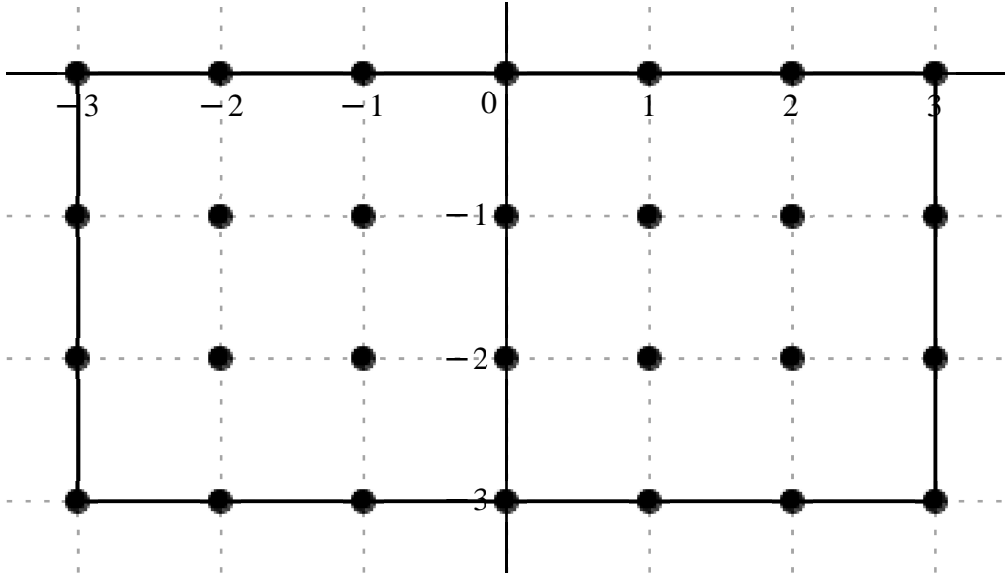


$$\begin{aligned}
\frac{d}{dx_{ol}} u(x_{ol}) = & \frac{1}{142279800 \Delta x_{ol}} \Big( -(3328 + 6006 I) u_{ol-3} + (1584414 + 181818 I) u_{ol-2} + (-55740204 + 5272722 I) u_{ol-1} - 915698200 I u_{ol} + (55740204 + 5272722 I) u_{ol+1} \\
& + (-1584414 + 181818 I) u_{ol+2} + (3328 - 6006 I) u_{ol+3} + (142155 + 26325 I) u_{ol-3-1} + (11688300 - 63116820 I) u_{ol-2-1} - (2423569005 \\
& + 660973365 I) u_{ol-1-1} + 9988041960 I u_{ol-1} + (2423569005 - 660973365 I) u_{ol+1-1} - (11688300 + 63116820 I) u_{ol+2-1} + (-142155 + 26325 I) u_{ol+3-1} \\
& + (-58320 + 112590 I) u_{ol-3-21} - (50259690 + 7012980 I) u_{ol-2-21} - (881297820 + 1321946730 I) u_{ol-1-21} - 4994020980 I u_{ol-21} + (881297820 - 1321946730 I) u_{ol+1-21} \\
& + (50259690 - 7012980 I) u_{ol+2-21} + (58320 + 112590 I) u_{ol+3-21} - (1339 + 4667 I) u_{ol-3-31} + (-403596 + 787212 I) u_{ol-2-31} + (7155837 - 16194789 I) u_{ol-1-31} + 47426600 I u_{ol-31} \\
& - (7155837 + 16194789 I) u_{ol+1-31} + (403596 + 787212 I) u_{ol+2-31} + (1339 - 4667 I) u_{ol+3-31} \Big), \quad O(\Delta x_{ol}^{27})
\end{aligned}$$

Formula: 300, Var.: 1  
Variavel :  $x_{ol}$ , Derivada de Ordem : 2

Error order.: 26, Error.:  $4.2781065136775774392 \times 10^{-69}$ , New Error.:  $4.2659845076430994864 \times 10^{-95}$   
Error order.: 26, Error.:  $4.2659845076430994864 \times 10^{-95}$ , New Error.:  $4.2647268165719799325 \times 10^{-121}$   
Error order.: 26, Error.:  $4.2647268165719799325 \times 10^{-121}$ , New Error.:  $4.2646005930068843999 \times 10^{-147}$   
Error order.: 26, Error.:  $4.2646005930068843999 \times 10^{-147}$ , New Error.:  $4.2645879661062491497 \times 10^{-173}$   
Error order.: 26, Error.:  $4.2645879661062491497 \times 10^{-173}$ , New Error.:  $4.2645867033707448226 \times 10^{-199}$

$$x_o+h., \left[ \begin{array}{cccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I \\ -3-2I & -2-2I & -1-2I & -2I & 1-2I & 2-2I & 3-2I \\ -3-3I & -2-3I & -1-3I & -3I & 1-3I & 2-3I & 3-3I \end{array} \right]$$
$$c=,\left[ \begin{array}{cc} -\frac{56317}{106709850}+\frac{35131I}{106709850} & \frac{681}{128180}-\frac{18537I}{128180} & \frac{13929}{11050}+\frac{54903I}{11050} & -\frac{260285}{6084} & \frac{13929}{11050}-\frac{54903I}{11050} & \frac{681}{128180}+\frac{18537I}{128180} & -\frac{56317}{106709850}-\frac{35131I}{106709850} \\ \frac{20691}{11856650}-\frac{302859I}{23713300} & -\frac{896994}{160225}-\frac{107298I}{160225} & -\frac{648}{17}+\frac{14067I}{68} & \frac{3816}{5} & -\frac{648}{17}-\frac{14067I}{68} & -\frac{896994}{160225}+\frac{107298I}{160225} & \frac{20691}{11856650}+\frac{302859I}{23713300} \\ \frac{312327}{30827290}+\frac{147501I}{30827290} & -\frac{111051}{256360}+\frac{1126683I}{256360} & -\frac{93231}{850}+\frac{66717I}{850} & -\frac{4167}{10} & -\frac{93231}{850}-\frac{66717I}{850} & -\frac{111051}{256360}-\frac{1126683I}{256360} & \frac{312327}{30827290}-\frac{147501I}{30827290} \\ -\frac{43553}{106709850}+\frac{27517I}{213419700} & \frac{1704}{24505}+\frac{13956I}{416585} & -\frac{7773}{5525}-\frac{13137I}{22100} & \frac{476}{117} & -\frac{7773}{5525}+\frac{13137I}{22100} & \frac{1704}{24505}-\frac{13956I}{416585} & -\frac{43553}{106709850}-\frac{27517I}{213419700} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{5548912200 \, \Delta x_{ol}^2} \Big( (-2928484 + 1826812 \, \mathrm{I}) \, u_{ol-3} + (29480490 - 802466730 \, \mathrm{I}) \, u_{ol-2} + (6994642356 + 27570310092 \, \mathrm{I}) \, u_{ol-1} - 237392934250 \, u_{ol} + (6994642356 - 27570310092 \, \mathrm{I}) \, u_{ol+1} + (29480490 + 802466730 \, \mathrm{I}) \, u_{ol+2} - (2928484 + 1826812 \, \mathrm{I}) \, u_{ol+3} + (9683388 - 70869006 \, \mathrm{I}) \, u_{ol-3-1} - (31064696208$$
$$+ 3715944336 \, \mathrm{I}) \, u_{ol-2-1} + (-211511476800 + 1147890410550 \, \mathrm{I}) \, u_{ol-1-1} + 4234929791040 \, u_{ol-1} - (211511476800 + 1147890410550 \, \mathrm{I}) \, u_{ol+1-1} + (-31064696208 + 3715944336 \, \mathrm{I}) \, u_{ol+2-1} + (9683388 + 70869006 \, \mathrm{I}) \, u_{ol+3-1} + (56218860 + 26550180 \, \mathrm{I}) \, u_{ol-3-21} + (-2403698895 + 24387053535 \, \mathrm{I}) \, u_{ol-2-21} + (-608624274492$$
$$+ 435537382644 \, \mathrm{I}) \, u_{ol-1-21} - 2312231713740 \, u_{ol-21} - (608624274492 + 435537382644 \, \mathrm{I}) \, u_{ol+1-21} - (2403698895 + 24387053535 \, \mathrm{I}) \, u_{ol+2-21} + (56218860 - 26550180 \, \mathrm{I}) \, u_{ol+3-21} + (-2264756 + 715442 \, \mathrm{I}) \, u_{ol-3-31} + (385853760 + 185893920 \, \mathrm{I}) \, u_{ol-2-31} - (7806641544 + 3298464234 \, \mathrm{I}) \, u_{ol-1-31} + 22575061600 \, u_{ol-31}$$
$$+ (-7806641544 + 3298464234 \, \mathrm{I}) \, u_{ol+1-31} + (385853760 - 185893920 \, \mathrm{I}) \, u_{ol+2-31} - (2264756 + 715442 \, \mathrm{I}) \, u_{ol+3-31} \Big), \, O( \, \Delta x_{ol}^{26} \, )$$

Formula:, 301, Var:, 1

Variavel :,  $x_o$  , Derivada de Ordem :, 3

Error order:, 25, Error:,  $3.8778981438326153465 \times 10^{-66}$ , New Error:,  $3.8669466089783434862 \times 10^{-91}$

Error order:, 25, Error:,  $3.8669466089783434862 \times 10^{-91}$ , New Error:,  $3.8658105082076846920 \times 10^{-116}$

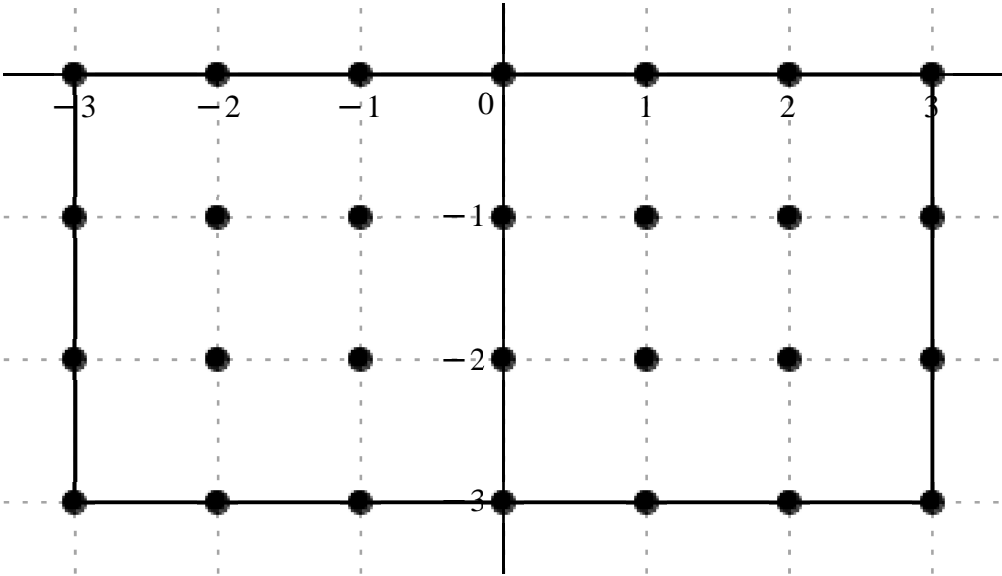
Error order:, 25, Error:,  $3.8658105082076846920 \times 10^{-116}$ , New Error:,  $3.8656964890584167629 \times 10^{-141}$

Error order:, 25, Error:,  $3.8656964890584167629 \times 10^{-141}$ , New Error:,  $3.8656850830531752516 \times 10^{-166}$

Error order:, 25, Error:,  $3.8656850830531752516 \times 10^{-166}$ , New Error:,  $3.8656839424117483612 \times 10^{-191}$

$$x_o+h., \left[ \begin{array}{cccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3 -1 & -2 -1 & -1 -1 & -1 & 1 -1 & 2 -1 & 3 -1 \\ -3 -2 1 & -2 -2 1 & -1 -2 1 & -2 1 & 1 -2 1 & 2 -2 1 & 3 -2 1 \\ -3 -3 1 & -2 -3 1 & -1 -3 1 & -3 1 & 1 -3 1 & 2 -3 1 & 3 -3 1 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} \frac{1632227}{462409350} + \frac{56472211 I}{11097824400} & -\frac{9579549}{6665360} + \frac{352689 I}{6665360} & \frac{26718711}{574600} - \frac{22595721 I}{1149200} & \frac{89313631 I}{304200} & -\frac{26718711}{574600} - \frac{22595721 I}{1149200} & \frac{9579549}{6665360} + \frac{352689 I}{6665360} & -\frac{1632227}{462409350} + \frac{56472211 I}{11097824400} \\ -\frac{1553352147}{12330916000} - \frac{144627021 I}{12330916000} & -\frac{285260643}{83317000} + \frac{4530785949 I}{83317000} & \frac{13670829}{7072} + \frac{1617813 I}{7072} & -\frac{1747269 I}{260} & -\frac{13670829}{7072} + \frac{1617813 I}{7072} & \frac{285260643}{83317000} + \frac{4530785949 I}{83317000} & \frac{1553352147}{12330916000} - \frac{144627021 I}{12330916000} \\ \frac{668736}{15413645} - \frac{24711147 I}{246618320} & \frac{282386061}{6665360} + \frac{18030357 I}{6665360} & \frac{169420707}{221000} + \frac{448085277 I}{442000} & \frac{2017539 I}{520} & -\frac{169420707}{221000} + \frac{448085277 I}{442000} & -\frac{282386061}{6665360} + \frac{18030357 I}{6665360} & -\frac{668736}{15413645} - \frac{24711147 I}{246618320} \\ \frac{29907983}{22195648800} + \frac{87481919 I}{22195648800} & \frac{205815}{666536} - \frac{2257683 I}{3332680} & -\frac{63182757}{11492000} + \frac{155382141 I}{11492000} & -\frac{78511 I}{2028} & \frac{63182757}{11492000} + \frac{155382141 I}{11492000} & -\frac{205815}{666536} - \frac{2257683 I}{3332680} & -\frac{29907983}{22195648800} + \frac{87481919 I}{22195648800} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3}u\big(x_{ol}\big)=\frac{1}{110978244000\,\varDelta x_{ol}^3}\Big( (391734480+564722110\,\mathrm{I})\,u_{ol-3}+(-159499490850+5872271850\,\mathrm{I})\,u_{ol-2}+(5160451842540-2182068776970\,\mathrm{I})\,u_{ol-1}+32583398861420\,\mathrm{I}u_{ol}-(5160451842540+2182068776970\,\mathrm{I})\,u_{ol+1}+(159499490850+5872271850\,\mathrm{I})\,u_{ol+2}+(-391734480+564722110\,\mathrm{I})\,u_{ol+3}-(13980169323+1301643189\,\mathrm{I})\,u_{ol-3-1}+(-379967176476+6035006884068\,\mathrm{I})\,u_{ol-2-1}+(214531192936125+25387732729125\,\mathrm{I})\,u_{ol-1-1}-745803251598600\,\mathrm{I}u_{ol-1}+(-214531192936125+25387732729125\,\mathrm{I})\,u_{ol+1-1}+(379967176476+6035006884068\,\mathrm{I})\,u_{ol+2-1}+(13980169323-1301643189\,\mathrm{I})\,u_{ol+3-1}+(4814899200-11120016150\,\mathrm{I})\,u_{ol-3-21}+(4701727915650+300205444050\,\mathrm{I})\,u_{ol-2-21}+(85076979909948+112506147519714\,\mathrm{I})\,u_{ol-1-21}+430582568118300\,\mathrm{I}u_{ol-21}+(-85076979909948+112506147519714\,\mathrm{I})\,u_{ol+1-21}+(-4701727915650+300205444050\,\mathrm{I})\,u_{ol+2-21}-(4814899200+11120016150\,\mathrm{I})\,u_{ol+3-21}+(149539915+437409595\,\mathrm{I})\,u_{ol-3-31}+(34268197500-75180843900\,\mathrm{I})\,u_{ol-2-31}+(-610155884349+1500525335637\,\mathrm{I})\,u_{ol-1-31}-4296357453000\,\mathrm{I}u_{ol-31}+(610155884349+1500525335637\,\mathrm{I})\,u_{ol+1-31}-(34268197500+75180843900\,\mathrm{I})\,u_{ol+2-31}+(-149539915+437409595\,\mathrm{I})\,u_{ol+3-31}\Big),\,\,O(\,\varDelta x_{ol}^{25}\,)\,$$

Formula:, 302, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 4

Error order:., 24, Error:., 3.2257948778725298861 × 10<sup>−63</sup>, New Error:., 3.2167133839338454004 × 10<sup>−87</sup>

Error order:., 24, Error:., 3.2167133839338454004 × 10<sup>−87</sup>, New Error:., 3.2157713953969021080 × 10<sup>−111</sup>

Error order:., 24, Error:., 3.2157713953969021080 × 10<sup>−111</sup>, New Error:., 3.2156768584817860955 × 10<sup>−135</sup>

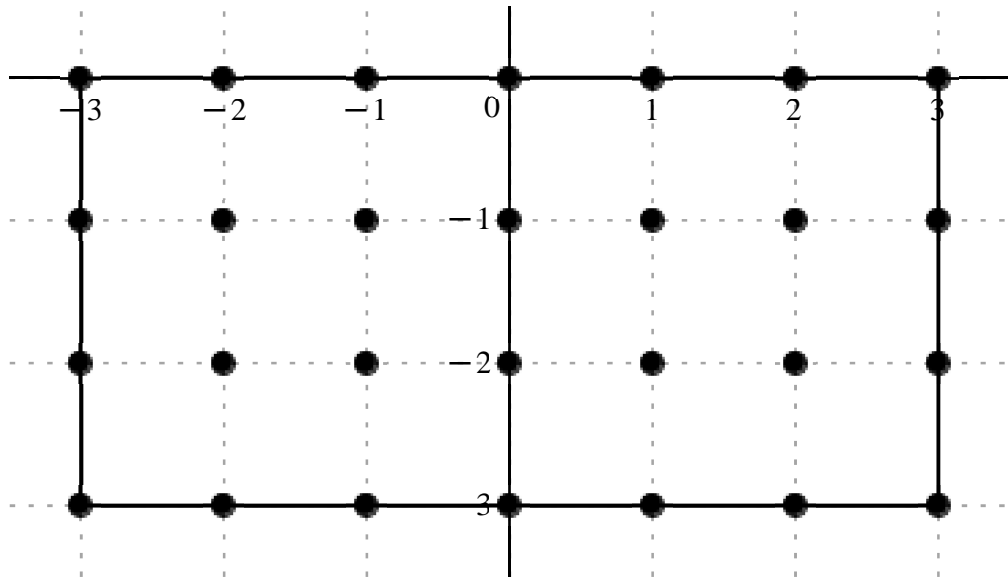
Error order:., 24, Error:., 3.2156768584817860955 × 10<sup>−135</sup>, New Error:., 3.2156674014099957457 × 10<sup>−159</sup>

Error order:., 24, Error:., 3.2156674014099957457 × 10<sup>−159</sup>, New Error:., 3.2156664556690142592 × 10<sup>−183</sup>

$$x_o+h\,,\left[\begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I \\ -3-2\,I & -2-2\,I & -1-2\,I & -2\,I & 1-2\,I & 2-2\,I & 3-2\,I \\ -3-3\,I & -2-3\,I & -1-3\,I & -3\,I & 1-3\,I & 2-3\,I & 3-3\,I \end{array}\right]$$

$$c=,\left[\begin{array}{cccccccc} \frac{2074752929}{46240935000}-\frac{7127877659\,I}{208084207500} & \frac{71531026}{52073125}+\frac{2702022683\,I}{208292500} & -\frac{3297066517}{14365000}-\frac{1369855661\,I}{3591250} & \frac{603364993}{292500} & -\frac{3297066517}{14365000}+\frac{1369855661\,I}{3591250} & \frac{71531026}{52073125}-\frac{2702022683\,I}{208292500} & \frac{2074752929}{46240935000}+\frac{7127877659\,I}{208084207500} \\ -\frac{1893838863}{30827290000}+\frac{35052549471\,I}{30827290000} & \frac{100595532339}{208292500}+\frac{1401901893\,I}{208292500} & \frac{500387787}{442000}-\frac{7335422469\,I}{442000} & -\frac{180577443}{3250} & \frac{500387787}{442000}+\frac{7335422469\,I}{442000} & \frac{100595532339}{208292500}-\frac{1401901893\,I}{208292500} & -\frac{1893838863}{30827290000}-\frac{35052549471\,I}{30827290000} \\ -\frac{12661899}{13949000}-\frac{42944067\,I}{118566500} & \frac{62807697}{4901000}-\frac{31259928897\,I}{83317000} & \frac{9587316249}{1105000}-\frac{947378961\,I}{138125} & \frac{108751209}{3250} & \frac{9587316249}{1105000}+\frac{947378961\,I}{138125} & \frac{62807697}{4901000}+\frac{31259928897\,I}{83317000} & -\frac{12661899}{13949000}+\frac{42944067\,I}{118566500} \\ \frac{29128845979}{832336830000}-\frac{10638652393\,I}{832336830000} & -\frac{5713909}{942500}-\frac{42130349\,I}{16022500} & \frac{3437522467}{28730000}+\frac{1352028577\,I}{28730000} & -\frac{77536981}{228150} & \frac{3437522467}{28730000}-\frac{1352028577\,I}{28730000} & -\frac{5713909}{942500}+\frac{42130349\,I}{16022500} & \frac{29128845979}{832336830000}+\frac{10638652393\,I}{832336830000} \end{array}\right]$$





$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{832336830000 \, \mathcal{A}x_{ol}^4} \, \big( (37345552722 - 28511510636 \, \mathrm{I}) \, u_{ol-3} + (1143351919584 + 10797282641268 \, \mathrm{I}) \, u_{ol-2} - (191038628128014 + 317488706838648 \, \mathrm{I}) \, u_{ol-1} + 1716933010620828 \, u_{ol} + (-191038628128014 + 317488706838648 \, \mathrm{I}) \, u_{ol+1} + (1143351919584 - 10797282641268 \, \mathrm{I}) \, u_{ol+2} + (37345552722$$

$$+ 28511510636 \, \mathrm{I}) \, u_{ol+3} + (-51133649301 + 946418835717 \, \mathrm{I}) \, u_{ol-3-1} + (401979747226644 + 5601999964428 \, \mathrm{I}) \, u_{ol-2-1} + (942287747516505 - 13813444082710935 \, \mathrm{I}) \, u_{ol-1-1} - 46246540454192520 \, u_{ol-1} + (942287747516505 + 13813444082710935 \, \mathrm{I}) \, u_{ol+1-1} + (401979747226644 - 5601999964428 \, \mathrm{I}) \, u_{ol+2-1} - (51133649301$$

$$+ 946418835717 \, \mathrm{I}) \, u_{ol+3-1} - (755535513330 + 301467350340 \, \mathrm{I}) \, u_{ol-3-2\mathrm{I}} + (10666631181510 - 312286689681030 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (7221607615294254 - 5708875302859248 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + 27851580479300760 \, u_{ol-2\mathrm{I}} + (7221607615294254 + 5708875302859248 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (10666631181510 + 312286689681030 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}}$$

$$+ (-755535513330 + 301467350340 \, \mathrm{I}) \, u_{ol+3-2\mathrm{I}} + (29128845979 - 10638652393 \, \mathrm{I}) \, u_{ol-3-3\mathrm{I}} - (5046044460444 + 2188587369852 \, \mathrm{I}) \, u_{ol-2-3\mathrm{I}} + (99588463391457 + 39169619904267 \, \mathrm{I}) \, u_{ol-1-3\mathrm{I}} - 282870414084200 \, u_{ol-3\mathrm{I}} + (99588463391457 - 39169619904267 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} + (-5046044460444 + 2188587369852 \, \mathrm{I}) \, u_{ol+2-3\mathrm{I}}$$

$$+ (29128845979 + 10638652393 \, \mathrm{I}) \, u_{ol+3-3\mathrm{I}} \big), \, O( \, \mathcal{A}x_{ol}^{24} \, )$$

Formula: 303, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 5

Error order.: 23, Error.:  $2.5754054076928094517 \times 10^{-60}$ , New Error.:  $2.5681769778022838952 \times 10^{-83}$

Error order.: 23, Error.:  $2.5681769778022838952 \times 10^{-83}$ , New Error.:  $2.5674272895688306334 \times 10^{-106}$

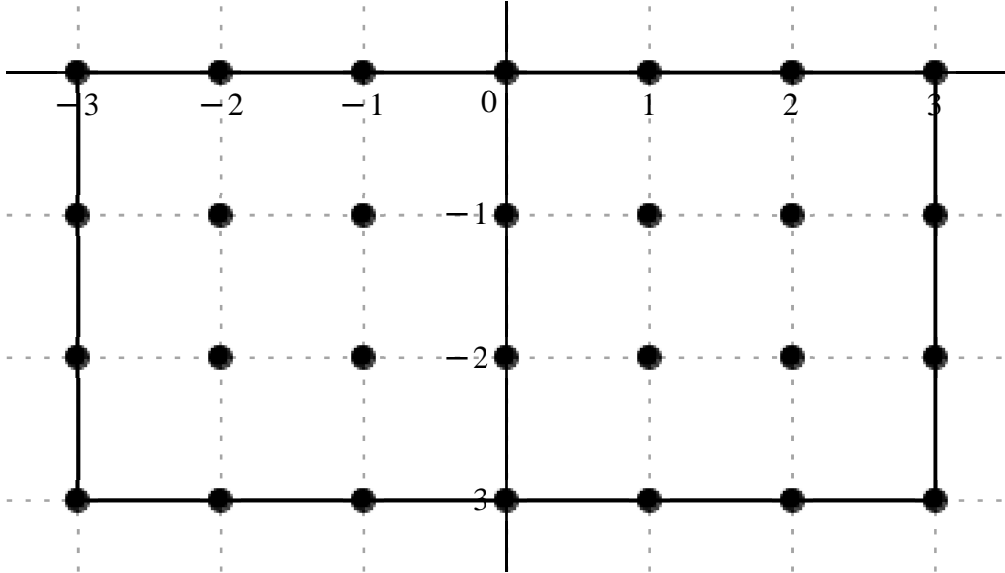
Error order.: 23, Error.:  $2.5674272895688306334 \times 10^{-106}$ , New Error.:  $2.5673520525540143849 \times 10^{-129}$

Error order.: 23, Error.:  $2.5673520525540143849 \times 10^{-129}$ , New Error.:  $2.5673445261708833261 \times 10^{-152}$

Error order.: 23, Error.:  $2.5673445261708833261 \times 10^{-152}$ , New Error.:  $2.5673437735057539915 \times 10^{-175}$

$$x_o + h., \left[ \begin{array}{cccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & 3 - \mathrm{I} \\ -3 - 2\mathrm{I} & -2 - 2\mathrm{I} & -1 - 2\mathrm{I} & -2\mathrm{I} & 1 - 2\mathrm{I} & 2 - 2\mathrm{I} & 3 - 2\mathrm{I} \\ -3 - 3\mathrm{I} & -2 - 3\mathrm{I} & -1 - 3\mathrm{I} & -3\mathrm{I} & 1 - 3\mathrm{I} & 2 - 3\mathrm{I} & 3 - 3\mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{cc} \frac{-17773139023}{56238975000} - \frac{127646688001 \text{ I}}{337433850000} & \frac{464162234249}{4165850000} - \frac{80194919787 \text{ I}}{4165850000} & \frac{-51947974677}{17956250} + \frac{328877346563 \text{ I}}{143650000} & \frac{-200903789471 \text{ I}}{13689000} & \frac{51947974677}{17956250} + \frac{328877346563 \text{ I}}{143650000} & \frac{-464162234249}{4165850000} - \frac{80194919787 \text{ I}}{4165850000} & \frac{17773139023}{56238975000} - \frac{127646688001 \text{ I}}{337433850000} \\ \frac{35645429691}{3626740000} + \frac{10604686359 \text{ I}}{61654580000} & \frac{-52217412237}{416585000} - \frac{1710446555781 \text{ I}}{416585000} & \frac{-605654878941}{4420000} - \frac{15885856143 \text{ I}}{4420000} & \frac{14502362577 \text{ I}}{32500} & \frac{605654878941}{4420000} - \frac{15885856143 \text{ I}}{4420000} & \frac{52217412237}{416585000} - \frac{1710446555781 \text{ I}}{416585000} & \frac{-35645429691}{3626740000} + \frac{10604686359 \text{ I}}{61654580000} \\ \frac{-44725091319}{15413645000} + \frac{242961193881 \text{ I}}{30827290000} & \frac{-2658126804183}{833170000} - \frac{19466478261 \text{ I}}{833170000} & \frac{-32511478527}{552500} - \frac{158273784171 \text{ I}}{2210000} & \frac{-18093674277 \text{ I}}{65000} & \frac{32511478527}{552500} - \frac{158273784171 \text{ I}}{2210000} & \frac{2658126804183}{833170000} - \frac{19466478261 \text{ I}}{833170000} & \frac{44725091319}{15413645000} + \frac{242961193881 \text{ I}}{30827290000} \\ \frac{-961990672177}{8323368300000} - \frac{7453525807693 \text{ I}}{24970104900000} & \frac{-44906666643}{2082925000} + \frac{108505470571 \text{ I}}{2082925000} & \frac{111563112281}{287300000} - \frac{292478336967 \text{ I}}{287300000} & \frac{19654385677 \text{ I}}{6844500} & \frac{-111563112281}{287300000} - \frac{292478336967 \text{ I}}{287300000} & \frac{44906666643}{2082925000} + \frac{108505470571 \text{ I}}{2082925000} & \frac{961990672177}{8323368300000} - \frac{7453525807693 \text{ I}}{24970104900000} \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x}{}^s_{ol} \; u(x_{ol}) = \frac{1}{24970104900000 \; \Delta x_{ol}{}^s} \big( -(7891273726212 + 9445854912074 \text{ I}) \; u_{ol-3} + (2782188432088506 - 480688349203278 \text{ I}) \; u_{ol-2} + (-72239269169633616 + 57167433643660038 \text{ I}) \; u_{ol-1} - 366468602374051100 \text{ I} u_{ol} + (72239269169633616 + 57167433643660038 \text{ I}) \; u_{ol+1} - (2782188432088506 + 480688349203278 \text{ I}) \; u_{ol+2} \\ + (7891273726212 - 9445854912074 \text{ I}) \; u_{ol+3} + (245418783422535 + 4294897975395 \text{ I}) \; u_{ol-3-1} - (3129911689485780 + 102524166553513140 \text{ I}) \; u_{ol-2-1} - (3421553362070943645 + 89744681972176335 \text{ I}) \; u_{ol-1-1} + 11142323533708440840 \text{ I} u_{ol-1} + (3421553362070943645 - 89744681972176335 \text{ I}) \; u_{ol+1-1} \\ + (3129911689485780 - 102524166553513140 \text{ I}) \; u_{ol+2-1} + (-245418783422535 + 4294897975395 \text{ I}) \; u_{ol+3-1} + (-72454647936780 + 196798567043610 \text{ I}) \; u_{ol-3-21} - (79664060321364510 + 583410353482170 \text{ I}) \; u_{ol-2-21} - (1469348469272918520 + 1788286422475035990 \text{ I}) \; u_{ol-1-21} - 6950783764971102420 \text{ I} u_{ol-21} \\ + (1469348469272918520 - 1788286422475035990 \text{ I}) \; u_{ol+1-21} + (79664060321364510 - 583410353482170 \text{ I}) \; u_{ol+2-21} + (72454647936780 + 196798567043610 \text{ I}) \; u_{ol+3-21} - (2885972016531 + 7453525807693 \text{ I}) \; u_{ol-3-31} + (-538341119716284 + 1300763581205148 \text{ I}) \; u_{ol-2-31} + (9696284777678553 \\ - 25420169700812871 \text{ I}) \; u_{ol-1-31} + 71703129826831400 \text{ I} u_{ol-31} - (9696284777678553 + 25420169700812871 \text{ I}) \; u_{ol+1-31} + (538341119716284 + 1300763581205148 \text{ I}) \; u_{ol+2-31} + (2885972016531 - 7453525807693 \text{ I}) \; u_{ol+3-31} \big), \; O(\; \Delta x_{ol}{}^{23} \; )$$

Formula: 304, Var: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 6

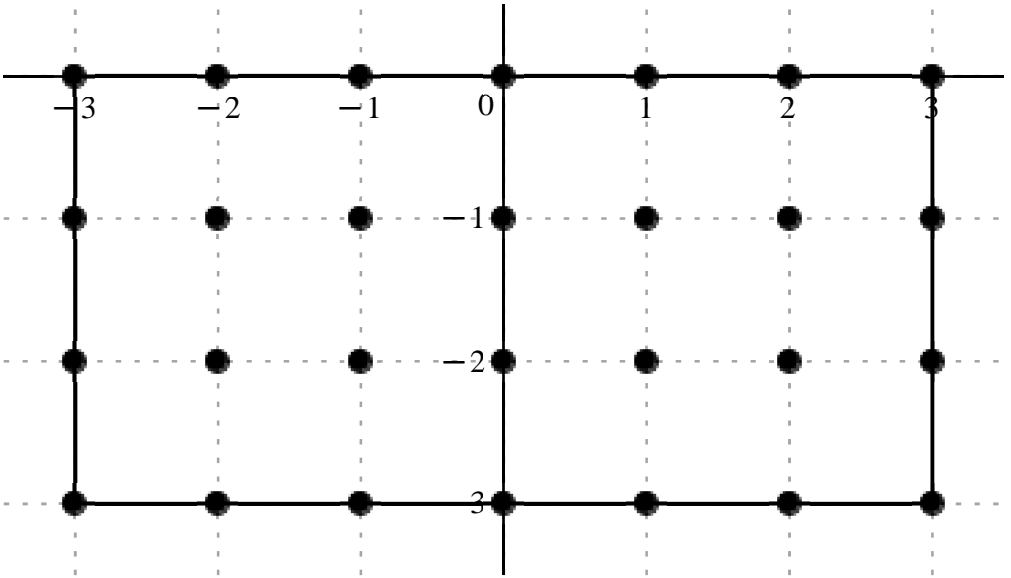
Error order: 22, Error: 1.9989048158289421447 × 10<sup>−57</sup>, New Error: 1.9933117354405472195 × 10<sup>−79</sup>

Error order: 22, Error: 1.9933117354405472195 × 10<sup>−79</sup>, New Error: 1.9927317247508306938 × 10<sup>−101</sup>

Error order: 22, Error: 1.9927317247508306938 × 10<sup>−101</sup>, New Error: 1.9926735168559700281 × 10<sup>−123</sup>

*Error order:.* 22, *Error:.*  $1.9926735168559700281 \times 10^{-123}$ , *New Error:.*  $1.9926676939984289870 \times 10^{-145}$   
*Error order:.* 22, *Error:.*  $1.9926676939984289870 \times 10^{-145}$ , *New Error:.*  $1.9926671116919945374 \times 10^{-167}$

$$c = , \left[ \begin{array}{cccccccc} \frac{-4279722404621}{1387228050000} + \frac{1953418886909 \text{ I}}{693614025000} & \frac{-26645515211}{120168750} - \frac{55448927306 \text{ I}}{60084375} & \frac{1777366975957}{86190000} + \frac{111838602284 \text{ I}}{5386875} & \frac{-39785237923}{380250} & \frac{1777366975957}{86190000} - \frac{111838602284 \text{ I}}{5386875} & \frac{-26645515211}{120168750} + \frac{55448927306 \text{ I}}{60084375} & \frac{-4279722404621}{1387228050000} - \frac{1953418886909 \text{ I}}{693614025000} \\ \frac{-1424523277}{948532000} - \frac{78152421051 \text{ I}}{948532000} & \frac{-2819069858169}{83317000} + \frac{8230831977 \text{ I}}{3332680} & \frac{56488100013}{4420000} + \frac{285912822597 \text{ I}}{260000} & \frac{113889614009}{32500} & \frac{56488100013}{4420000} - \frac{285912822597 \text{ I}}{260000} & \frac{-2819069858169}{83317000} - \frac{8230831977 \text{ I}}{3332680} & \frac{-1424523277}{948532000} + \frac{78152421051 \text{ I}}{948532000} \\ \frac{2047707361337}{30827290000} + \frac{346860352323 \text{ I}}{15413645000} & \frac{5884142841}{12252500} + \frac{5489649588219 \text{ I}}{208292500} & \frac{-1272221926299}{2210000} + \frac{270810270993 \text{ I}}{552500} & \frac{-3665569166}{1625} & \frac{-1272221926299}{2210000} - \frac{270810270993 \text{ I}}{552500} & \frac{5884142841}{12252500} - \frac{5489649588219 \text{ I}}{208292500} & \frac{2047707361337}{30827290000} - \frac{346860352323 \text{ I}}{15413645000} \\ \frac{-457666389599}{184963740000} + \frac{112269529363 \text{ I}}{110978244000} & \frac{2718107008777}{6248775000} + \frac{63167990033 \text{ I}}{367575000} & \frac{-7260293529737}{861900000} - \frac{2688270187091 \text{ I}}{861900000} & \frac{460384667}{19500} & \frac{-7260293529737}{861900000} + \frac{2688270187091 \text{ I}}{861900000} & \frac{2718107008777}{6248775000} - \frac{63167990033 \text{ I}}{367575000} & \frac{-457666389599}{184963740000} - \frac{112269529363 \text{ I}}{110978244000} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{2774456100000 \, \Delta x_{ol}^6} \big( (-8559444809242 + 7813675547636 \, \text{I}) \, u_{ol-3} - (615191655191568 + 2560409667281856 \, \text{I}) \, u_{ol-2} + (57213442956055830 + 57601353720351360 \, \text{I}) \, u_{ol-1} - 290289009981377200 \, u_{ol} + (57213442956055830 - 57601353720351360 \, \text{I}) \, u_{ol+1} + (-615191655191568 + 2560409667281856 \, \text{I}) \, u_{ol+2} \\ - (8559444809242 + 7813675547636 \, \text{I}) \, u_{ol+3} - (4166730585225 + 228595831574175 \, \text{I}) \, u_{ol-3-1} + (-93875026277027700 + 6852167620852500 \, \text{I}) \, u_{ol-2-1} + (35457862818660165 + 3050971441240248045 \, \text{I}) \, u_{ol-1-1} + 9722514901966630920 \, u_{ol-1} + (35457862818660165 - 3050971441240248045 \, \text{I}) \, u_{ol+1-1} \\ - (93875026277027700 + 6852167620852500 \, \text{I}) \, u_{ol+2-1} + (-4166730585225 + 228595831574175 \, \text{I}) \, u_{ol+3-1} + (184293662520330 + 62434863418140 \, \text{I}) \, u_{ol-3-21} + (1332405304916040 + 73122132515077080 \, \text{I}) \, u_{ol-2-21} + (-1597160128495027590 + 1359911689229288520 \, \text{I}) \, u_{ol-1-21} - 6258437373895761600 \, u_{ol-21} \\ - (1597160128495027590 + 1359911689229288520 \, \text{I}) \, u_{ol+1-21} + (1332405304916040 - 73122132515077080 \, \text{I}) \, u_{ol+2-21} + (184293662520330 - 62434863418140 \, \text{I}) \, u_{ol+3-21} + (-6864995843985 + 2806738234075 \, \text{I}) \, u_{ol-3-31} + (1206839511896988 + 476791988769084 \, \text{I}) \, u_{ol-2-31} - (23370884872223403 \\ + 8653541732245929 \, \text{I}) \, u_{ol-1-31} + 65503438343826600 \, u_{ol-31} + (-23370884872223403 + 8653541732245929 \, \text{I}) \, u_{ol+1-31} + (1206839511896988 - 476791988769084 \, \text{I}) \, u_{ol+2-31} - (6864995843985 + 2806738234075 \, \text{I}) \, u_{ol+3-31} \big), \, O(\, \Delta x_{ol}^{22} \,)$$

Formula:., 305, Var.: 1

Variavel :.,  $x_{oi}$  , Derivada de Ordem :., 7

Error order:., 21, Error:.,  $1.5113956249006463757 \times 10^{-54}$ , New Error:.,  $1.5071802318511960977 \times 10^{-75}$

Error order:., 21, Error:.,  $1.5071802318511960977 \times 10^{-75}$ , New Error:.,  $1.5067431433070741124 \times 10^{-96}$

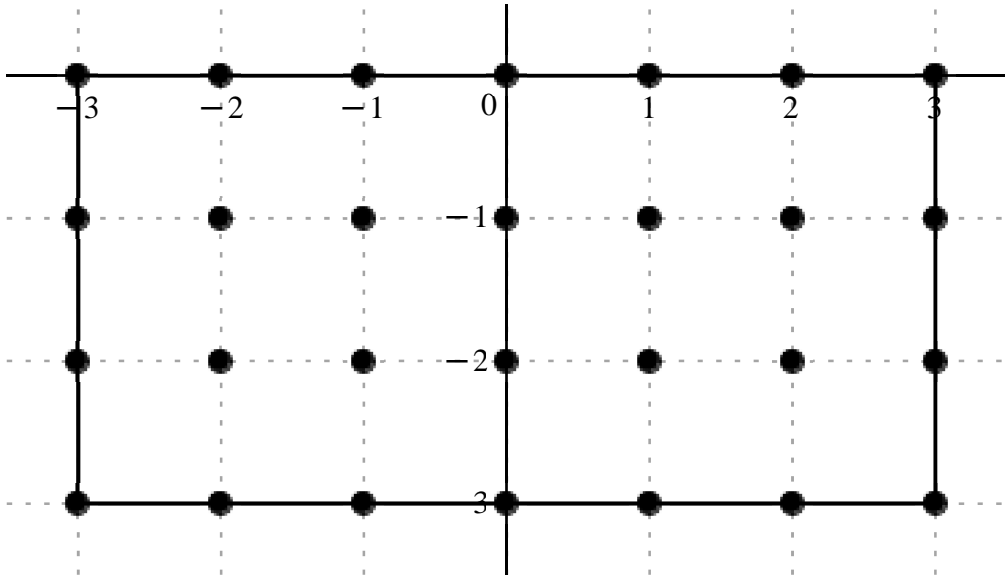
Error order:., 21, Error:.,  $1.5067431433070741124 \times 10^{-96}$ , New Error:.,  $1.5066992791104565256 \times 10^{-117}$

Error order:., 21, Error:.,  $1.5066992791104565256 \times 10^{-117}$ , New Error:.,  $1.5066948911375253579 \times 10^{-138}$

Error order:., 21, Error:.,  $1.5066948911375253579 \times 10^{-138}$ , New Error:.,  $1.5066944523246996999 \times 10^{-159}$

$$x_o + h., \begin{bmatrix} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3 -1 & -2 -1 & -1 -1 & -1 & 1 -1 & 2 -1 & 3 -1 \\ -3 -2 \text{ I} & -2 -2 \text{ I} & -1 -2 \text{ I} & -2 \text{ I} & 1 -2 \text{ I} & 2 -2 \text{ I} & 3 -2 \text{ I} \\ -3 -3 \text{ I} & -2 -3 \text{ I} & -1 -3 \text{ I} & -3 \text{ I} & 1 -3 \text{ I} & 2 -3 \text{ I} & 3 -3 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{912191019733}{37492650000} + \frac{171144586193 \text{ I}}{7029871875} & -\frac{46115406010961}{6248775000} + \frac{14334979564703 \text{ I}}{6248775000} & \frac{61444675306189}{430950000} - \frac{37163238614201 \text{ I}}{215475000} & \frac{1690272671423 \text{ I}}{2281500} - \frac{61444675306189}{430950000} - \frac{37163238614201 \text{ I}}{215475000} & \frac{46115406010961}{6248775000} + \frac{14334979564703 \text{ I}}{6248775000} & -\frac{912191019733}{37492650000} + \frac{171144586193 \text{ I}}{7029871875} \\ -\frac{41366077219551}{61654580000} + \frac{140505606283 \text{ I}}{3853411250} & \frac{762463678053}{24505000} + \frac{112735099214913 \text{ I}}{416585000} & \frac{37932818466711}{4420000} - \frac{887642329791 \text{ I}}{2210000} & -\frac{873752694703 \text{ I}}{32500} - \frac{37932818466711}{4420000} - \frac{887642329791 \text{ I}}{2210000} & -\frac{762463678053}{24505000} + \frac{112735099214913 \text{ I}}{416585000} & \frac{41366077219551}{61654580000} + \frac{140505606283 \text{ I}}{3853411250} \\ \frac{5199739617387}{30827290000} - \frac{8391017335897 \text{ I}}{15413645000} & \frac{88214329475601}{416585000} - \frac{3824847124833 \text{ I}}{416585000} & \frac{516112683429}{130000} + \frac{622503813981 \text{ I}}{138125} & \frac{578900154763 \text{ I}}{32500} - \frac{516112683429}{130000} + \frac{622503813981 \text{ I}}{138125} & -\frac{88214329475601}{416585000} - \frac{3824847124833 \text{ I}}{416585000} & -\frac{5199739617387}{30827290000} - \frac{8391017335897 \text{ I}}{15413645000} \\ \frac{23858071573217}{2774456100000} + \frac{41527384131947 \text{ I}}{2080842075000} & \frac{8320346823439}{6248775000} - \frac{22087445616803 \text{ I}}{6248775000} & -\frac{21021046998847}{861900000} + \frac{29243656203727 \text{ I}}{430950000} & -\frac{431308316831 \text{ I}}{2281500} + \frac{21021046998847}{861900000} + \frac{29243656203727 \text{ I}}{430950000} & -\frac{8320346823439}{6248775000} - \frac{22087445616803 \text{ I}}{6248775000} & -\frac{23858071573217}{2774456100000} + \frac{41527384131947 \text{ I}}{2080842075000} \end{bmatrix}$$



$$\frac{d^7}{dx_{oi}^7} u(x_{oi}) = \frac{1}{8323368300000 \Delta x_{oi}^7} (7 ((28929486625818 + 28947884293216 \text{ I}) u_{oi-3} + (-8775102972371436 + 2727741825740628 \text{ I}) u_{oi-2} + (169534636980533478 - 205077368741336604 \text{ I}) u_{oi-1} + 880921822840769800 \text{ I} u_{oi} - (169534636980533478 + 205077368741336604 \text{ I}) u_{oi+1} + (8775102972371436 + 2727741825740628 \text{ I}) u_{oi+2} + (-28929486625818 + 28947884293216 \text{ I}) u_{oi+3} + (-797774346377055 + 43356015653040 \text{ I}) u_{oi-3-1} + (36996916126783140 + 321778183187708820 \text{ I}) u_{oi-2-1} + (10204551349562926395 - 477580738818393990 \text{ I}) u_{oi-1-1} - 31967320796178145560 \text{ I} u_{oi-1} - (10204551349562926395 + 477580738818393990 \text{ I}) u_{oi+1-1} + (-36996916126783140 + 321778183187708820 \text{ I}) u_{oi+2-1} + (797774346377055 + 43356015653040 \text{ I}) u_{oi+3-1} + (200561385242070 - 647307051626340 \text{ I}) u_{oi-3-21} + (251788900417501140 - 10917206507737620 \text{ I}) u_{oi-2-21} + (4720654888440520770 + 5358840089896369440 \text{ I}) u_{oi-1-21}$$

$$+21179776690195376760 \, \text{I} u_{ol-21} + (-4720654888440520770 + 5358840089896369440 \, \text{I}) u_{ol+1-21} - (251788900417501140 + 10917206507737620 \, \text{I}) u_{ol+2-21} - (200561385242070 + 647307051626340 \, \text{I}) u_{ol+3-21} + (10224887817093 + 23729933789684 \, \text{I}) u_{ol-3-31} + (1583243138402964 - 4202925365940228 \, \text{I}) u_{ol-2-31} \\ + (-29000035838266497 + 80687425131254754 \, \text{I}) u_{ol-1-31} - 224785571637550600 \, \text{I} u_{ol-31} + (29000035838266497 + 80687425131254754 \, \text{I}) u_{ol+1-31} - (1583243138402964 + 4202925365940228 \, \text{I}) u_{ol+2-31} + (-10224887817093 + 23729933789684 \, \text{I}) u_{ol+3-31} \Big) \Big), \, O(\, \Delta \mathfrak{x}_{ol}^{21} \, )$$

Formula.: 306, Var.: 1

Variavel .:,  $x_{ol}$  , Derivada de Ordem .:, 8

Error order.: 20, Error.: 1.1118759429569627435 × 10<sup>−51</sup>, New Error.: 1.1087854360233467171 × 10<sup>−71</sup>

Error order.: 20, Error.: 1.1087854360233467171 × 10<sup>−71</sup>, New Error.: 1.1084650270292206225 × 10<sup>−91</sup>

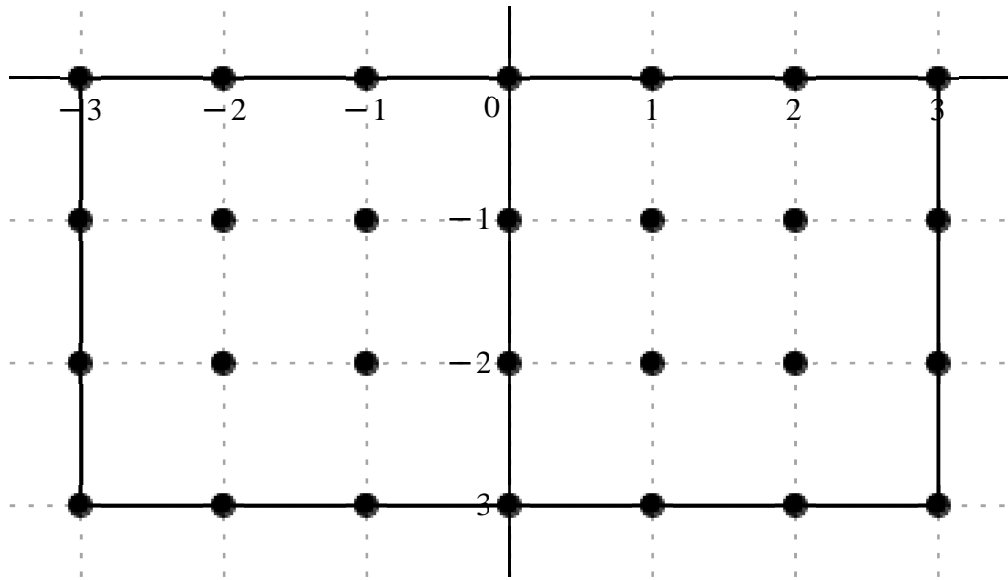
Error order.: 20, Error.: 1.1084650270292206225 × 10<sup>−91</sup>, New Error.: 1.1084328726561298270 × 10<sup>−111</sup>

Error order.: 20, Error.: 1.1084328726561298270 × 10<sup>−111</sup>, New Error.: 1.1084296560841950781 × 10<sup>−131</sup>

Error order.: 20, Error.: 1.1084296560841950781 × 10<sup>−131</sup>, New Error.: 1.1084293344156554578 × 10<sup>−151</sup>

$$x_o+h., \left[ \begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I \\ -3-2\,I & -2-2\,I & -1-2\,I & -2\,I & 1-2\,I & 2-2\,I & 3-2\,I \\ -3-3\,I & -2-3\,I & -1-3\,I & -3\,I & 1-3\,I & 2-3\,I & 3-3\,I \end{array} \right]$$

$$c=, \left[ \begin{array}{cccccccccccc} \frac{642666186463}{3468070125} - \frac{705938882152 \, \text{I}}{3468070125} & \frac{45711329748}{2082925} + \frac{591811022614 \, \text{I}}{10414625} & - \frac{488510560041}{359125} - \frac{338358003046 \, \text{I}}{359125} & \frac{15135898358}{2925} & - \frac{488510560041}{359125} + \frac{338358003046 \, \text{I}}{359125} & \frac{45711329748}{2082925} - \frac{591811022614 \, \text{I}}{10414625} & \frac{642666186463}{3468070125} + \frac{705938882152 \, \text{I}}{3468070125} \\ \frac{1493460335479}{3082729000} + \frac{16330530998523 \, \text{I}}{3082729000} & \frac{21836062706304}{10414625} - \frac{3429514621848 \, \text{I}}{10414625} & - \frac{1146525144303}{221000} - \frac{574799145501 \, \text{I}}{8840} & - \frac{326607990688}{1625} & - \frac{1146525144303}{221000} + \frac{574799145501 \, \text{I}}{8840} & \frac{21836062706304}{10414625} + \frac{3429514621848 \, \text{I}}{10414625} & \frac{1493460335479}{3082729000} - \frac{16330530998523 \, \text{I}}{3082729000} \\ - \frac{128392337773}{29641625} - \frac{7213496934 \, \text{I}}{5928325} & - \frac{1176983308977}{10414625} - \frac{3440511726267 \, \text{I}}{2082925} & \frac{947364650967}{27625} - \frac{862408198596 \, \text{I}}{27625} & \frac{222274503332}{1625} & \frac{947364650967}{27625} + \frac{862408198596 \, \text{I}}{27625} & - \frac{1176983308977}{10414625} + \frac{3440511726267 \, \text{I}}{2082925} & - \frac{128392337773}{29641625} + \frac{7213496934 \, \text{I}}{5928325} \\ \frac{4337475674819}{27744561000} - \frac{1967695520539 \, \text{I}}{27744561000} & - \frac{22355982096}{801125} - \frac{8014328056 \, \text{I}}{801125} & \frac{1526336955969}{2873000} + \frac{532270277777 \, \text{I}}{2873000} & - \frac{279769856576}{190125} & \frac{1526336955969}{2873000} - \frac{532270277777 \, \text{I}}{2873000} & - \frac{22355982096}{801125} + \frac{8014328056 \, \text{I}}{801125} & \frac{4337475674819}{27744561000} + \frac{1967695520539 \, \text{I}}{27744561000} \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} u(x_{ol}) = \frac{1}{27744561000 \Delta x_{ol}^8} (7 \left( (734475641672 - 806787293888 \operatorname{I}) u_{ol-3} + (86982130320480 + 225226366320528 \operatorname{I}) u_{ol-2} - (5391481689503928 + 3734312269045968 \operatorname{I}) u_{ol-1} + 20509834201872080 u_{ol} + (-5391481689503928 + 3734312269045968 \operatorname{I}) u_{ol+1} + (86982130320480 - 225226366320528 \operatorname{I}) u_{ol+2} + (734475641672 \right. \\ \left. + 806787293888 \operatorname{I}) u_{ol+3} + (1920163288473 + 20996396998101 \operatorname{I}) u_{ol-3-1} + (8310181578513408 - 1305175278943296 \operatorname{I}) u_{ol-2-1} - (20562273305848989 + 257717355447646575 \operatorname{I}) u_{ol-1-1} - 796623764459837184 u_{ol-1} + (-20562273305848989 + 257717355447646575 \operatorname{I}) u_{ol+1-1} + (8310181578513408 \right. \\ \left. + 1305175278943296 \operatorname{I}) u_{ol+2-1} + (1920163288473 - 20996396998101 \operatorname{I}) u_{ol+3-1} - (17167889736504 + 4822737950160 \operatorname{I}) u_{ol-3-21} - (447926219302104 + 6546802313410920 \operatorname{I}) u_{ol-2-21} + (135923549310912168 - 123734385897074784 \operatorname{I}) u_{ol-1-21} + 542145803643022176 u_{ol-21} + (135923549310912168 \right. \\ \left. + 123734385897074784 \operatorname{I}) u_{ol+1-21} + (-447926219302104 + 6546802313410920 \operatorname{I}) u_{ol+2-21} + (-17167889736504 + 4822737950160 \operatorname{I}) u_{ol+3-21} + (619639382117 - 281099360077 \operatorname{I}) u_{ol-3-31} - (110604624564096 + 39650315605056 \operatorname{I}) u_{ol-2-31} + (2105690854827519 + 734304867498927 \operatorname{I}) u_{ol-1-31} - 5832322232917504 u_{ol-31} \right. \\ \left. + (2105690854827519 - 734304867498927 \operatorname{I}) u_{ol+1-31} + (-110604624564096 + 39650315605056 \operatorname{I}) u_{ol+2-31} + (619639382117 + 281099360077 \operatorname{I}) u_{ol+3-31} \right), O(\Delta x_{ol}^{20})$$

Formula.: 307, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 9

Error order.: 19, Error.:  $7.9425003928305860820 \times 10^{-49}$ , New Error.:  $7.9205046678943753633 \times 10^{-68}$

Error order.: 19, Error.:  $7.9205046678943753633 \times 10^{-68}$ , New Error.:  $7.9182245698248977086 \times 10^{-87}$

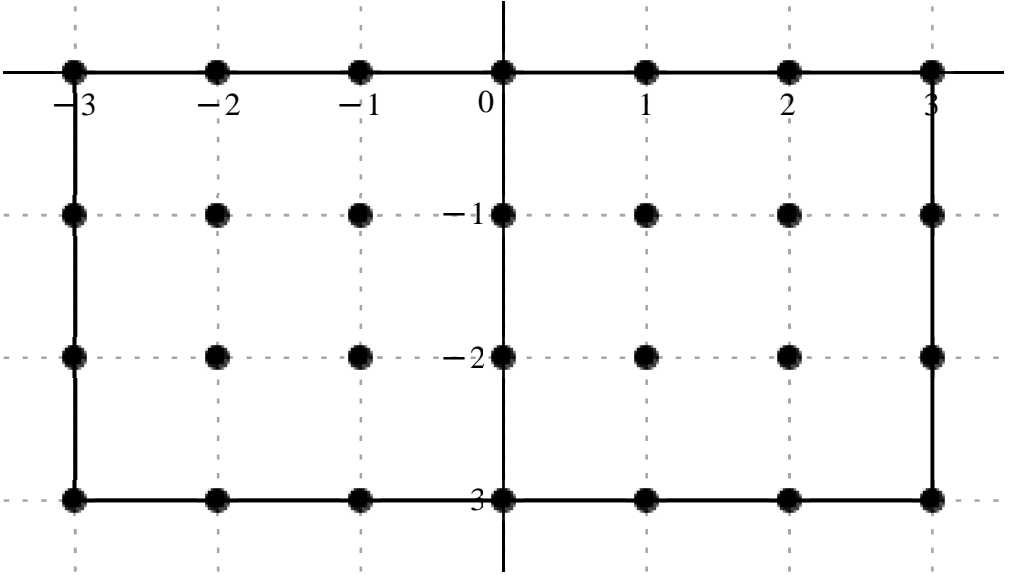
Error order.: 19, Error.:  $7.9182245698248977086 \times 10^{-87}$ , New Error.:  $7.9179957555344711089 \times 10^{-106}$

Error order.: 19, Error.:  $7.9179957555344711089 \times 10^{-106}$ , New Error.:  $7.9179728660613784864 \times 10^{-125}$

Error order.: 19, Error.:  $7.9179728660613784864 \times 10^{-125}$ , New Error.:  $7.9179705770336295106 \times 10^{-144}$

$$x_o + h., \begin{bmatrix} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-1 & -2-1 & -1-1 & -1 & 1-1 & 2-1 & 3-1 \\ -3-21 & -2-21 & -1-21 & -21 & 1-21 & 2-21 & 3-21 \\ -3-31 & -2-31 & -1-31 & -31 & 1-31 & 2-31 & 3-31 \end{bmatrix}$$

$$c = , \left[ \begin{array}{cc} -\frac{3169954883081}{1926705625} - \frac{15667162563017 \text{ I}}{11560233750} & \frac{43727404097223}{104146250} - \frac{1201961508237 \text{ I}}{6126250} & -\frac{10778676794046}{1795625} + \frac{36650370651741 \text{ I}}{3591250} & -\frac{449455301071 \text{ I}}{12675} & \frac{10778676794046}{1795625} + \frac{36650370651741 \text{ I}}{3591250} & -\frac{43727404097223}{104146250} - \frac{1201961508237 \text{ I}}{6126250} & \frac{3169954883081}{1926705625} - \frac{15667162563017 \text{ I}}{11560233750} \\ \frac{62356543967151}{1541364500} - \frac{16184817775791 \text{ I}}{3082729000} & -\frac{32591446995933}{10414625} - \frac{163513197598149 \text{ I}}{10414625} & -\frac{13186855457811}{27625} + \frac{11691237806577 \text{ I}}{221000} & \frac{2373228407466 \text{ I}}{1625} & \frac{13186855457811}{27625} + \frac{11691237806577 \text{ I}}{221000} & \frac{32591446995933}{10414625} - \frac{163513197598149 \text{ I}}{10414625} & -\frac{62356543967151}{1541364500} - \frac{16184817775791 \text{ I}}{3082729000} \\ -\frac{3240238758057}{385341125} + \frac{25728033281139 \text{ I}}{770682250} & -\frac{259961232144537}{20829250} + \frac{1429458002217 \text{ I}}{1225250} & -\frac{6569637342282}{27625} - \frac{13981456454553 \text{ I}}{55250} & -\frac{331222979367 \text{ I}}{325} & \frac{6569637342282}{27625} - \frac{13981456454553 \text{ I}}{55250} & \frac{259961232144537}{20829250} + \frac{1429458002217 \text{ I}}{1225250} & \frac{3240238758057}{385341125} + \frac{25728033281139 \text{ I}}{770682250} \\ -\frac{4365236381177}{7706822500} - \frac{54876309648391 \text{ I}}{46240935000} & -\frac{3785293127511}{52073125} + \frac{11121205836447 \text{ I}}{52073125} & \frac{2449117124748}{1795625} - \frac{57938371983513 \text{ I}}{14365000} & \frac{704063536694 \text{ I}}{63375} & -\frac{2449117124748}{1795625} - \frac{57938371983513 \text{ I}}{14365000} & \frac{3785293127511}{52073125} + \frac{11121205836447 \text{ I}}{52073125} & \frac{4365236381177}{7706822500} - \frac{54876309648391 \text{ I}}{46240935000} \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{46240935000 \, \Delta x_{ol}^9} \, \big( 7 \, \big( -(10868416741992 + 8952664321724 \, \mathrm{I}) \, u_{ol-3} + (2773566774166716 - 1296057923453268 \, \mathrm{I}) \, u_{ol-2} + (-39653212114324656 + 67415738930259588 \, \mathrm{I}) \, u_{ol-1} - 234243261338174600 \, \mathrm{I} u_{ol} + (39653212114324656 + 67415738930259588 \, \mathrm{I}) \, u_{ol+1} - (2773566774166716 + 1296057923453268 \, \mathrm{I}) \, u_{ol+2} \\ + (10868416741992 - 8952664321724 \, \mathrm{I}) \, u_{ol+3} + (267242331287790 - 34681752376695 \, \mathrm{I}) \, u_{ol-3-1} - (20672289237420360 + 103714085333683080 \, \mathrm{I}) \, u_{ol-2-1} + (-3153316230531525240 + 349459448922734085 \, \mathrm{I}) \, u_{ol-1-1} + 9647498947673742480 \, \mathrm{I} u_{ol-1} + (3153316230531525240 + 349459448922734085 \, \mathrm{I}) \, u_{ol+1-1} \\ + (20672289237420360 - 103714085333683080 \, \mathrm{I}) \, u_{ol+2-1} - (267242331287790 + 34681752376695 \, \mathrm{I}) \, u_{ol+3-1} + (-55546950138120 + 220525999552620 \, \mathrm{I}) \, u_{ol-3-21} + (-82444847908696020 + 7706820714809940 \, \mathrm{I}) \, u_{ol-2-21} - (1570969222071284880 + 1671662880724798260 \, \mathrm{I}) \, u_{ol-1-21} - 6732334179962983800 \, \mathrm{I} u_{ol-21} \\ + (1570969222071284880 - 1671662880724798260 \, \mathrm{I}) \, u_{ol+1-21} + (82444847908696020 + 7706820714809940 \, \mathrm{I}) \, u_{ol+2-21} + (55546950138120 + 220525999552620 \, \mathrm{I}) \, u_{ol+3-21} - (3741631183866 + 7839472806913 \, \mathrm{I}) \, u_{ol-3-31} + (-480191471032824 + 1410804397537848 \, \mathrm{I}) \, u_{ol-2-31} + (9009952028072928 \\ - 26643374202132621 \, \mathrm{I}) \, u_{ol-1-31} + 73387559844772880 \, \mathrm{I} u_{ol-31} - (9009952028072928 + 26643374202132621 \, \mathrm{I}) \, u_{ol+1-31} + (480191471032824 + 1410804397537848 \, \mathrm{I}) \, u_{ol+2-31} + (3741631183866 - 7839472806913 \, \mathrm{I}) \, u_{ol+3-31} \big) \big) , \, O( \, \Delta x_{ol}^{19} \, )$$

Formula: 308, Var: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 10

Error order: 18, Error: 5.4975974620991438740 × 10<sup>−46</sup>, New Error: 5.4824325462153680590 × 10<sup>−64</sup>

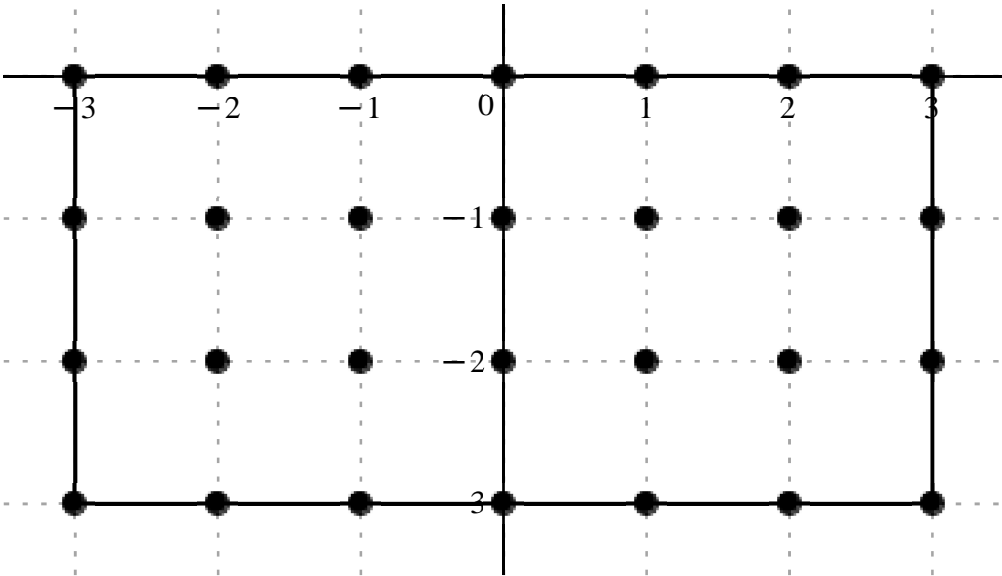
Error order: 18, Error: 5.4824325462153680590 × 10<sup>−64</sup>, New Error: 5.4808607663494306744 × 10<sup>−82</sup>

Error order: 18, Error: 5.4808607663494306744 × 10<sup>−82</sup>, New Error: 5.4807030360082566941 × 10<sup>−100</sup>

*Error order:.* 18,    *Error:.*  $5.4807030360082566941 \times 10^{-100}$ ,    *New Error:.*  $5.4806872574511302346 \times 10^{-118}$   
*Error order:.* 18,    *Error:.*  $5.4806872574511302346 \times 10^{-118}$ ,    *New Error:.*  $5.4806856795401880356 \times 10^{-136}$

$$x_o+h.,\left[\begin{array}{cccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I \\ -3-2I & -2-2I & -1-2I & -2I & 1-2I & 2-2I & 3-2I \\ -3-3I & -2-3I & -1-3I & -3I & 1-3I & 2-3I & 3-3I \end{array}\right]$$

$$c=,\left[\begin{array}{cccccccccccc} -\frac{7309412883381}{770682250}+\frac{4936922425729\text{ I}}{385341125} & -\frac{1318801645182}{801125}-\frac{2377575940614\text{ I}}{801125} & \frac{2102130739947}{28730}+\frac{2647833553428\text{ I}}{71825} & -\frac{200532179442}{845} & \frac{2102130739947}{28730}-\frac{2647833553428\text{ I}}{71825} & -\frac{1318801645182}{801125}+\frac{2377575940614\text{ I}}{801125} & -\frac{7309412883381}{770682250}-\frac{4936922425729\text{ I}}{385341125} \\ -\frac{2395377854541}{47426600}-\frac{14137059082167\text{ I}}{47426600} & -\frac{13892616343809}{122525}+\frac{57097513635561\text{ I}}{2082925} & \frac{20991847082409}{44200}+\frac{149790367367109\text{ I}}{44200} & \frac{3343738604346}{325} & \frac{20991847082409}{44200}-\frac{149790367367109\text{ I}}{44200} & -\frac{13892616343809}{122525}-\frac{57097513635561\text{ I}}{2082925} & -\frac{2395377854541}{47426600}+\frac{14137059082167\text{ I}}{47426600} \\ \frac{38326101047073}{154136450}+\frac{4267574051643\text{ I}}{77068225} & \frac{22509232139961}{2082925}+\frac{189843297726159\text{ I}}{2082925} & -\frac{19965004349283}{11050}+\frac{9675874546002\text{ I}}{5525} & -\frac{2388982812804}{325} & -\frac{19965004349283}{11050}-\frac{9675874546002\text{ I}}{5525} & \frac{22509232139961}{2082925}-\frac{189843297726159\text{ I}}{2082925} & \frac{38326101047073}{154136450}-\frac{4267574051643\text{ I}}{77068225} \\ -\frac{1073960792149}{123309160}+\frac{2694948519599\text{ I}}{616545800} & \frac{16464770801871}{10414625}+\frac{5306798008743\text{ I}}{10414625} & -\frac{85115031885807}{2873000}-\frac{27894467726601\text{ I}}{2873000} & \frac{26379708866}{325} & -\frac{85115031885807}{2873000}+\frac{27894467726601\text{ I}}{2873000} & \frac{16464770801871}{10414625}-\frac{5306798008743\text{ I}}{10414625} & -\frac{1073960792149}{123309160}-\frac{2694948519599\text{ I}}{616545800} \end{array}\right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{3082729000\; \Delta x_{ol}^{10}}\Big(7\left((\begin{array}{l} (-4176807361932+5642197057976\text{ I})\;u_{ol-3}-(724964104380048+1306987459926096\text{ I})\;u_{ol-2}+(32222661199473300+16235002301875680\text{ I})\;u_{ol-1}-104511642434329200\;u_{ol}+(32222661199473300-16235002301875680\text{ I})\;u_{ol+1}+(-724964104380048+1306987459926096\text{ I})\;u_{ol+2} \\ -(4176807361932+5642197057976\text{ I})\;u_{ol+3}-(22242794363595+131272691477265\text{ I})\;u_{ol+3-1}+(-49934032458604920+12072045740090040\text{ I})\;u_{ol+2-1}+(209153767823230815+1492447024574145315\text{ I})\;u_{ol-1-1}+4530918665510742960\;u_{ol-1}+(209153767823230815-1492447024574145315\text{ I})\;u_{ol+1-1} \\ -(49934032458604920+12072045740090040\text{ I})\;u_{ol+2-1}+(-22242794363595+131272691477265\text{ I})\;u_{ol+3-1}+(109503145848780+24386137437960\text{ I})\;u_{ol-3-21}+(4759094795306040+40138297233530760\text{ I})\;u_{ol-2-21}+(-795690987623281620+771250137383896560\text{ I})\;u_{ol-1-21}-3237180921992291040\;u_{ol-21} \\ -(795690987623281620+771250137383896560\text{ I})\;u_{ol+1-21}+(4759094795306040-40138297233530760\text{ I})\;u_{ol+2-21}+(109503145848780-24386137437960\text{ I})\;u_{ol+3-21}+(-3835574257675+1924963228285\text{ I})\;u_{ol-3-31}+(696224593907688+224401744369704\text{ I})\;u_{ol-2-31}-(13046918459067273 \\ +4275823410091839\text{ I})\;u_{ol-1-31}+35745711442978160\;u_{ol-31}+(-13046918459067273+4275823410091839\text{ I})\;u_{ol+1-31}+(696224593907688-224401744369704\text{ I})\;u_{ol+2-31}-(3835574257675+1924963228285\text{ I})\;u_{ol+3-31})\Big),\;O(\;\Delta x_{ol}^{18}\;)\end{array}\right)$$



Formula:, 309, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

Error order:, 16, Error:,  $2.3749792336692001125 \times 10^{-40}$ , New Error:,  $2.3684860775362960928 \times 10^{-56}$

Error order:, 16, Error:,  $2.3684860775362960928 \times 10^{-56}$ , New Error:,  $2.3678133070612854183 \times 10^{-72}$

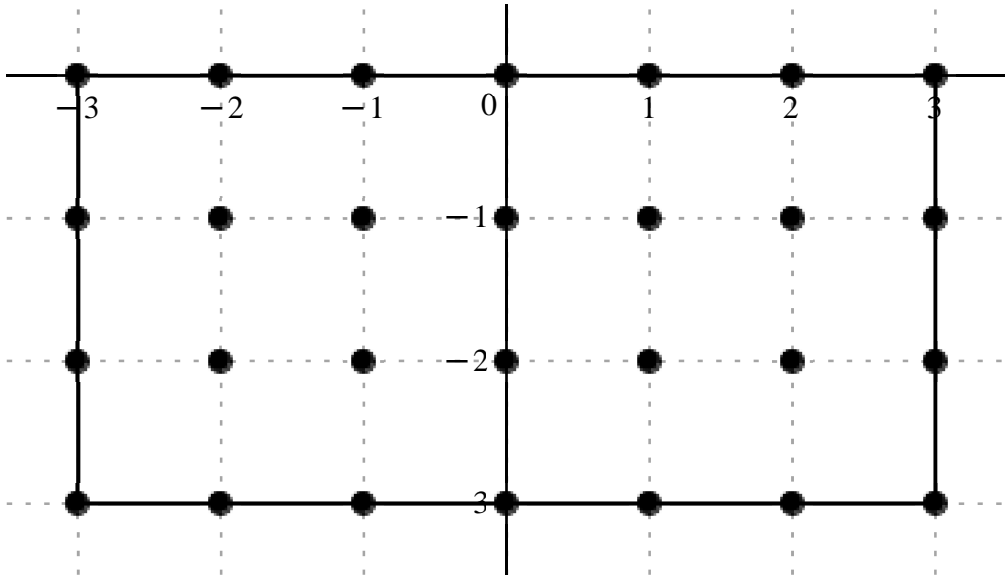
Error order:, 16, Error:,  $2.3678133070612854183 \times 10^{-72}$ , New Error:,  $2.3677457956873415387 \times 10^{-88}$

Error order:, 16, Error:,  $2.3677457956873415387 \times 10^{-88}$ , New Error:,  $2.3677390422069084595 \times 10^{-104}$

Error order:, 16, Error:,  $2.3677390422069084595 \times 10^{-104}$ , New Error:,  $2.3677383668354349908 \times 10^{-120}$

$$x_o+h., \left[ \begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I \\ -3-2\,I & -2-2\,I & -1-2\,I & -2\,I & 1-2\,I & 2-2\,I & 3-2\,I \\ -3-3\,I & -2-3\,I & -1-3\,I & -3\,I & 1-3\,I & 2-3\,I & 3-3\,I \end{array} \right]$$

$$c=,\left[ \begin{array}{cccccccccccc} \frac{1809377262231}{4533425}-\frac{3111956309154\,I}{4533425} & \frac{2362494219624}{24505}+\frac{15744024459702\,I}{122525} & -\frac{13946768437833}{4225}-\frac{5216939922348\,I}{4225} & \frac{633022024866}{65} & -\frac{13946768437833}{4225}+\frac{5216939922348\,I}{4225} & \frac{2362494219624}{24505}-\frac{15744024459702\,I}{122525} & \frac{1809377262231}{4533425}+\frac{3111956309154\,I}{4533425} \\ \frac{66102223375881}{18133700}+\frac{260785340010657\,I}{18133700} & \frac{643977063585702}{122525}-\frac{210935971571094\,I}{122525} & -\frac{38715231602817}{1300}-\frac{7958798612919\,I}{52} & -\frac{149582176845948}{325} & -\frac{38715231602817}{1300}+\frac{7958798612919\,I}{52} & \frac{643977063585702}{122525}+\frac{210935971571094\,I}{122525} & \frac{66102223375881}{18133700}-\frac{260785340010657\,I}{18133700} \\ -\frac{116188393167}{9425}-\frac{140626624446\,I}{69745} & -\frac{90046308558591}{122525}-\frac{106492849388541\,I}{24505} & \frac{26845785834021}{325}-\frac{27622879803288\,I}{325} & \frac{111614945241492}{325} & \frac{26845785834021}{325}+\frac{27622879803288\,I}{325} & -\frac{90046308558591}{122525}+\frac{106492849388541\,I}{24505} & -\frac{116188393167}{9425}+\frac{140626624446\,I}{69745} \\ \frac{7610412454029}{18133700}-\frac{4219655812449\,I}{18133700} & -\frac{731664677898}{9425}-\frac{209400751098\,I}{9425} & \frac{24229292047191}{16900}+\frac{7439735339883\,I}{16900} & -\frac{16429307664924}{4225} & \frac{24229292047191}{16900}-\frac{7439735339883\,I}{16900} & -\frac{731664677898}{9425}+\frac{209400751098\,I}{9425} & \frac{7610412454029}{18133700}+\frac{4219655812449\,I}{18133700} \end{array} \right]$$



$$\frac{d^{12}}{dx_{ol}^{12}}\,u(x_{ol})=\frac{1}{18133700\,\Delta x_{ol}^{12}}\left(231\left((31331208004-53886689336\,I)\,u_{ol-3}+(7568163300960+10087080606216\,I)\,u_{ol-2}-(259132165087356+96931195440336\,I)\,u_{ol-1}+764504261892280\,u_{ol}+(-259132165087356+96931195440336\,I)\,u_{ol+1}+(7568163300960-10087080606216\,I)\,u_{ol+2}+(31331208004\right.\right.\\ \left.+53886689336\,I)\,u_{ol+3}+(286156811151+1128940865847\,I)\,u_{ol-3-1}+(412591365414216-135145124642952\,I)\,u_{ol-2-1}-(2337830154232443+12014857343247525\,I)\,u_{ol-1-1}-36130247356261968\,u_{ol-1}+(-2337830154232443+12014857343247525\,I)\,u_{ol+1-1}+(412591365414216+135145124642952\,I)\,u_{ol+2-1}\right.\\ \left.+ (286156811151-1128940865847\,I)\,u_{ol+3-1}-(967733629668+158281049160\,I)\,u_{ol-3-21}-(57692007215028+341145924448140\,I)\,u_{ol-2-21}+(6484361326385436-6672061478373408\,I)\,u_{ol-1-21}+26959599500841072\,u_{ol-21}+(6484361326385436+6672061478373408\,I)\,u_{ol+1-21}+(-57692007215028\right.$$

$$+ 341145924448140 \, \text{I} \, u_{ol+2-21} + ( -967733629668 + 158281049160 \, \text{I} \, u_{ol+3-21} + (32945508459 - 18266908279 \, \text{I} \, u_{ol-3-31} - (6094038269592 + 1744099762392 \, \text{I} \, u_{ol-2-31} + (112545586002753 + 34557731686989 \, \text{I} \, u_{ol-1-31} - 305257958865168 \, u_{ol-31} + (112545586002753 - 34557731686989 \, \text{I} \, u_{ol+1-31} + ( -6094038269592 + 1744099762392 \, \text{I} \, u_{ol+2-31} + (32945508459 + 18266908279 \, \text{I} \, u_{ol+3-31}))) \bigg) \cdot O( \Delta x_{ol}^{16} )$$

Formula.: 310, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 13

Error order.: 15, Error.:  $1.4746415026812864991 \times 10^{-37}$ , New Error.:  $1.4706303309194543674 \times 10^{-52}$

Error order.: 15, Error.:  $1.4706303309194543674 \times 10^{-52}$ , New Error.:  $1.4702147996324243770 \times 10^{-67}$

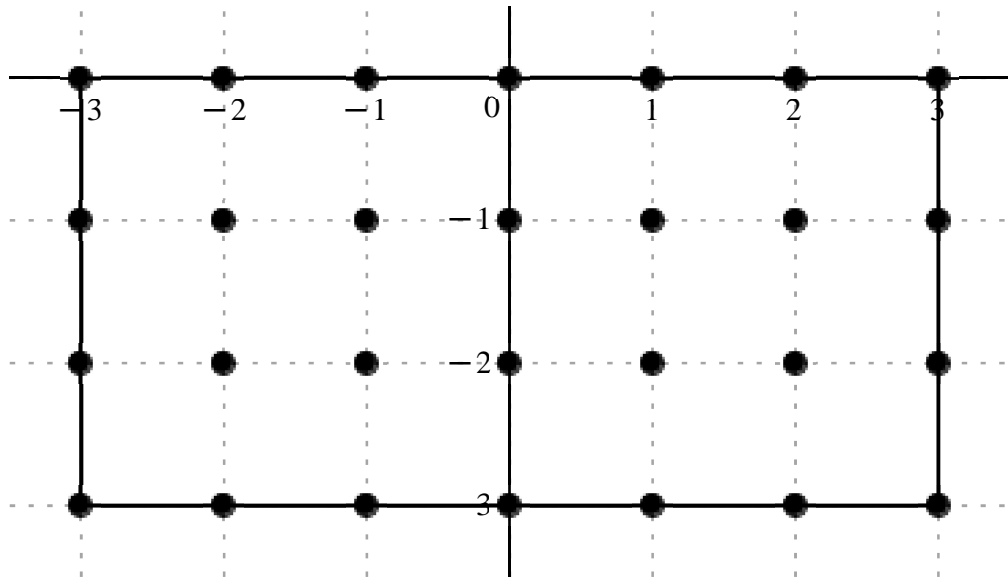
Error order.: 15, Error.:  $1.4702147996324243770 \times 10^{-67}$ , New Error.:  $1.4701731024985039612 \times 10^{-82}$

Error order.: 15, Error.:  $1.4701731024985039612 \times 10^{-82}$ , New Error.:  $1.4701689313451978048 \times 10^{-97}$

Error order.: 15, Error.:  $1.4701689313451978048 \times 10^{-97}$ , New Error.:  $1.4701685142154681863 \times 10^{-112}$

$$x_o+h., \left[ \begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I \\ -3-2\,I & -2-2\,I & -1-2\,I & -2\,I & 1-2\,I & 2-2\,I & 3-2\,I \\ -3-3\,I & -2-3\,I & -1-3\,I & -3\,I & 1-3\,I & 2-3\,I & 3-3\,I \end{array} \right]$$

$$c=, \left[ \begin{array}{cccccccccccc} -\frac{8179102541841}{1743625} & -\frac{8263725446669 \, \text{I}}{3487250} & \frac{73816414846713}{94250} & -\frac{63471738817179 \, \text{I}}{94250} & -\frac{10864756212156}{1625} & +\frac{67417782704811 \, \text{I}}{3250} & -\frac{3849438308639 \, \text{I}}{65} & \frac{10864756212156}{1625} & +\frac{67417782704811 \, \text{I}}{3250} & -\frac{73816414846713}{94250} & -\frac{63471738817179 \, \text{I}}{94250} & \frac{8179102541841}{1743625} & -\frac{8263725446669 \, \text{I}}{3487250} \\ \frac{130536379270143}{1394900} & -\frac{19475136102807 \, \text{I}}{697450} & -\frac{117378308740077}{9425} & -\frac{316166939506341 \, \text{I}}{9425} & -\frac{96813110773071}{100} & +\frac{5328043358022 \, \text{I}}{25} & \frac{72608553882018 \, \text{I}}{25} & \frac{96813110773071}{100} & +\frac{5328043358022 \, \text{I}}{25} & \frac{117378308740077}{9425} & -\frac{316166939506341 \, \text{I}}{9425} & -\frac{130536379270143}{1394900} & -\frac{19475136102807 \, \text{I}}{697450} \\ -\frac{3793804707231}{348725} & +\frac{56897377112961 \, \text{I}}{697450} & -\frac{531762494717223}{18850} & +\frac{4143143293443 \, \text{I}}{754} & -\frac{13925069721486}{25} & -\frac{26289412839459 \, \text{I}}{50} & -\frac{55287892743237 \, \text{I}}{25} & \frac{13925069721486}{25} & -\frac{26289412839459 \, \text{I}}{50} & \frac{531762494717223}{18850} & +\frac{4143143293443 \, \text{I}}{754} & \frac{3793804707231}{348725} & +\frac{56897377112961 \, \text{I}}{697450} \\ -\frac{11135596135587}{6974500} & -\frac{4776367616174 \, \text{I}}{1743625} & -\frac{6466371972291}{47125} & +\frac{24129274109787 \, \text{I}}{47125} & \frac{18114220415907}{6500} & -\frac{30522285492237 \, \text{I}}{3250} & \frac{8239041317122 \, \text{I}}{325} & -\frac{18114220415907}{6500} & -\frac{30522285492237 \, \text{I}}{3250} & \frac{6466371972291}{47125} & +\frac{24129274109787 \, \text{I}}{47125} & \frac{11135596135587}{6974500} & -\frac{4776367616174 \, \text{I}}{1743625} \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\,u(x_{ol})=\frac{1}{6974500\,\mathcal{A}x_{ol}^{13}}\left(77\left(-(424888443732+214642219394\,\mathrm{I})\,u_{ol-3}+(70940450631906-60998813928198\,\mathrm{I})\,u_{ol-2}+(-605604333280176+1878942359539278\,\mathrm{I})\,u_{ol-1}-5364217279441100\,\mathrm{I}u_{ol}+(605604333280176+1878942359539278\,\mathrm{I})\,u_{ol+1}-(70940450631906+60998813928198\,\mathrm{I})\,u_{ol+2}+(424888443732\right.\\ \left.-214642219394\,\mathrm{I})\,u_{ol+3}+(8476388264295-2529238454910\,\mathrm{I})\,u_{ol-3-1}-(1128051278800740+3038487470580420\,\mathrm{I})\,u_{ol-2-1}+(-87691304037244635+19304123844428280\,\mathrm{I})\,u_{ol-1-1}+263069277428641320\,\mathrm{I}u_{ol-1}+(87691304037244635+19304123844428280\,\mathrm{I})\,u_{ol+1-1}+(1128051278800740\right.\\ \left.-3038487470580420\,\mathrm{I})\,u_{ol+2-1}-(8476388264295+2529238454910\,\mathrm{I})\,u_{ol+3-1}+(-985403820060+7389269754930\,\mathrm{I})\,u_{ol-3-21}+(-2555222377212630+497715265770750\,\mathrm{I})\,u_{ol-2-21}-(50452155206495640+47624807752936830\,\mathrm{I})\,u_{ol-1-21}-200314497629977380\,\mathrm{I}u_{ol-21}+(50452155206495640\right.\\ \left.-47624807752936830\,\mathrm{I})\,u_{ol+1-21}+(2555222377212630+497715265770750\,\mathrm{I})\,u_{ol+2-21}+(985403820060+7389269754930\,\mathrm{I})\,u_{ol+3-21}-(144618131631+248122993048\,\mathrm{I})\,u_{ol-3-31}+(-12428870803884+46378345042188\,\mathrm{I})\,u_{ol-2-31}+(252422837743743-850660060601826\,\mathrm{I})\,u_{ol-1-31}+2296231515135560\,\mathrm{I}u_{ol-31}\right.\\ \left.- (252422837743743+850660060601826\,\mathrm{I})\,u_{ol+1-31}+(12428870803884+46378345042188\,\mathrm{I})\,u_{ol+2-31}+(144618131631-248122993048\,\mathrm{I})\,u_{ol+3-31}\right)\Big),\,O(\,\mathcal{A}x_{ol}^{15}\,)$$

Formula.: 311, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 1

Error order.: 48, Error.: 8.8878354667922093596 × 10<sup>−138</sup>, New Error.: 8.8878354668011021029 × 10<sup>−186</sup>

Error order.: 48, Error.: 8.8878354668011021029 × 10<sup>−186</sup>, New Error.: 8.8878354668011029921 × 10<sup>−234</sup>

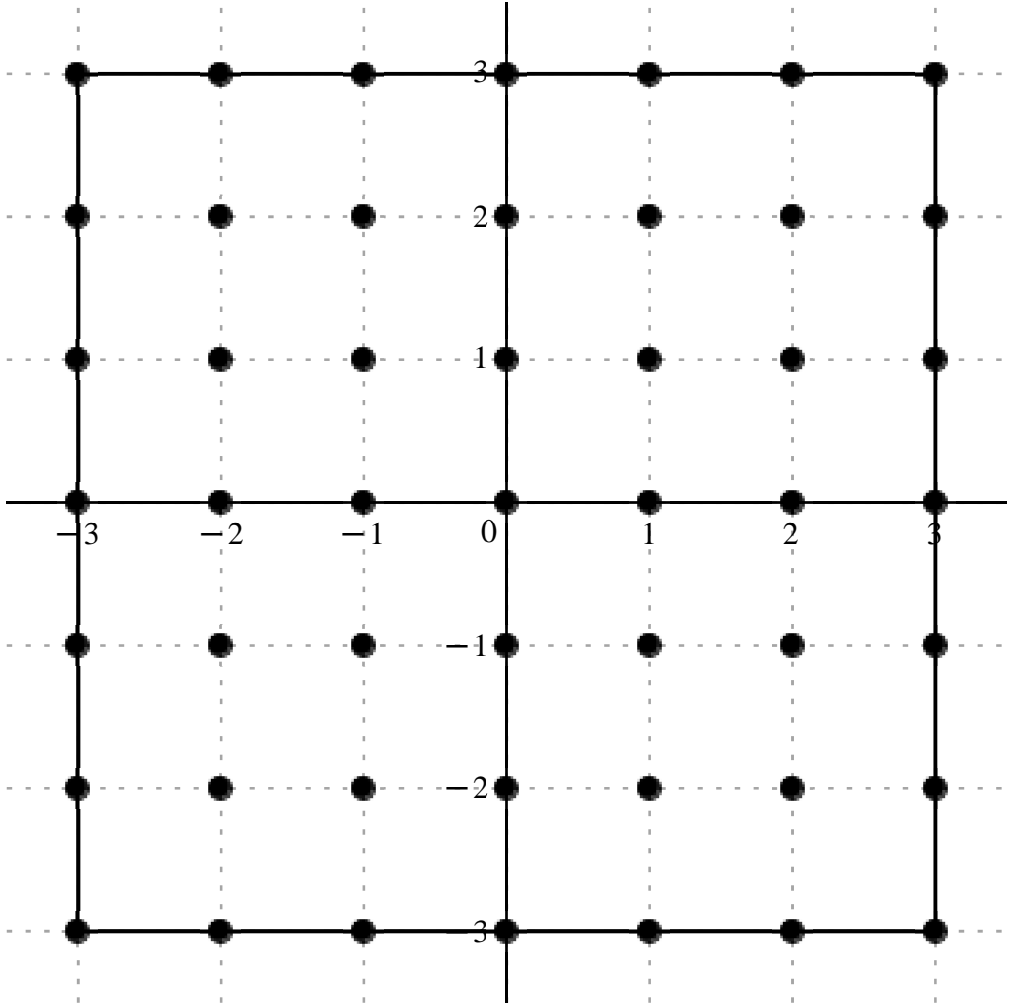
Error order.: 48, Error.: 8.8878354668011029921 × 10<sup>−234</sup>, New Error.: 8.8878354668011029922 × 10<sup>−282</sup>

Error order.: 48, Error.: 8.8878354668011029922 × 10<sup>−282</sup>, New Error.: 8.8878354668011029922 × 10<sup>−330</sup>

Error order.: 48, Error.: 8.8878354668011029922 × 10<sup>−330</sup>, New Error.: 8.8878354668011029922 × 10<sup>−378</sup>

$$x_o+h.,\left[\begin{array}{cccccc} -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} & 1+3\,\mathrm{I} & 2+3\,\mathrm{I} & 3+3\,\mathrm{I} \\ -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & 3+2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} \\ -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & 3-2\,\mathrm{I} \\ -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} & 1-3\,\mathrm{I} & 2-3\,\mathrm{I} & 3-3\,\mathrm{I} \end{array}\right]$$

$$c = \left[ \begin{array}{cccccccccccccccc} -\frac{13}{14890609862400} & -\frac{13 \text{ I}}{14890609862400} & -\frac{57051}{68558849574800} & -\frac{8181 \text{ I}}{68558849574800} & -\frac{44577}{1383280697600} & -\frac{1053 \text{ I}}{47699334400} & -\frac{13 \text{ I}}{93029100} & \frac{44577}{1383280697600} & -\frac{1053 \text{ I}}{47699334400} & \frac{57051}{68558849574800} & -\frac{8181 \text{ I}}{68558849574800} & \frac{13}{14890609862400} & -\frac{13 \text{ I}}{14890609862400} \\ -\frac{8181}{68558849574800} & -\frac{57051 \text{ I}}{68558849574800} & \frac{3159}{2336622800} + \frac{3159 \text{ I}}{2336622800} & & -\frac{249561}{2336622800} & -\frac{344331 \text{ I}}{2336622800} & \frac{351 \text{ I}}{419050} & \frac{249561}{2336622800} & -\frac{344331 \text{ I}}{2336622800} & -\frac{3159}{2336622800} + \frac{3159 \text{ I}}{2336622800} & \frac{8181}{68558849574800} & -\frac{57051 \text{ I}}{68558849574800} & \\ -\frac{1053}{47699334400} & -\frac{44577 \text{ I}}{1383280697600} & -\frac{344331}{2336622800} & -\frac{249561 \text{ I}}{2336622800} & -\frac{41067}{1849600} & -\frac{41067 \text{ I}}{1849600} & -\frac{351 \text{ I}}{1700} & \frac{41067}{1849600} & -\frac{41067 \text{ I}}{1849600} & \frac{344331}{2336622800} & -\frac{249561 \text{ I}}{2336622800} & \frac{1053}{47699334400} & -\frac{44577 \text{ I}}{1383280697600} \\ & -\frac{13}{93029100} & \frac{351}{419050} & & -\frac{351}{1700} & & 0 & \frac{351}{1700} & & -\frac{351}{419050} & & \frac{13}{93029100} & \\ -\frac{1053}{47699334400} + \frac{44577 \text{ I}}{1383280697600} & & -\frac{344331}{2336622800} + \frac{249561 \text{ I}}{2336622800} & & -\frac{41067}{1849600} + \frac{41067 \text{ I}}{1849600} & & \frac{351 \text{ I}}{1700} & \frac{41067}{1849600} + \frac{41067 \text{ I}}{1849600} & & \frac{344331}{2336622800} + \frac{249561 \text{ I}}{2336622800} & & \frac{1053}{47699334400} + \frac{44577 \text{ I}}{1383280697600} & \\ -\frac{8181}{68558849574800} + \frac{57051 \text{ I}}{68558849574800} & & \frac{3159}{2336622800} - \frac{3159 \text{ I}}{2336622800} & & -\frac{249561}{2336622800} + \frac{344331 \text{ I}}{2336622800} & & -\frac{351 \text{ I}}{419050} & \frac{249561}{2336622800} + \frac{344331 \text{ I}}{2336622800} & & -\frac{3159}{2336622800} - \frac{3159 \text{ I}}{2336622800} & & \frac{8181}{68558849574800} + \frac{57051 \text{ I}}{68558849574800} & \\ -\frac{13}{14890609862400} + \frac{13 \text{ I}}{14890609862400} & & -\frac{57051}{68558849574800} + \frac{8181 \text{ I}}{68558849574800} & & -\frac{44577}{1383280697600} + \frac{1053 \text{ I}}{47699334400} & & \frac{13 \text{ I}}{93029100} & \frac{44577}{1383280697600} + \frac{1053 \text{ I}}{47699334400} & & \frac{57051}{68558849574800} + \frac{8181 \text{ I}}{68558849574800} & & \frac{13}{14890609862400} + \frac{13 \text{ I}}{14890609862400} & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{1}{3290824779590400\, \Delta x_{ol}} \Big( -(2873+2873\,\mathrm{I})\, u_{ol-3+3\mathrm{I}} - (2738448+392688\,\mathrm{I})\, u_{ol-2+3\mathrm{I}} - (106048683+72647523\,\mathrm{I})\, u_{ol-1+3\mathrm{I}} - 459863872\,\mathrm{I}\, u_{ol+3\mathrm{I}} + (106048683-72647523\,\mathrm{I})\, u_{ol+1+3\mathrm{I}} + (2738448-392688\,\mathrm{I})\, u_{ol+2+3\mathrm{I}} + (2873-2873\,\mathrm{I})\, u_{ol+3+3\mathrm{I}} - (392688+2738448\,\mathrm{I})\, u_{ol-3+2\mathrm{I}} + (4449034512$$

$$+ 4449034512\,\mathrm{I})\, u_{ol-2+2\mathrm{I}} - (351473726448+484944761808\,\mathrm{I})\, u_{ol-1+2\mathrm{I}} + 2756424048768\,\mathrm{I}\, u_{ol+2\mathrm{I}} + (351473726448-484944761808\,\mathrm{I})\, u_{ol+1+2\mathrm{I}} + (-4449034512+4449034512\,\mathrm{I})\, u_{ol+2+2\mathrm{I}} + (392688-2738448\,\mathrm{I})\, u_{ol+3+2\mathrm{I}} - (72647523+106048683\,\mathrm{I})\, u_{ol-3+1\mathrm{I}} - (484944761808+351473726448\,\mathrm{I})\, u_{ol-2+1\mathrm{I}} - (73066771855233$$

$$+ 73066771855233\,\mathrm{I})\, u_{ol-1+1\mathrm{I}} - 679458528021312\,\mathrm{I}\, u_{ol+1\mathrm{I}} + (73066771855233-73066771855233\,\mathrm{I})\, u_{ol+1+1\mathrm{I}} + (484944761808-351473726448\,\mathrm{I})\, u_{ol+2+1\mathrm{I}} + (72647523-106048683\,\mathrm{I})\, u_{ol+3+1\mathrm{I}} - 459863872\, u_{ol-3} + 2756424048768\, u_{ol-2} - 679458528021312\, u_{ol-1} + 679458528021312\, u_{ol+1} - 2756424048768\, u_{ol+2}$$

$$+ 459863872\, u_{ol+3} + (-72647523+106048683\,\mathrm{I})\, u_{ol-3-1\mathrm{I}} + (-484944761808+351473726448\,\mathrm{I})\, u_{ol-2-1\mathrm{I}} + (-73066771855233+73066771855233\,\mathrm{I})\, u_{ol-1-1\mathrm{I}} + 679458528021312\,\mathrm{I}\, u_{ol-1\mathrm{I}} + (73066771855233+73066771855233\,\mathrm{I})\, u_{ol+1-1\mathrm{I}} + (484944761808+351473726448\,\mathrm{I})\, u_{ol+2-1\mathrm{I}} + (72647523+106048683\,\mathrm{I})\, u_{ol+3-1\mathrm{I}}$$

$$+ (-392688+2738448\,\mathrm{I})\, u_{ol-3-2\mathrm{I}} + (4449034512-4449034512\,\mathrm{I})\, u_{ol-2-2\mathrm{I}} + (-351473726448+484944761808\,\mathrm{I})\, u_{ol-1-2\mathrm{I}} - 2756424048768\,\mathrm{I}\, u_{ol-2\mathrm{I}} + (351473726448+484944761808\,\mathrm{I})\, u_{ol+1-2\mathrm{I}} - (4449034512+4449034512\,\mathrm{I})\, u_{ol+2-2\mathrm{I}} + (392688+2738448\,\mathrm{I})\, u_{ol+3-2\mathrm{I}} + (-2873+2873\,\mathrm{I})\, u_{ol-3-3\mathrm{I}} + (-2738448$$

$$+ 392688\,\mathrm{I})\, u_{ol-2-3\mathrm{I}} + (-106048683+72647523\,\mathrm{I})\, u_{ol-1-3\mathrm{I}} + 459863872\,\mathrm{I}\, u_{ol-3\mathrm{I}} + (106048683+72647523\,\mathrm{I})\, u_{ol+1-3\mathrm{I}} + (2738448+392688\,\mathrm{I})\, u_{ol+2-3\mathrm{I}} + (2873+2873\,\mathrm{I})\, u_{ol+3-3\mathrm{I}} \Big) \cdot \mathcal{O}(\Delta x_{ol}^{48})$$

Formula:, 312, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

*Error order*., 48, *Error*.,  $3.5374469519573604566 \times 10^{-139}$ , *New Error*.,  $3.5374469519606376791 \times 10^{-187}$

*Error order*., 48, *Error*.,  $3.5374469519606376791 \times 10^{-187}$ , *New Error*.,  $3.5374469519606380068 \times 10^{-235}$

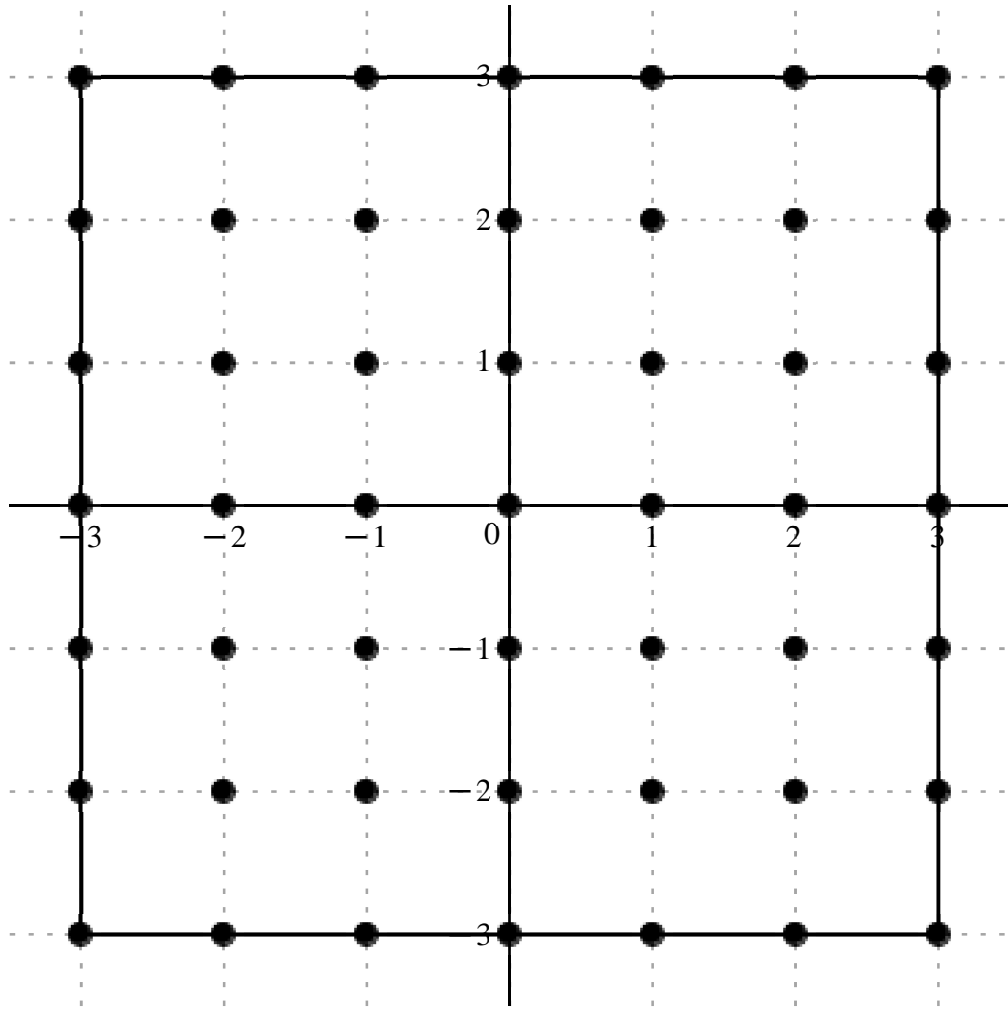
*Error order*., 48, *Error*.,  $3.5374469519606380068 \times 10^{-235}$ , *New Error*.,  $3.5374469519606380069 \times 10^{-283}$

*Error order*., 48, *Error*.,  $3.5374469519606380069 \times 10^{-283}$ , *New Error*.,  $3.5374469519606380069 \times 10^{-331}$

*Error order.*, 48, *Error.*,  $3.5374469519606380069 \times 10^{-331}$ , *New Error.*,  $3.5374469519606380069 \times 10^{-379}$

$$x_o \neq h_o, \begin{bmatrix} -3+3\mathbf{I} & -2+3\mathbf{I} & -1+3\mathbf{I} & 3\mathbf{I} & 1+3\mathbf{I} & 2+3\mathbf{I} & 3+3\mathbf{I} \\ -3+2\mathbf{I} & -2+2\mathbf{I} & -1+2\mathbf{I} & 2\mathbf{I} & 1+2\mathbf{I} & 2+2\mathbf{I} & 3+2\mathbf{I} \\ -3+\mathbf{I} & -2+\mathbf{I} & -1+\mathbf{I} & \mathbf{I} & 1+\mathbf{I} & 2+\mathbf{I} & 3+\mathbf{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-\mathbf{I} & -2-\mathbf{I} & -1-\mathbf{I} & -\mathbf{I} & 1-\mathbf{I} & 2-\mathbf{I} & 3-\mathbf{I} \\ -3-2\mathbf{I} & -2-2\mathbf{I} & -1-2\mathbf{I} & -2\mathbf{I} & 1-2\mathbf{I} & 2-2\mathbf{I} & 3-2\mathbf{I} \\ -3-3\mathbf{I} & -2-3\mathbf{I} & -1-3\mathbf{I} & -3\mathbf{I} & 1-3\mathbf{I} & 2-3\mathbf{I} & 3-3\mathbf{I} \end{bmatrix}$$

$$c = \begin{array}{cccccccccccc} \frac{13 \text{ I}}{22335914793600} & \frac{89559}{445632522236200} + \frac{37503 \text{ I}}{89126504447240} & -\frac{23517}{3458201744000} + \frac{41067 \text{ I}}{1729100872000} & -\frac{13}{139543650} & -\frac{23517}{3458201744000} - \frac{41067 \text{ I}}{1729100872000} & \frac{89559}{445632522236200} - \frac{37503 \text{ I}}{89126504447240} & -\frac{13 \text{ I}}{22335914793600} \\ -\frac{89559}{445632522236200} + \frac{37503 \text{ I}}{89126504447240} & -\frac{3159 \text{ I}}{2336622800} & -\frac{439101}{5841557000} + \frac{843453 \text{ I}}{5841557000} & \frac{351}{419050} & -\frac{439101}{5841557000} - \frac{843453 \text{ I}}{5841557000} & \frac{3159 \text{ I}}{2336622800} & -\frac{89559}{445632522236200} - \frac{37503 \text{ I}}{89126504447240} \\ \frac{23517}{3458201744000} + \frac{41067 \text{ I}}{1729100872000} & \frac{439101}{5841557000} + \frac{843453 \text{ I}}{5841557000} & \frac{41067 \text{ I}}{924800} & -\frac{351}{850} & -\frac{41067 \text{ I}}{924800} & \frac{439101}{5841557000} - \frac{843453 \text{ I}}{5841557000} & \frac{23517}{3458201744000} - \frac{41067 \text{ I}}{1729100872000} \\ c =, & \frac{13}{139543650} & -\frac{351}{419050} & \frac{351}{850} & 0 & \frac{351}{850} & -\frac{351}{419050} & \frac{13}{139543650} \\ \frac{23517}{3458201744000} - \frac{41067 \text{ I}}{1729100872000} & \frac{439101}{5841557000} - \frac{843453 \text{ I}}{5841557000} & -\frac{41067 \text{ I}}{924800} & -\frac{351}{850} & \frac{41067 \text{ I}}{924800} & \frac{439101}{5841557000} + \frac{843453 \text{ I}}{5841557000} & \frac{23517}{3458201744000} + \frac{41067 \text{ I}}{1729100872000} \\ -\frac{89559}{445632522236200} - \frac{37503 \text{ I}}{89126504447240} & \frac{3159 \text{ I}}{2336622800} & -\frac{439101}{5841557000} - \frac{843453 \text{ I}}{5841557000} & \frac{351}{419050} & -\frac{439101}{5841557000} + \frac{843453 \text{ I}}{5841557000} & -\frac{3159 \text{ I}}{2336622800} & -\frac{89559}{445632522236200} + \frac{37503 \text{ I}}{89126504447240} \\ \frac{13 \text{ I}}{22335914793600} & \frac{89559}{445632522236200} - \frac{37503 \text{ I}}{89126504447240} & -\frac{23517}{3458201744000} - \frac{41067 \text{ I}}{1729100872000} & -\frac{13}{139543650} & -\frac{23517}{3458201744000} + \frac{41067 \text{ I}}{1729100872000} & \frac{89559}{445632522236200} + \frac{37503 \text{ I}}{89126504447240} & \frac{13 \text{ I}}{22335914793600} \end{array}$$



$$\frac{d^2}{dx_{ol}^2} u(x_{ol}) = \frac{1}{320855416010064000 \Delta x_{ol}^2} (186745 I u_{ol-3+3I} + (64482480 + 135010800 I) u_{ol-2+3I} + (-2181930777 + 7620474654 I) u_{ol-1+3I} - 29891151680 u_{ol+3I} - (2181930777 + 7620474654 I) u_{ol+1+3I} + (64482480 - 135010800 I) u_{ol+2+3I} - 186745 I u_{ol+3+3I} + (-64482480 + 135010800 I) u_{ol-3+2I} - 433780864920 I u_{ol-2+2I} + (-24118216089552 + 46327796373456 I) u_{ol-1+2I} + 268751344754880 u_{ol+2I} - (24118216089552 + 46327796373456 I) u_{ol+1+2I} + 433780864920 I u_{ol+2+2I} - (64482480 + 135010800 I) u_{ol+3+2I} + (2181930777 + 7620474654 I) u_{ol-3+1I} + (24118216089552 + 46327796373456 I) u_{ol-2+1I} + 14248020511770435 I u_{ol-1+1I} - 132494412964155840 u_{ol+1I} - 14248020511770435 I u_{ol+1+1I} + (24118216089552 - 46327796373456 I) u_{ol+2+1I} + (2181930777 - 7620474654 I) u_{ol+3+1I} + 29891151680 u_{ol-3I} - 268751344754880 u_{ol-2I} + 132494412964155840 u_{ol-1I} + 132494412964155840 u_{ol+1I} - 268751344754880 u_{ol+2I} + 29891151680 u_{ol+3I} + (2181930777 - 7620474654 I) u_{ol-3-1I} + (24118216089552 - 46327796373456 I) u_{ol-2-1I} - 14248020511770435 I u_{ol-1-1I} - 132494412964155840 u_{ol-1I} + 14248020511770435 I u_{ol+1-1I} + (24118216089552 + 46327796373456 I) u_{ol+2-1I} + (2181930777 + 7620474654 I) u_{ol+3-1I} - (64482480 + 135010800 I) u_{ol-3-2I} + 433780864920 I u_{ol-2-2I} - (24118216089552 + 46327796373456 I) u_{ol-1-2I} + 268751344754880 u_{ol-2I} + (-24118216089552 + 46327796373456 I) u_{ol+1-2I} - 433780864920 I u_{ol+2-2I} + (-64482480 + 135010800 I) u_{ol+3-2I} - 186745 I u_{ol-3-3I} + (64482480 - 135010800 I) u_{ol-2-3I} - (2181930777 + 7620474654 I) u_{ol-1-3I} - 29891151680 u_{ol-3I} + (-2181930777 + 7620474654 I) u_{ol+1-3I} + (64482480 + 135010800 I) u_{ol+2-3I} + 186745 I u_{ol+3-3I}), O(\Delta x_{ol}^{48})$$

Square: Interval, 7

Square: Interval, 8

Formula:, 313, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 44, Error:,  $6.5204514170874187854 \times 10^{-121}$ , New Error:,  $6.3960209015964098220 \times 10^{-165}$

Error order:, 44, Error:,  $6.3960209015964098220 \times 10^{-165}$ , New Error:,  $6.3837059555212202905 \times 10^{-209}$

Error order:, 44, Error:,  $6.3837059555212202905 \times 10^{-209}$ , New Error:,  $6.3824757333182562413 \times 10^{-253}$

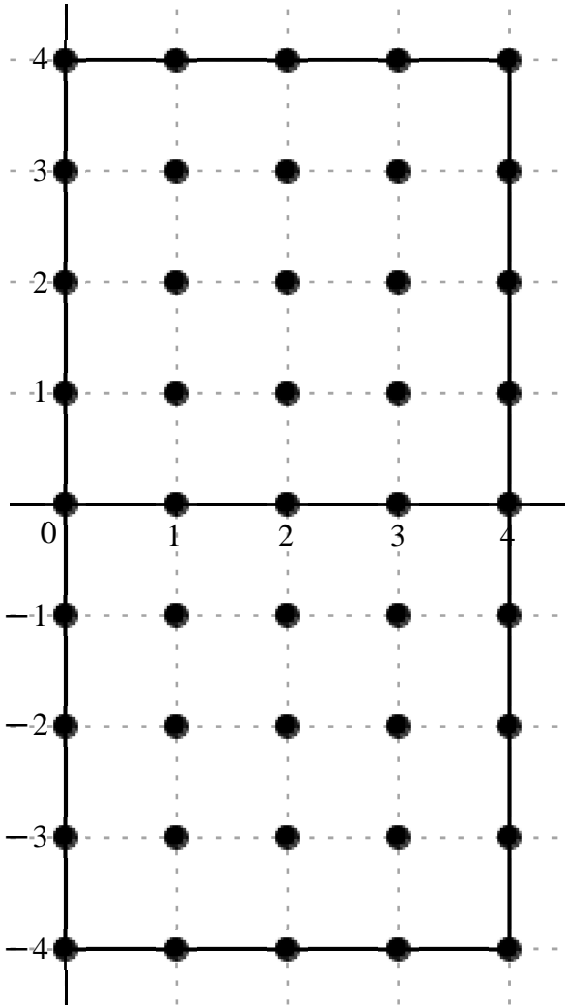
Error order:, 44, Error:,  $6.3824757333182562413 \times 10^{-253}$ , New Error:,  $6.3823527238133977882 \times 10^{-297}$

Error order:, 44, Error:,  $6.3823527238133977882 \times 10^{-297}$ , New Error:,  $6.3823404229900577191 \times 10^{-341}$



$$x_o + h., \begin{bmatrix} 4\text{ I} & 1+4\text{ I} & 2+4\text{ I} & 3+4\text{ I} & 4+4\text{ I} \\ 3\text{ I} & 1+3\text{ I} & 2+3\text{ I} & 3+3\text{ I} & 4+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I} & 4+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} \\ 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} & 4-\text{I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & 3-2\text{ I} & 4-2\text{ I} \\ -3\text{ I} & 1-3\text{ I} & 2-3\text{ I} & 3-3\text{ I} & 4-3\text{ I} \\ -4\text{ I} & 1-4\text{ I} & 2-4\text{ I} & 3-4\text{ I} & 4-4\text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{3093}{123912091576} + \frac{7009\text{ I}}{123912091576} & -\frac{2624}{6422273039} + \frac{2816\text{ I}}{494021003} & -\frac{54}{5175079} + \frac{108\text{ I}}{5175079} & -\frac{2496}{726501475} + \frac{4352\text{ I}}{1349217025} & -\frac{979}{61956045788} + \frac{5051\text{ I}}{123912091576} \\ -\frac{3568}{212178239} - \frac{50608\text{ I}}{636534717} & \frac{256}{398083} + \frac{7680\text{ I}}{398083} & \frac{293760}{5175079} - \frac{440640\text{ I}}{5175079} & -\frac{15616}{1194249} + \frac{1024\text{ I}}{170607} & \frac{234544}{5304455975} - \frac{109008\text{ I}}{5304455975} \\ \frac{7350}{571909} - \frac{1780\text{ I}}{571909} & \frac{39808}{13949} + \frac{60544\text{ I}}{13949} & -\frac{22950}{1073} + \frac{22950\text{ I}}{1073} & -\frac{40320}{13949} - \frac{19840\text{ I}}{13949} & -\frac{758}{571909} - \frac{3296\text{ I}}{571909} \\ \frac{4464}{15457} + \frac{4432\text{ I}}{15457} & \frac{60160}{377} + \frac{20480\text{ I}}{377} & \frac{293760}{377} - \frac{146880\text{ I}}{377} & \frac{3840}{377} - \frac{28160\text{ I}}{377} & -\frac{22192}{262769} - \frac{13424\text{ I}}{262769} \\ -\frac{287879}{33150} & 640 & -2700 & \frac{640}{3} & -\frac{1}{4} \\ \frac{4464}{15457} - \frac{4432\text{ I}}{15457} & \frac{60160}{377} - \frac{20480\text{ I}}{377} & \frac{293760}{377} + \frac{146880\text{ I}}{377} & \frac{3840}{377} + \frac{28160\text{ I}}{377} & -\frac{22192}{262769} + \frac{13424\text{ I}}{262769} \\ \frac{7350}{571909} + \frac{1780\text{ I}}{571909} & \frac{39808}{13949} - \frac{60544\text{ I}}{13949} & -\frac{22950}{1073} - \frac{22950\text{ I}}{1073} & -\frac{40320}{13949} + \frac{19840\text{ I}}{13949} & -\frac{758}{571909} + \frac{3296\text{ I}}{571909} \\ -\frac{3568}{212178239} + \frac{50608\text{ I}}{636534717} & \frac{256}{398083} - \frac{7680\text{ I}}{398083} & \frac{293760}{5175079} + \frac{440640\text{ I}}{5175079} & -\frac{15616}{1194249} - \frac{1024\text{ I}}{170607} & \frac{234544}{5304455975} + \frac{109008\text{ I}}{5304455975} \\ -\frac{3093}{123912091576} - \frac{7009\text{ I}}{123912091576} & -\frac{2624}{6422273039} - \frac{2816\text{ I}}{494021003} & -\frac{54}{5175079} - \frac{108\text{ I}}{5175079} & -\frac{2496}{726501475} - \frac{4352\text{ I}}{1349217025} & -\frac{979}{61956045788} - \frac{5051\text{ I}}{123912091576} \end{bmatrix}$$



$$\begin{aligned} \frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = & \frac{1}{157987916759400\,\mathbb{A}x_{ol}} \Big( (-3943575 + 8936475\,\mathrm{I})\, u_{ol+41} + (-64550400 + 900556800\,\mathrm{I})\, u_{ol+1+41} + (-1648544400 + 3297088800\,\mathrm{I})\, u_{ol+2+41} + (-542790144 + 509601792\,\mathrm{I})\, u_{ol+3+41} + (-2496450 + 6440025\,\mathrm{I})\, u_{ol+4+41} - (2656732800 + 12560905600\,\mathrm{I})\, u_{ol+31} + (101599180800 + 3047975424000\,\mathrm{I})\, u_{ol+1+31} \\ & + (8968081536000 - 13452122304000\,\mathrm{I})\, u_{ol+2+31} + (-2065850009600 + 948259020800\,\mathrm{I})\, u_{ol+3+31} + (6985658496 - 3246694272\,\mathrm{I})\, u_{ol+4+31} + (2030412510000 - 491718948000\,\mathrm{I})\, u_{ol+21} + (450869810764800 + 685728040166400\,\mathrm{I})\, u_{ol+1+21} + (-3379145097510000 + 3379145097510000\,\mathrm{I})\, u_{ol+2+21} - (456668779392000 \\ & + 224710034304000\,\mathrm{I})\, u_{ol+3+21} - (209394922800 + 910508793600\,\mathrm{I})\, u_{ol+4+21} + (45627098428800 + 45300022454400\,\mathrm{I})\, u_{ol+1} + (25211016106752000 + 8582473568256000\,\mathrm{I})\, u_{ol+1+1} + (123104855244672000 - 61552427622336000\,\mathrm{I})\, u_{ol+2+1} + (1609213794048000 - 11800901156352000\,\mathrm{I})\, u_{ol+3+1} - (13342775779200 \\ & + 8071080662400\,\mathrm{I})\, u_{ol+4+1} - 1371988038877204\, u_{ol} + 101112266726016000\, u_{ol+1} - 426567375250380000\, u_{ol+2} + 33704088908672000\, u_{ol+3} - 39496979189850\, u_{ol+4} + (45627098428800 - 45300022454400\,\mathrm{I})\, u_{ol-1} + (25211016106752000 - 8582473568256000\,\mathrm{I})\, u_{ol+1-1} + (123104855244672000 \\ & + 61552427622336000\,\mathrm{I})\, u_{ol+2-1} + (1609213794048000 + 11800901156352000\,\mathrm{I})\, u_{ol+3-1} + (-13342775779200 + 8071080662400\,\mathrm{I})\, u_{ol+4-1} + (2030412510000 + 491718948000\,\mathrm{I})\, u_{ol-21} + (450869810764800 - 685728040166400\,\mathrm{I})\, u_{ol+1-21} - (3379145097510000 + 3379145097510000\,\mathrm{I})\, u_{ol+2-21} + (-456668779392000 \\ & + 224710034304000\,\mathrm{I})\, u_{ol+3-21} + (-209394922800 + 910508793600\,\mathrm{I})\, u_{ol+4-21} + (-2656732800 + 12560905600\,\mathrm{I})\, u_{ol-31} + (101599180800 - 3047975424000\,\mathrm{I})\, u_{ol+1-31} + (8968081536000 + 13452122304000\,\mathrm{I})\, u_{ol+2-31} - (2065850009600 + 948259020800\,\mathrm{I})\, u_{ol+3-31} + (6985658496 + 3246694272\,\mathrm{I})\, u_{ol+4-31} - (3943575 \\ & + 8936475\,\mathrm{I})\, u_{ol-41} - (64550400 + 900556800\,\mathrm{I})\, u_{ol+1-41} - (1648544400 + 3297088800\,\mathrm{I})\, u_{ol+2-41} - (542790144 + 509601792\,\mathrm{I})\, u_{ol+3-41} - (2496450 + 6440025\,\mathrm{I})\, u_{ol+4-41} \Big),\, O(\,\mathbb{A}x_{ol}^{44}\,) \end{aligned}$$

Formula.: 314, Var.: 1

Variavel .:, x<sub>ol</sub>., Derivada de Ordem .:, 1

Error order.: 44, Error.: 6.2470807709273781338 × 10<sup>−121</sup>, New Error.: 6.3686857506823237087 × 10<sup>−165</sup>

Error order.: 44, Error.: 6.3686857506823237087 × 10<sup>−165</sup>, New Error.: 6.3809724423434776151 × 10<sup>−209</sup>

Error order.: 44, Error.: 6.3809724423434776151 × 10<sup>−209</sup>, New Error.: 6.3822023820023956394 × 10<sup>−253</sup>

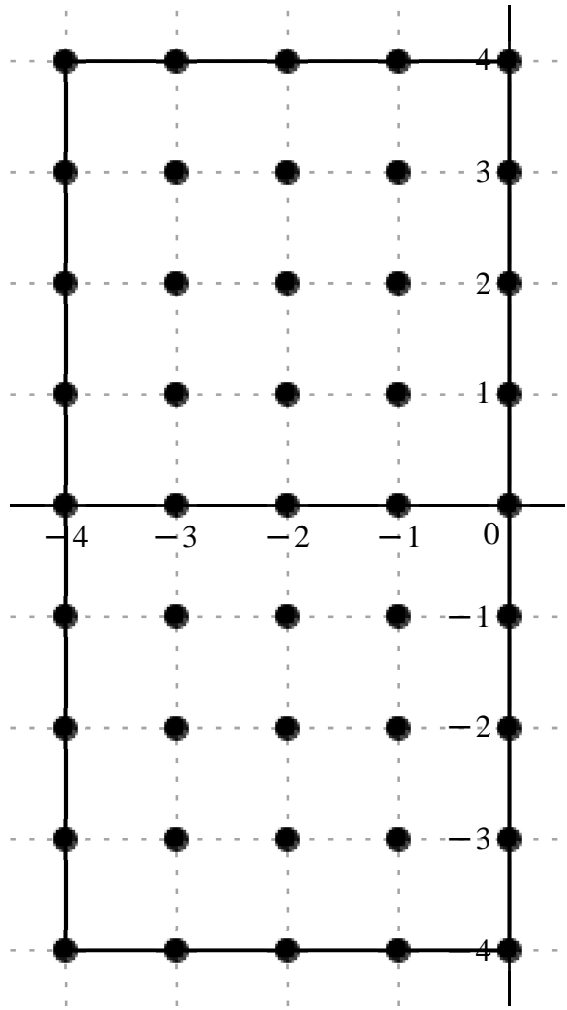
Error order.: 44, Error.: 6.3822023820023956394 × 10<sup>−253</sup>, New Error.: 6.3823253886818136417 × 10<sup>−297</sup>

Error order.: 44, Error.: 6.3823253886818136417 × 10<sup>−297</sup>, New Error.: 6.3823376894768993063 × 10<sup>−341</sup>

$$x_o\, +h\, .\, ,\left[\begin{array}{ccccc} -4+4\,\mathrm{I} & -3+4\,\mathrm{I} & -2+4\,\mathrm{I} & -1+4\,\mathrm{I} & 4\,\mathrm{I} \\ -4+3\,\mathrm{I} & -3+3\,\mathrm{I} & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ -4+2\,\mathrm{I} & -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -4+\mathrm{I} & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -4 & -3 & -2 & -1 & 0 \\ -4-\mathrm{I} & -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ -4-2\,\mathrm{I} & -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ -4-3\,\mathrm{I} & -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \\ -4-4\,\mathrm{I} & -3-4\,\mathrm{I} & -2-4\,\mathrm{I} & -1-4\,\mathrm{I} & -4\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{ccccc} \frac{979}{61956045788}+\frac{5051\,\mathrm{I}}{123912091576} & \frac{2496}{726501475}+\frac{4352\,\mathrm{I}}{1349217025} & \frac{54}{5175079}+\frac{108\,\mathrm{I}}{5175079} & \frac{2624}{6422273039}+\frac{2816\,\mathrm{I}}{494021003} & \frac{3093}{123912091576}+\frac{7009\,\mathrm{I}}{123912091576} \\ -\frac{234544}{5304455975}-\frac{109008\,\mathrm{I}}{5304455975} & \frac{15616}{1194249}+\frac{1024\,\mathrm{I}}{170607} & -\frac{293760}{5175079}-\frac{440640\,\mathrm{I}}{5175079} & -\frac{256}{398083}+\frac{7680\,\mathrm{I}}{398083} & \frac{3568}{212178239}-\frac{50608\,\mathrm{I}}{636534717} \\ \frac{758}{571909}-\frac{3296\,\mathrm{I}}{571909} & \frac{40320}{13949}-\frac{19840\,\mathrm{I}}{13949} & \frac{22950}{1073}+\frac{22950\,\mathrm{I}}{1073} & -\frac{39808}{13949}+\frac{60544\,\mathrm{I}}{13949} & -\frac{7350}{571909}-\frac{1780\,\mathrm{I}}{571909} \\ \frac{22192}{262769}-\frac{13424\,\mathrm{I}}{262769} & -\frac{3840}{377}-\frac{28160\,\mathrm{I}}{377} & -\frac{293760}{377}-\frac{146880\,\mathrm{I}}{377} & -\frac{60160}{377}+\frac{20480\,\mathrm{I}}{377} & -\frac{4464}{15457}+\frac{4432\,\mathrm{I}}{15457} \\ \frac{1}{4} & -\frac{640}{3} & 2700 & -640 & \frac{287879}{33150} \\ \frac{22192}{262769}+\frac{13424\,\mathrm{I}}{262769} & -\frac{3840}{377}+\frac{28160\,\mathrm{I}}{377} & -\frac{293760}{377}+\frac{146880\,\mathrm{I}}{377} & -\frac{60160}{377}-\frac{20480\,\mathrm{I}}{377} & -\frac{4464}{15457}-\frac{4432\,\mathrm{I}}{15457} \\ \frac{758}{571909}+\frac{3296\,\mathrm{I}}{571909} & \frac{40320}{13949}+\frac{19840\,\mathrm{I}}{13949} & \frac{22950}{1073}-\frac{22950\,\mathrm{I}}{1073} & -\frac{39808}{13949}-\frac{60544\,\mathrm{I}}{13949} & -\frac{7350}{571909}+\frac{1780\,\mathrm{I}}{571909} \\ -\frac{234544}{5304455975}+\frac{109008\,\mathrm{I}}{5304455975} & \frac{15616}{1194249}-\frac{1024\,\mathrm{I}}{170607} & -\frac{293760}{5175079}+\frac{440640\,\mathrm{I}}{5175079} & -\frac{256}{398083}-\frac{7680\,\mathrm{I}}{398083} & \frac{3568}{212178239}+\frac{50608\,\mathrm{I}}{636534717} \\ \frac{979}{61956045788}-\frac{5051\,\mathrm{I}}{123912091576} & \frac{2496}{726501475}-\frac{4352\,\mathrm{I}}{1349217025} & \frac{54}{5175079}-\frac{108\,\mathrm{I}}{5175079} & \frac{2624}{6422273039}-\frac{2816\,\mathrm{I}}{494021003} & \frac{3093}{123912091576}-\frac{7009\,\mathrm{I}}{123912091576} \end{array}\right]$$





$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{157987916759400 \Delta x_{ol}} \left( (2496450 + 6440025 \text{ I}) u_{ol-4+4\text{I}} + (542790144 + 509601792 \text{ I}) u_{ol-3+4\text{I}} + (1648544400 + 3297088800 \text{ I}) u_{ol-2+4\text{I}} + (64550400 + 900556800 \text{ I}) u_{ol-1+4\text{I}} + (3943575 + 8936475 \text{ I}) u_{ol+4\text{I}} - (6985658496 + 3246694272 \text{ I}) u_{ol-4+3\text{I}} + (2065850009600 + 948259020800 \text{ I}) u_{ol-3+3\text{I}} - (8968081536000 + 13452122304000 \text{ I}) u_{ol-2+3\text{I}} + (-101599180800 + 3047975424000 \text{ I}) u_{ol-1+3\text{I}} + (2656732800 - 12560905600 \text{ I}) u_{ol+3\text{I}} + (209394922800 - 910508793600 \text{ I}) u_{ol-4+2\text{I}} + (456668779392000 - 224710034304000 \text{ I}) u_{ol-3+2\text{I}} + (3379145097510000 + 3379145097510000 \text{ I}) u_{ol-2+2\text{I}} + (-450869810764800 + 685728040166400 \text{ I}) u_{ol-1+2\text{I}} - (2030412510000 + 491718948000 \text{ I}) u_{ol+2\text{I}} + (13342775779200 - 8071080662400 \text{ I}) u_{ol-4+1\text{I}} - (1609213794048000 + 11800901156352000 \text{ I}) u_{ol-3+1\text{I}} - (123104855244672000 + 61552427622336000 \text{ I}) u_{ol-2+1\text{I}} + (-25211016106752000 + 8582473568256000 \text{ I}) u_{ol-1+1\text{I}} + (-45627098428800 + 45300022454400 \text{ I}) u_{ol+1\text{I}} + 39496979189850 u_{ol-4} - 33704088908672000 u_{ol-3} + 426567375250380000 u_{ol-2} - 101112266726016000 u_{ol-1} + 1371988038877204 u_{ol} + (13342775779200 + 8071080662400 \text{ I}) u_{ol-4-1\text{I}} + (-1609213794048000 + 11800901156352000 \text{ I}) u_{ol-3-1\text{I}} + (-123104855244672000 + 61552427622336000 \text{ I}) u_{ol-2-1\text{I}} - (25211016106752000 + 8582473568256000 \text{ I}) u_{ol-1-1\text{I}} - (45627098428800 + 45300022454400 \text{ I}) u_{ol-1} + (209394922800 + 910508793600 \text{ I}) u_{ol-4-2\text{I}} + (456668779392000 + 224710034304000 \text{ I}) u_{ol-3-2\text{I}} + (3379145097510000 - 3379145097510000 \text{ I}) u_{ol-2-2\text{I}} - (450869810764800 + 685728040166400 \text{ I}) u_{ol-1-2\text{I}} + (-2030412510000 + 491718948000 \text{ I}) u_{ol-2\text{I}} + (-6985658496 + 3246694272 \text{ I}) u_{ol-4-3\text{I}} + (2065850009600 - 948259020800 \text{ I}) u_{ol-3-3\text{I}} + (-8968081536000 + 13452122304000 \text{ I}) u_{ol-2-3\text{I}} - (101599180800 + 3047975424000 \text{ I}) u_{ol-1-3\text{I}} + (2656732800 + 12560905600 \text{ I}) u_{ol-3\text{I}} + (2496450 - 6440025 \text{ I}) u_{ol-4-4\text{I}} + (542790144 - 509601792 \text{ I}) u_{ol-3-4\text{I}} + (1648544400 - 3297088800 \text{ I}) u_{ol-2-4\text{I}} + (64550400 - 900556800 \text{ I}) u_{ol-1-4\text{I}} + (3943575 - 8936475 \text{ I}) u_{ol-4\text{I}} \right), O(\Delta x_{ol}^{44})$$

Formula.: 315, Var.: 1

Variavel.:  $x_{ol}$ , Derivada de Ordem.: 1

Error order.: 44, Error.:  $6.3524421524602530248 \times 10^{-121}$ , New Error.:  $6.3794775908860249446 \times 10^{-165}$

Error order.: 44, Error.:  $6.3794775908860249446 \times 10^{-165}$ , New Error.:  $6.3820541937899174191 \times 10^{-209}$

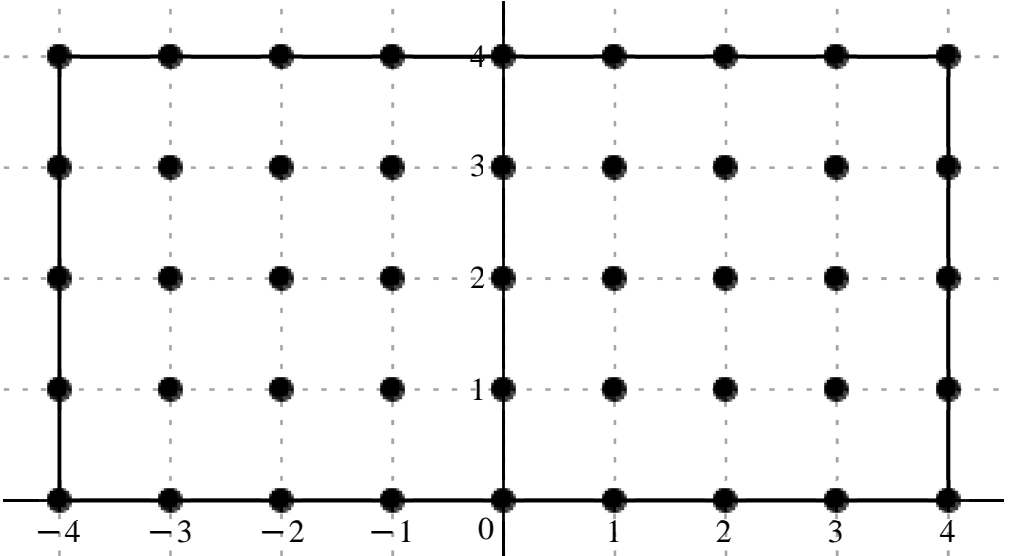
Error order.: 44, Error.:  $6.3820541937899174191 \times 10^{-209}$ , New Error.:  $6.3823105828317057409 \times 10^{-253}$

Error order.: 44, Error.:  $6.3823105828317057409 \times 10^{-253}$ , New Error.:  $6.3823362090216017185 \times 10^{-297}$

Error order.: 44, Error.:  $6.3823362090216017185 \times 10^{-297}$ , New Error.:  $6.3823387715134466951 \times 10^{-341}$

$$x_o \neq h., \left[ \begin{array}{cccccccc} -4+4\text{I} & -3+4\text{I} & -2+4\text{I} & -1+4\text{I} & 4\text{I} & 1+4\text{I} & 2+4\text{I} & 3+4\text{I} & 4+4\text{I} \\ -4+3\text{I} & -3+3\text{I} & -2+3\text{I} & -1+3\text{I} & 3\text{I} & 1+3\text{I} & 2+3\text{I} & 3+3\text{I} & 4+3\text{I} \\ -4+2\text{I} & -3+2\text{I} & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} & 3+2\text{I} & 4+2\text{I} \\ -4+\text{I} & -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccccccc} \frac{5051}{123912091576} + \frac{979 \text{ I}}{61956045788} & - \frac{109008}{5304455975} - \frac{234544 \text{ I}}{5304455975} & - \frac{3296}{571909} + \frac{758 \text{ I}}{571909} & - \frac{13424}{262769} + \frac{22192 \text{ I}}{262769} & \frac{\text{I}}{4} & \frac{13424}{262769} + \frac{22192 \text{ I}}{262769} & \frac{3296}{571909} + \frac{758 \text{ I}}{571909} & \frac{109008}{5304455975} - \frac{234544 \text{ I}}{5304455975} & - \frac{5051}{123912091576} + \frac{979 \text{ I}}{61956045788} \\ \frac{4352}{1349217025} + \frac{2496 \text{ I}}{726501475} & \frac{1024}{170607} + \frac{15616 \text{ I}}{1194249} & - \frac{19840}{13949} + \frac{40320 \text{ I}}{13949} & - \frac{28160}{377} - \frac{3840 \text{ I}}{377} & - \frac{640 \text{ I}}{3} & \frac{28160}{377} - \frac{3840 \text{ I}}{377} & \frac{19840}{13949} + \frac{40320 \text{ I}}{13949} & - \frac{1024}{170607} + \frac{15616 \text{ I}}{1194249} & - \frac{4352}{1349217025} + \frac{2496 \text{ I}}{726501475} \\ \frac{108}{5175079} + \frac{54 \text{ I}}{5175079} & - \frac{440640}{5175079} - \frac{293760 \text{ I}}{5175079} & \frac{22950}{1073} + \frac{22950 \text{ I}}{1073} & - \frac{146880}{377} - \frac{293760 \text{ I}}{377} & 2700 \text{ I} & \frac{146880}{377} - \frac{293760 \text{ I}}{377} & - \frac{22950}{1073} + \frac{22950 \text{ I}}{1073} & \frac{440640}{5175079} - \frac{293760 \text{ I}}{5175079} & - \frac{108}{5175079} + \frac{54 \text{ I}}{5175079} \\ \frac{2816}{494021003} + \frac{2624 \text{ I}}{6422273039} & \frac{7680}{398083} - \frac{256 \text{ I}}{398083} & \frac{60544}{13949} - \frac{39808 \text{ I}}{13949} & \frac{20480}{377} - \frac{60160 \text{ I}}{377} & -640 \text{ I} & - \frac{20480}{377} - \frac{60160 \text{ I}}{377} & - \frac{60544}{13949} - \frac{39808 \text{ I}}{13949} & - \frac{7680}{398083} - \frac{256 \text{ I}}{398083} & - \frac{2816}{494021003} + \frac{2624 \text{ I}}{6422273039} \\ \frac{7009}{123912091576} + \frac{3093 \text{ I}}{123912091576} & - \frac{50608}{636534717} + \frac{3568 \text{ I}}{212178239} & - \frac{1780}{571909} - \frac{7350 \text{ I}}{571909} & \frac{4432}{15457} - \frac{4464 \text{ I}}{15457} & \frac{287879 \text{ I}}{33150} & - \frac{4432}{15457} - \frac{4464 \text{ I}}{15457} & \frac{1780}{571909} - \frac{7350 \text{ I}}{571909} & \frac{50608}{636534717} + \frac{3568 \text{ I}}{212178239} & - \frac{7009}{123912091576} + \frac{3093 \text{ I}}{123912091576} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\; u(x_{ol}) = \frac{1}{157987916759400\; \mathcal{A}x_{ol}}\; \big( (6440025 + 2496450 \text{ I})\; u_{ol-4+4\text{I}} - (3246694272 + 6985658496 \text{ I})\; u_{ol-3+4\text{I}} + (-910508793600 + 209394922800 \text{ I})\; u_{ol-2+4\text{I}} + (-8071080662400 + 13342775779200 \text{ I})\; u_{ol-1+4\text{I}} + 39496979189850 \text{ I}\; u_{ol+4\text{I}} + (8071080662400 + 13342775779200 \text{ I})\; u_{ol+1+4\text{I}} + (910508793600$$

$$+ 209394922800 \text{ I})\; u_{ol+2+4\text{I}} + (3246694272 - 6985658496 \text{ I})\; u_{ol+3+4\text{I}} + (-6440025 + 2496450 \text{ I})\; u_{ol+4+4\text{I}} + (509601792 + 542790144 \text{ I})\; u_{ol-4+3\text{I}} + (948259020800 + 2065850009600 \text{ I})\; u_{ol-3+3\text{I}} + (-224710034304000 + 456668779392000 \text{ I})\; u_{ol-2+3\text{I}} - (11800901156352000 + 1609213794048000 \text{ I})\; u_{ol-1+3\text{I}}$$

$$- 33704088908672000 \text{ I}\; u_{ol+3\text{I}} + (11800901156352000 - 1609213794048000 \text{ I})\; u_{ol+1+3\text{I}} + (224710034304000 + 456668779392000 \text{ I})\; u_{ol+2+3\text{I}} + (-948259020800 + 2065850009600 \text{ I})\; u_{ol+3+3\text{I}} + (-509601792 + 542790144 \text{ I})\; u_{ol+4+3\text{I}} + (3297088800 + 1648544400 \text{ I})\; u_{ol-4+2\text{I}} - (13452122304000 + 8968081536000 \text{ I})\; u_{ol-3+2\text{I}}$$

$$+ (3379145097510000 + 3379145097510000 \text{ I})\; u_{ol-2+2\text{I}} - (61552427622336000 + 123104855244672000 \text{ I})\; u_{ol-1+2\text{I}} + 426567375250380000 \text{ I}\; u_{ol+2\text{I}} + (61552427622336000 - 123104855244672000 \text{ I})\; u_{ol+1+2\text{I}} + (-3379145097510000 + 3379145097510000 \text{ I})\; u_{ol+2+2\text{I}} + (13452122304000 - 8968081536000 \text{ I})\; u_{ol+3+2\text{I}}$$

$$+ (-3297088800 + 1648544400 \text{ I})\; u_{ol+4+2\text{I}} + (900556800 + 64550400 \text{ I})\; u_{ol-4+1\text{I}} + (3047975424000 - 101599180800 \text{ I})\; u_{ol-3+1\text{I}} + (685728040166400 - 450869810764800 \text{ I})\; u_{ol-2+1\text{I}} + (8582473568256000 - 25211016106752000 \text{ I})\; u_{ol-1+1\text{I}} - 101112266726016000 \text{ I}\; u_{ol+1\text{I}} - (8582473568256000 + 25211016106752000 \text{ I})\; u_{ol+1+1\text{I}}$$

$$- (685728040166400 + 450869810764800 \text{ I})\; u_{ol+2+1\text{I}} - (3047975424000 + 101599180800 \text{ I})\; u_{ol+3+1\text{I}} + (-900556800 + 64550400 \text{ I})\; u_{ol+4+1\text{I}} + (8936475 + 3943575 \text{ I})\; u_{ol-4\text{I}} + (-12560905600 + 2656732800 \text{ I})\; u_{ol-3\text{I}} - (491718948000 + 2030412510000 \text{ I})\; u_{ol-2\text{I}} + (45300022454400 - 45627098428800 \text{ I})\; u_{ol-1\text{I}}$$

$$+ 1371988038877204 \text{ I}\; u_{ol\text{I}} - (45300022454400 + 45627098428800 \text{ I})\; u_{ol+1\text{I}} + (491718948000 - 2030412510000 \text{ I})\; u_{ol+2\text{I}} + (12560905600 + 2656732800 \text{ I})\; u_{ol+3\text{I}} + (-8936475 + 3943575 \text{ I})\; u_{ol+4\text{I}} \big),\; O(\;\mathcal{A}x_{ol}^{44}\;)$$

$$Variavel \, :, x_{ol} \, , \, Derivada \, de \, Ordem \, :, 1$$

$$Error \, order.: 44, \, Error.: 6.4093820750458139378 \times 10^{-121}, \, New \, Error.: 6.3851719817876435315 \times 10^{-165}$$

$$Error \, order.: 44, \, Error.: 6.3851719817876435315 \times 10^{-165}, \, New \, Error.: 6.3826236332787298359 \times 10^{-209}$$

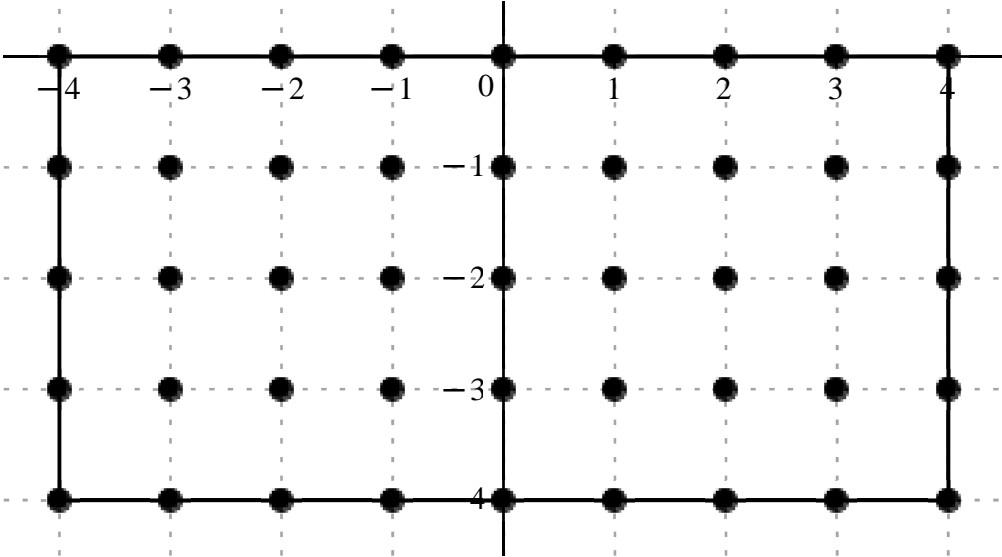
$$Error \, order.: 44, \, Error.: 6.3826236332787298359 \times 10^{-209}, \, New \, Error.: 6.3823675267809856333 \times 10^{-253}$$

$$Error \, order.: 44, \, Error.: 6.3823675267809856333 \times 10^{-253}, \, New \, Error.: 6.3823419034165301064 \times 10^{-297}$$

$$Error \, order.: 44, \, Error.: 6.3823419034165301064 \times 10^{-297}, \, New \, Error.: 6.3823393409529395343 \times 10^{-341}$$

$$x_o \, + h \, ., \left[ \begin{array}{cccccccc} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ -4-I & -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I & 4-I \\ -4-2\,I & -3-2\,I & -2-2\,I & -1-2\,I & -2\,I & 1-2\,I & 2-2\,I & 3-2\,I & 4-2\,I \\ -4-3\,I & -3-3\,I & -2-3\,I & -1-3\,I & -3\,I & 1-3\,I & 2-3\,I & 3-3\,I & 4-3\,I \\ -4-4\,I & -3-4\,I & -2-4\,I & -1-4\,I & -4\,I & 1-4\,I & 2-4\,I & 3-4\,I & 4-4\,I \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccccccccccc} \frac{7009}{123912091576} - \frac{3093\,I}{123912091576} & - \frac{50608}{636534717} - \frac{3568\,I}{212178239} & - \frac{1780}{571909} + \frac{7350\,I}{571909} & \frac{4432}{15457} + \frac{4464\,I}{15457} & - \frac{287879\,I}{33150} & - \frac{4432}{15457} + \frac{4464\,I}{15457} & \frac{1780}{571909} + \frac{7350\,I}{571909} & \frac{50608}{636534717} - \frac{3568\,I}{212178239} & - \frac{7009}{123912091576} - \frac{3093\,I}{123912091576} \\ \frac{2816}{494021003} - \frac{2624\,I}{6422273039} & \frac{7680}{398083} + \frac{256\,I}{398083} & \frac{60544}{13949} + \frac{39808\,I}{13949} & \frac{20480}{377} + \frac{60160\,I}{377} & 640\,I & - \frac{20480}{377} + \frac{60160\,I}{377} & - \frac{60544}{13949} + \frac{39808\,I}{13949} & - \frac{7680}{398083} + \frac{256\,I}{398083} & - \frac{2816}{494021003} - \frac{2624\,I}{6422273039} \\ \frac{108}{5175079} - \frac{54\,I}{5175079} & - \frac{440640}{5175079} + \frac{293760\,I}{5175079} & \frac{22950}{1073} - \frac{22950\,I}{1073} & - \frac{146880}{377} + \frac{293760\,I}{377} & -2700\,I & \frac{146880}{377} + \frac{293760\,I}{377} & - \frac{22950}{1073} - \frac{22950\,I}{1073} & \frac{440640}{5175079} + \frac{293760\,I}{5175079} & - \frac{108}{5175079} - \frac{54\,I}{5175079} \\ \frac{4352}{1349217025} - \frac{2496\,I}{726501475} & \frac{1024}{170607} - \frac{15616\,I}{1194249} & - \frac{19840}{13949} - \frac{40320\,I}{13949} & - \frac{28160}{377} + \frac{3840\,I}{377} & \frac{640\,I}{3} & \frac{28160}{377} + \frac{3840\,I}{377} & \frac{19840}{13949} - \frac{40320\,I}{13949} & - \frac{1024}{170607} - \frac{15616\,I}{1194249} & - \frac{4352}{1349217025} - \frac{2496\,I}{726501475} \\ \frac{5051}{123912091576} - \frac{979\,I}{61956045788} & - \frac{109008}{5304455975} + \frac{234544\,I}{5304455975} & - \frac{3296}{571909} - \frac{758\,I}{571909} & - \frac{13424}{262769} - \frac{22192\,I}{262769} & - \frac{I}{4} & \frac{13424}{262769} - \frac{22192\,I}{262769} & \frac{3296}{571909} - \frac{758\,I}{571909} & \frac{109008}{5304455975} + \frac{234544\,I}{5304455975} & - \frac{5051}{123912091576} - \frac{979\,I}{61956045788} \end{array} \right]$$



$$\frac{d}{dx_{ol}} \, u(x_{ol}) = \frac{1}{157987916759400 \, \Delta x_{ol}} \, \big( (8936475 - 3943575 \, I) \, u_{ol-4} - (12560905600 + 2656732800 \, I) \, u_{ol-3} + ( -491718948000 + 2030412510000 \, I) \, u_{ol-2} + (45300022454400 + 45627098428800 \, I) \, u_{ol-1} - 1371988038877204 \, I u_{ol} + ( -45300022454400 + 45627098428800 \, I) \, u_{ol+1} + (491718948000 + 2030412510000 \, I) \, u_{ol+2}$$

$$+ (12560905600 - 2656732800 \, I) \, u_{ol+3} - (8936475 + 3943575 \, I) \, u_{ol+4} + (900556800 - 64550400 \, I) \, u_{ol-4-1} + (3047975424000 + 101599180800 \, I) \, u_{ol-3-1} + (685728040166400 + 450869810764800 \, I) \, u_{ol-2-1} + (8582473568256000 + 25211016106752000 \, I) \, u_{ol-1-1} + 101112266726016000 \, I u_{ol-1} + ( -8582473568256000$$

$$+ 25211016106752000 \, I) \, u_{ol+1-1} + ( -685728040166400 + 450869810764800 \, I) \, u_{ol+2-1} + ( -3047975424000 + 101599180800 \, I) \, u_{ol+3-1} - (900556800 + 64550400 \, I) \, u_{ol+4-1} + (3297088800 - 1648544400 \, I) \, u_{ol-4-21} + ( -13452122304000 + 8968081536000 \, I) \, u_{ol-3-21} + (3379145097510000 - 3379145097510000 \, I) \, u_{ol-2-21}$$

$$\begin{aligned} &+ ( -61552427622336000 + 123104855244672000 \, \mathrm{I} ) \, u_{ol-1-21} - 426567375250380000 \, \mathrm{I} u_{ol-21} + ( 61552427622336000 + 123104855244672000 \, \mathrm{I} ) \, u_{ol+1-21} - ( 3379145097510000 + 3379145097510000 \, \mathrm{I} ) \, u_{ol+2-21} + ( 13452122304000 + 8968081536000 \, \mathrm{I} ) \, u_{ol+3-21} - ( 3297088800 + 1648544400 \, \mathrm{I} ) \, u_{ol+4-21} + ( 509601792 \\ &- 542790144 \, \mathrm{I} ) \, u_{ol-4-31} + ( 948259020800 - 2065850009600 \, \mathrm{I} ) \, u_{ol-3-31} - ( 224710034304000 + 456668779392000 \, \mathrm{I} ) \, u_{ol-2-31} + ( -11800901156352000 + 1609213794048000 \, \mathrm{I} ) \, u_{ol-1-31} + 33704088908672000 \, \mathrm{I} u_{ol-31} + ( 11800901156352000 + 1609213794048000 \, \mathrm{I} ) \, u_{ol+1-31} + ( 224710034304000 - 456668779392000 \, \mathrm{I} ) \, u_{ol+2-31} \\ &- ( 948259020800 + 2065850009600 \, \mathrm{I} ) \, u_{ol+3-31} - ( 509601792 + 542790144 \, \mathrm{I} ) \, u_{ol+4-31} + ( 6440025 - 2496450 \, \mathrm{I} ) \, u_{ol-4-41} + ( -3246694272 + 6985658496 \, \mathrm{I} ) \, u_{ol-3-41} - ( 910508793600 + 209394922800 \, \mathrm{I} ) \, u_{ol-2-41} - ( 8071080662400 + 13342775779200 \, \mathrm{I} ) \, u_{ol-1-41} - 39496979189850 \, \mathrm{I} u_{ol-41} + ( 8071080662400 \\ &- 13342775779200 \, \mathrm{I} ) \, u_{ol+1-41} + ( 910508793600 - 209394922800 \, \mathrm{I} ) \, u_{ol+2-41} + ( 3246694272 + 6985658496 \, \mathrm{I} ) \, u_{ol+3-41} - ( 6440025 + 2496450 \, \mathrm{I} ) \, u_{ol+4-41} \Big), \quad O( \Delta x_{ol}^{44} ) \end{aligned}$$

*Square: Interval* , 9

*Square: Interval* , 10

*Not square - Triangle: Interval* , 1

*Formula:*, 317, *Var:*, 1

*Variavel* :,  $x_{oi}$ , *Derivada de Ordem* :, 1

*Error order:*, 2, *Error:*, 0.000073827947612028816137, *New Error:*,  $7.3684409807816249012 \times 10^{-7}$

*Error order:*, 2, *Error:*,  $7.3684409807816249012 \times 10^{-7}$ , *New Error:*,  $7.3670047837049154755 \times 10^{-9}$

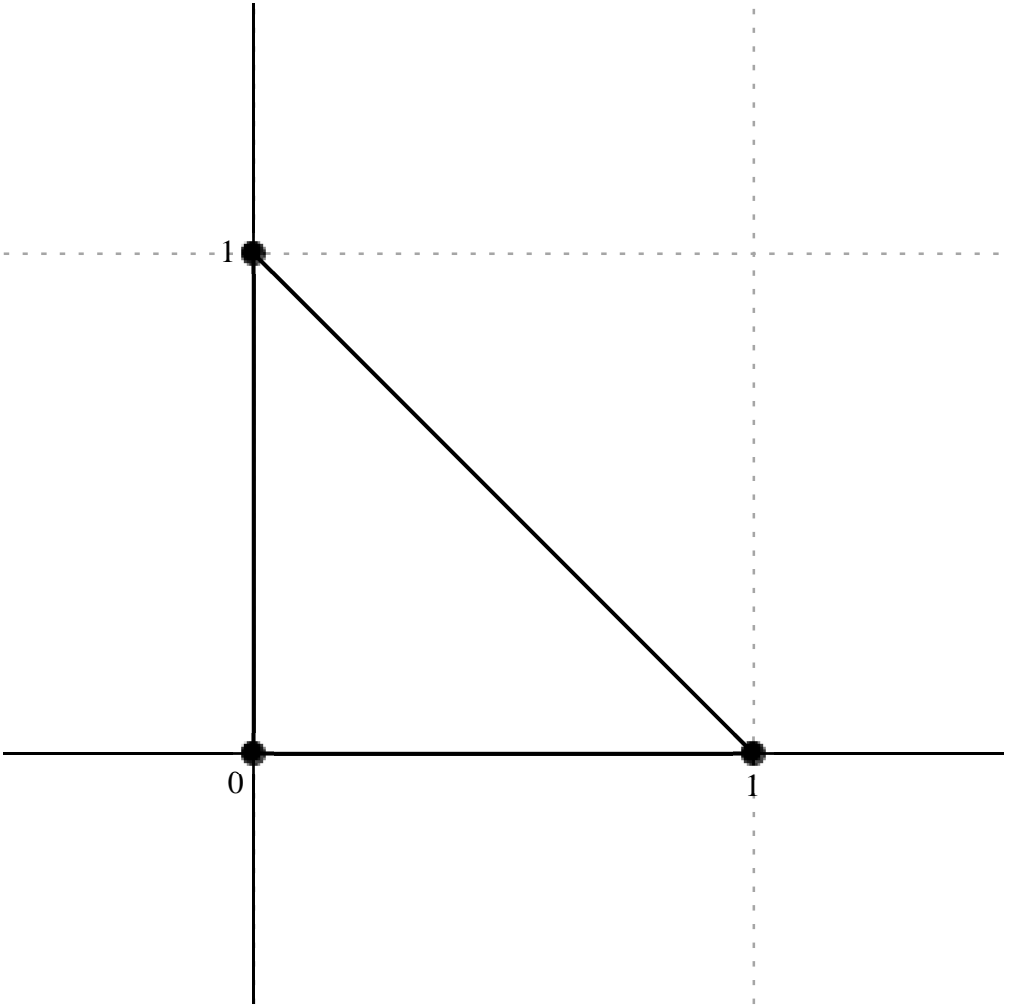
*Error order:*, 2, *Error:*,  $7.3670047837049154755 \times 10^{-9}$ , *New Error:*,  $7.3668611558067740889 \times 10^{-11}$

*Error order:*, 2, *Error:*,  $7.3668611558067740889 \times 10^{-11}$ , *New Error:*,  $7.3668467929350552333 \times 10^{-13}$

*Error order:*, 2, *Error:*,  $7.3668467929350552333 \times 10^{-13}$ , *New Error:*,  $7.3668453566470643006 \times 10^{-15}$

$$x_o+h\,,\left[\begin{array}{cc} \mathrm{I} & \\ 0 & \mathrm{1} \end{array}\right]$$

$$c=,\left[\begin{array}{cc} \frac{1}{2}-\frac{\mathrm{I}}{2} & \\ -1+\mathrm{I} & \frac{1}{2}-\frac{\mathrm{I}}{2} \end{array}\right]$$



$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{\left(\frac{1}{2} - \frac{I}{2}\right) (u_{ol+1} - 2u_{ol} + u_{ol+1})}{\Delta x_{ol}}, \quad O(\Delta x_{ol}^2)$$

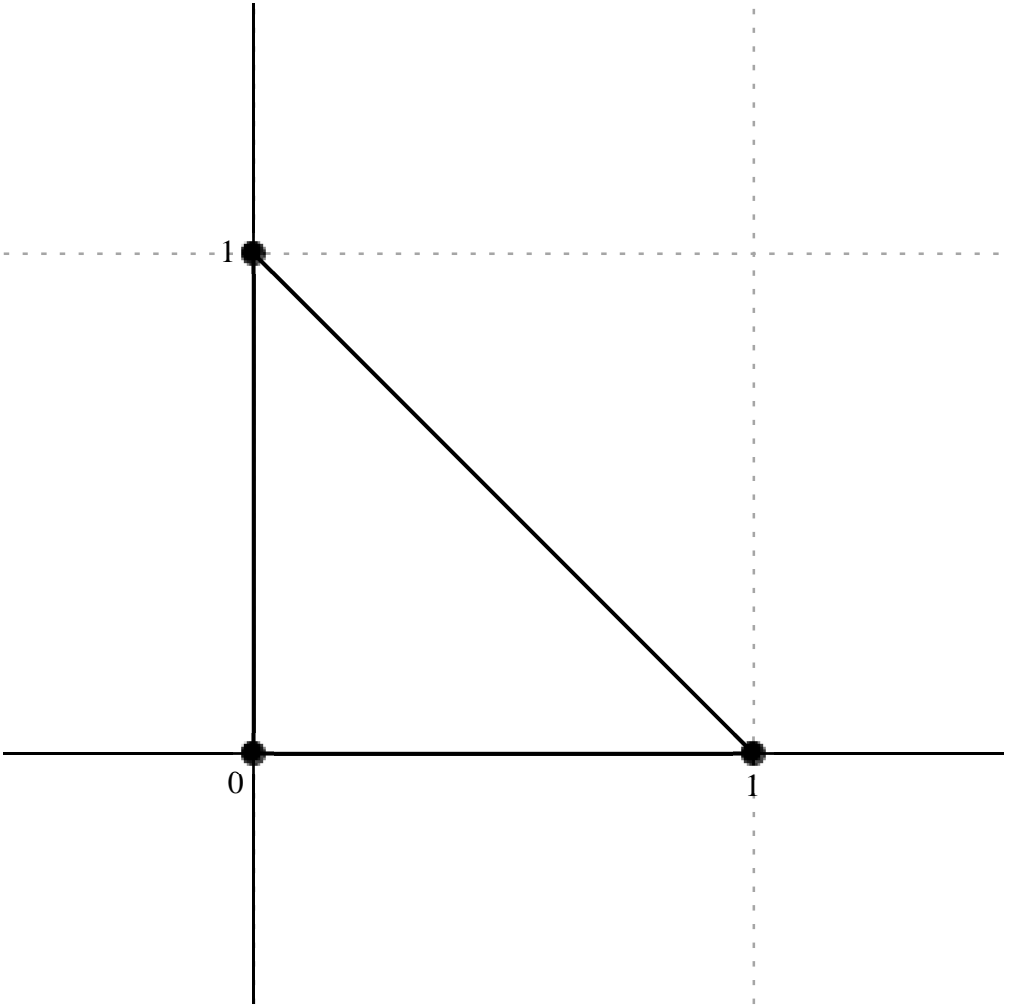
Formula:, 318, Var:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 2

Error order:, 1, Error:, 0.016221178827032697634, New Error:, 0.0016188192922280646389  
Error order:, 1, Error:, 0.0016188192922280646389, New Error:, 0.00016184894334848491742  
Error order:, 1, Error:, 0.00016184894334848491742, New Error:, 0.000016184564476108294438  
Error order:, 1, Error:, 0.000016184564476108294438, New Error:,  $1.6184531490234277723 \times 10^{-6}$   
Error order:, 1, Error:,  $1.6184531490234277723 \times 10^{-6}$ , New Error:,  $1.6184528191646876054 \times 10^{-7}$

$$x_o + h, \begin{bmatrix} I & \\ 0 & 1 \end{bmatrix}$$

$$c =, \begin{bmatrix} -1 + I & \\ -2I & 1 + I \end{bmatrix}$$



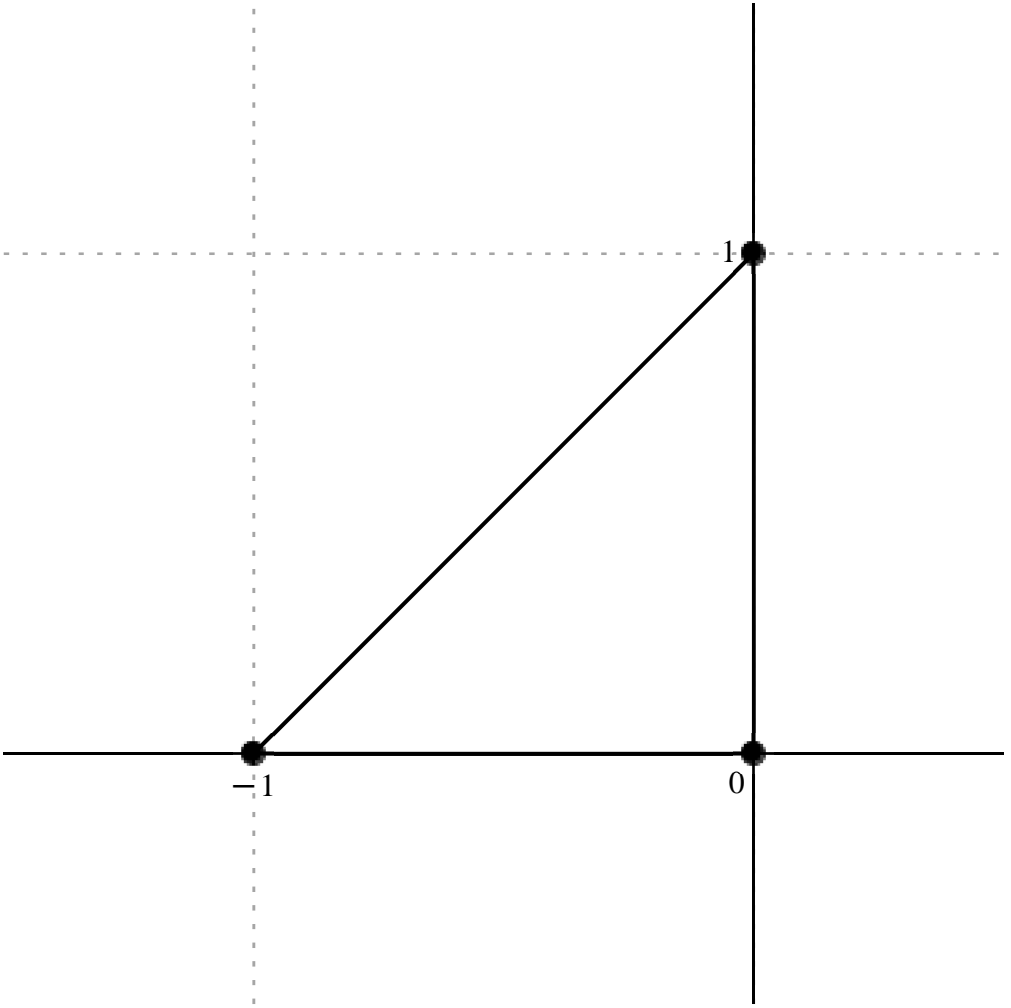
$$\frac{d^2}{dx_{ol}^2} u(x_{ol}) = \frac{(-1 + I) u_{ol+1} - 2 I u_{ol} + (1 + I) u_{ol-1}}{\Delta x_{ol}^2}, \quad O(\Delta x_{ol})$$

Formula:, 319, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 2, Error:, 0.000073424970778571205723, New Error:,  $7.3644095578063354541 \times 10^{-7}$   
Error order:, 2, Error:,  $7.3644095578063354541 \times 10^{-7}$ , New Error:,  $7.3666016248609790534 \times 10^{-9}$   
Error order:, 2, Error:,  $7.3666016248609790534 \times 10^{-9}$ , New Error:,  $7.3668208397569163719 \times 10^{-11}$   
Error order:, 2, Error:,  $7.3668208397569163719 \times 10^{-11}$ , New Error:,  $7.3668427613284148209 \times 10^{-13}$   
Error order:, 2, Error:,  $7.3668427613284148209 \times 10^{-13}$ , New Error:,  $7.3668449534863837130 \times 10^{-15}$

$$x_o + h, \begin{bmatrix} I \\ -1 & 0 \end{bmatrix}$$
  
$$c =, \begin{bmatrix} -\frac{1}{2} - \frac{I}{2} \\ -\frac{1}{2} - \frac{I}{2} & 1 + I \end{bmatrix}$$



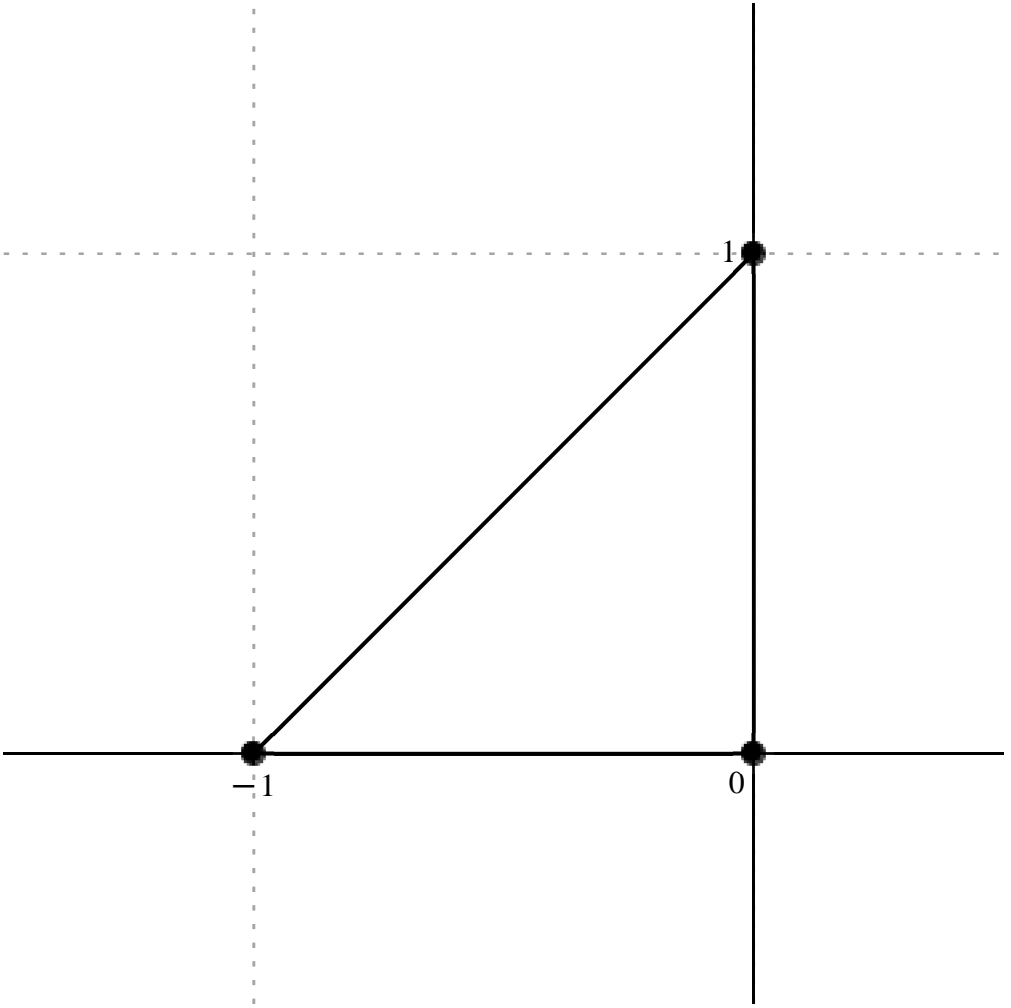
$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{\left(\frac{1}{2}+\frac{\mathrm{I}}{2}\right)\left(-u_{ol+1}-u_{ol-1}+2\,u_{ol}\right)}{\Delta x_{ol}},\,O(\,\Delta x_{ol}^{\,2}\,)$$

Formula.: 320, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 2

Error order.: 1, Error.: 0.016176892628772861176, New Error.: 0.0016183764319962592307  
Error order.: 1, Error.: 0.0016183764319962592307, New Error.: 0.00016184451474634194226  
Error order.: 1, Error.: 0.00016184451474634194226, New Error.: 0.000016184520190086882194  
Error order.: 1, Error.: 0.000016184520190086882194, New Error.: 1.6184527061632136516 × 10<sup>-6</sup>  
Error order.: 1, Error.: 1.6184527061632136516 × 10<sup>-6</sup>, New Error.: 1.6184527748786661934 × 10<sup>-7</sup>

$$x_o\neq h.\,,\left[\begin{array}{cc} \mathrm{I} & \\ -1 & 0 \end{array}\right]$$
  
$$c=\,,\left[\begin{array}{cc} & -1-\mathrm{I} \\ 1-\mathrm{I} & 2\mathrm{I} \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{-(1+\mathrm{I}) \, u_{ol+1} + (1-\mathrm{I}) \, u_{ol-1} + 2 \, \mathrm{I} u_{ol}}{\Delta x_{ol}^2}, \, O(\, \Delta x_{ol} \, )$$

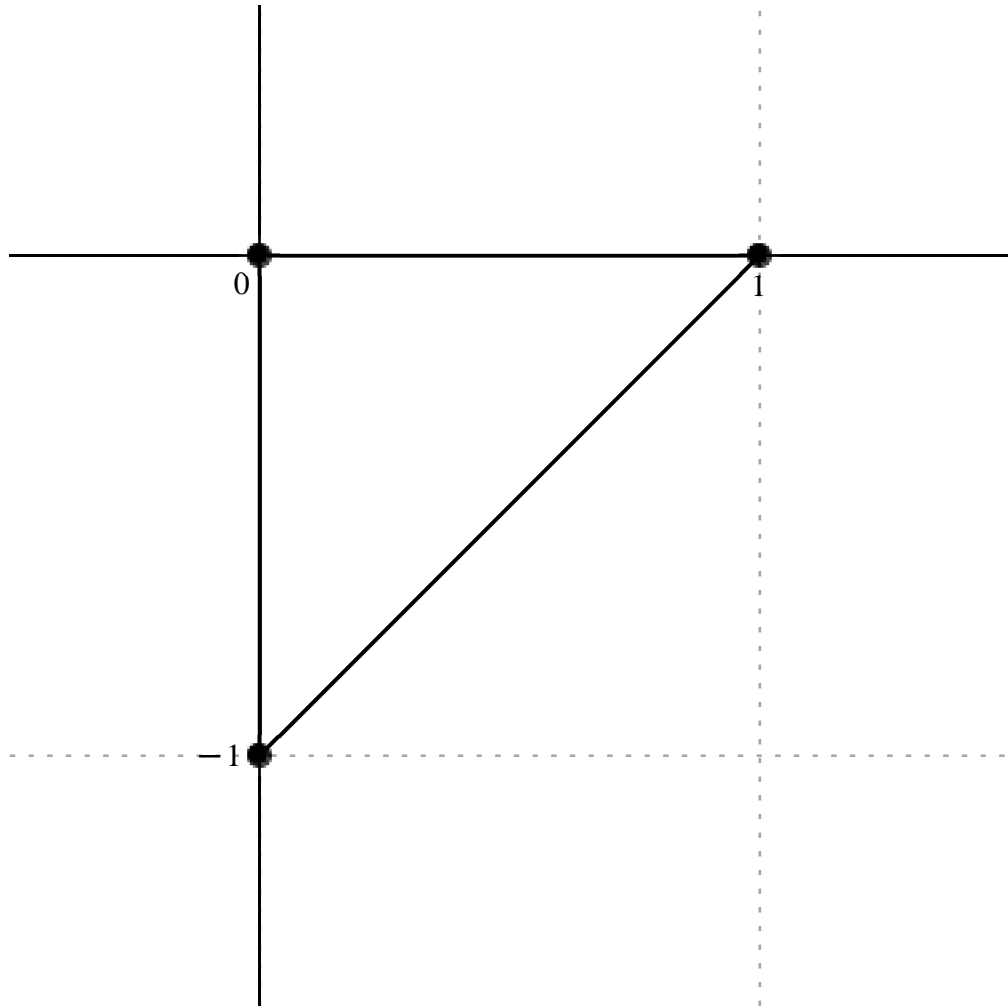
Formula:, 321, Var:., 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:., 2, Error:., 0.000073912117014108102843, New Error:.,  $7.3692810201616628139 \times 10^{-7}$   
Error order:., 2, Error:.,  $7.3692810201616628139 \times 10^{-7}$ , New Error:.,  $7.3670887710965117890 \times 10^{-9}$   
Error order:., 2, Error:.,  $7.3670887710965117890 \times 10^{-9}$ , New Error:.,  $7.3668695543804696455 \times 10^{-11}$   
Error order:., 2, Error:.,  $7.3668695543804696455 \times 10^{-11}$ , New Error:.,  $7.3668476327907701482 \times 10^{-13}$   
Error order:., 2, Error:.,  $7.3668476327907701482 \times 10^{-13}$ , New Error:.,  $7.3668454406326192457 \times 10^{-15}$

$$x_o \neq h \, . \, , \left[ \begin{array}{cc} 0 & 1 \\ -\mathrm{I} & \end{array} \right]$$
  
$$c = , \left[ \begin{array}{cc} -1-\mathrm{I} & \frac{1}{2} + \frac{\mathrm{I}}{2} \\ \frac{1}{2} + \frac{\mathrm{I}}{2} & \end{array} \right]$$





$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\; u(x_{ol}) = \frac{\left(\frac{1}{2}+\frac{\mathrm{I}}{2}\right)\left(-2\,u_{ol}+u_{ol+1}+u_{ol-1}\right)}{\Delta x_{ol}},\; O(\;\Delta x_{ol}^{\;2}\;)$$

Formula.: 322, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 2

Error order.: 1, Error.: 0.016192163022054509222, New Error.: 0.0016185291330311792513

Error order.: 1, Error.: 0.0016185291330311792513, New Error.: 0.00016184604175640135295

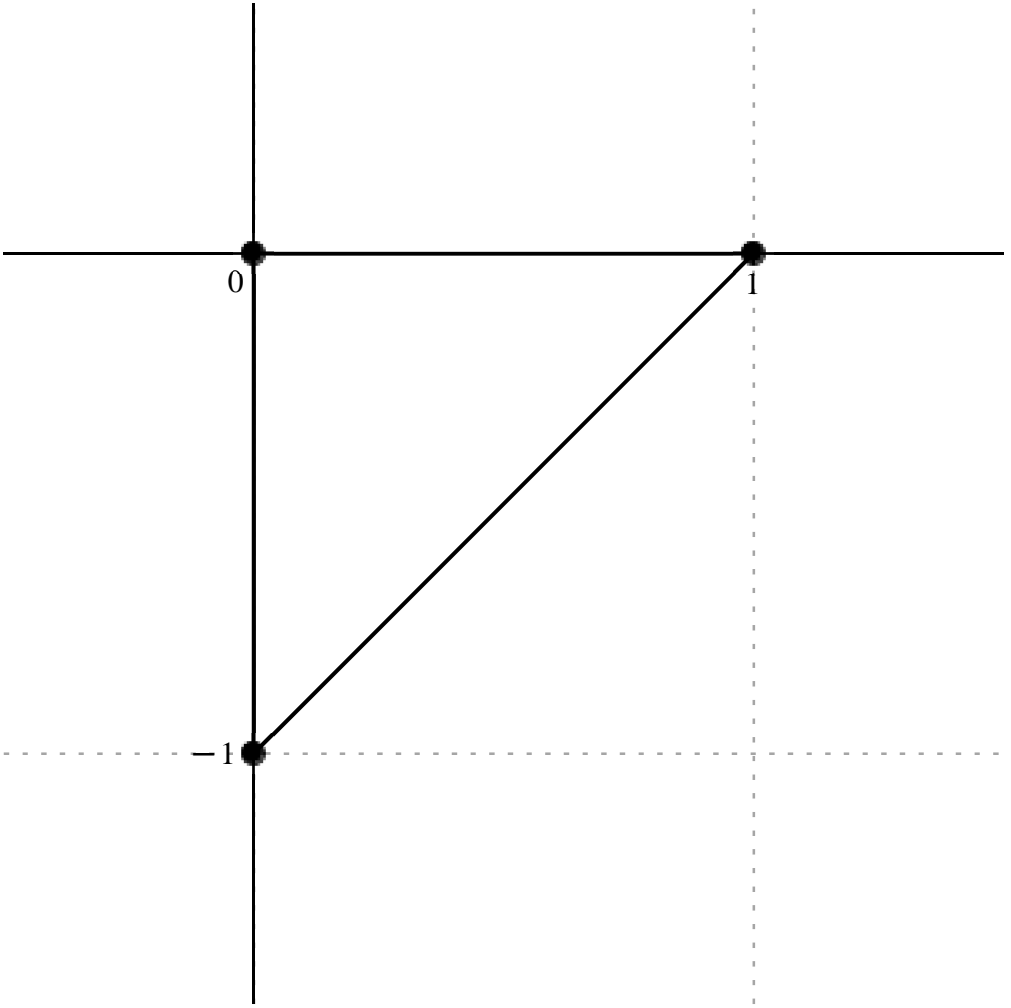
Error order.: 1, Error.: 0.00016184604175640135295, New Error.: 0.000016184535460187447322

Error order.: 1, Error.: 0.000016184535460187447322, New Error.: 1.6184528588642193000 × 10<sup>−6</sup>

Error order.: 1, Error.: 1.6184528588642193000 × 10<sup>−6</sup>, New Error.: 1.6184527901487667582 × 10<sup>−7</sup>

$$x_o\neq h\;,\;\left[\begin{array}{cc}0&1\\-\mathrm{I}&\end{array}\right]$$

$$c=,\left[\begin{array}{cc}2\;\mathrm{I}&1-\mathrm{I}\\-1-\mathrm{I}&\end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{oi}^2} \, u(x_{oi}) = \frac{2 \, \mathrm{I} \, u_{oi} + (1 - \mathrm{I}) \, u_{oi+1} - (1 + \mathrm{I}) \, u_{oi-1}}{\Delta x_{oi}^2}, \, O( \, \Delta x_{oi} \, )$$

Formula:, 323, Var:., 1

Variavel :.,  $x_{oi}$ , Derivada de Ordem :., 1

Error order:., 2, Error:., 0.000073508772482706541419, New Error:.,  $7.3652492294884294176 \times 10^{-7}$

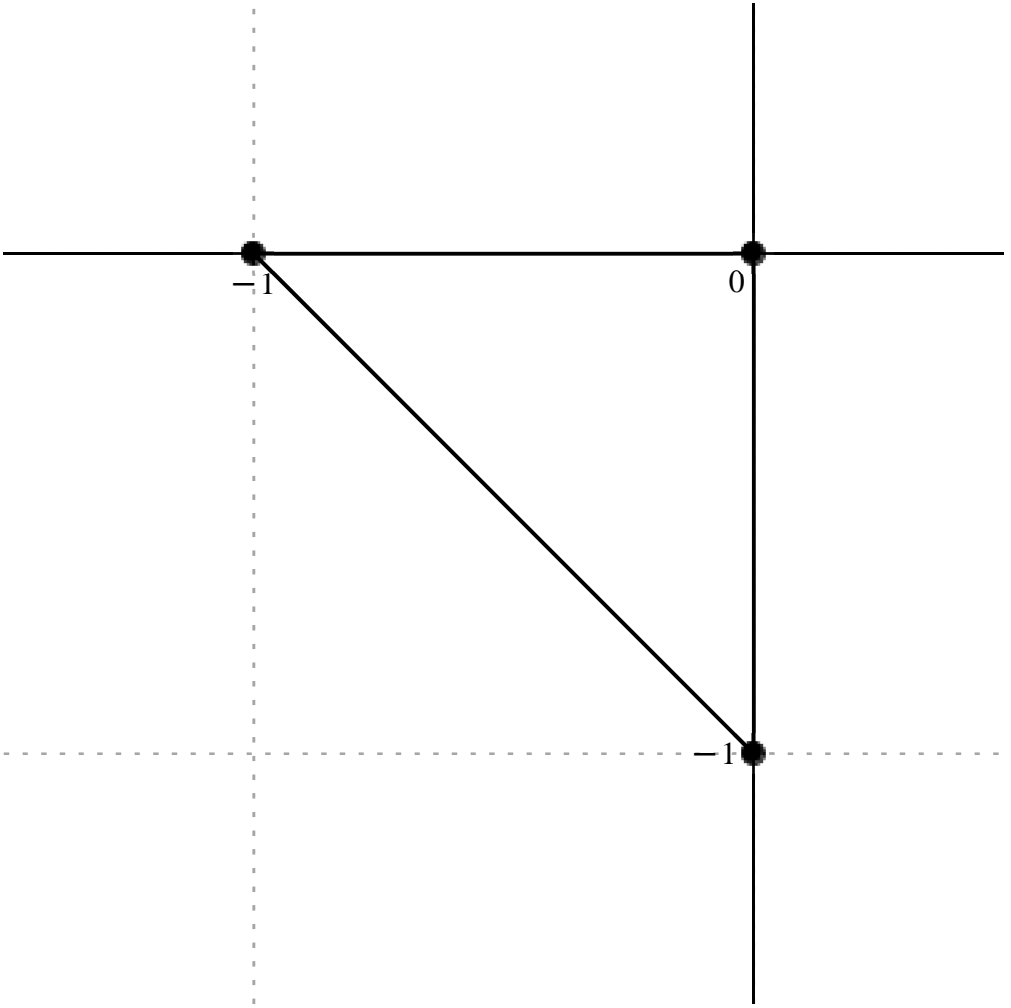
Error order:., 2, Error:.,  $7.3652492294884294176 \times 10^{-7}$ , New Error:.,  $7.3666856085755959274 \times 10^{-9}$

Error order:., 2, Error:.,  $7.3666856085755959274 \times 10^{-9}$ , New Error:.,  $7.3668292382938421341 \times 10^{-11}$

Error order:., 2, Error:.,  $7.3668292382938421341 \times 10^{-11}$ , New Error:.,  $7.3668436011837620379 \times 10^{-13}$

Error order:., 2, Error:.,  $7.3668436011837620379 \times 10^{-13}$ , New Error:.,  $7.3668450374719349811 \times 10^{-15}$

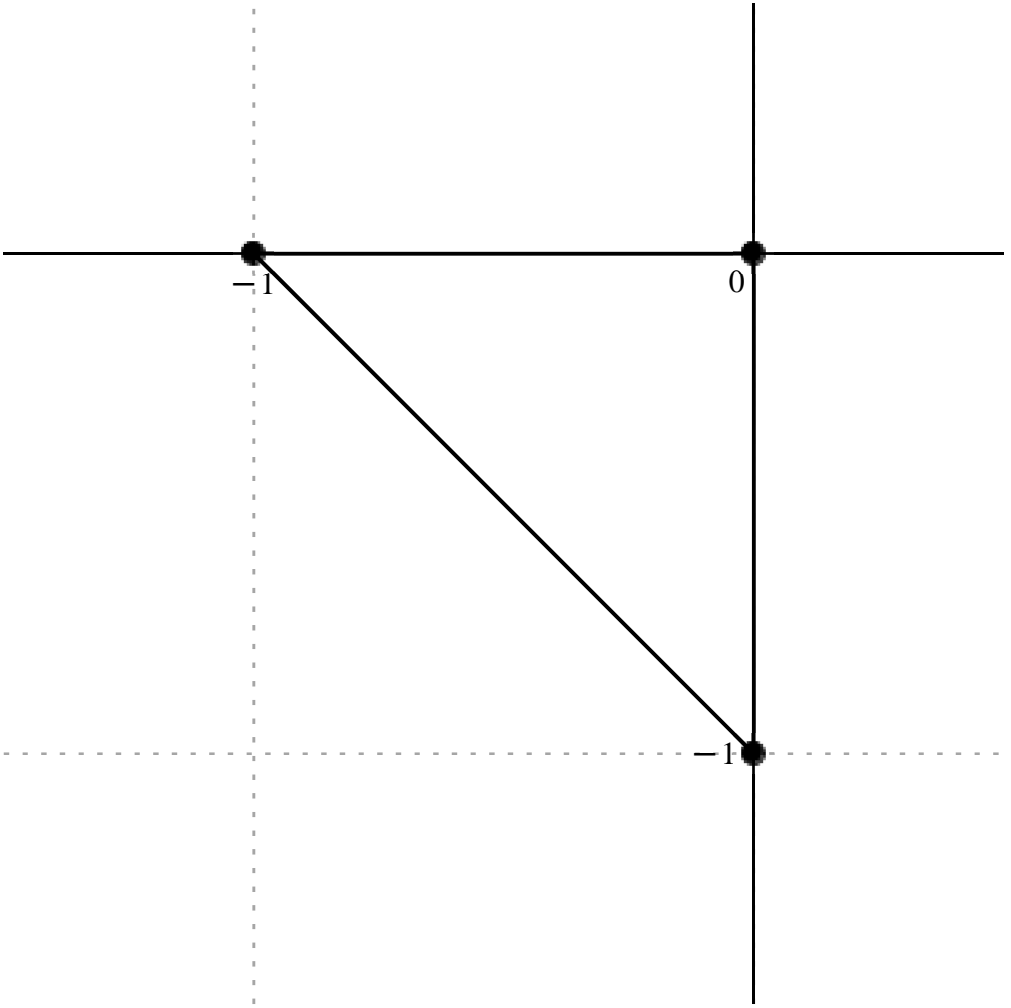
$$x_o + h. , \begin{bmatrix} -1 & 0 \\ & -1 \end{bmatrix}$$
  
$$c = , \begin{bmatrix} -\frac{1}{2} + \frac{\mathrm{I}}{2} & 1 - \mathrm{I} \\ & -\frac{1}{2} + \frac{\mathrm{I}}{2} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{\left(\frac{1}{2} - \frac{\mathrm{I}}{2}\right) \left(-u_{ol-1} + 2\, u_{ol} - u_{ol+1}\right)}{\Delta x_{ol}},\, O(\,\Delta x_{ol}^2\,)$$

Formula.: 324, Var.: 1  
Variavel :,  $x_{ol}$  , Derivada de Ordem :, 2  
Error order.: 1, Error.: 0.016147876823794672764, New Error.: 0.0016180862727993738431  
Error order.: 1, Error.: 0.0016180862727993738431, New Error.: 0.00016184161315425837779  
Error order.: 1, Error.: 0.00016184161315425837779, New Error.: 0.000016184491174166035078  
Error order.: 1, Error.: 0.000016184491174166035078, New Error.:  $1.6184524160040051793 \times 10^{-6}$   
Error order.: 1, Error.:  $1.6184524160040051793 \times 10^{-6}$ , New Error.:  $1.6184527458627453461 \times 10^{-7}$

$$x_o \neq h. , \left[ \begin{array}{cc} -1 & 0 \\ & -\mathrm{I} \end{array} \right]$$
  
$$c = , \left[ \begin{array}{cc} 1 + \mathrm{I} & -2\, \mathrm{I} \\ & -1 + \mathrm{I} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{(1 + \mathrm{I}) \, u_{ol-1} - 2 \, \mathrm{I} \, u_{ol} + (-1 + \mathrm{I}) \, u_{ol+1}}{\Delta x_{ol}^2}, \, O(\, \Delta x_{ol} \, )$$

Not square - Triangle: Interval , 2

Formula:, 325, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 1

Error order:, 5, Error:,  $3.9310123823677897379 \times 10^{-12}$ , New Error:,  $3.8946712497702865065 \times 10^{-17}$

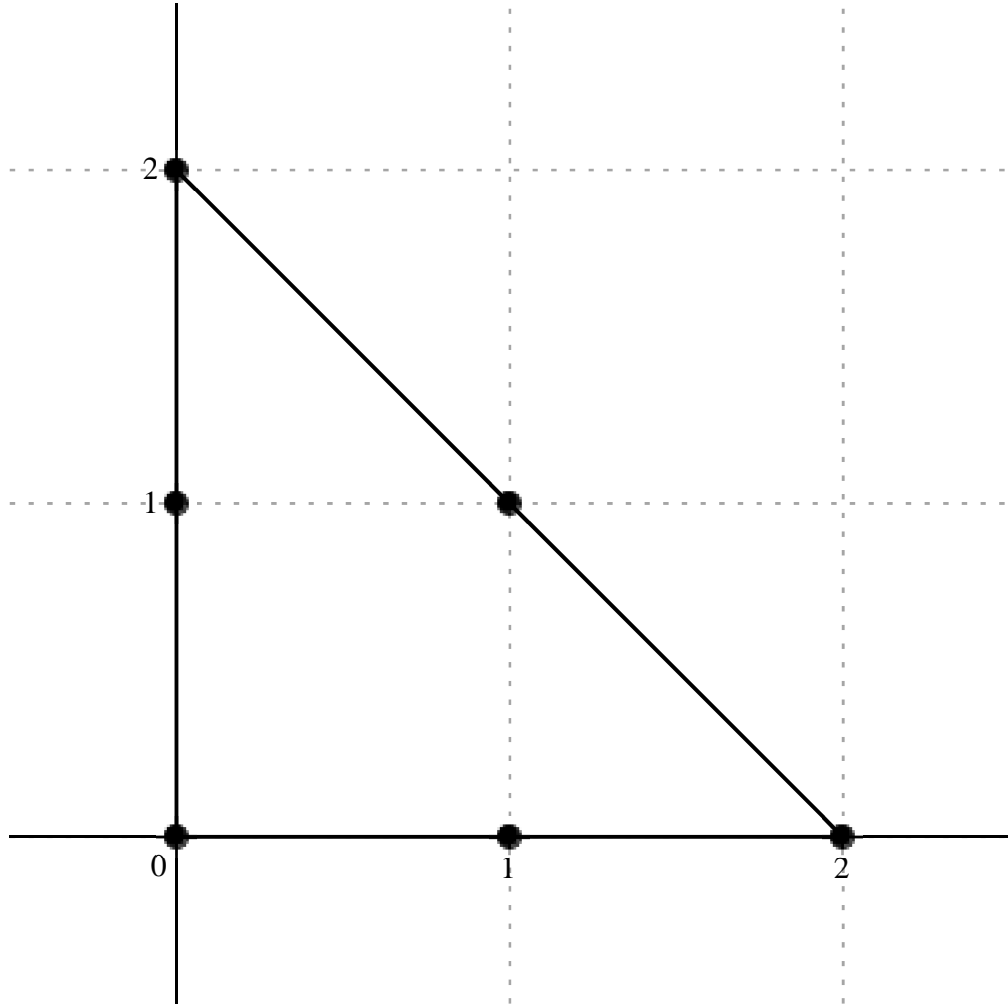
Error order:, 5, Error:,  $3.8946712497702865065 \times 10^{-17}$ , New Error:,  $3.8910453885886907356 \times 10^{-22}$

Error order:, 5, Error:,  $3.8910453885886907356 \times 10^{-22}$ , New Error:,  $3.8906828850631263432 \times 10^{-27}$

Error order:, 5, Error:,  $3.8906828850631263432 \times 10^{-27}$ , New Error:,  $3.8906466355365673443 \times 10^{-32}$

Error order:, 5, Error:,  $3.8906466355365673443 \times 10^{-32}$ , New Error:,  $3.8906430105921714903 \times 10^{-37}$

$$x_o \, + h \, , \, \left[ \begin{array}{ccc} 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & \\ 0 & 1 & 2 \end{array} \right]$$
  
$$c = , \, \left[ \begin{array}{ccc} \frac{1}{20} - \frac{3 \, \mathrm{I}}{20} & & \\ \frac{8}{5} + \frac{4 \, \mathrm{I}}{5} & 1 - \mathrm{I} & \\ -2 + 2 \, \mathrm{I} & -\frac{4}{5} - \frac{8 \, \mathrm{I}}{5} & \frac{3}{20} - \frac{\mathrm{I}}{20} \end{array} \right]$$



$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{(1-3 I) u_{ol+2I} + (32+16 I) u_{ol+I} + (20-20 I) u_{ol+1+1} + (-40+40 I) u_{ol} - (16+32 I) u_{ol+1} + (3-I) u_{ol+2}, O(\Delta x_{ol}^5)}$$

Formula:, 326, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 4, Error:,  $2.3525881335243364786 \times 10^{-9}$ , New Error:,  $2.3428203489518796333 \times 10^{-13}$

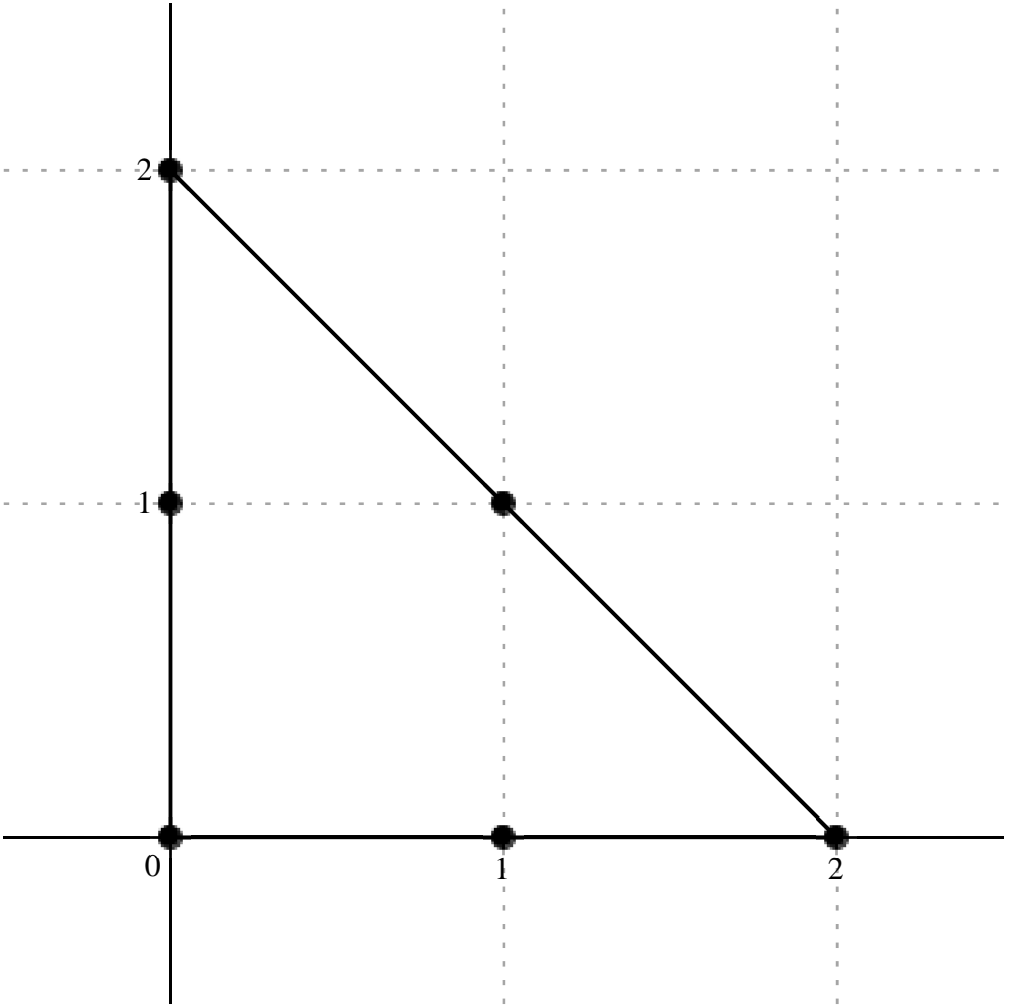
Error order:, 4, Error:,  $2.3428203489518796333 \times 10^{-13}$ , New Error:,  $2.3418421620737303966 \times 10^{-17}$

Error order:, 4, Error:,  $2.3418421620737303966 \times 10^{-17}$ , New Error:,  $2.3417443294247086233 \times 10^{-21}$

Error order:, 4, Error:,  $2.3417443294247086233 \times 10^{-21}$ , New Error:,  $2.3417345460203172521 \times 10^{-25}$

Error order:, 4, Error:,  $2.3417345460203172521 \times 10^{-25}$ , New Error:,  $2.3417335676784833460 \times 10^{-29}$

$$x_o + h, \begin{bmatrix} 2 I \\ I & 1+I \\ 0 & 1 & 2 \end{bmatrix}$$
  
$$c =, \begin{bmatrix} \frac{1}{4} + \frac{3 I}{4} \\ -8 & 6 I \\ -\frac{15 I}{2} & 8 & -\frac{1}{4} + \frac{3 I}{4} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{(1+3 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} - 32 \, u_{ol+\mathrm{I}} + 24 \, \mathrm{I} u_{ol+\mathrm{I}+1} - 30 \, \mathrm{I} u_{ol} + 32 \, u_{ol+1} + (-1+3 \, \mathrm{I}) \, u_{ol+2}}{4 \, \Delta x_{ol}^2}, \, O(\, \Delta x_{ol}^4 \, )$$

Formula:, 327, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 3, Error:, 7.2997071895680959621 × 10<sup>-7</sup>, New Error:, 7.2411582700494836471 × 10<sup>-10</sup>

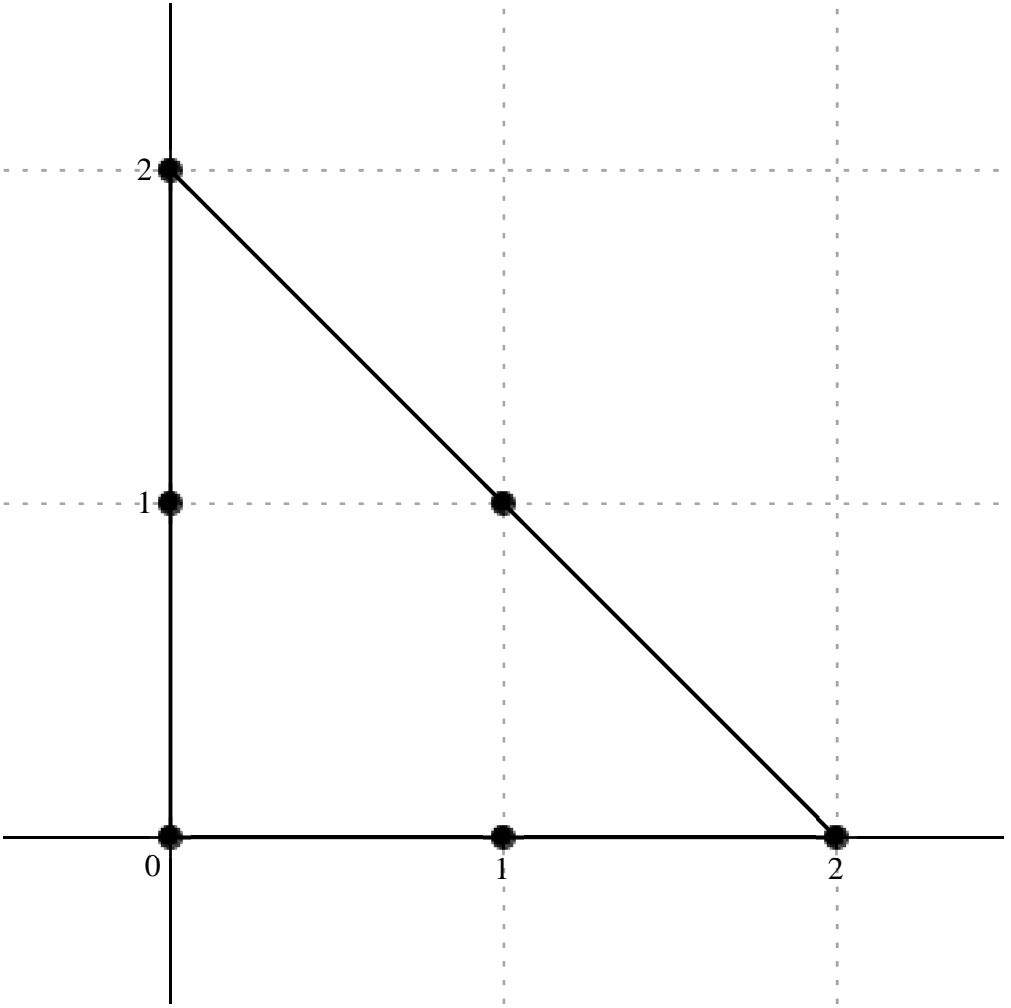
Error order:, 3, Error:, 7.2411582700494836471 × 10<sup>-10</sup>, New Error:, 7.2353151140226557440 × 10<sup>-13</sup>

Error order:, 3, Error:, 7.2353151140226557440 × 10<sup>-13</sup>, New Error:, 7.2347309158661389162 × 10<sup>-16</sup>

Error order:, 3, Error:, 7.2347309158661389162 × 10<sup>-16</sup>, New Error:, 7.2346724972250355713 × 10<sup>-19</sup>

Error order:, 3, Error:, 7.2346724972250355713 × 10<sup>-19</sup>, New Error:, 7.2346666553726708068 × 10<sup>-22</sup>

$$x_o \, + h \, . \, , \, \left[ \begin{array}{ccc} 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & \\ 0 & 1 & 2 \end{array} \right]$$
  
$$c = , \, \left[ \begin{array}{ccc} -\frac{9}{4} - \frac{3 \, \mathrm{I}}{2} & & \\ 18 - 12 \, \mathrm{I} & -\frac{27}{2} - \frac{27 \, \mathrm{I}}{2} & \\ \frac{45}{4} + \frac{45 \, \mathrm{I}}{4} & -12 + 18 \, \mathrm{I} & -\frac{3}{2} - \frac{9 \, \mathrm{I}}{4} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{-(9+6\,\mathrm{I})\,u_{ol+2\,\mathrm{I}} + (72-48\,\mathrm{I})\,u_{ol+\,\mathrm{I}} - (54+54\,\mathrm{I})\,u_{ol+\,\mathrm{I}+\,\mathrm{I}} + (45+45\,\mathrm{I})\,u_{ol} + (-48+72\,\mathrm{I})\,u_{ol+\,\mathrm{I}} - (6+9\,\mathrm{I})\,u_{ol+2}}{4\,\Delta x_{ol}^3},\,O(\,\Delta x_{ol}^3\,)$$

Formula.: 328, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 4

Error order.: 2, Error.: 0.00021853071568266069714, New Error.:  $2.1780399711283143144 \times 10^{-6}$

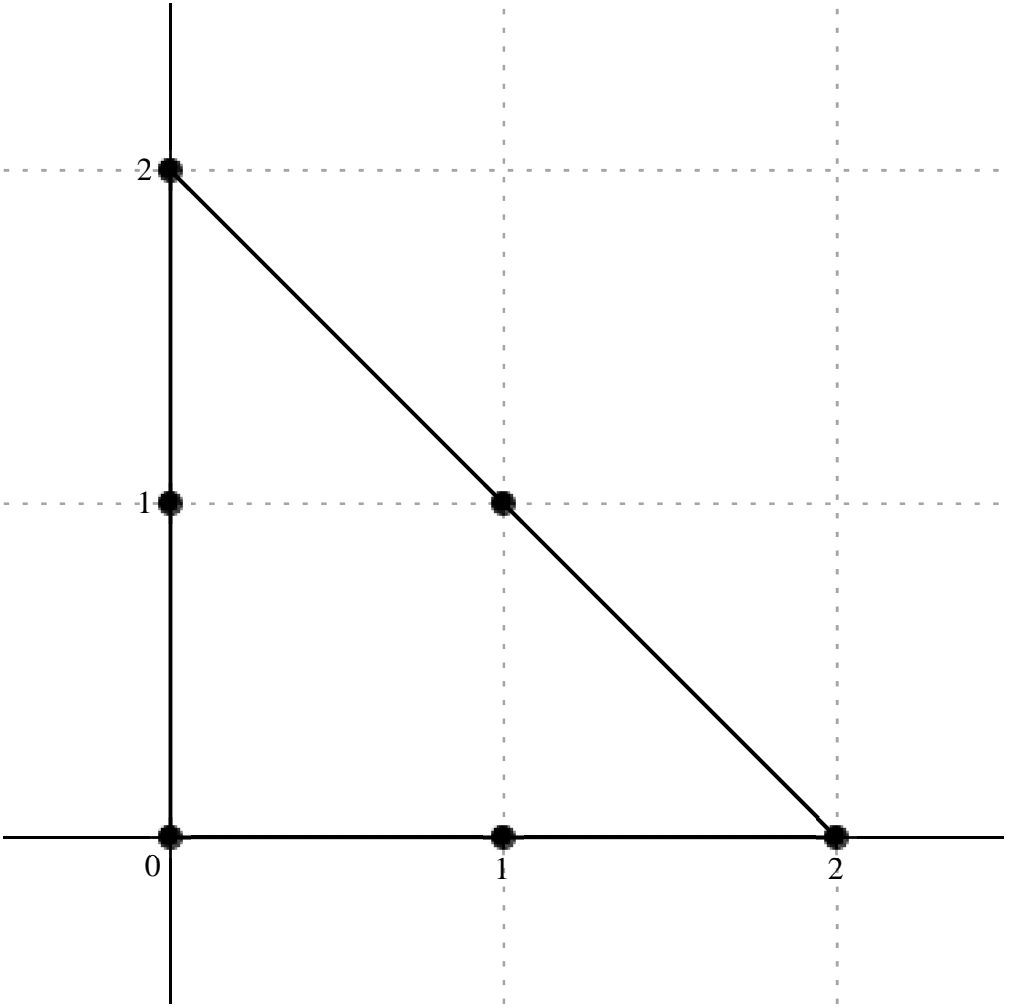
Error order.: 2, Error.:  $2.1780399711283143144 \times 10^{-6}$ , New Error.:  $2.1773123755061888842 \times 10^{-8}$

Error order.: 2, Error.:  $2.1773123755061888842 \times 10^{-8}$ , New Error.:  $2.1772396072343942061 \times 10^{-10}$

Error order.: 2, Error.:  $2.1772396072343942061 \times 10^{-10}$ , New Error.:  $2.1772323303201798414 \times 10^{-12}$

Error order.: 2, Error.:  $2.1772323303201798414 \times 10^{-12}$ , New Error.:  $2.1772316026278881169 \times 10^{-14}$

$$x_o + h . , \left[ \begin{array}{ccc} 2\,\mathrm{I} & & \\ \mathrm{I} & 1+\mathrm{I} & \\ 0 & 1 & 2 \end{array} \right]$$
  
$$c = , \left[ \begin{array}{ccc} 6 & & \\ -12+36\,\mathrm{I} & 36 & \\ -24 & -12-36\,\mathrm{I} & 6 \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{6 \left( u_{ol+2i} + (-2+6 \, \mathrm{I}) u_{ol+1} + 6 u_{ol+1+1} - 4 u_{ol} - (2+6 \, \mathrm{I}) u_{ol+1} + u_{ol+2} \right)}{\Delta x_{ol}^4}, \, O(\Delta x_{ol}^2)$$

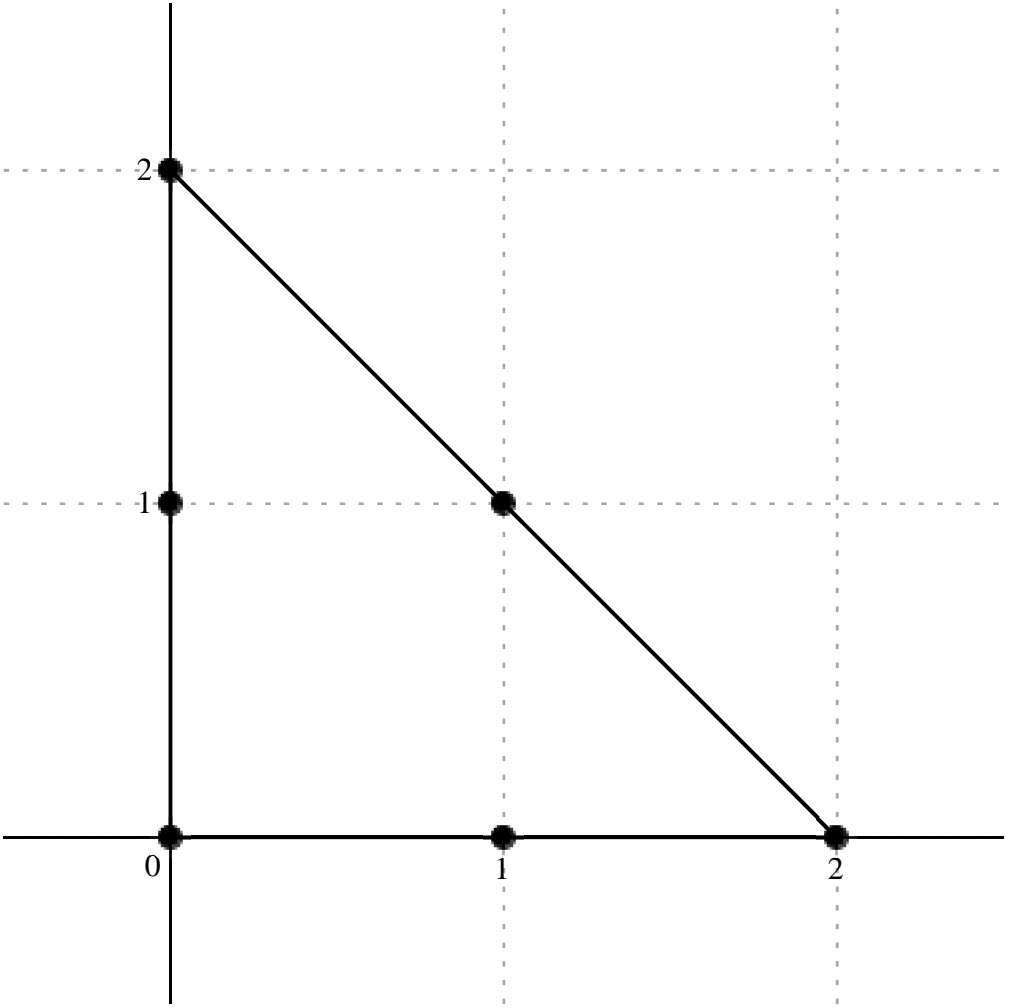
Formula:, 329, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 1, Error:, 0.032063967096759024907, New Error:, 0.0031905875103746149343  
Error order:, 1, Error:, 0.0031905875103746149343, New Error:, 0.00031890088791593653174  
Error order:, 1, Error:, 0.00031890088791593653174, New Error:, 0.000031888510389354516313  
Error order:, 1, Error:, 0.000031888510389354516313, New Error:,  $3.1888352551420468746 \times 10^{-6}$   
Error order:, 1, Error:,  $3.1888352551420468746 \times 10^{-6}$ , New Error:,  $3.1888336767649962756 \times 10^{-7}$

$$x_o + h., \begin{bmatrix} 2 \, \mathrm{I} \\ 1 & 1 + \mathrm{I} \\ 0 & 1 & 2 \end{bmatrix}$$
  
$$c =, \begin{bmatrix} -6 + 3 \, \mathrm{I} \\ -12 - 36 \, \mathrm{I} & -30 + 30 \, \mathrm{I} \\ 15 - 15 \, \mathrm{I} & 36 + 12 \, \mathrm{I} & -3 + 6 \, \mathrm{I} \end{bmatrix}$$





$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} u(x_{ol}) = \frac{(-6 + 3 \operatorname{I}) u_{ol+2 \operatorname{I}} - (12 + 36 \operatorname{I}) u_{ol+1 \operatorname{I}} + (-30 + 30 \operatorname{I}) u_{ol+1 \operatorname{I}+1} + (15 - 15 \operatorname{I}) u_{ol} + (36 + 12 \operatorname{I}) u_{ol+1} + (-3 + 6 \operatorname{I}) u_{ol+2}}{\Delta x_{ol}^5}, \mathcal{O}(\Delta x_{ol})$$

Formula.: 330, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 1

Error order.: 5, Error.:  $3.8821598394714386697 \times 10^{-12}$ , New Error.:  $3.8898026363620152573 \times 10^{-17}$

Error order.: 5, Error.:  $3.8898026363620152573 \times 10^{-17}$ , New Error.:  $3.8905586940715412876 \times 10^{-22}$

Error order.: 5, Error.:  $3.8905586940715412876 \times 10^{-22}$ , New Error.:  $3.8906342172800630396 \times 10^{-27}$

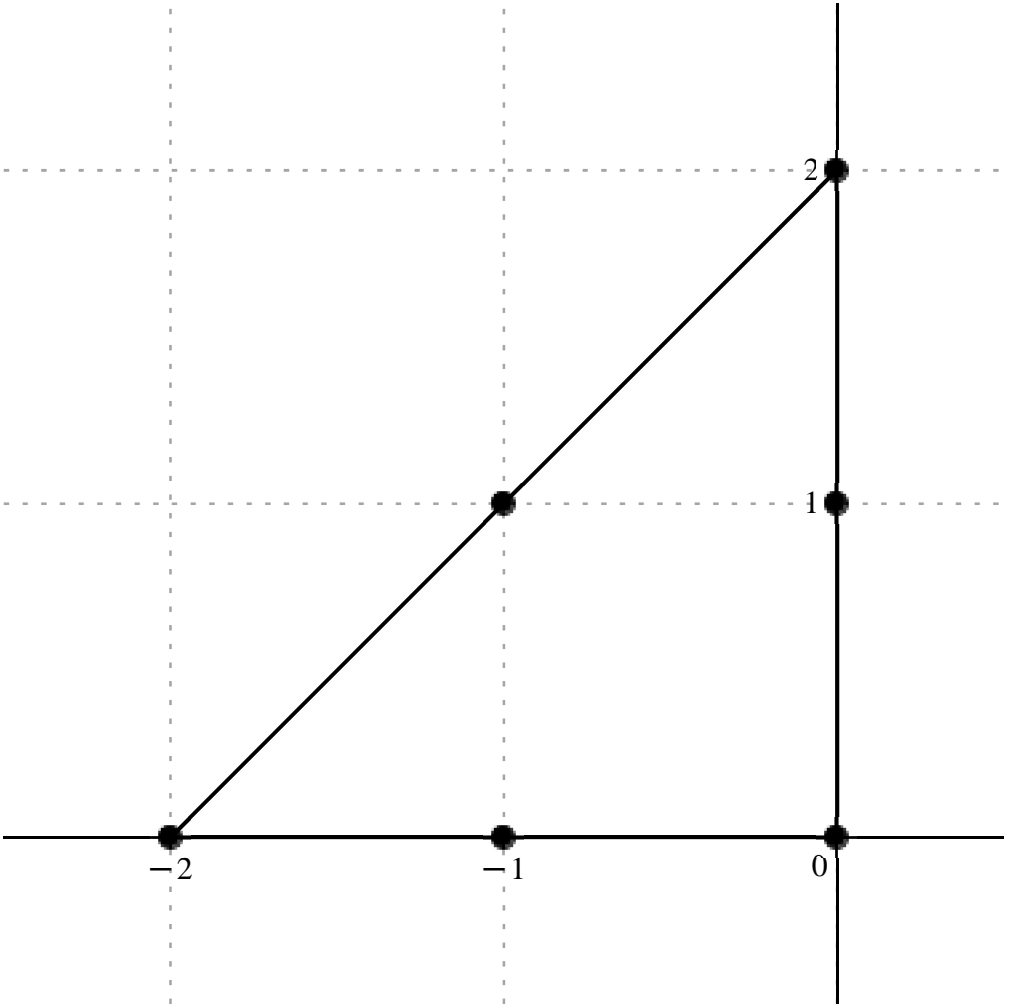
Error order.: 5, Error.:  $3.8906342172800630396 \times 10^{-27}$ , New Error.:  $3.8906417687749479453 \times 10^{-32}$

Error order.: 5, Error.:  $3.8906417687749479453 \times 10^{-32}$ , New Error.:  $3.8906425239161764201 \times 10^{-37}$

$$x_o+h., \left[ \begin{array}{cc} & 2 \operatorname{I} \\ & -1 + \operatorname{I} \quad \operatorname{I} \\ -2 & -1 \quad 0 \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} & & -\frac{1}{20} - \frac{3 \operatorname{I}}{20} \\ & -1 - \operatorname{I} & -\frac{8}{5} + \frac{4 \operatorname{I}}{5} \\ -\frac{3}{20} - \frac{\operatorname{I}}{20} & \frac{4}{5} - \frac{8 \operatorname{I}}{5} & 2 + 2 \operatorname{I} \end{array} \right]$$





$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{(1-3\mathrm{I}) u_{ol+2\mathrm{I}} - 24\mathrm{I} u_{ol-\mathrm{I}+1} - 32 u_{ol+1} - (1+3\mathrm{I}) u_{ol-2} + 32 u_{ol-1} + 30\mathrm{I} u_{ol}}{4\Delta x_{ol}^2}, O(\Delta x_{ol}^4)$$

Formula:, 332, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 3, Error:,  $7.2210128524385922572 \times 10^{-7}$ , New Error:,  $7.2333125088788105839 \times 10^{-10}$

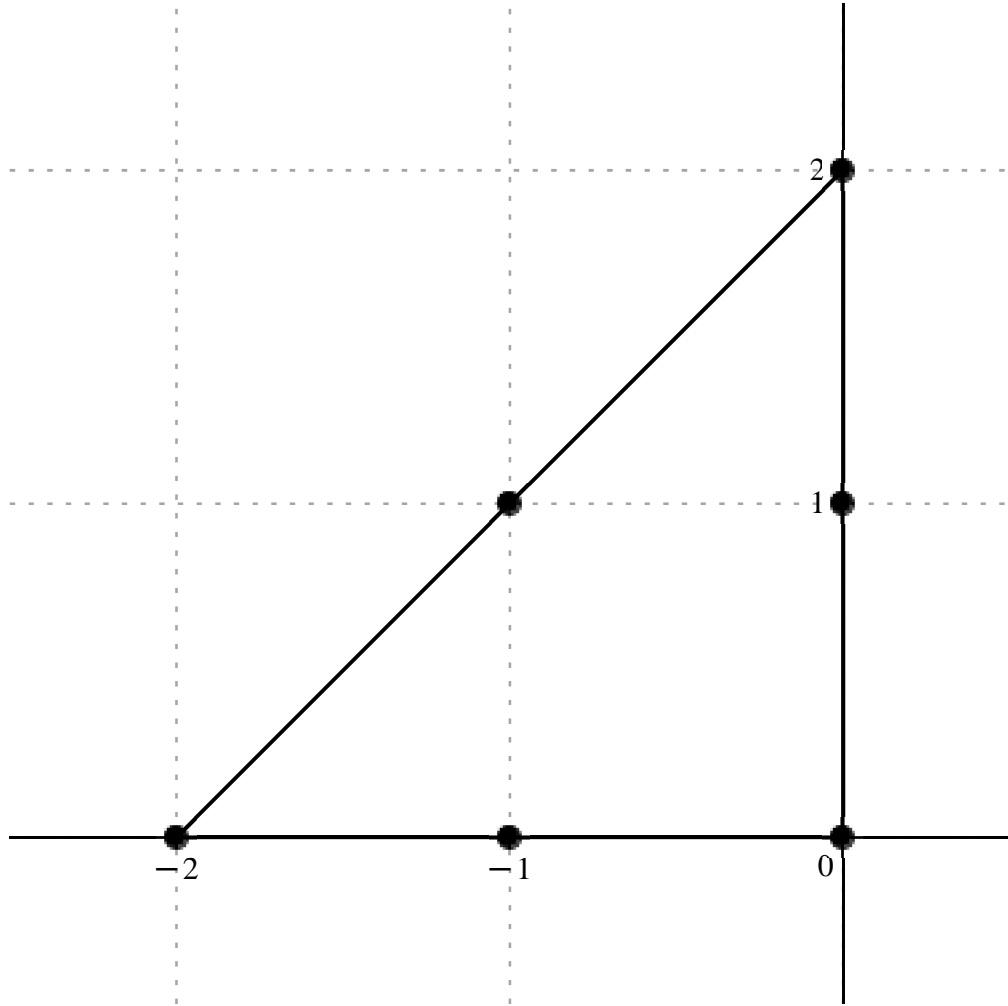
Error order:, 3, Error:,  $7.2333125088788105839 \times 10^{-10}$ , New Error:,  $7.2345307751341244361 \times 10^{-13}$

Error order:, 3, Error:,  $7.2345307751341244361 \times 10^{-13}$ , New Error:,  $7.2346524843500742598 \times 10^{-16}$

Error order:, 3, Error:,  $7.2346524843500742598 \times 10^{-16}$ , New Error:,  $7.2346646540971574935 \times 10^{-19}$

Error order:, 3, Error:,  $7.2346646540971574935 \times 10^{-19}$ , New Error:,  $7.2346658710601202834 \times 10^{-22}$

$$x_o + h., \begin{bmatrix} 2\mathrm{I} \\ -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \end{bmatrix}$$
  
$$c =, \begin{bmatrix} \frac{9}{4} - \frac{3\mathrm{I}}{2} \\ \frac{27}{2} - \frac{27\mathrm{I}}{2} & -18 - 12\mathrm{I} \\ \frac{3}{2} - \frac{9\mathrm{I}}{4} & 12 + 18\mathrm{I} & -\frac{45}{4} + \frac{45\mathrm{I}}{4} \end{bmatrix}$$



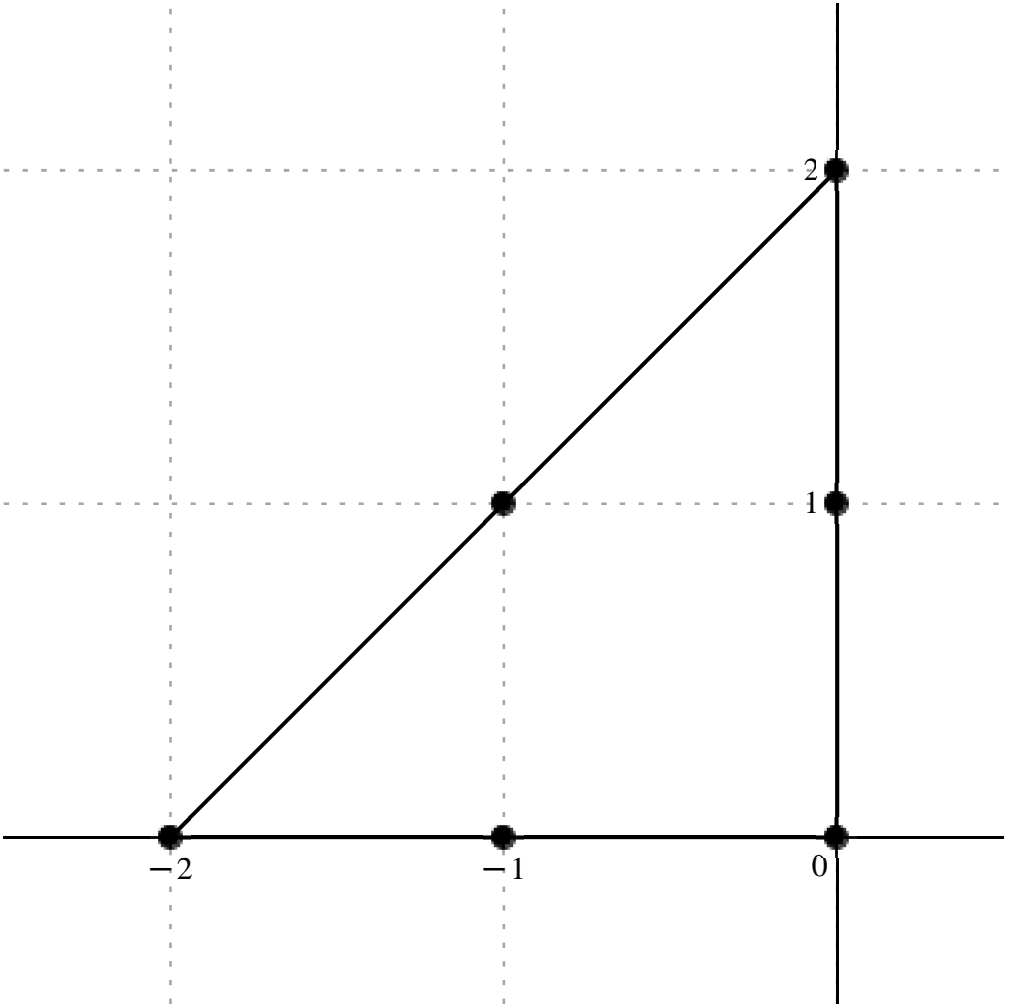
$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{(9-6\mathrm{I})u_{ol+2\mathrm{I}} + (54-54\mathrm{I})u_{ol-1+\mathrm{I}} - (72+48\mathrm{I})u_{ol+\mathrm{I}} + (6-9\mathrm{I})u_{ol-2} + (48+72\mathrm{I})u_{ol-1} + (-45+45\mathrm{I})u_{ol}}{4\Delta x_{ol}^3}, O(\Delta x_{ol}^3)$$

Formula:, 333, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 2, Error:, 0.00021649007523912126360, New Error:,  $2.1759975613253056317 \times 10^{-6}$   
Error order:, 2, Error:,  $2.1759975613253056317 \times 10^{-6}$ , New Error:,  $2.1771081169332325573 \times 10^{-8}$   
Error order:, 2, Error:,  $2.1771081169332325573 \times 10^{-8}$ , New Error:,  $2.1772191812012729585 \times 10^{-10}$   
Error order:, 2, Error:,  $2.1772191812012729585 \times 10^{-10}$ , New Error:,  $2.1772302877151095614 \times 10^{-12}$   
Error order:, 2, Error:,  $2.1772302877151095614 \times 10^{-12}$ , New Error:,  $2.1772313983673635074 \times 10^{-14}$

$$x_o+h., \begin{bmatrix} 2\mathrm{I} \\ -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \end{bmatrix}$$
$$c=, \begin{bmatrix} 6 \\ 36 & -12-36\mathrm{I} \\ 6 & -12+36\mathrm{I} & -24 \end{bmatrix}$$



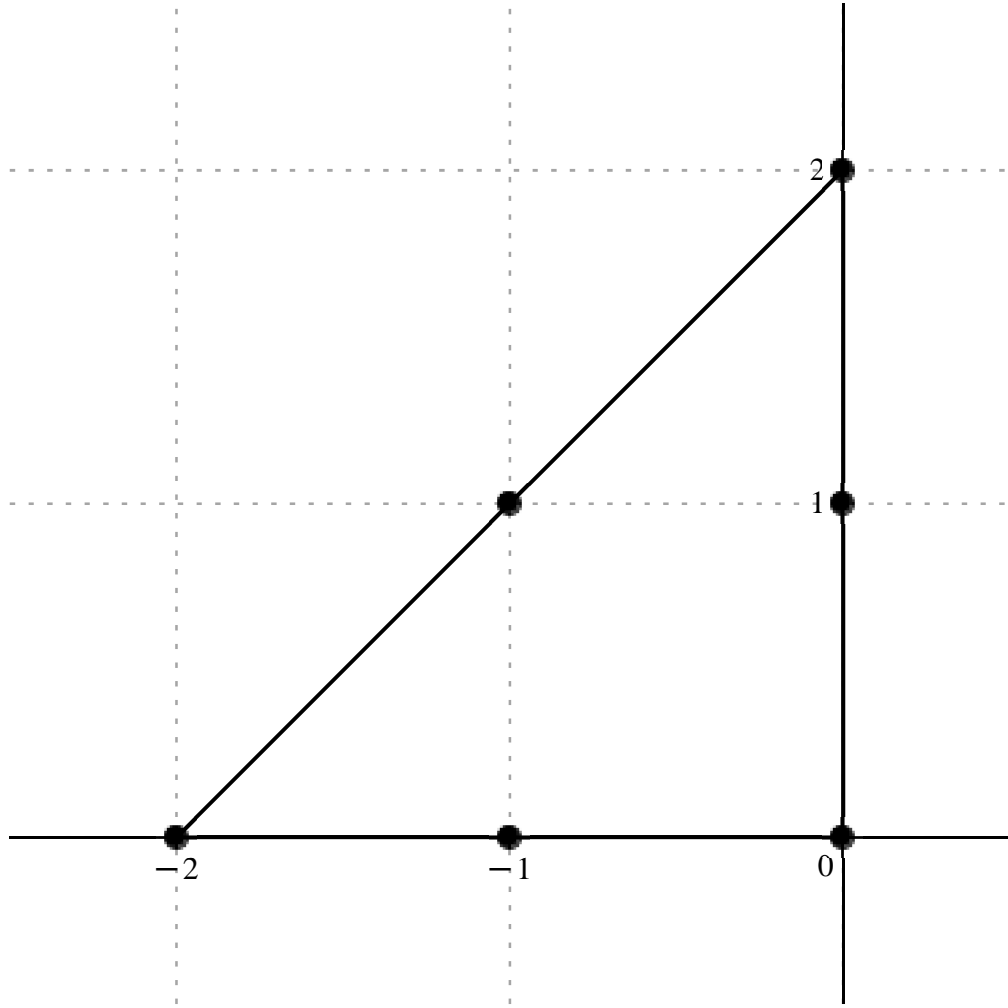
$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{6 \left( u_{ol+2l} + 6 u_{ol-1+l} - (2+6 \mathrm{I}) u_{ol+1} + u_{ol-2} + (-2+6 \mathrm{I}) u_{ol-1} - 4 u_{ol} \right)}{\Delta x_{ol}^4}, O(\Delta x_{ol}^2)$$

Formula:, 334, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 1, Error:, 0.031851544801208526858, New Error:, 0.0031884679066589369590  
Error order:, 1, Error:, 0.0031884679066589369590, New Error:, 0.00031887969650411789307  
Error order:, 1, Error:, 0.00031887969650411789307, New Error:, 0.000031888298479862277903  
Error order:, 1, Error:, 0.000031888298479862277903, New Error:,  $3.1888331360517504995 \times 10^{-6}$   
Error order:, 1, Error:,  $3.1888331360517504995 \times 10^{-6}$ , New Error:,  $3.1888334648560128982 \times 10^{-7}$

$$x_o + h., \begin{bmatrix} 2 \mathrm{I} \\ -1 + \mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \end{bmatrix}$$
$$c =, \begin{bmatrix} 6 + 3 \mathrm{I} \\ 30 + 30 \mathrm{I} & 12 - 36 \mathrm{I} \\ 3 + 6 \mathrm{I} & -36 + 12 \mathrm{I} & -15 - 15 \mathrm{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{(6+3 \, \mathrm{I}) \, u_{ol+2 \, \mathrm{I}} + (30+30 \, \mathrm{I}) \, u_{ol-1+1} + (12-36 \, \mathrm{I}) \, u_{ol+1} + (3+6 \, \mathrm{I}) \, u_{ol-2} + (-36+12 \, \mathrm{I}) \, u_{ol-1} - (15+15 \, \mathrm{I}) \, u_{ol}}{\Delta x_{ol}^5}, \, O(\, \Delta x_{ol} \, )$$

Formula:, 335, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 5, Error:,  $3.8989399645789851245 \times 10^{-12}$ , New Error:,  $3.8914807251706439894 \times 10^{-17}$

Error order:, 5, Error:,  $3.8914807251706439894 \times 10^{-17}$ , New Error:,  $3.8907265030287020484 \times 10^{-22}$

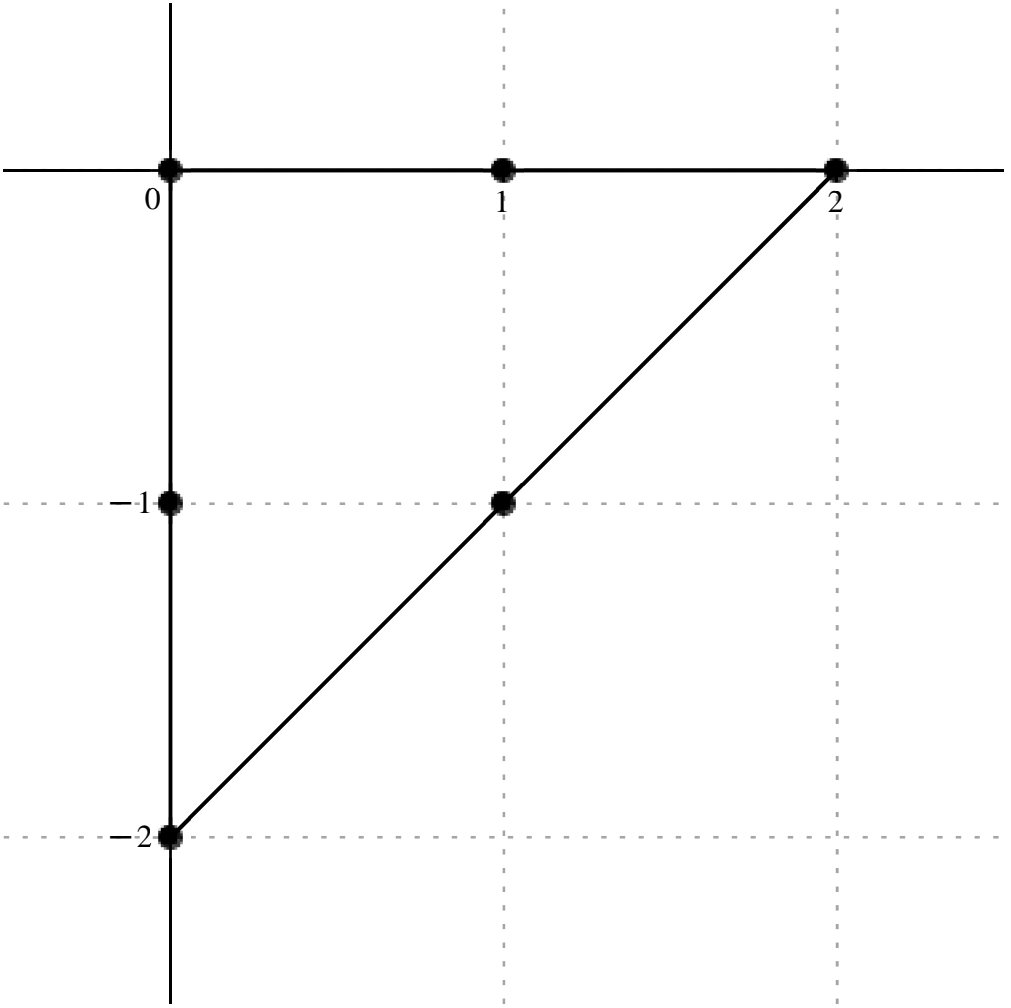
Error order:, 5, Error:,  $3.8907265030287020484 \times 10^{-22}$ , New Error:,  $3.8906509981758554135 \times 10^{-27}$

Error order:, 5, Error:,  $3.8906509981758554135 \times 10^{-27}$ , New Error:,  $3.8906434468645272590 \times 10^{-32}$

Error order:, 5, Error:,  $3.8906434468645272590 \times 10^{-32}$ , New Error:,  $3.8906426917251343516 \times 10^{-37}$

$$x_o+h\cdot,\left[\begin{array}{ccc}0&1&2\\-1&1-1\\-2\,\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{ccc}-2-2\,\mathrm{I}&-\frac{4}{5}+\frac{8\,\mathrm{I}}{5}&\frac{3}{20}+\frac{1}{20}\\\frac{8}{5}-\frac{4\,\mathrm{I}}{5}&1+\mathrm{I}&\\\frac{1}{20}+\frac{3\,\mathrm{I}}{20}&&\end{array}\right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{-(40+40\,\mathrm{I})\, u_{ol} + (-16+32\,\mathrm{I})\, u_{ol+1} + (3+\mathrm{I})\, u_{ol+2} + (32-16\,\mathrm{I})\, u_{ol-1} + (20+20\,\mathrm{I})\, u_{ol+1-1} + (1+3\,\mathrm{I})\, u_{ol-2\mathrm{I}}}{20\,\Delta x_{ol}},\, O(\,\Delta x_{ol}^5\,)$$

Formula:, 336, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 4, Error:,  $2.3583402486884488010 \times 10^{-9}$ , New Error:,  $2.3433927380688349516 \times 10^{-13}$

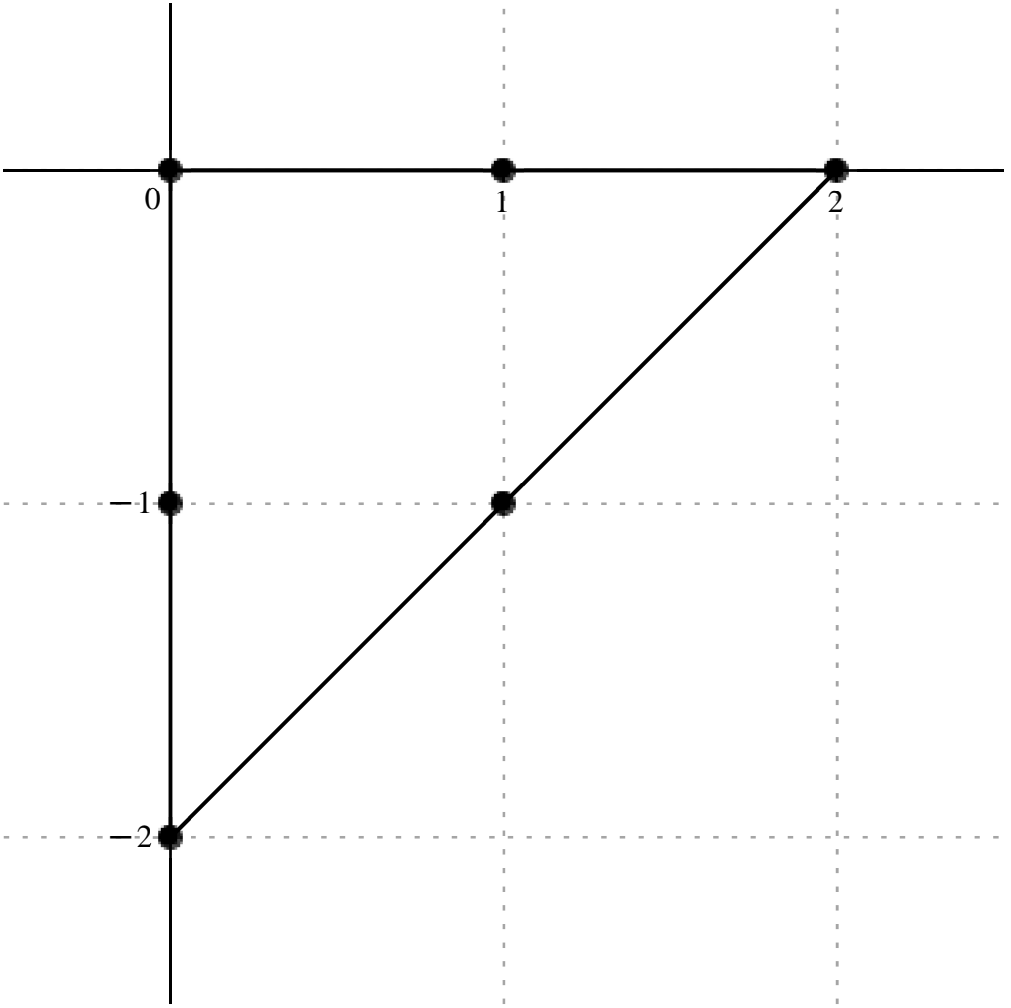
Error order:, 4, Error:,  $2.3433927380688349516 \times 10^{-13}$ , New Error:,  $2.3418993728038369416 \times 10^{-17}$

Error order:, 4, Error:,  $2.3418993728038369416 \times 10^{-17}$ , New Error:,  $2.3417500502159457934 \times 10^{-21}$

Error order:, 4, Error:,  $2.3417500502159457934 \times 10^{-21}$ , New Error:,  $2.3417351180966232767 \times 10^{-25}$

Error order:, 4, Error:,  $2.3417351180966232767 \times 10^{-25}$ , New Error:,  $2.3417336248860857715 \times 10^{-29}$

$$x_o + h \cdot , \begin{bmatrix} 0 & 1 & 2 \\ -1 & 1 - \mathrm{I} \\ -2\,\mathrm{I} \end{bmatrix}$$
  
$$c = , \begin{bmatrix} \frac{15\,\mathrm{I}}{2} & 8 & -\frac{1}{4} - \frac{3\,\mathrm{I}}{4} \\ -8 & -6\,\mathrm{I} \\ \frac{1}{4} - \frac{3\,\mathrm{I}}{4} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{30 \, \mathrm{I} u_{ol} + 32 \, u_{ol+1} - (1+3 \, \mathrm{I}) \, u_{ol+2} - 32 \, u_{ol-1} - 24 \, \mathrm{I} u_{ol+1-1} + (1-3 \, \mathrm{I}) \, u_{ol-2\mathrm{I}}}{4 \, \Delta x_{ol}^2}, \, O( \, \Delta x_{ol}^4 \, )$$

Formula:, 337, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 3, Error:,  $7.2480555102068485544 \times 10^{-7}$ , New Error:,  $7.2360168671835755982 \times 10^{-10}$

Error order:, 3, Error:,  $7.2360168671835755982 \times 10^{-10}$ , New Error:,  $7.2348012110571289182 \times 10^{-13}$

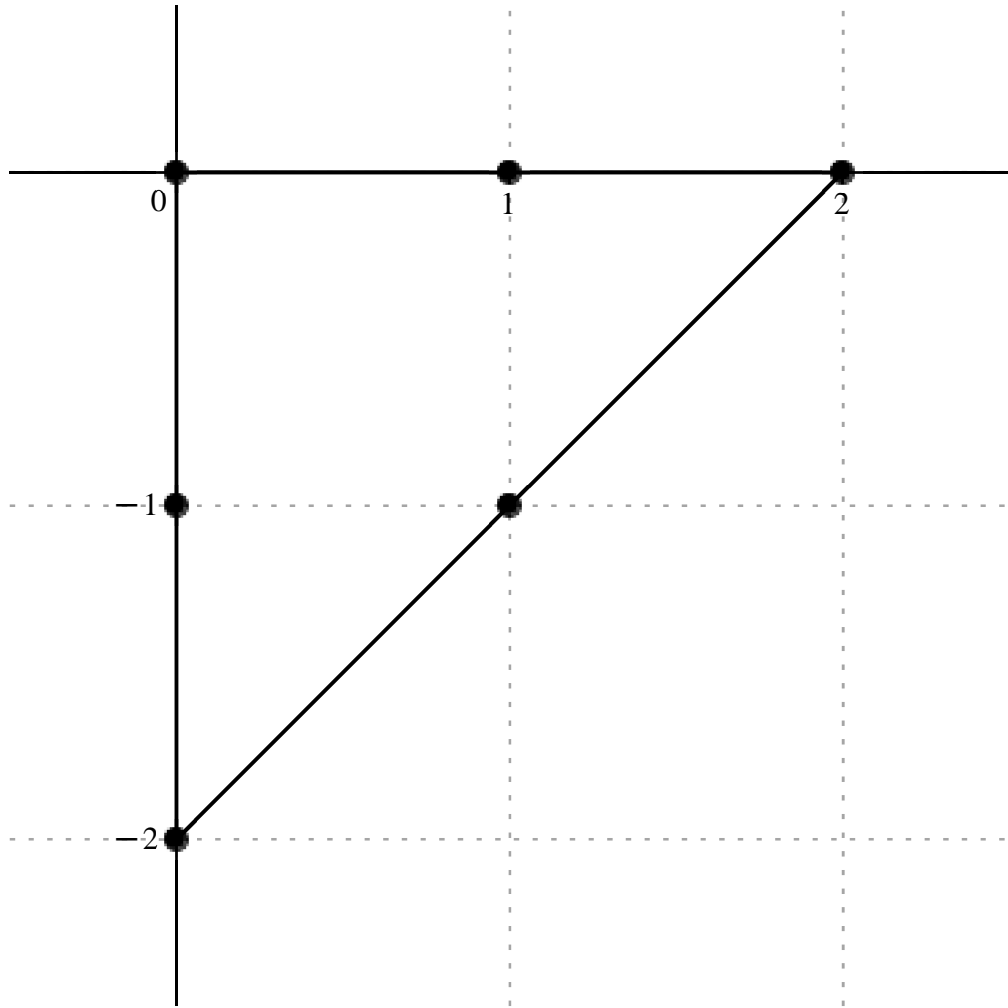
Error order:, 3, Error:,  $7.2348012110571289182 \times 10^{-13}$ , New Error:,  $7.2346795279424672360 \times 10^{-16}$

Error order:, 3, Error:,  $7.2346795279424672360 \times 10^{-16}$ , New Error:,  $7.2346673584563968837 \times 10^{-19}$

Error order:, 3, Error:,  $7.2346673584563968837 \times 10^{-19}$ , New Error:,  $7.2346661414960442225 \times 10^{-22}$

$$x_o \neq h \, , \, \left[ \begin{array}{ccc} 0 & 1 & 2 \\ -1 & 1-1 & \\ -2 \, \mathrm{I} & & \end{array} \right]$$
$$c =, \left[ \begin{array}{ccc} \frac{45}{4} - \frac{45 \, \mathrm{I}}{4} & -12-18 \, \mathrm{I} & -\frac{3}{2} + \frac{9 \, \mathrm{I}}{4} \\ 18+12 \, \mathrm{I} & -\frac{27}{2} + \frac{27 \, \mathrm{I}}{2} & \\ -\frac{9}{4} + \frac{3 \, \mathrm{I}}{2} & & \end{array} \right]$$





$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{(45-45 \, \mathrm{I}) \, u_{ol} - (48+72 \, \mathrm{I}) \, u_{ol+1} + (-6+9 \, \mathrm{I}) \, u_{ol+2} + (72+48 \, \mathrm{I}) \, u_{ol-1} + (-54+54 \, \mathrm{I}) \, u_{ol+1-1} + (-9+6 \, \mathrm{I}) \, u_{ol-2\mathrm{I}}}{4 \, \Delta x_{ol}^3}, \, O(\, \Delta x_{ol}^3 \,)$$

Formula.: 338, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 4

Error order.: 2, Error.: 0.00021895818260512206021, New Error.:  $2.1784656775703819206 \times 10^{-6}$

Error order.: 2, Error.:  $2.1784656775703819206 \times 10^{-6}$ , New Error.:  $2.1773549285666193074 \times 10^{-8}$

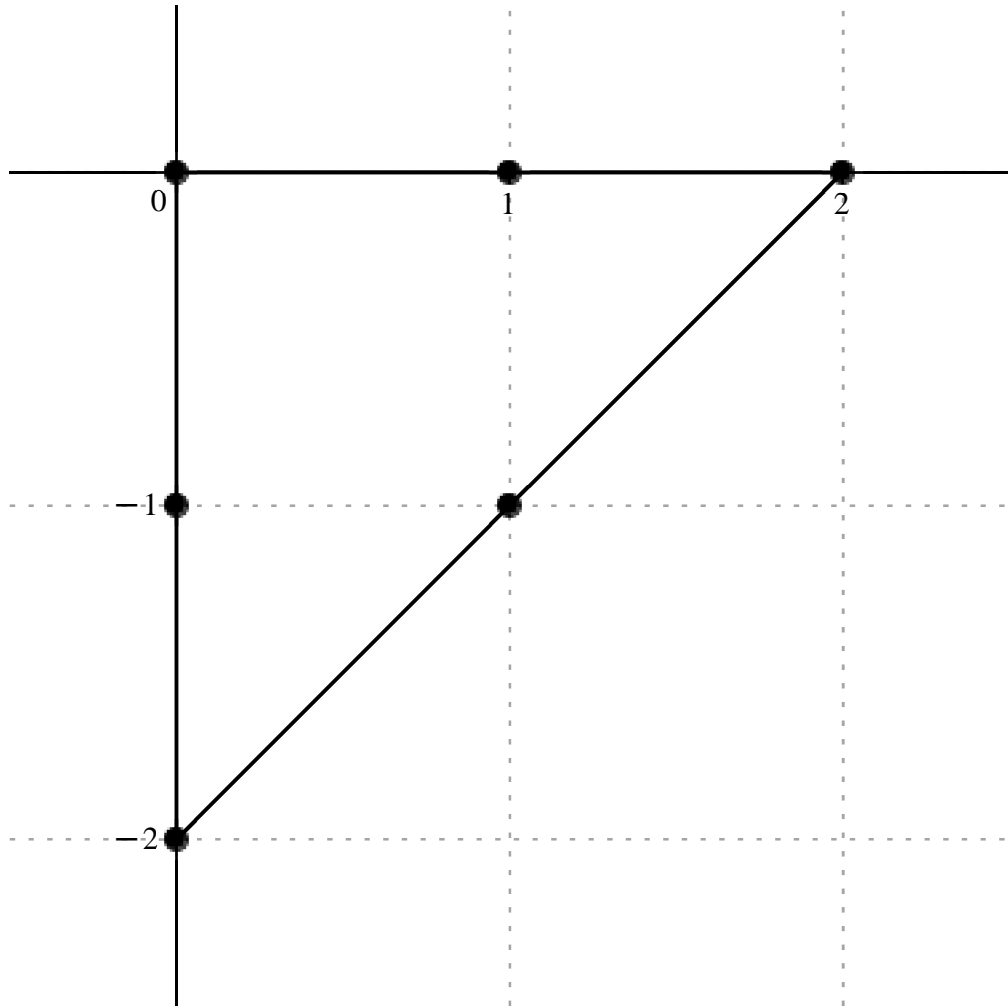
Error order.: 2, Error.:  $2.1773549285666193074 \times 10^{-8}$ , New Error.:  $2.1772438623646205126 \times 10^{-10}$

Error order.: 2, Error.:  $2.1772438623646205126 \times 10^{-10}$ , New Error.:  $2.1772327558314443257 \times 10^{-12}$

Error order.: 2, Error.:  $2.1772327558314443257 \times 10^{-12}$ , New Error.:  $2.1772316451789969839 \times 10^{-14}$

$$x_o \neq h \, , \, \left[ \begin{array}{ccc} 0 & 1 & 2 \\ -1 & 1-1 & \\ -2 \, \mathrm{I} & & \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} -24 & -12+36 \, \mathrm{I} & 6 \\ -12-36 \, \mathrm{I} & 36 & \\ 6 & & \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{6 \left( -4 u_{ol} + (-2 + 6 \text{ I}) u_{ol+1} + u_{ol+2} - (2 + 6 \text{ I}) u_{ol-1} + 6 u_{ol+1-1} + u_{ol-2 \text{ I}} \right)}{\Delta x_{ol}^4}, O(\Delta x_{ol}^2)$$

Formula:, 339, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 1, Error:, 0.031924611225656118069, New Error:, 0.0031891985821189110049

Error order:, 1, Error:, 0.0031891985821189110049, New Error:, 0.00031888700325983918480

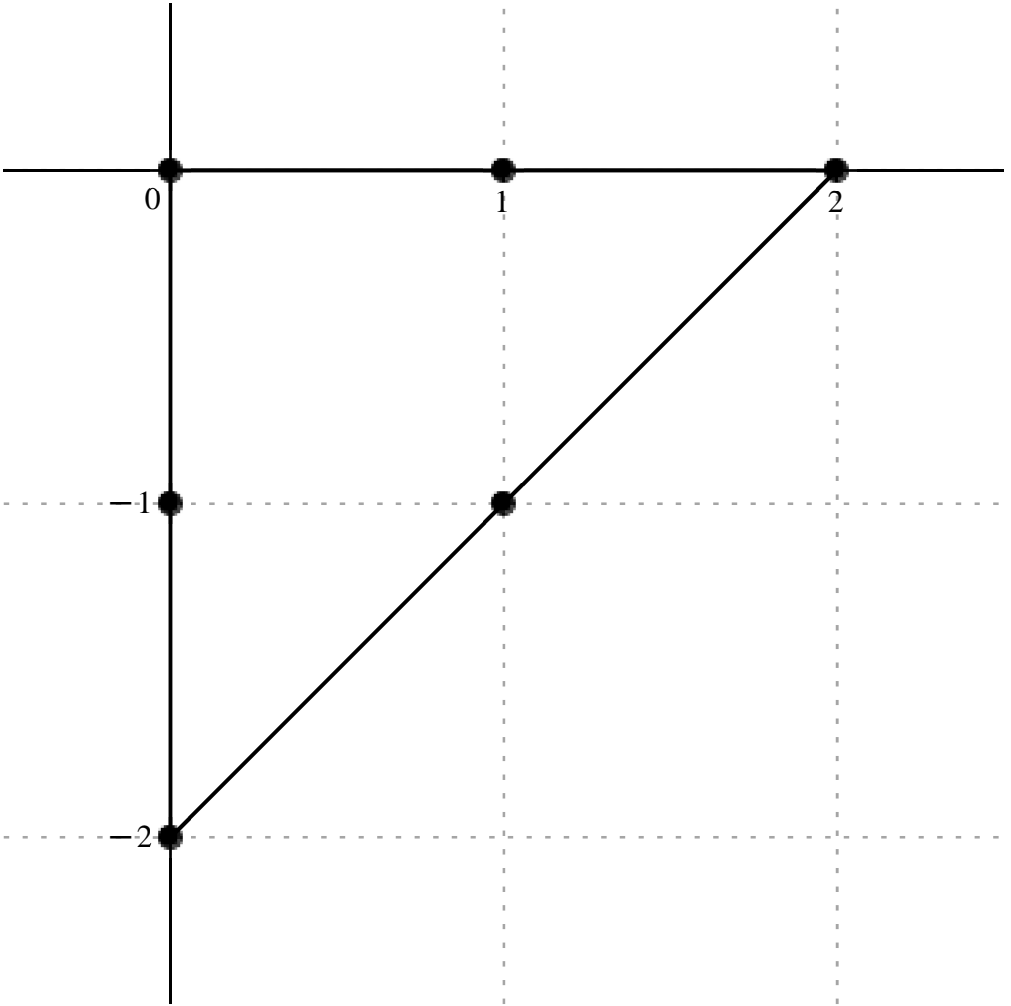
Error order:, 1, Error:, 0.00031888700325983918480, New Error:, 0.000031888371547419602975

Error order:, 1, Error:, 0.000031888371547419602975, New Error:,  $3.1888338667273237614 \times 10^{-6}$

Error order:, 1, Error:,  $3.1888338667273237614 \times 10^{-6}$ , New Error:,  $3.1888335379235702244 \times 10^{-7}$

$$x_o + h \cdot \begin{bmatrix} 0 & 1 & 2 \\ -1 & 1 - 1 \\ -2 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} 15 + 15 \text{ I} & 36 - 12 \text{ I} & -3 - 6 \text{ I} \\ -12 + 36 \text{ I} & -30 - 30 \text{ I} \\ -6 - 3 \text{ I} \end{bmatrix}$$



$$\frac{d^5}{dx_{ol}^5} u(x_{ol}) = \frac{(15 + 15 \, \text{I}) u_{ol} + (36 - 12 \, \text{I}) u_{ol+1} - (3 + 6 \, \text{I}) u_{ol+2} + (-12 + 36 \, \text{I}) u_{ol-1} - (30 + 30 \, \text{I}) u_{ol+1-1} - (6 + 3 \, \text{I}) u_{ol-2\text{I}}}{\Delta x_{ol}^5}, \, O(\Delta x_{ol})$$

Formula:, 340, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 5, Error:,  $3.8504582434020280933 \times 10^{-12}$ , New Error:,  $3.8866158199795666308 \times 10^{-17}$

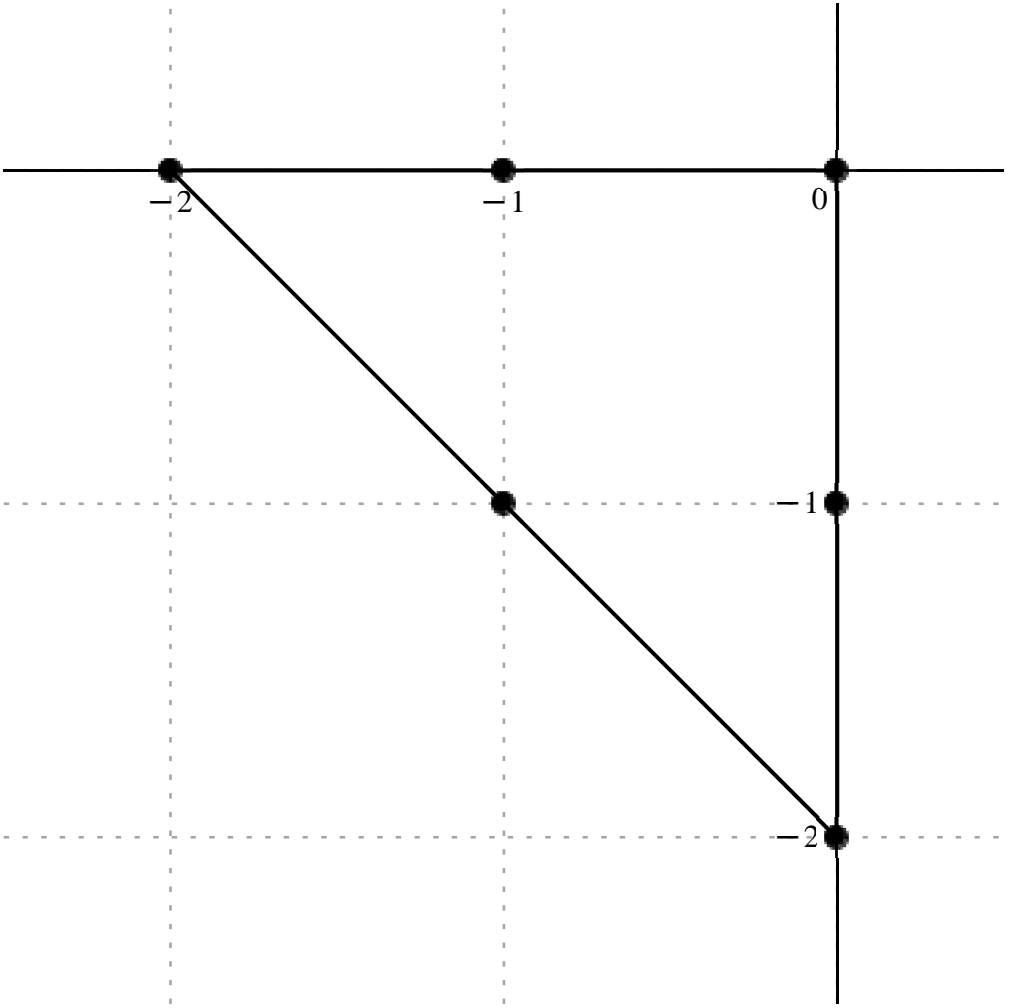
Error order:, 5, Error:,  $3.8866158199795666308 \times 10^{-17}$ , New Error:,  $3.8902398455937245393 \times 10^{-22}$

Error order:, 5, Error:,  $3.8902398455937245393 \times 10^{-22}$ , New Error:,  $3.8906023307636138293 \times 10^{-27}$

Error order:, 5, Error:,  $3.8906023307636138293 \times 10^{-27}$ , New Error:,  $3.8906385801066160771 \times 10^{-32}$

Error order:, 5, Error:,  $3.8906385801066160771 \times 10^{-32}$ , New Error:,  $3.8906422050491763636 \times 10^{-37}$

$$x_o + h, \begin{bmatrix} -2 & -1 & 0 \\ & -1 - \text{I} & -\text{I} \\ & & -2 \, \text{I} \end{bmatrix}$$
  
$$c =, \begin{bmatrix} -\frac{3}{20} + \frac{\text{I}}{20} & \frac{4}{5} + \frac{8 \, \text{I}}{5} & 2 - 2 \, \text{I} \\ & -1 + \text{I} & -\frac{8}{5} - \frac{4 \, \text{I}}{5} \\ & & -\frac{1}{20} + \frac{3 \, \text{I}}{20} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{(-3+\mathrm{I})\,u_{ol-2}+(16+32\,\mathrm{I})\,u_{ol-1}+(40-40\,\mathrm{I})\,u_{ol}+(-20+20\,\mathrm{I})\,u_{ol+1}- (32+16\,\mathrm{I})\,u_{ol+1}+(-1+3\,\mathrm{I})\,u_{ol+2\mathrm{I}}}{20\,\Delta x_{ol}},\,O(\,\Delta x_{ol}^5\,)$$

Formula:, 341, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 4, Error:,  $2.3308474764951611377\times10^{-9}$ , New Error:,  $2.3406462559193166026\times10^{-13}$

Error order:, 4, Error:,  $2.3406462559193166026\times10^{-13}$ , New Error:,  $2.3416247527431444207\times10^{-17}$

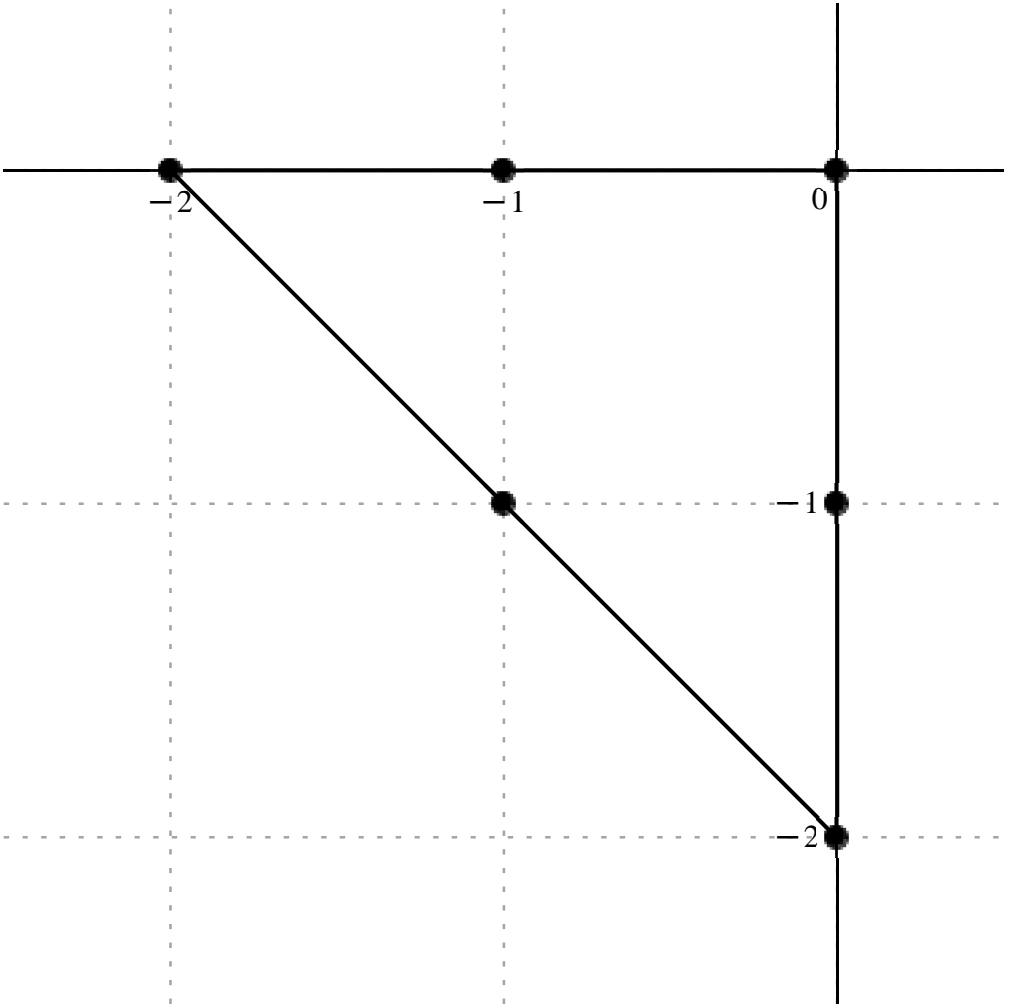
Error order:, 4, Error:,  $2.3416247527431444207\times10^{-17}$ , New Error:,  $2.3417225884916226960\times10^{-21}$

Error order:, 4, Error:,  $2.3417225884916226960\times10^{-21}$ , New Error:,  $2.3417323719270086321\times10^{-25}$

Error order:, 4, Error:,  $2.3417323719270086321\times10^{-25}$ , New Error:,  $2.3417333502691524839\times10^{-29}$

$$x_o+h\,.,\left[\begin{array}{ccc} -2 & -1 & 0 \\ & -1-\mathrm{I} & -\mathrm{I} \\ & & -2\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{ccc} -\frac{1}{4}+\frac{3\,\mathrm{I}}{4} & 8 & -\frac{15\,\mathrm{I}}{2} \\ & 6\,\mathrm{I} & -8 \\ & & \frac{1}{4}+\frac{3\,\mathrm{I}}{4} \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{(-1+3 \, \mathrm{I}) \, u_{ol-2} + 32 \, u_{ol-1} - 30 \, \mathrm{I} \, u_{ol} + 24 \, \mathrm{I} \, u_{ol+1} - 32 \, u_{ol+1} + (1+3 \, \mathrm{I}) \, u_{ol+2}}{4 \, \Delta x_{ol}^2}, \, O( \, \Delta x_{ol}^4 \, )$$

Formula:, 342, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 3, Error:,  $7.1698884718275778192 \times 10^{-7}$ , New Error:,  $7.2281763790004047859 \times 10^{-10}$

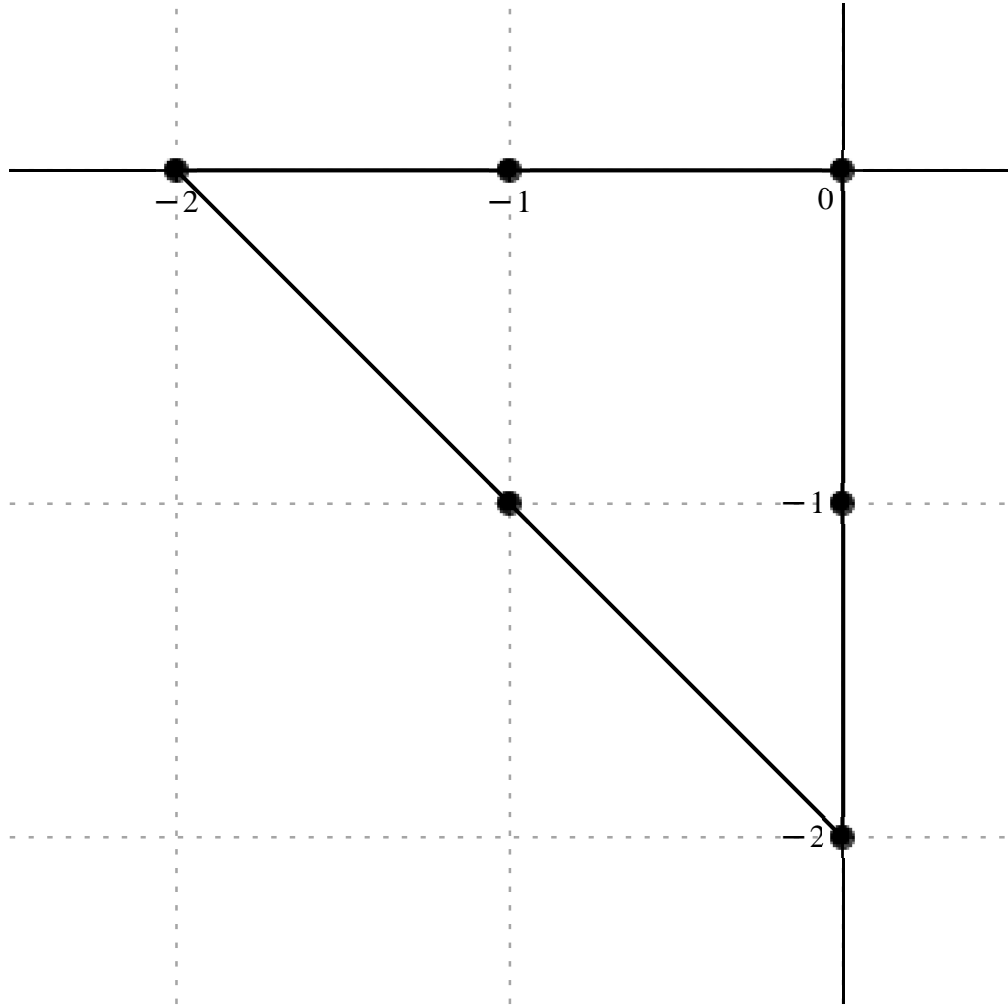
Error order:, 3, Error:,  $7.2281763790004047859 \times 10^{-10}$ , New Error:,  $7.2340169248984726329 \times 10^{-13}$

Error order:, 3, Error:,  $7.2340169248984726329 \times 10^{-13}$ , New Error:,  $7.2346010969537013298 \times 10^{-16}$

Error order:, 3, Error:,  $7.2346010969537013298 \times 10^{-16}$ , New Error:,  $7.2346595153337917934 \times 10^{-19}$

Error order:, 3, Error:,  $7.2346595153337917934 \times 10^{-19}$ , New Error:,  $7.2346653571835464290 \times 10^{-22}$

$$x_o + h \, , \left[ \begin{array}{ccc} -2 & -1 & 0 \\ & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 \, \mathrm{I} \end{array} \right]$$
  
$$c = , \left[ \begin{array}{ccc} \frac{3}{2} + \frac{9 \, \mathrm{I}}{4} & 12 - 18 \, \mathrm{I} & -\frac{45}{4} - \frac{45 \, \mathrm{I}}{4} \\ & \frac{27}{2} + \frac{27 \, \mathrm{I}}{2} & -18 + 12 \, \mathrm{I} \\ & & \frac{9}{4} + \frac{3 \, \mathrm{I}}{2} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{(6+9 \, \mathrm{I}) \, u_{ol-2} + (48-72 \, \mathrm{I}) \, u_{ol-1} - (45+45 \, \mathrm{I}) \, u_{ol} + (54+54 \, \mathrm{I}) \, u_{ol+1-1} + (-72+48 \, \mathrm{I}) \, u_{ol+1} + (9+6 \, \mathrm{I}) \, u_{ol+2\mathrm{I}}}{4 \, \Delta x_{ol}^3}, \, O(\, \Delta x_{ol}^3 \, )$$

Formula:, 343, Var.: 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 4

Error order:, 2, Error:, 0.00021691363517492787708, New Error:, 2.1764228770687077690 × 10<sup>−6</sup>

Error order:, 2, Error:, 2.1764228770687077690 × 10<sup>−6</sup>, New Error:, 2.1771506660866763259 × 10<sup>−8</sup>

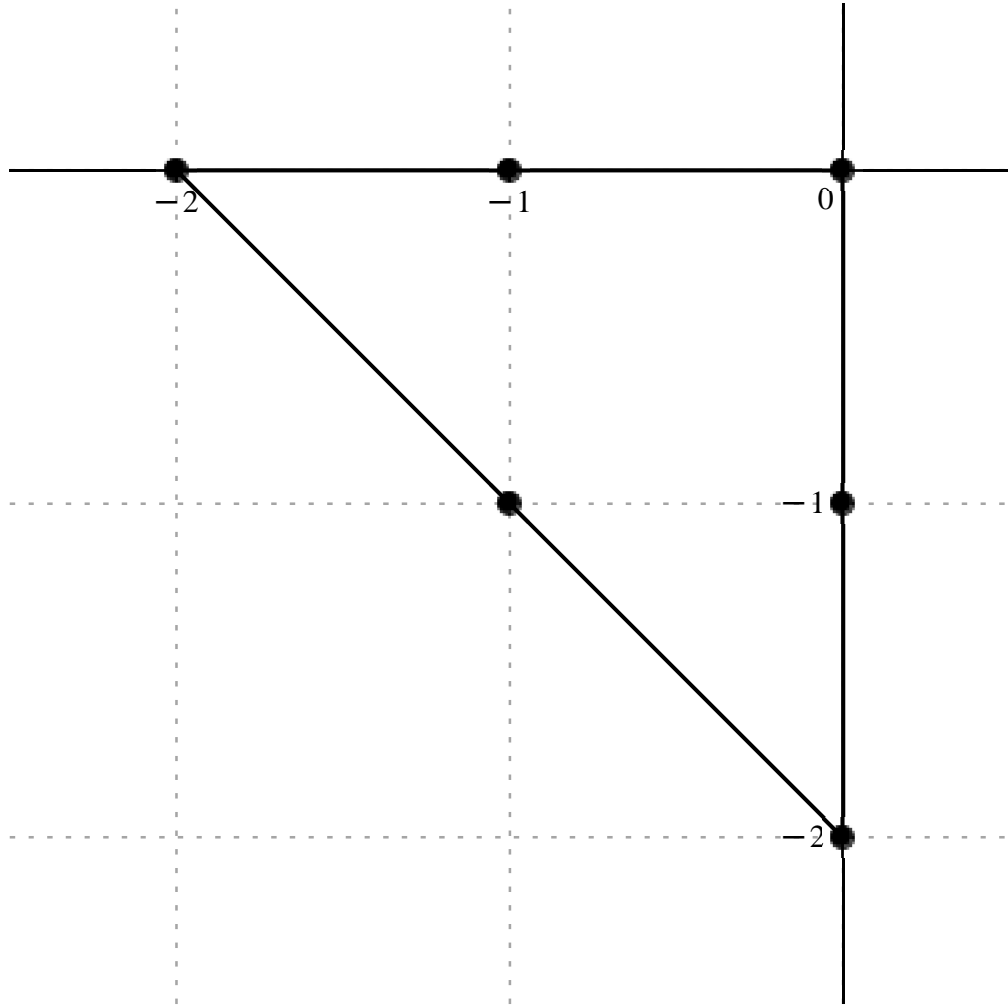
Error order:, 2, Error:, 2.1771506660866763259 × 10<sup>−8</sup>, New Error:, 2.1772234362924293984 × 10<sup>−10</sup>

Error order:, 2, Error:, 2.1772234362924293984 × 10<sup>−10</sup>, New Error:, 2.1772307132259833471 × 10<sup>−12</sup>

Error order:, 2, Error:, 2.1772307132259833471 × 10<sup>−12</sup>, New Error:, 2.1772314409184684674 × 10<sup>−14</sup>

$$x_o + h \, , \left[ \begin{array}{ccc} -2 & -1 & 0 \\ & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccc} 6 & -12 - 36 \, \mathrm{I} & -24 \\ & 36 & -12 + 36 \, \mathrm{I} \\ & & 6 \end{array} \right]$$



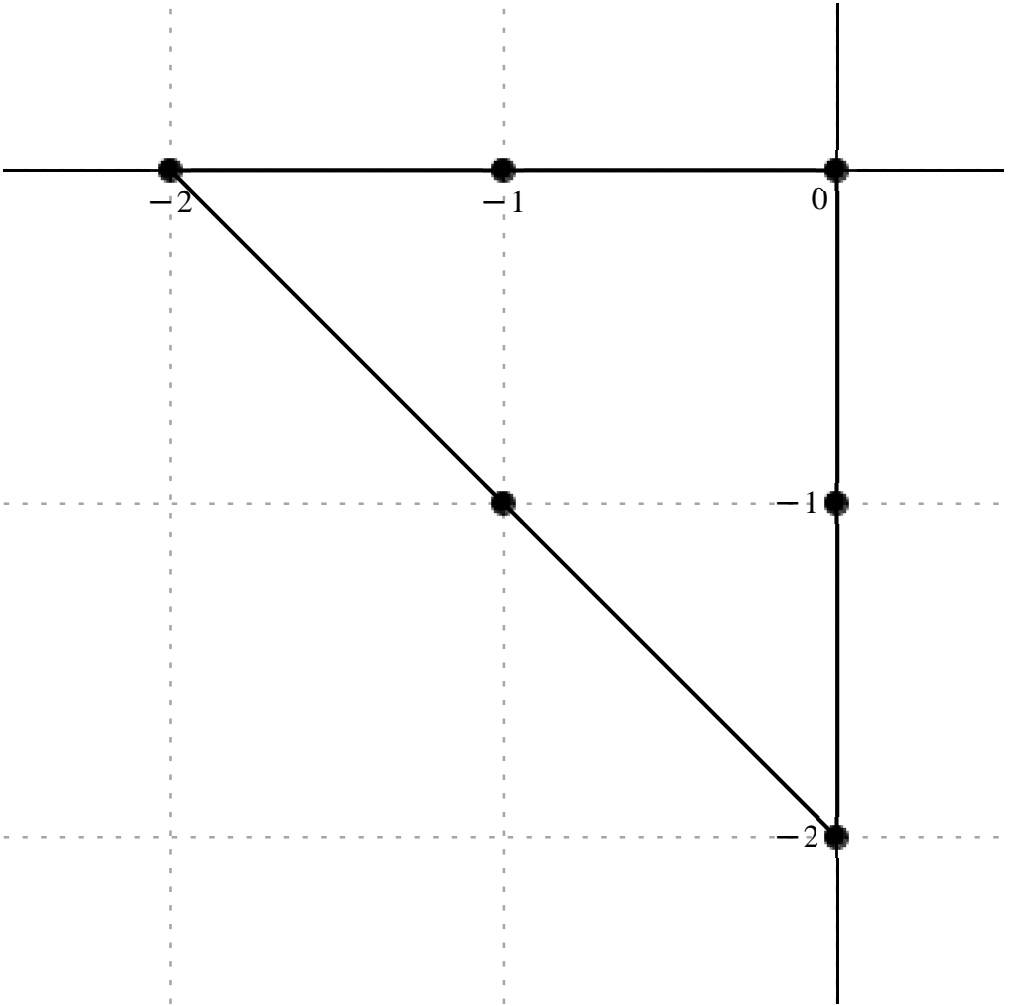
$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{6 \left( u_{ol-2} - (2+6 \, \mathrm{I}) u_{ol-1} - 4 u_{ol} + 6 u_{ol+1} + (-2+6 \, \mathrm{I}) u_{ol+1} + u_{ol+2} \right)}{\Delta x_{ol}^4}, \, O(\Delta x_{ol}^2)$$

Formula:, 344, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 1, Error:, 0.031713216933602578037, New Error:, 0.0031870800064067299719  
Error order:, 1, Error:, 0.0031870800064067299719, New Error:, 0.00031886581287602404308  
Error order:, 1, Error:, 0.00031886581287602404308, New Error:, 0.000031888159638955368062  
Error order:, 1, Error:, 0.000031888159638955368062, New Error:,  $3.1888317476380553898 \times 10^{-6}$   
Error order:, 1, Error:,  $3.1888317476380553898 \times 10^{-6}$ , New Error:,  $3.1888333260145971271 \times 10^{-7}$

$$x_o + h \cdot , \begin{bmatrix} -2 & -1 & 0 \\ & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 \, \mathrm{I} \end{bmatrix}$$
  
$$c = , \begin{bmatrix} 3 - 6 \, \mathrm{I} & -36 - 12 \, \mathrm{I} & -15 + 15 \, \mathrm{I} \\ & 30 - 30 \, \mathrm{I} & 12 + 36 \, \mathrm{I} \\ & & 6 - 3 \, \mathrm{I} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{(3-6 \, \mathrm{I}) \, u_{ol-2} - (36+12 \, \mathrm{I}) \, u_{ol-1} + (-15+15 \, \mathrm{I}) \, u_{ol} + (30-30 \, \mathrm{I}) \, u_{ol+1} + (12+36 \, \mathrm{I}) \, u_{ol+2} + (6-3 \, \mathrm{I}) \, u_{ol+3}}{\Delta x_{ol}^5}, \, O(\, \Delta x_{ol} \,)$$

Formula:, 345, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 3, Error:,  $2.0202161161347043275 \times 10^{-7}$ , New Error:,  $2.0162446825293862098 \times 10^{-10}$

Error order:, 3, Error:,  $2.0162446825293862098 \times 10^{-10}$ , New Error:,  $2.0158475391705766466 \times 10^{-13}$

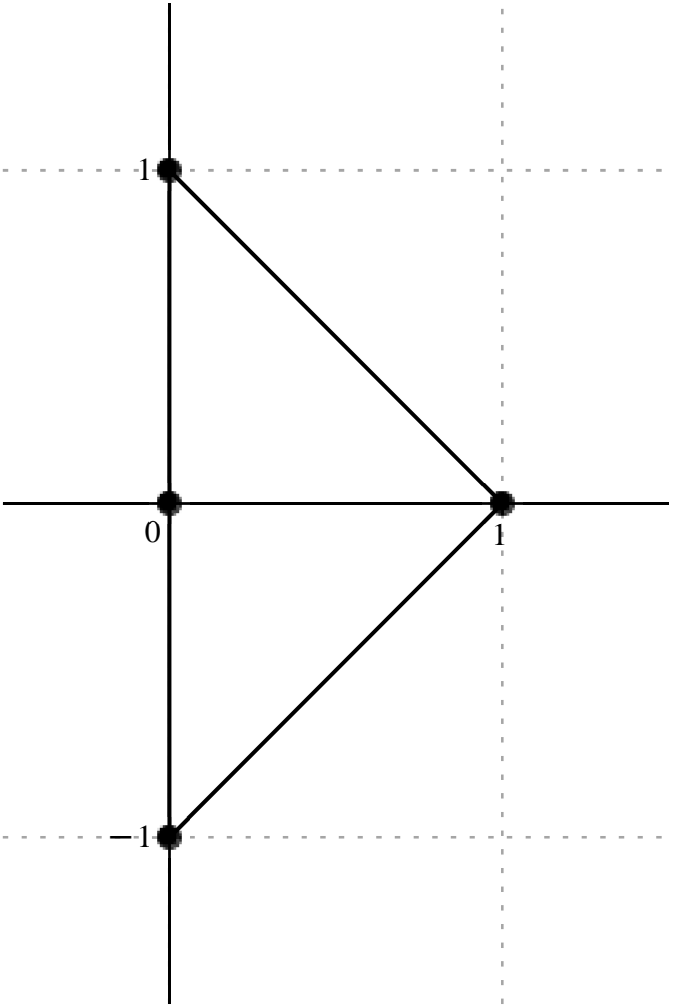
Error order:, 3, Error:,  $2.0158475391705766466 \times 10^{-13}$ , New Error:,  $2.0158078248346958623 \times 10^{-16}$

Error order:, 3, Error:,  $2.0158078248346958623 \times 10^{-16}$ , New Error:,  $2.0158038534011077839 \times 10^{-19}$

Error order:, 3, Error:,  $2.0158038534011077839 \times 10^{-19}$ , New Error:,  $2.0158034562577489760 \times 10^{-22}$

$$x_o \neq h \, , \, \left[ \begin{array}{c} \mathrm{I} \\ 0 \quad \mathrm{I} \\ -\mathrm{I} \end{array} \right]$$
  
$$c =, \left[ \begin{array}{cc} \frac{1}{4} - \frac{\mathrm{I}}{4} & \\ -1 & \frac{1}{2} \\ \frac{1}{4} + \frac{\mathrm{I}}{4} & \end{array} \right]$$





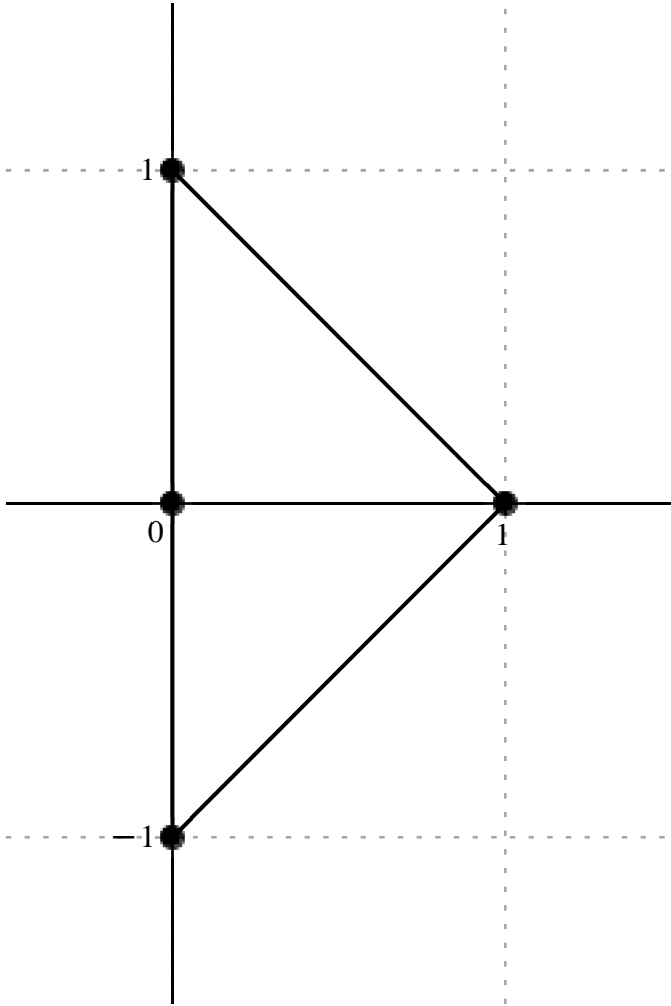
$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol})=\frac{(1-\mathrm{I})\, u_{ol+1}-4\, u_{ol}+2\, u_{ol+1}+(1+\mathrm{I})\, u_{ol-1}}{4\, \Delta x_{ol}},\, O(\, \Delta x_{ol}^3\, )$$

Formula:, 346, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 2, Error:, 0.000036650824771621169971, New Error:,  $3.6650969666065875969 \times 10^{-7}$   
Error order:, 2, Error:,  $3.6650969666065875969 \times 10^{-7}$ , New Error:,  $3.6650971115013422402 \times 10^{-9}$   
Error order:, 2, Error:,  $3.6650971115013422402 \times 10^{-9}$ , New Error:,  $3.6650971129502898177 \times 10^{-11}$   
Error order:, 2, Error:,  $3.6650971129502898177 \times 10^{-11}$ , New Error:,  $3.6650971129647792934 \times 10^{-13}$   
Error order:, 2, Error:,  $3.6650971129647792934 \times 10^{-13}$ , New Error:,  $3.6650971129649241882 \times 10^{-15}$

$$x_o \neq h., \begin{bmatrix} \mathrm{I} \\ 0 \quad \mathrm{I} \\ -\mathrm{I} \end{bmatrix}$$
$$c=, \begin{bmatrix} -1 \\ 2 \quad 0 \\ -1 \end{bmatrix}$$



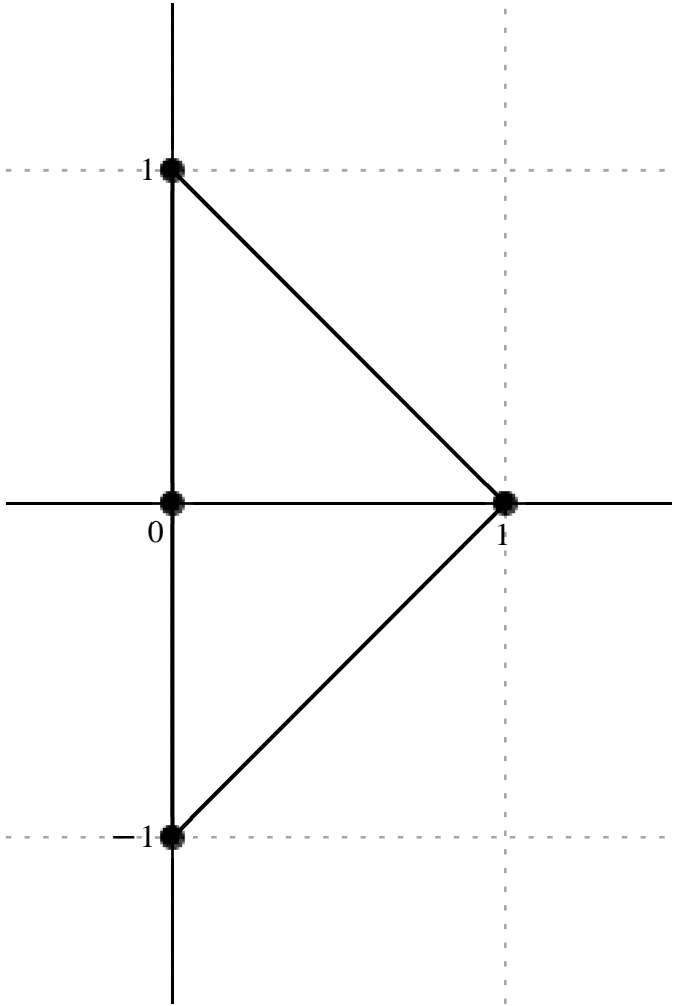
$$\frac{d^2}{dx_{ol}^2} u(x_{ol}) = \frac{-u_{ol+1} + 2 u_{ol} - u_{ol-1}}{\Delta x_{ol}^2}, \, O(\Delta x_{ol}^2)$$

Formula:, 347, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 1, Error:, 0.0099957194614935812862, New Error:, 0.00099957193990576732553  
Error order:, 1, Error:, 0.00099957193990576732553, New Error:, 0.000099957193989953141914  
Error order:, 1, Error:, 0.000099957193989953141914, New Error:,  $9.9957193989952518400 \times 10^{-6}$   
Error order:, 1, Error:,  $9.9957193989952518400 \times 10^{-6}$ , New Error:,  $9.9957193989952517776 \times 10^{-7}$   
Error order:, 1, Error:,  $9.9957193989952517776 \times 10^{-7}$ , New Error:,  $9.9957193989952517776 \times 10^{-8}$

$$x_o \neq h., \left[ \begin{array}{cc} \text{I} & \\ 0 & \text{I} \\ -\text{I} & \end{array} \right]$$
  
$$c =, \left[ \begin{array}{cc} \frac{3}{2} + \frac{3 \text{I}}{2} & \\ -6 & 3 \\ \frac{3}{2} - \frac{3 \text{I}}{2} & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{3 \left( (1+I) u_{ol+1} - 4 u_{ol} + 2 u_{ol+1} + (1-I) u_{ol-1} \right)}{2 \Delta x_{ol}^3}, \quad O(\Delta x_{ol})$$

Formula:, 348, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 3, Error:,  $2.0113907081611548602 \times 10^{-7}$ , New Error:,  $2.0153621417320354512 \times 10^{-10}$

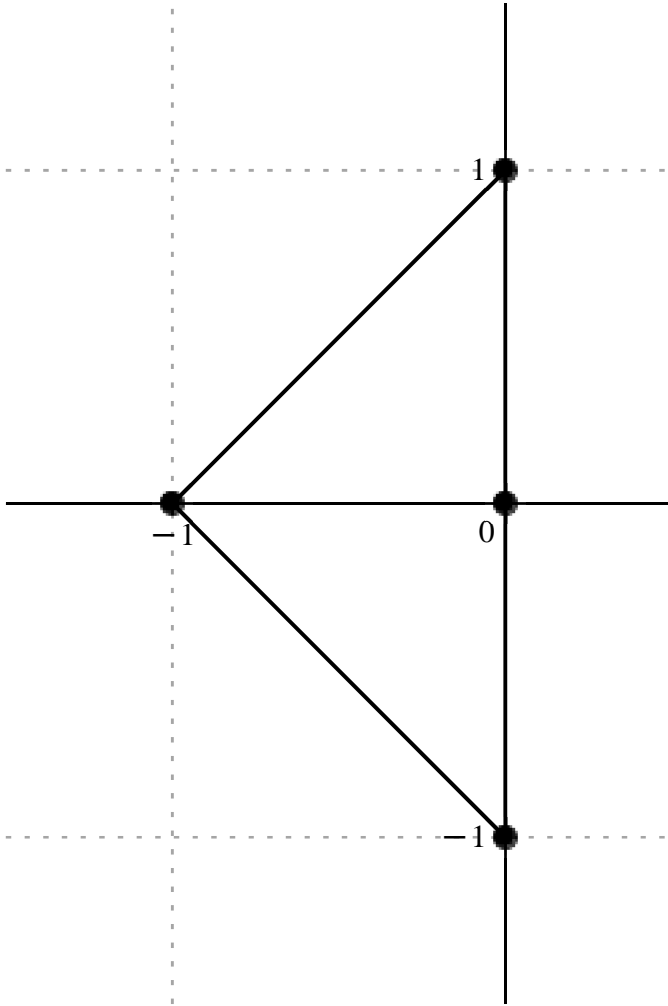
Error order:, 3, Error:,  $2.0153621417320354512 \times 10^{-10}$ , New Error:,  $2.0157592850908415707 \times 10^{-13}$

Error order:, 3, Error:,  $2.0157592850908415707 \times 10^{-13}$ , New Error:,  $2.0157989994267223547 \times 10^{-16}$

Error order:, 3, Error:,  $2.0157989994267223547 \times 10^{-16}$ , New Error:,  $2.0158029708603104331 \times 10^{-19}$

Error order:, 3, Error:,  $2.0158029708603104331 \times 10^{-19}$ , New Error:,  $2.0158033680036692409 \times 10^{-22}$

$$x_o \neq h, \begin{bmatrix} I \\ -1 & 0 \\ -I \end{bmatrix}$$
  
$$c =, \begin{bmatrix} -\frac{1}{4} - \frac{I}{4} \\ -\frac{1}{2} & 1 \\ -\frac{1}{4} + \frac{I}{4} \end{bmatrix}$$



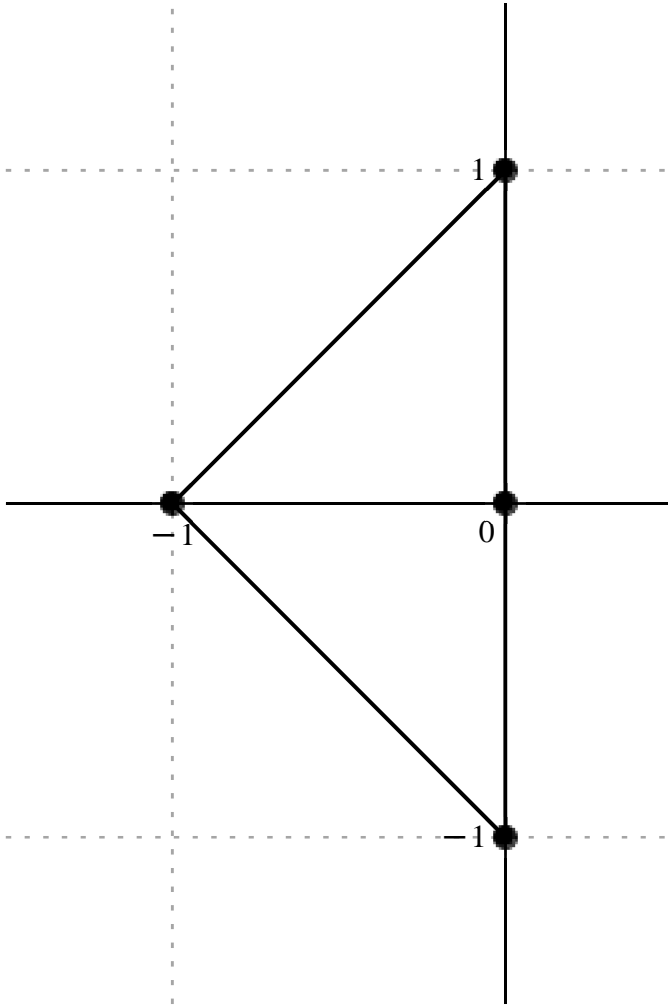
$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol})=\frac{-(1+\mathrm{I})\, u_{ol+1}-2\, u_{ol-1}+4\, u_{ol}+(\,-1+\mathrm{I})\, u_{ol-1}}{4\, \Delta x_{ol}},\, O(\, \Delta x_{ol}^{\,3}\, )$$

Formula:, 349, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 2, Error:, 0.000036650824771621169971, New Error:,  $3.6650969666065875969 \times 10^{-7}$   
Error order:, 2, Error:,  $3.6650969666065875969 \times 10^{-7}$ , New Error:,  $3.6650971115013422402 \times 10^{-9}$   
Error order:, 2, Error:,  $3.6650971115013422402 \times 10^{-9}$ , New Error:,  $3.6650971129502898177 \times 10^{-11}$   
Error order:, 2, Error:,  $3.6650971129502898177 \times 10^{-11}$ , New Error:,  $3.6650971129647792934 \times 10^{-13}$   
Error order:, 2, Error:,  $3.6650971129647792934 \times 10^{-13}$ , New Error:,  $3.6650971129649241882 \times 10^{-15}$

$$x_o \neq h, \left[ \begin{array}{cc} \mathrm{I} & \\ -1 & 0 \\ & -\mathrm{I} \end{array} \right]$$
  
$$c =, \left[ \begin{array}{cc} -1 & \\ 0 & 2 \\ & -1 \end{array} \right]$$



$$\frac{d^2}{dx_{ol}^2} u(x_{ol}) = \frac{-u_{ol+1} + 2u_{ol} - u_{ol-1}}{\Delta x_{ol}^2}, O(\Delta x_{ol}^2)$$

Formula:, 350, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 1, Error:, 0.0099957193366677039419, New Error:, 0.00099957193989328473780

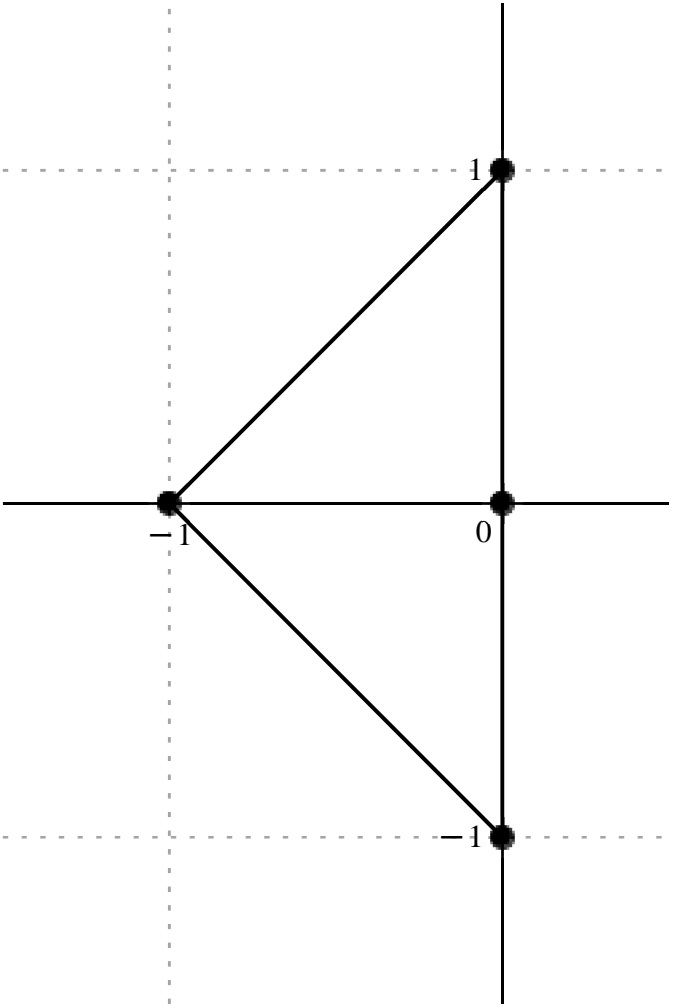
Error order:, 1, Error:, 0.00099957193989328473780, New Error:, 0.000099957193989951893655

Error order:, 1, Error:, 0.000099957193989951893655, New Error:,  $9.9957193989952517152 \times 10^{-6}$

Error order:, 1, Error:,  $9.9957193989952517152 \times 10^{-6}$ , New Error:,  $9.9957193989952517775 \times 10^{-7}$

Error order:, 1, Error:,  $9.9957193989952517775 \times 10^{-7}$ , New Error:,  $9.9957193989952517776 \times 10^{-8}$

$$x_o \neq h, \begin{bmatrix} I \\ -1 & 0 \\ -I \end{bmatrix}$$
  
$$c =, \begin{bmatrix} -\frac{3}{2} + \frac{3I}{2} \\ -3 & 6 \\ -\frac{3}{2} - \frac{3I}{2} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{3 \left( (-1 + \mathrm{I}) \, u_{ol+1} - 2 \, u_{ol-1} + 4 \, u_{ol} - (1 + \mathrm{I}) \, u_{ol-1} \right)}{2 \, \Delta x_{ol}^3}, \, O( \, \Delta x_{ol} \, )$$

Formula:, 351, Var:., 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:., 3, Error:.,  $2.0148841672880520659 \times 10^{-7}$ , New Error:.,  $2.0157114876447235140 \times 10^{-10}$

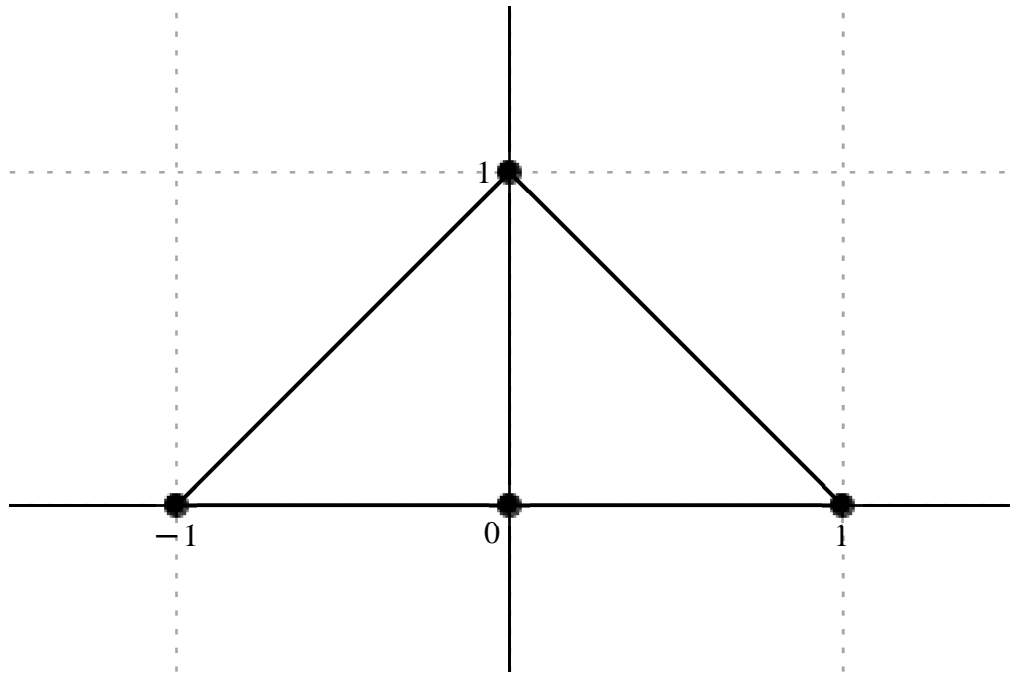
Error order:., 3, Error:.,  $2.0157114876447235140 \times 10^{-10}$ , New Error:.,  $2.0157942196821103770 \times 10^{-13}$

Error order:., 3, Error:.,  $2.0157942196821103770 \times 10^{-13}$ , New Error:.,  $2.0158024928858492353 \times 10^{-16}$

Error order:., 3, Error:.,  $2.0158024928858492353 \times 10^{-16}$ , New Error:.,  $2.0158033202062231212 \times 10^{-19}$

Error order:., 3, Error:.,  $2.0158033202062231212 \times 10^{-19}$ , New Error:.,  $2.0158034029382605097 \times 10^{-22}$

$$x_o \neq h. , \left[ \begin{array}{ccc} \mathrm{I} & & \\ -1 & 0 & 1 \end{array} \right]$$
  
$$c = , \left[ \begin{array}{ccc} & -\frac{\mathrm{I}}{2} & \\ -\frac{1}{4} - \frac{\mathrm{I}}{4} & \mathrm{I} & \frac{1}{4} - \frac{\mathrm{I}}{4} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol})=\frac{-2\,\mathrm{I}\,u_{ol+1}-(1+\mathrm{I})\,u_{ol-1}+4\,\mathrm{I}\,u_{ol}+(1-\mathrm{I})\,u_{ol+1}}{4\,\Delta x_{ol}},\,O(\,\Delta x_{ol}^{\,3}\,)$$

Formula:, 352, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 2, Error:, 0.000036651117488303542532, New Error:,  $3.6650972593232699686 \times 10^{-7}$

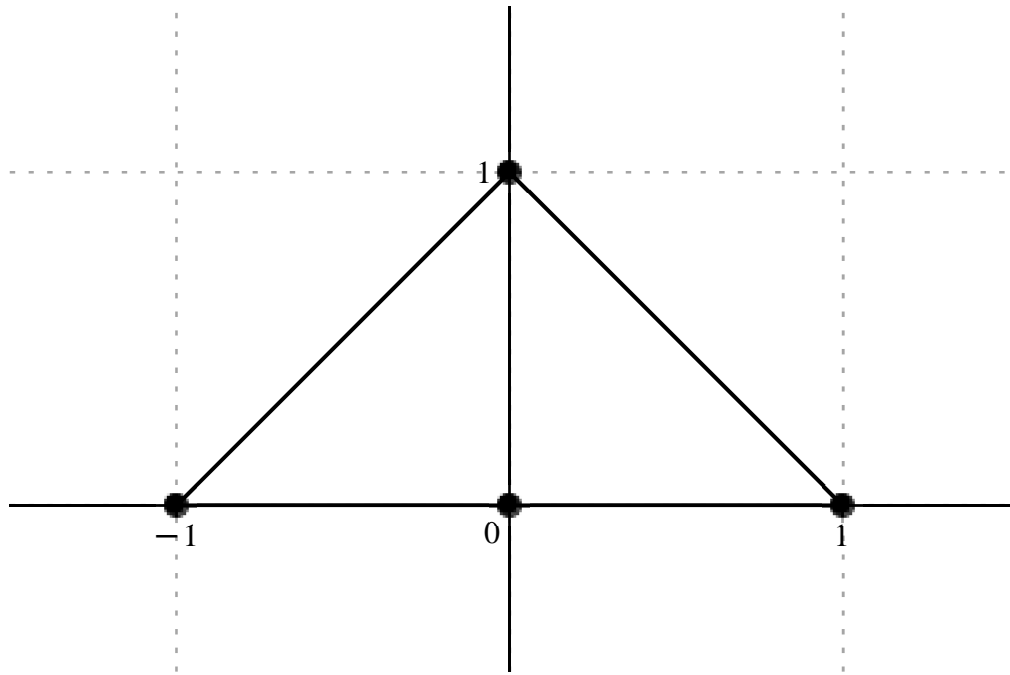
Error order:, 2, Error:,  $3.6650972593232699686 \times 10^{-7}$ , New Error:,  $3.6650971144285090640 \times 10^{-9}$

Error order:, 2, Error:,  $3.6650971144285090640 \times 10^{-9}$ , New Error:,  $3.6650971129795614859 \times 10^{-11}$

Error order:, 2, Error:,  $3.6650971129795614859 \times 10^{-11}$ , New Error:,  $3.6650971129650720101 \times 10^{-13}$

Error order:, 2, Error:,  $3.6650971129650720101 \times 10^{-13}$ , New Error:,  $3.6650971129649271154 \times 10^{-15}$

$$x_o \neq h. , \left[ \begin{array}{ccc} \mathrm{I} & & \\ -1 & 0 & 1 \end{array} \right]$$
$$c =, \left[ \begin{array}{ccc} 0 & & \\ 1 & -2 & 1 \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{u_{ol-1} - 2 \, u_{ol} + u_{ol+1}}{\Delta x_{ol}^2} \, , \, O( \, \Delta x_{ol}^2 \, )$$

Formula.: 353, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 3

Error order.: 1, Error.: 0.0099957194120823697266, New Error.: 0.00099957193990082620438

Error order.: 1, Error.: 0.00099957193990082620438, New Error.: 0.000099957193989952647802

Error order.: 1, Error.: 0.000099957193989952647802, New Error.:  $9.9957193989952517906 \times 10^{-6}$

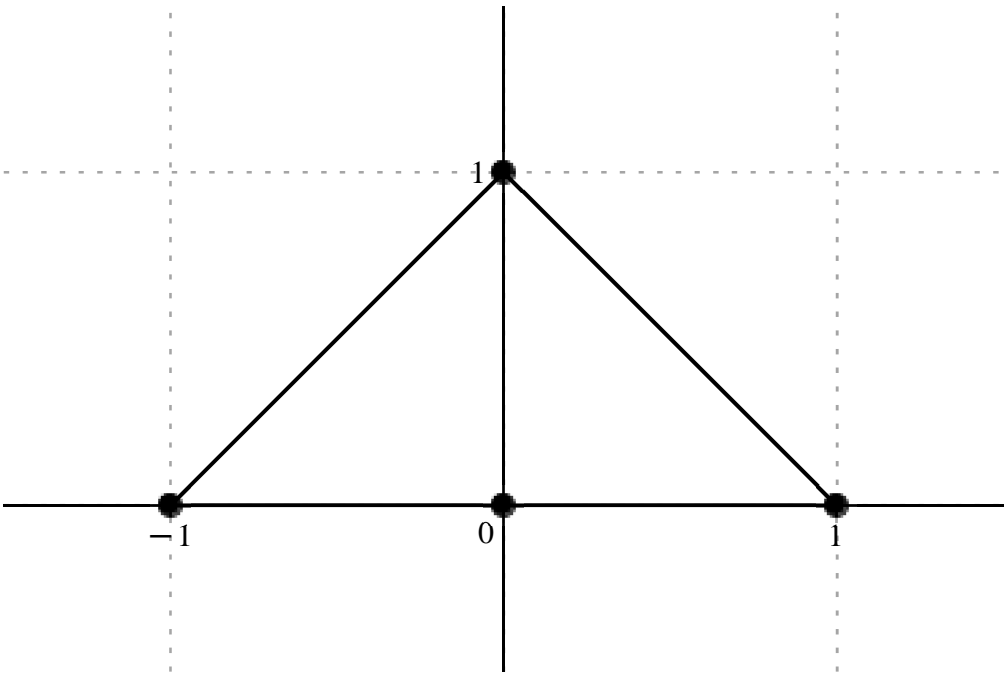
Error order.: 1, Error.:  $9.9957193989952517906 \times 10^{-6}$ , New Error.:  $9.9957193989952517776 \times 10^{-7}$

Error order.: 1, Error.:  $9.9957193989952517776 \times 10^{-7}$ , New Error.:  $9.9957193989952517776 \times 10^{-8}$

$$x_o \neq h. \, , \, \left[ \begin{array}{ccc} \text{I} & & \\ -1 & 0 & 1 \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} 3 \, \text{I} & & \\ -\frac{3}{2} + \frac{3 \, \text{I}}{2} & -6 \, \text{I} & \frac{3}{2} + \frac{3 \, \text{I}}{2} \end{array} \right]$$





$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{3 \left( 2 \, \mathrm{I} u_{ol+1} + (-1 + \mathrm{I}) \, u_{ol-1} - 4 \, \mathrm{I} u_{ol} + (1 + \mathrm{I}) \, u_{ol+1} \right)}{2 \, \Delta x_{ol}^3}, \, O( \, \Delta x_{ol} \, )$$

Formula:, 354, Var:; 1

Variavel :;  $x_{ol}$ , Derivada de Ordem :; 1

Error order:; 3, Error:;  $2.0167226570078071218 \times 10^{-7}$ , New Error:;  $2.0158953366166981471 \times 10^{-10}$

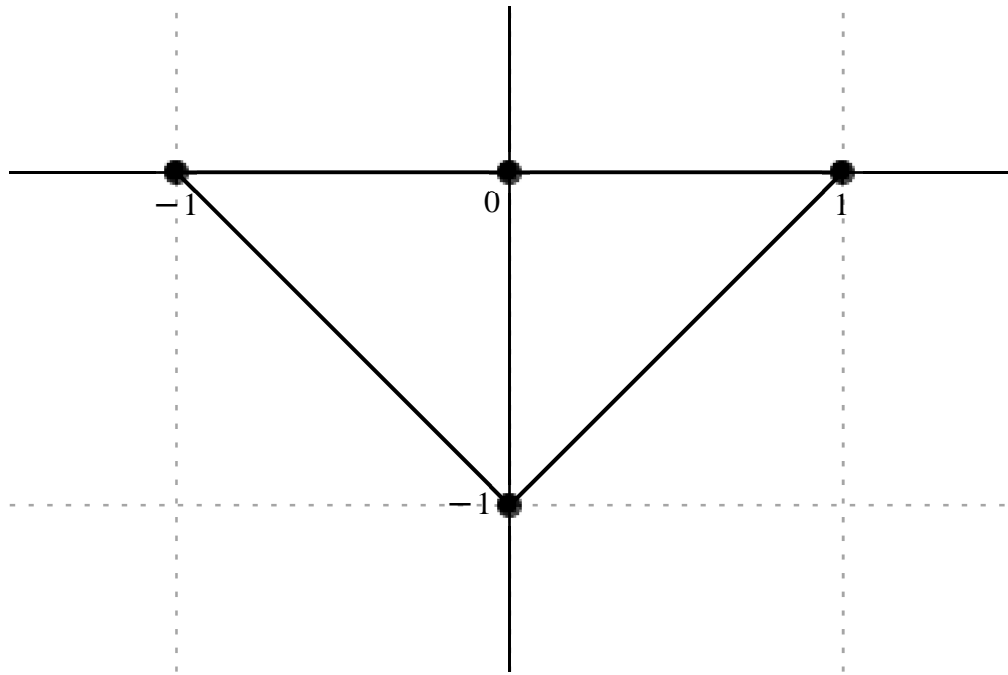
Error order:; 3, Error:;  $2.0158953366166981471 \times 10^{-10}$ , New Error:;  $2.0158126045793078403 \times 10^{-13}$

Error order:; 3, Error:;  $2.0158126045793078403 \times 10^{-13}$ , New Error:;  $2.0158043313755689816 \times 10^{-16}$

Error order:; 3, Error:;  $2.0158043313755689816 \times 10^{-16}$ , New Error:;  $2.0158035040551950958 \times 10^{-19}$

Error order:; 3, Error:;  $2.0158035040551950958 \times 10^{-19}$ , New Error:;  $2.0158034213231577072 \times 10^{-22}$

$$x_o + h \cdot , \left[ \begin{array}{ccc} -1 & 0 & 1 \\ & & -\mathrm{I} \end{array} \right]$$
$$c = , \left[ \begin{array}{ccc} -\frac{1}{4} + \frac{\mathrm{I}}{4} & -\mathrm{I} & \frac{1}{4} + \frac{\mathrm{I}}{4} \\ & & \frac{\mathrm{I}}{2} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}} u(x_{ol}) = \frac{(-1 + \mathrm{I}) u_{ol-1} - 4 \mathrm{I} u_{ol} + (1 + \mathrm{I}) u_{ol+1} + 2 \mathrm{I} u_{ol-1}}{4 \Delta x_{ol}}, O(\Delta x_{ol}^3)$$

Formula:, 355, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 2, Error:, 0.000036651117488303542532, New Error:,  $3.6650972593232699686 \times 10^{-7}$

Error order:, 2, Error:,  $3.6650972593232699686 \times 10^{-7}$ , New Error:,  $3.6650971144285090640 \times 10^{-9}$

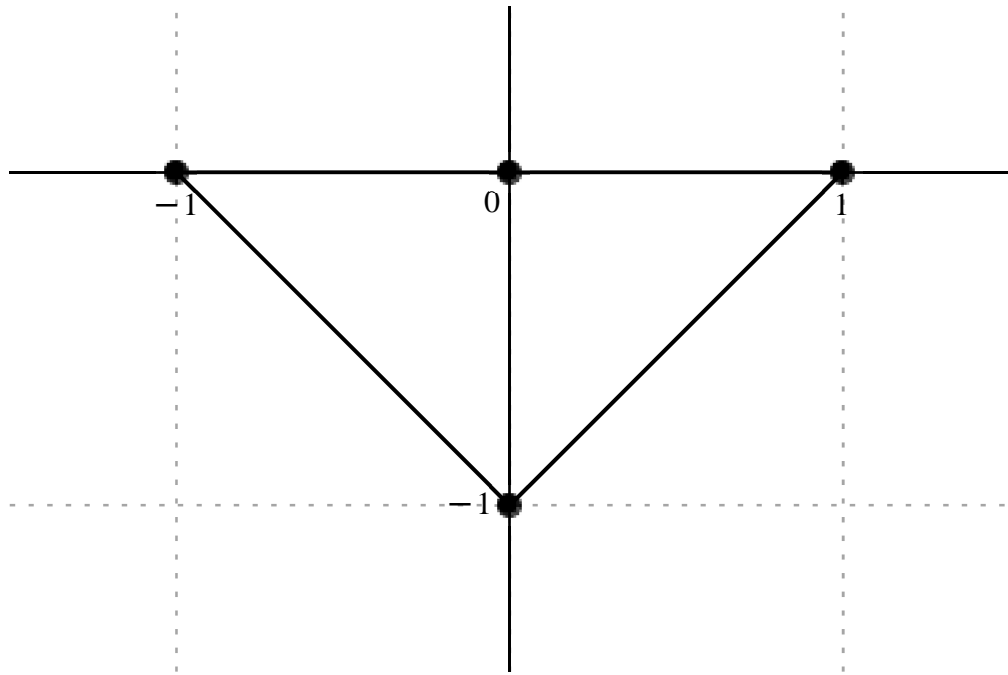
Error order:, 2, Error:,  $3.6650971144285090640 \times 10^{-9}$ , New Error:,  $3.6650971129795614859 \times 10^{-11}$

Error order:, 2, Error:,  $3.6650971129795614859 \times 10^{-11}$ , New Error:,  $3.6650971129650720101 \times 10^{-13}$

Error order:, 2, Error:,  $3.6650971129650720101 \times 10^{-13}$ , New Error:,  $3.6650971129649271154 \times 10^{-15}$

$$x_o + h, \begin{bmatrix} -1 & 0 & 1 \\ & -1 & \end{bmatrix}$$

$$c =, \begin{bmatrix} 1 & -2 & 1 \\ & 0 & \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{u_{ol-1} - 2 \, u_{ol} + u_{ol+1}}{\Delta x_{ol}^2} \, , \, O( \, \Delta x_{ol}^2 \, )$$

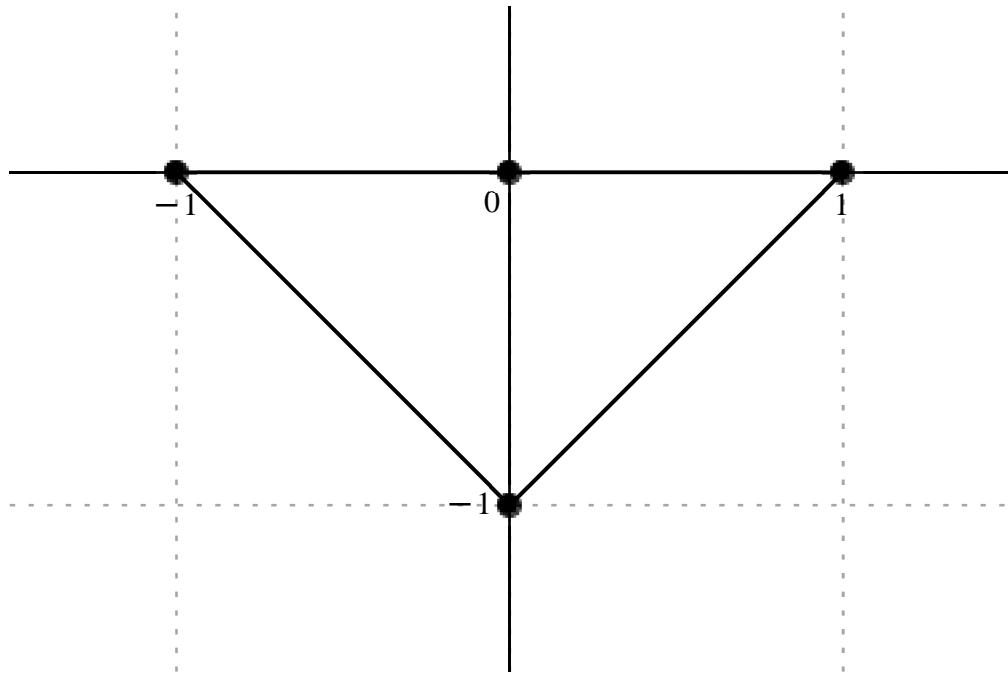
Formula.: 356, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 3

Error order.: 1, Error.: 0.0099957193860789155016, New Error.: 0.00099957193989822585896  
 Error order.: 1, Error.: 0.00099957193989822585896, New Error.: 0.000099957193989952387767  
 Error order.: 1, Error.: 0.000099957193989952387767, New Error.:  $9.9957193989952517646 \times 10^{-6}$   
 Error order.: 1, Error.:  $9.9957193989952517646 \times 10^{-6}$ , New Error.:  $9.9957193989952517776 \times 10^{-7}$   
 Error order.: 1, Error.:  $9.9957193989952517776 \times 10^{-7}$ , New Error.:  $9.9957193989952517776 \times 10^{-8}$

$$x_o+h., \left[ \begin{array}{ccc} -1 & 0 & 1 \\ & & -1 \end{array} \right]$$

$$c=, \left[ \begin{array}{ccc} -\frac{3}{2}-\frac{3\text{I}}{2} & 6\text{I} & \frac{3}{2}-\frac{3\text{I}}{2} \\ & & -3\text{I} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{3 \left( -(1+\mathrm{I}) \, u_{ol-1} + 4 \, \mathrm{I} \, u_{ol} + (1-\mathrm{I}) \, u_{ol+1} - 2 \, \mathrm{I} \, u_{ol-1} \right)}{2 \, \Delta x_{ol}^3}, \, O( \, \Delta x_{ol} \, )$$

Formula:, 357, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 4, Error:,  $4.4127039867747336304 \times 10^{-10}$ , New Error:,  $4.4127039867537931775 \times 10^{-14}$

Error order:, 4, Error:,  $4.4127039867537931775 \times 10^{-14}$ , New Error:,  $4.4127039867537910834 \times 10^{-18}$

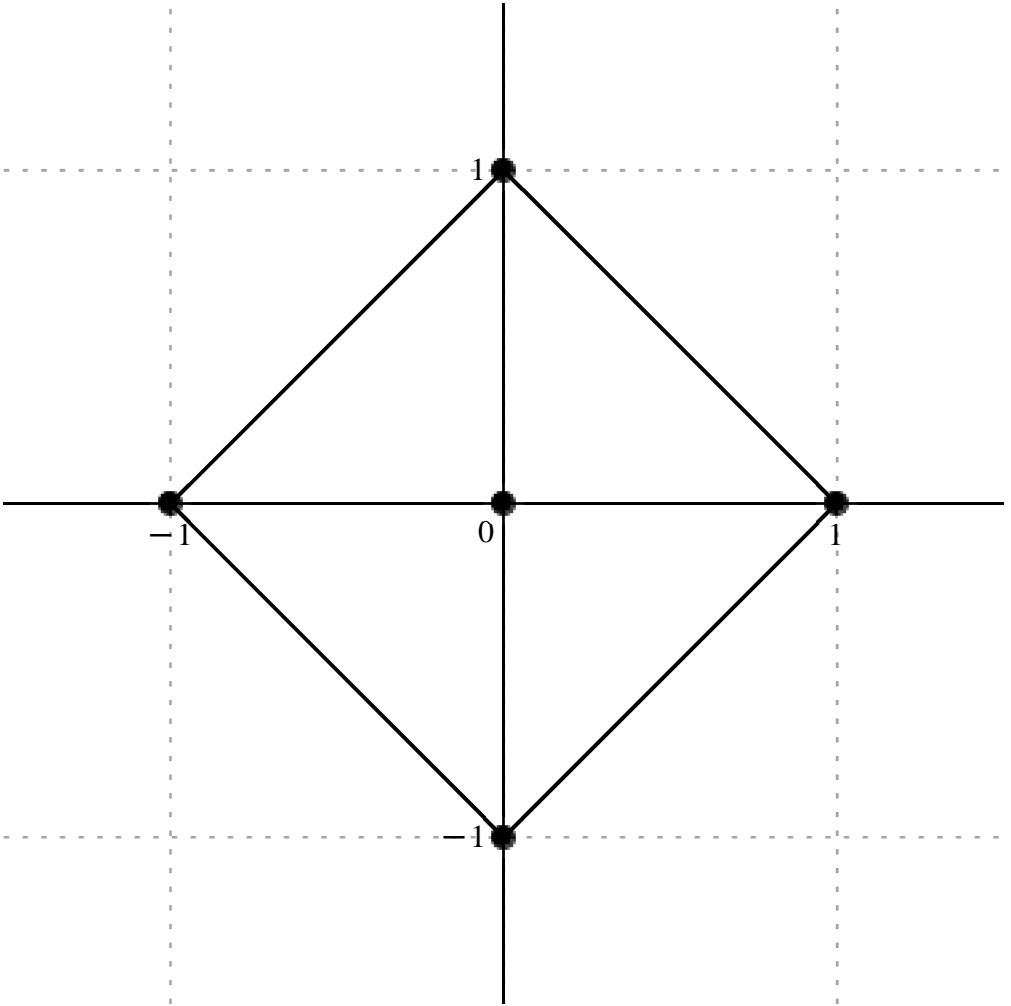
Error order:, 4, Error:,  $4.4127039867537910834 \times 10^{-18}$ , New Error:,  $4.4127039867537910832 \times 10^{-22}$

Error order:, 4, Error:,  $4.4127039867537910832 \times 10^{-22}$ , New Error:,  $4.4127039867537910832 \times 10^{-26}$

Error order:, 4, Error:,  $4.4127039867537910832 \times 10^{-26}$ , New Error:,  $4.4127039867537910832 \times 10^{-30}$

$$x_o \neq h, \left[ \begin{array}{ccc} \mathrm{I} & & \\ -1 & 0 & 1 \\ & -\mathrm{I} & \end{array} \right]$$

$$c =, \left[ \begin{array}{ccc} & -\frac{\mathrm{I}}{4} & \\ -\frac{1}{4} & 0 & \frac{1}{4} \\ & \frac{\mathrm{I}}{4} & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}} u(x_{ol}) = \frac{-\mathrm{I} u_{ol+1} - u_{ol-1} + u_{ol+1} + \mathrm{I} u_{ol-1}}{4 \Delta x_{ol}^4}, \quad O(\Delta x_{ol}^4)$$

Formula.: 358, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 2

Error order.: 4, Error.:  $1.4635834118628048463 \times 10^{-10}$ , New Error.:  $1.4635834118586375920 \times 10^{-14}$

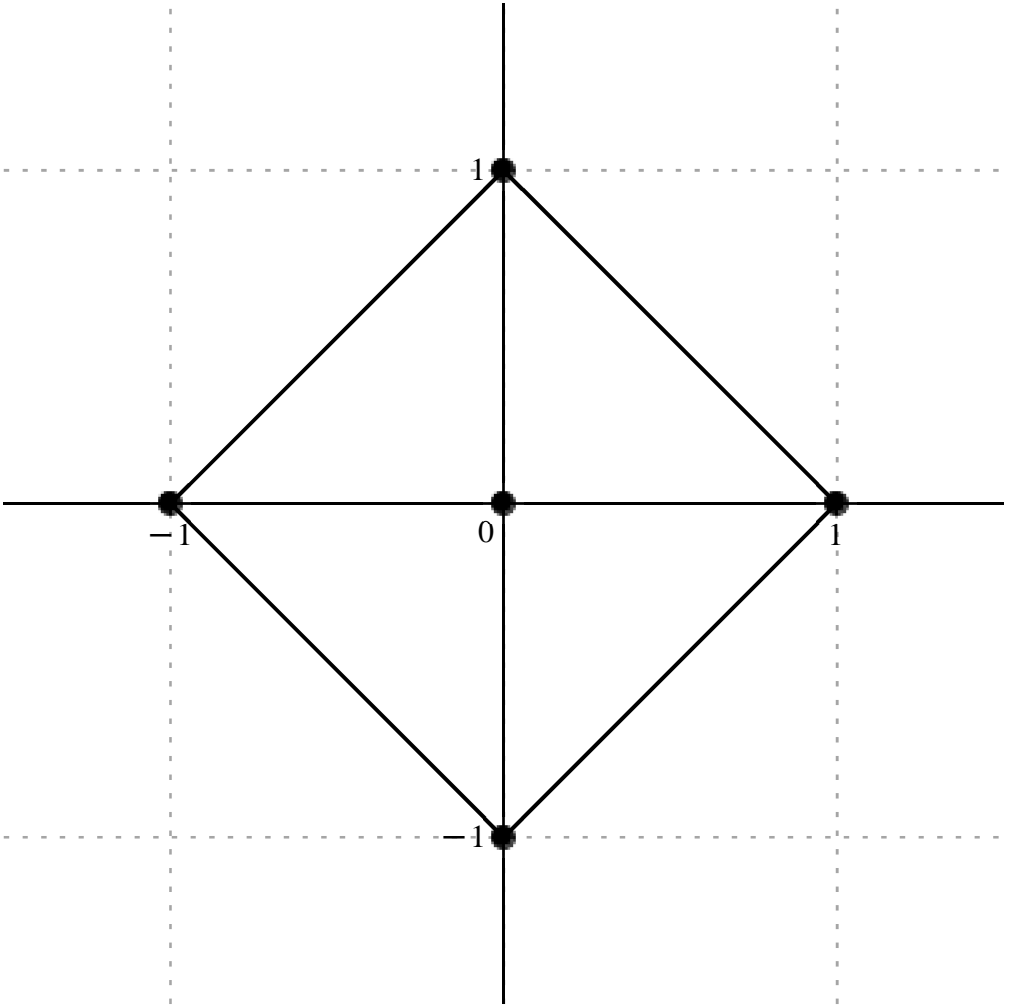
Error order.: 4, Error.:  $1.4635834118586375920 \times 10^{-14}$ , New Error.:  $1.4635834118586371752 \times 10^{-18}$

Error order.: 4, Error.:  $1.4635834118586371752 \times 10^{-18}$ , New Error.:  $1.4635834118586371752 \times 10^{-22}$

Error order.: 4, Error.:  $1.4635834118586371752 \times 10^{-22}$ , New Error.:  $1.4635834118586371752 \times 10^{-26}$

Error order.: 4, Error.:  $1.4635834118586371752 \times 10^{-26}$ , New Error.:  $1.4635834118586371752 \times 10^{-30}$

$$x_o + h, \begin{bmatrix} \mathrm{I} \\ -1 & 0 & 1 \\ -\mathrm{I} \end{bmatrix}$$
  
$$c =, \begin{bmatrix} -\frac{1}{2} \\ \frac{1}{2} & 0 & \frac{1}{2} \\ -\frac{1}{2} \end{bmatrix}$$



$$\frac{d^2}{dx_{ol}^2} u(x_{ol}) = \frac{-u_{ol+1} + u_{ol-1} + u_{ol+1} - u_{ol-1}}{2 \Delta x_{ol}^2}, O(\Delta x_{ol}^4)$$

Formula:, 359, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 4, Error:,  $6.2412938672123212346 \times 10^{-11}$ , New Error:,  $6.2412938672010125391 \times 10^{-15}$

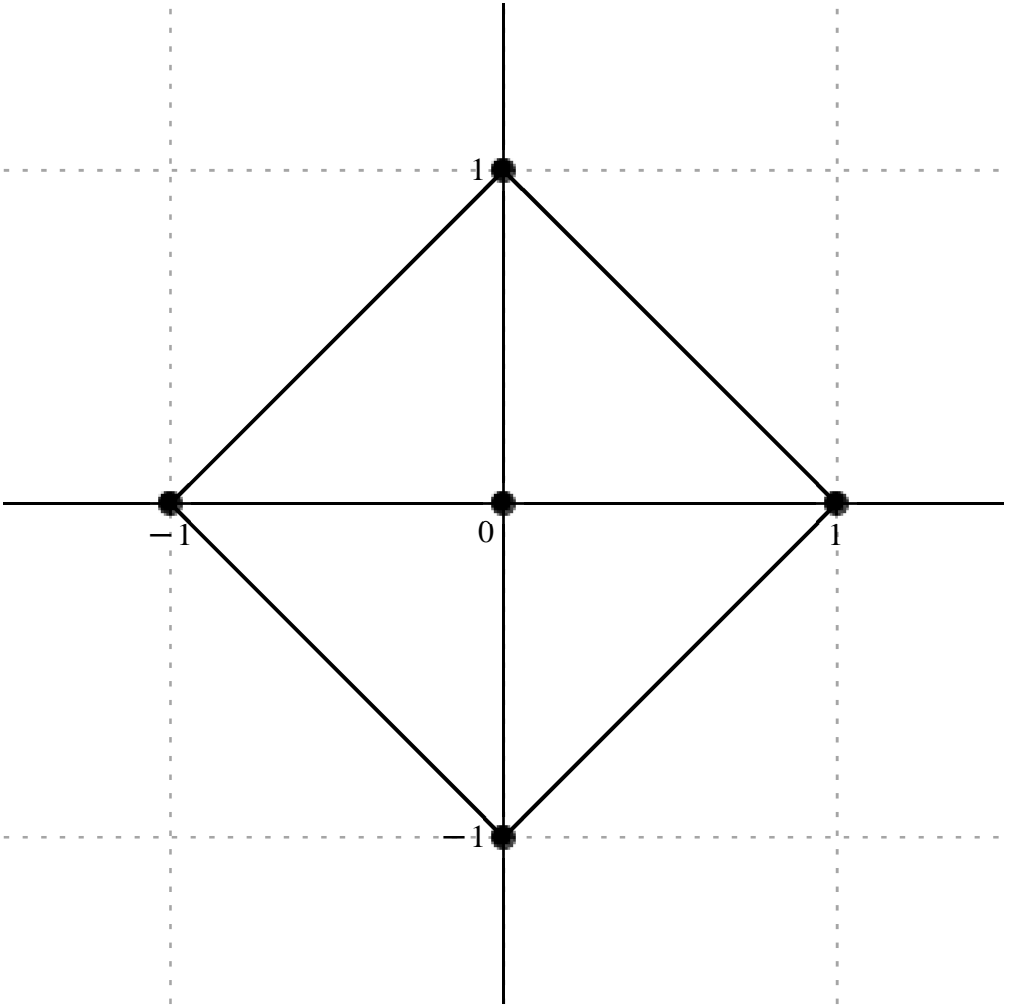
Error order:, 4, Error:,  $6.2412938672010125391 \times 10^{-15}$ , New Error:,  $6.2412938672010114082 \times 10^{-19}$

Error order:, 4, Error:,  $6.2412938672010114082 \times 10^{-19}$ , New Error:,  $6.2412938672010114081 \times 10^{-23}$

Error order:, 4, Error:,  $6.2412938672010114081 \times 10^{-23}$ , New Error:,  $6.2412938672010114081 \times 10^{-27}$

Error order:, 4, Error:,  $6.2412938672010114081 \times 10^{-27}$ , New Error:,  $6.2412938672010114081 \times 10^{-31}$

$$x_o + h, \begin{bmatrix} I \\ -1 & 0 & 1 \\ -I \end{bmatrix}$$
  
$$c =, \begin{bmatrix} \frac{3I}{2} \\ -\frac{3}{2} & 0 & \frac{3}{2} \\ -\frac{3I}{2} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{3 \mathbf{I} u_{ol+1} - 3 u_{ol-1} + 3 u_{ol+1} - 3 \mathbf{I} u_{ol-1}}{2 \Delta x_{ol}^3}, O( \Delta x_{ol}^4 )$$

Formula:, 360, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 4, Error:,  $3.1051213269694285037 \times 10^{-11}$ , New Error:,  $3.1051213269656776926 \times 10^{-15}$

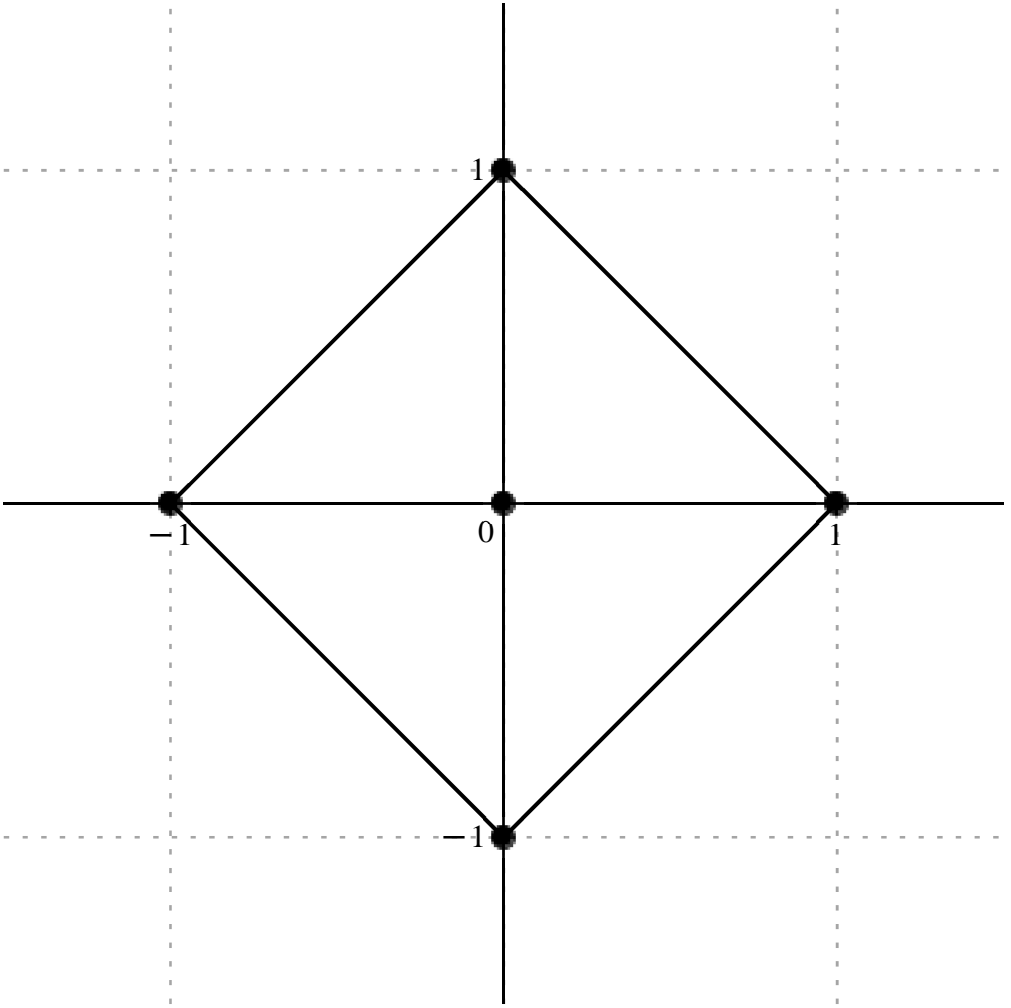
Error order:, 4, Error:,  $3.1051213269656776926 \times 10^{-15}$ , New Error:,  $3.1051213269656773175 \times 10^{-19}$

Error order:, 4, Error:,  $3.1051213269656773175 \times 10^{-19}$ , New Error:,  $3.1051213269656773175 \times 10^{-23}$

Error order:, 4, Error:,  $3.1051213269656773175 \times 10^{-23}$ , New Error:,  $3.1051213269656773175 \times 10^{-27}$

Error order:, 4, Error:,  $3.1051213269656773175 \times 10^{-27}$ , New Error:,  $3.1051213269656773175 \times 10^{-31}$

$$x_o + h, \begin{bmatrix} \mathbf{I} \\ -1 & 0 & 1 \\ -\mathbf{I} \end{bmatrix}$$
  
$$c =, \begin{bmatrix} 6 \\ 6 & -24 & 6 \\ 6 \end{bmatrix}$$



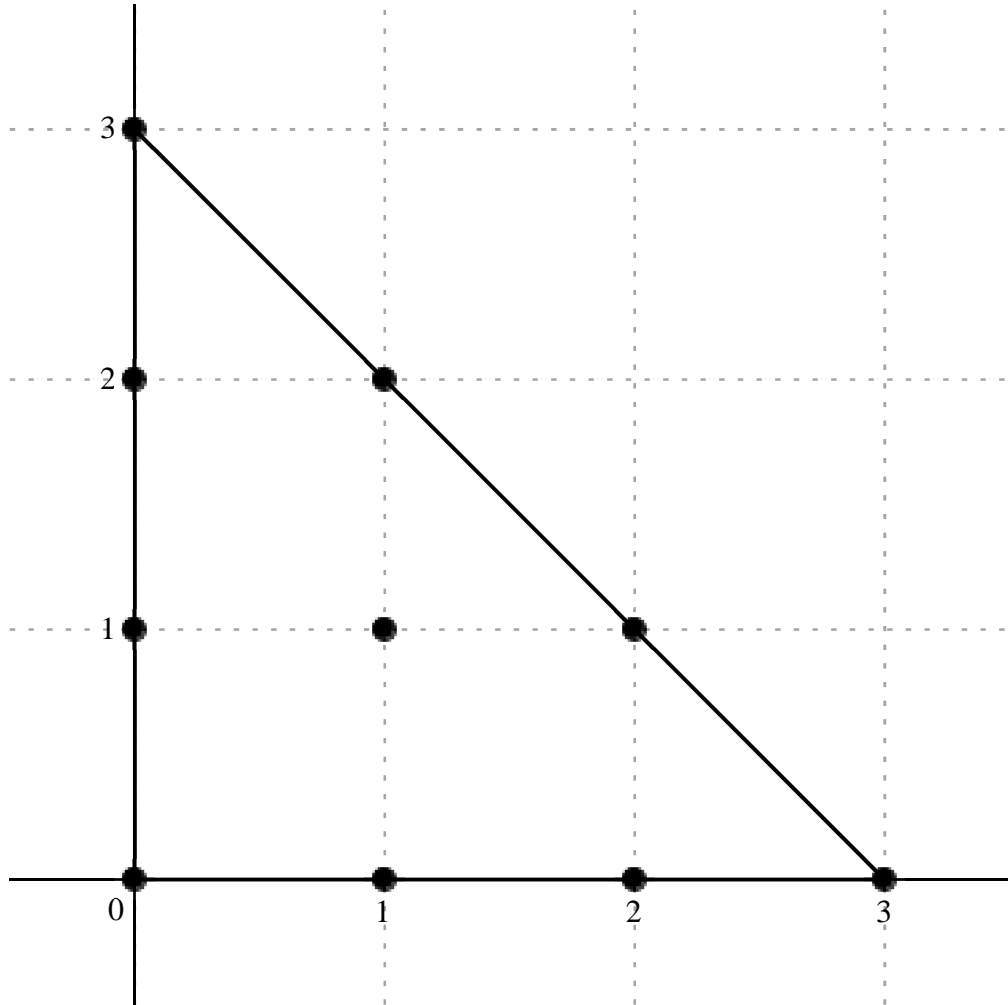
$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{6 u_{ol+1} + 6 u_{ol-1} - 24 u_{ol} + 6 u_{ol+1} + 6 u_{ol-1}}{\Delta x_{ol}^4}, O(\Delta x_{ol}^4)$$

Not square - Triangle: Interval, 3  
Formula:, 361, Var.: 1  
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1  
Error order:, 9, Error:,  $5.0679326204396755490 \times 10^{-22}$ , New Error:,  $4.9937265468954961806 \times 10^{-31}$   
Error order:, 9, Error:,  $4.9937265468954961806 \times 10^{-31}$ , New Error:,  $4.9863336250872843601 \times 10^{-40}$   
Error order:, 9, Error:,  $4.9863336250872843601 \times 10^{-40}$ , New Error:,  $4.9855946102061870875 \times 10^{-49}$   
Error order:, 9, Error:,  $4.9855946102061870875 \times 10^{-49}$ , New Error:,  $4.9855207114915136311 \times 10^{-58}$   
Error order:, 9, Error:,  $4.9855207114915136311 \times 10^{-58}$ , New Error:,  $4.9855133216477810867 \times 10^{-67}$

$$x_o + h., \begin{bmatrix} 3 & 1 \\ 2 & 1+2 & 1 \\ 1 & 1+1 & 2+1 \\ 0 & 1 & 2 & 3 \end{bmatrix}$$



$$c =, \begin{bmatrix} \frac{5}{156} + \frac{I}{156} \\ \frac{9}{52} + \frac{45 I}{52} & \frac{9}{20} + \frac{27 I}{20} \\ \frac{9 I}{2} & 9 - 9 I & -\frac{27}{20} - \frac{9 I}{20} \\ -\frac{44}{15} + \frac{44 I}{15} & -\frac{9}{2} & -\frac{45}{52} - \frac{9 I}{52} & -\frac{1}{156} - \frac{5 I}{156} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\; u(x_{ol}) = \frac{(25 + 5\; I)\; u_{ol + 3\; I} + (135 + 675\; I)\; u_{ol + 2\; I} + (351 + 1053\; I)\; u_{ol + 1 + 2\; I} + 3510\; I u_{ol + 1} + (7020 - 7020\; I)\; u_{ol + 1 + 1} - (1053 + 351\; I)\; u_{ol + 2 + 1} + (-2288 + 2288\; I)\; u_{ol} - 3510\; u_{ol + 1} - (675 + 135\; I)\; u_{ol + 2} - (5 + 25\; I)\; u_{ol + 3}}{780\; \Delta x_{ol}},\; O(\;\Delta x_{ol}^{\; 9}\; )$$

Formula:, 362, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 2

Error order:, 8, Error:, 4.4350527847282119864 × 10<sup>−19</sup>, New Error:, 4.4044676193177601184 × 10<sup>−27</sup>

Error order:, 8, Error:, 4.4044676193177601184 × 10<sup>−27</sup>, New Error:, 4.4014014270333948220 × 10<sup>−35</sup>

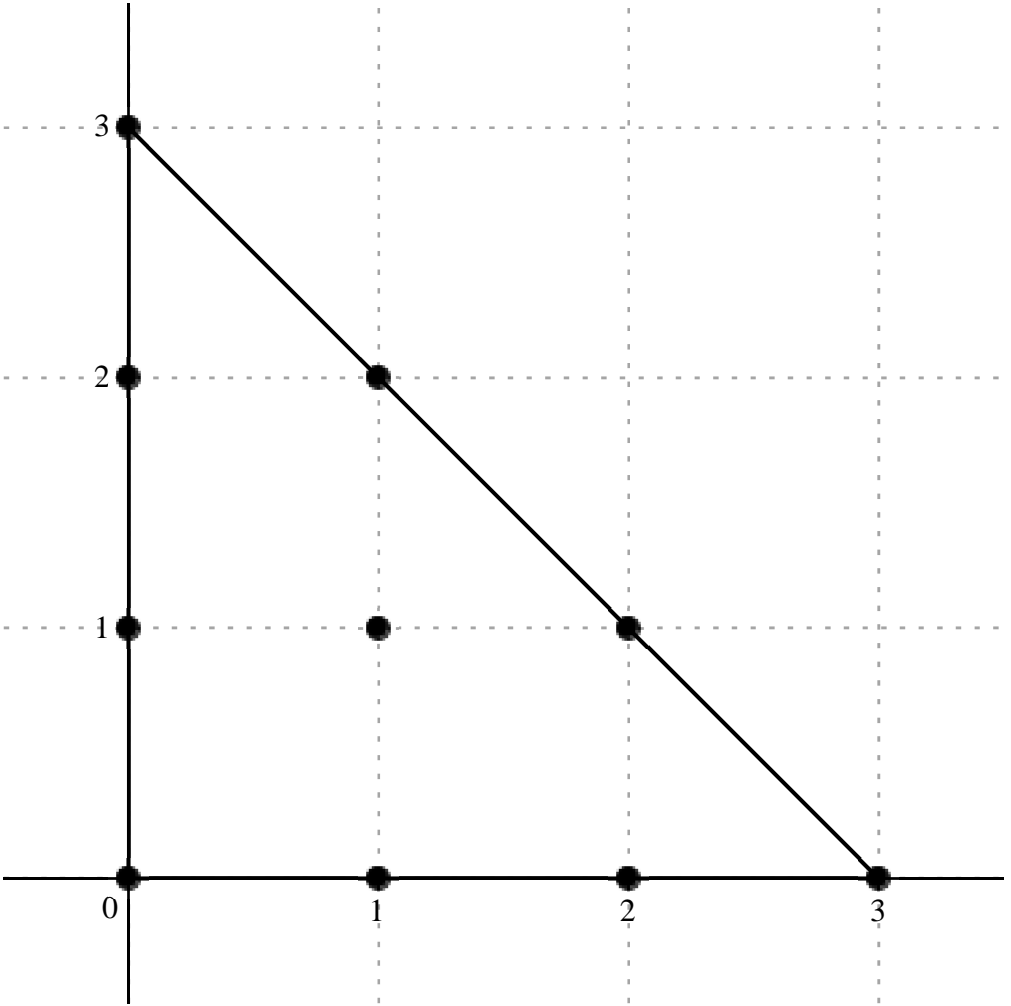
Error order:, 8, Error:, 4.4014014270333948220 × 10<sup>−35</sup>, New Error:, 4.4010947323439411491 × 10<sup>−43</sup>

Error order:, 8, Error:, 4.4010947323439411491 × 10<sup>−43</sup>, New Error:, 4.4010640621216777153 × 10<sup>−51</sup>

Error order:, 8, Error:, 4.4010640621216777153 × 10<sup>−51</sup>, New Error:, 4.4010609950919194829 × 10<sup>−59</sup>

$$x_o \neq h., \left[ \begin{array}{cccc} 3 \text{ I} & & & \\ 2 \text{ I} & 1+2 \text{ I} & & \\ 1 & 1+\text{I} & 2+\text{I} & \\ 0 & 1 & 2 & 3 \end{array} \right]$$

$$c=, \left[ \begin{array}{cccccc} -\frac{259}{1170}+\frac{151 \text{ I}}{1170} & & & & & \\ -\frac{1359}{260}-\frac{1101 \text{ I}}{260} & -\frac{93}{10}-\frac{51 \text{ I}}{10} & & & & \\ -\frac{87}{5}-\frac{132 \text{ I}}{5} & \frac{438 \text{ I}}{5} & \frac{93}{10}-\frac{51 \text{ I}}{10} & & & \\ -\frac{295 \text{ I}}{18} & \frac{87}{5}-\frac{132 \text{ I}}{5} & \frac{1359}{260}-\frac{1101 \text{ I}}{260} & \frac{259}{1170}+\frac{151 \text{ I}}{1170} & & \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u\big(x_{ol}\big) = \frac{(-518+302 \, \mathrm{I}) \, u_{_{ol+3 \mathrm{I}}}-(12231+9909 \, \mathrm{I}) \, u_{_{ol+2 \mathrm{I}}}- (21762+11934 \, \mathrm{I}) \, u_{_{ol+1+2 \mathrm{I}}}- (40716+61776 \, \mathrm{I}) \, u_{_{ol+1}}+204984 \, \mathrm{I} u_{_{ol+1+1}}+ (21762-11934 \, \mathrm{I}) \, u_{_{ol+2+1}}-38350 \, \mathrm{I} u_{_{ol}}+ (40716-61776 \, \mathrm{I}) \, u_{_{ol+1}}+ (12231-9909 \, \mathrm{I}) \, u_{_{ol+2}}+ (518+302 \, \mathrm{I}) \, u_{_{ol+3}}}{2340 \, \Delta x_{ol}^2}, \, O(\, \Delta x_{ol}^8 \, )$$

Formula.: 363, Var.: 1

Variavel .:, x\_{ol}, Derivada de Ordem .:, 3

Error order.: 7, Error:., 2.0580811409147649873 × 10<sup>−16</sup>, New Error:., 2.0290117938575552647 × 10<sup>−23</sup>

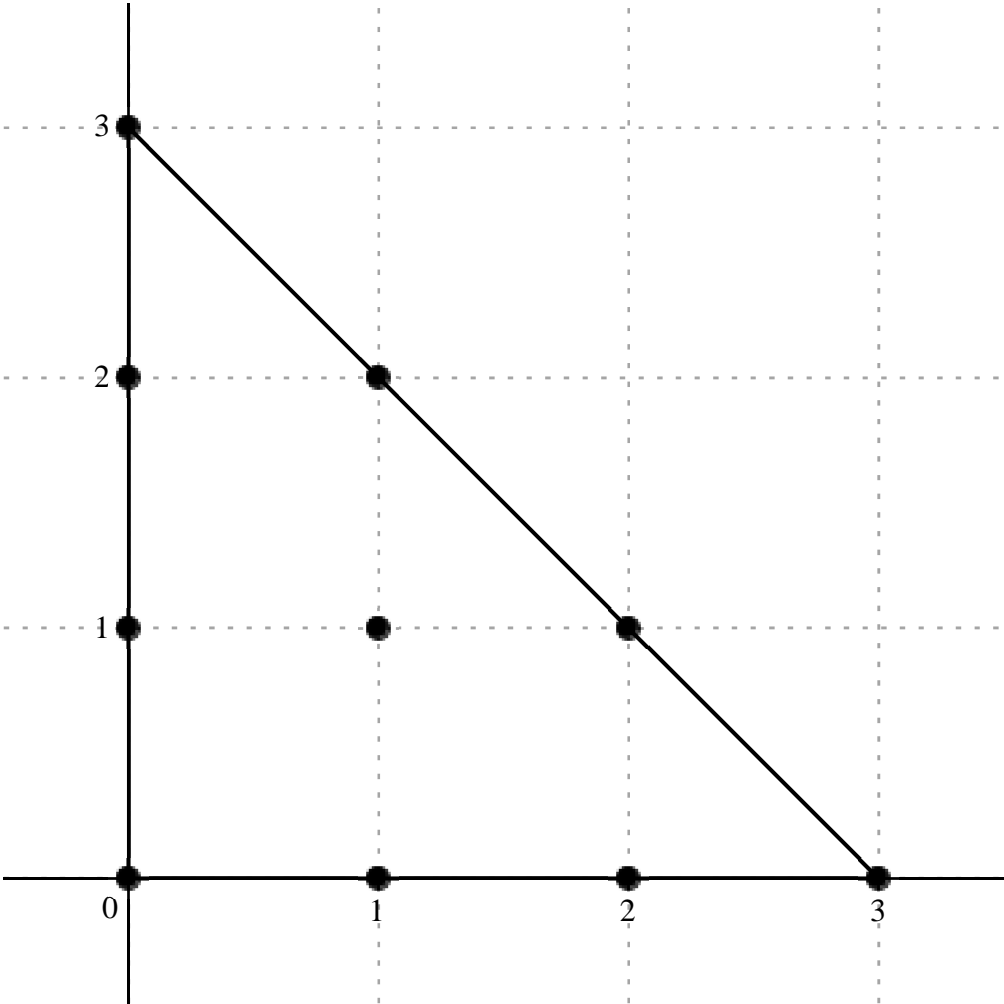
Error order.: 7, Error:., 2.0290117938575552647 × 10<sup>−23</sup>, New Error:., 2.0261153554255628513 × 10<sup>−30</sup>

Error order.: 7, Error:., 2.0261153554255628513 × 10<sup>−30</sup>, New Error:., 2.0258258167080364007 × 10<sup>−37</sup>

Error order: 7, Error:  $2.0258258167080364007 \times 10^{-37}$ , New Error:  $2.0257968638877015702 \times 10^{-44}$   
Error order: 7, Error:  $2.0257968638877015702 \times 10^{-44}$ , New Error:  $2.0257939686161824262 \times 10^{-51}$

$$x_o+h., \begin{bmatrix} 3 \text{ I} \\ 2 \text{ I} & 1+2 \text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$

$$c=, \begin{bmatrix} \frac{231}{520}-\frac{2113 \text{ I}}{1560} \\ \frac{9411}{260}-\frac{87 \text{ I}}{130} & \frac{2187}{40}-\frac{561 \text{ I}}{40} \\ \frac{2841}{20}+\frac{261 \text{ I}}{5} & -\frac{3111}{10}-\frac{3111 \text{ I}}{10} & -\frac{561}{40}+\frac{2187 \text{ I}}{40} \\ \frac{499}{12}+\frac{499 \text{ I}}{12} & \frac{261}{5}+\frac{2841 \text{ I}}{20} & -\frac{87}{130}+\frac{9411 \text{ I}}{260} & -\frac{2113}{1560}+\frac{231 \text{ I}}{520} \end{bmatrix}$$

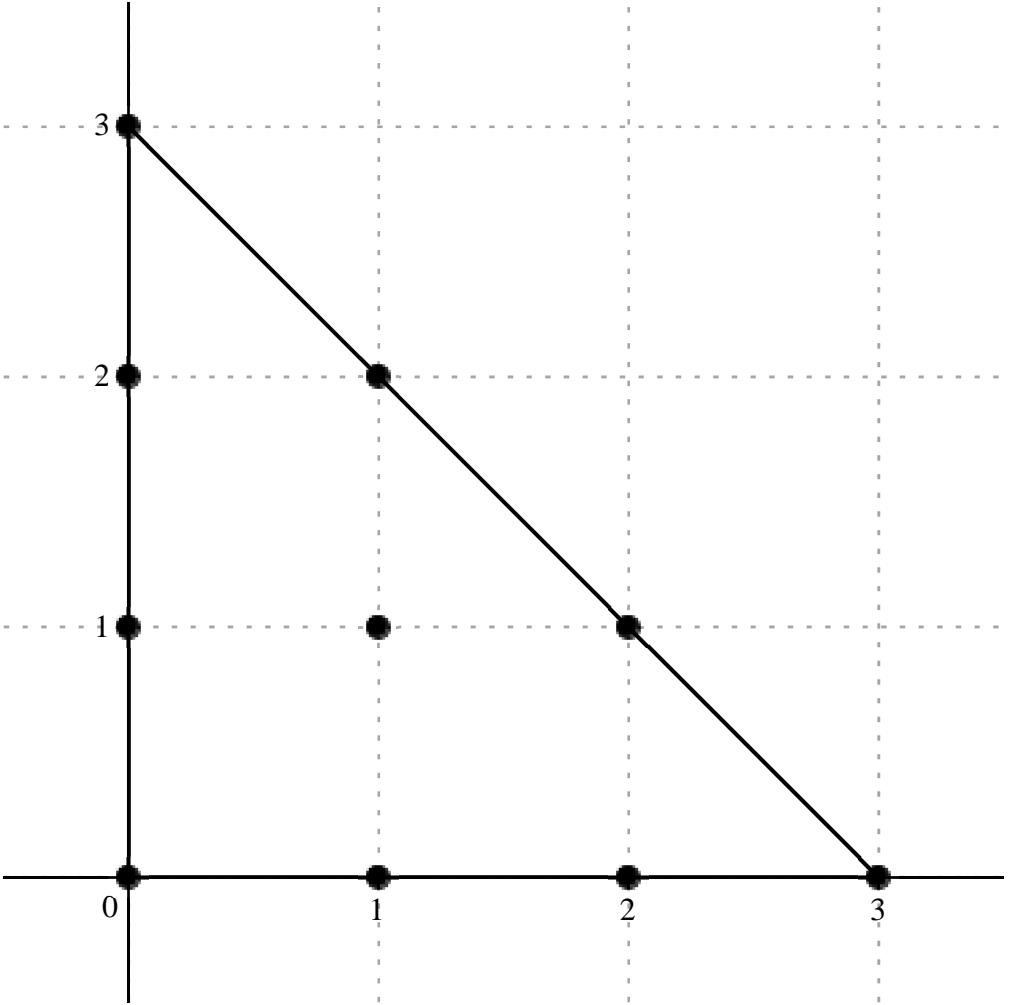


$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3}u(x_{ol})=\frac{(693-2113 \text{ I})u_{ol+3\text{I}}+(56466-1044 \text{ I})u_{ol+2\text{I}}+(85293-21879 \text{ I})u_{ol+1+2\text{I}}+(221598+81432 \text{ I})u_{ol+1}-(485316+485316 \text{ I})u_{ol+1+1}+(-21879+85293 \text{ I})u_{ol+2+1}+(64870+64870 \text{ I})u_{ol}+(81432+221598 \text{ I})u_{ol+1}+(-1044+56466 \text{ I})u_{ol+2}+(-2113+693 \text{ I})u_{ol+3}}{1560\Delta x_{ol}^3},O(\Delta x_{ol}^7)$$

*Error order*., 6,    *Error*.,  $1.0388649913966853727 \times 10^{-13}$ ,    *New Error*.,  $1.0320044092586466010 \times 10^{-19}$   
*Error order*., 6,    *Error*.,  $1.0320044092586466010 \times 10^{-19}$ ,    *New Error*.,  $1.0313166951010315592 \times 10^{-25}$   
*Error order*., 6,    *Error*.,  $1.0313166951010315592 \times 10^{-25}$ ,    *New Error*.,  $1.0312479073955228777 \times 10^{-31}$   
*Error order*., 6,    *Error*.,  $1.0312479073955228777 \times 10^{-31}$ ,    *New Error*.,  $1.0312410284623433682 \times 10^{-37}$   
*Error order*., 6,    *Error*.,  $1.0312410284623433682 \times 10^{-37}$ ,    *New Error*.,  $1.0312403405673993996 \times 10^{-43}$

$$x_o \neq h., \left[ \begin{array}{cccc} 3 \text{ I} & & & \\ 2 \text{ I} & 1+2 \text{ I} & & \\ \text{I} & 1+\text{I} & 2+\text{I} & \\ 0 & 1 & 2 & 3 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} \frac{959}{390} + \frac{1132 \text{ I}}{195} & & & & & \\ -\frac{7572}{65} + \frac{6522 \text{ I}}{65} & -\frac{642}{5} + \frac{2007 \text{ I}}{10} & & & & \\ -\frac{5397}{10} + \frac{1803 \text{ I}}{10} & \frac{8748}{5} & -\frac{642}{5} - \frac{2007 \text{ I}}{10} & & & \\ -\frac{556}{3} & -\frac{5397}{10} - \frac{1803 \text{ I}}{10} & -\frac{7572}{65} - \frac{6522 \text{ I}}{65} & \frac{959}{390} - \frac{1132 \text{ I}}{195} & & \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \; u(x_{ol}) = \frac{(959 + 2264 \text{ I}) \; u_{ol+3\text{I}} + (-45432 + 39132 \text{ I}) \; u_{ol+2\text{I}} + (-50076 + 78273 \text{ I}) \; u_{ol+1+2\text{I}} + (-210483 + 70317 \text{ I}) \; u_{ol+1} + 682344 \; u_{ol+1+1} - (50076 + 78273 \text{ I}) \; u_{ol+2+1} - 72280 \; u_{ol} - (210483 + 70317 \text{ I}) \; u_{ol+1} - (45432 + 39132 \text{ I}) \; u_{ol+2} + (959 - 2264 \text{ I}) \; u_{ol+3}}{390 \; \Delta x_{ol}^4}, \; O( \; \Delta x_{ol}^6 \; )$$

Formula:, 365, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 5

Error order:, 5, Error:,  $3.2029295654209694464 \times 10^{-11}$ , New Error:,  $3.1601916491981993300 \times 10^{-16}$

Error order:, 5, Error:,  $3.1601916491981993300 \times 10^{-16}$ , New Error:,  $3.1559325640369926788 \times 10^{-21}$

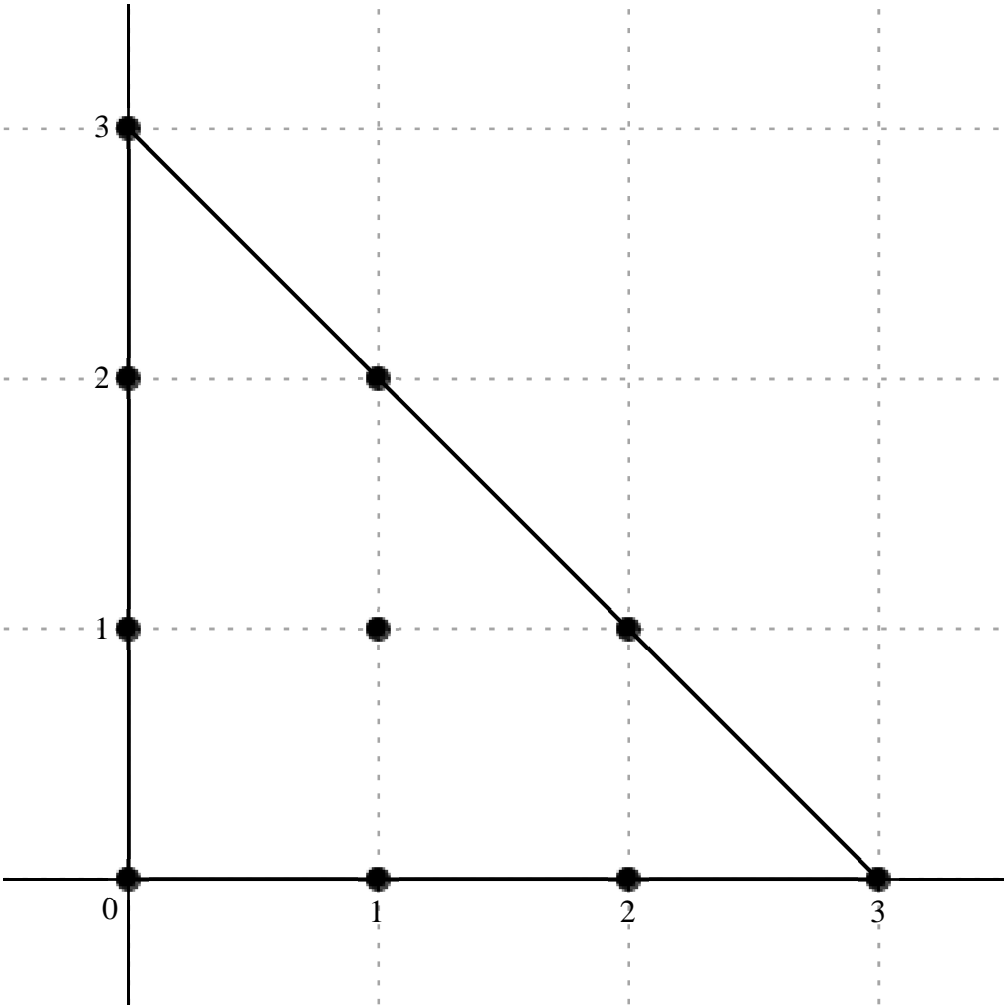
Error order:, 5, Error:,  $3.1559325640369926788 \times 10^{-21}$ , New Error:,  $3.1555068028034386730 \times 10^{-26}$

Error order:, 5, Error:,  $3.1555068028034386730 \times 10^{-26}$ , New Error:,  $3.1554642281531245428 \times 10^{-31}$

Error order:, 5, Error:,  $3.1554642281531245428 \times 10^{-31}$ , New Error:,  $3.1554599707028237578 \times 10^{-36}$

$$x_o \neq h., \begin{bmatrix} 3 \text{ I} \\ 2 \text{ I} & 1+2 \text{ I} \\ 1 & 1+\text{I} & 2+\text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{781}{39} - \frac{261 \text{ I}}{26} \\ \frac{1176}{13} - \frac{6639 \text{ I}}{13} & -144 - \frac{1587 \text{ I}}{2} \\ \frac{1803}{2} - \frac{2943 \text{ I}}{2} & -3966 + 3966 \text{ I} & \frac{1587}{2} + 144 \text{ I} \\ \frac{1057}{3} - \frac{1057 \text{ I}}{3} & \frac{2943}{2} - \frac{1803 \text{ I}}{2} & \frac{6639}{13} - \frac{1176 \text{ I}}{13} & \frac{261}{26} + \frac{781 \text{ I}}{39} \end{bmatrix}$$



$$\frac{d^5}{dx_{ol}^5} u(x_{ol}) = \frac{-(1562 + 783 \text{ I}) u_{ol+3 \text{ I}} + (7056 - 39834 \text{ I}) u_{ol+2 \text{ I}} - (11232 + 61893 \text{ I}) u_{ol+1+2 \text{ I}} + (70317 - 114777 \text{ I}) u_{ol+1} + (-309348 + 309348 \text{ I}) u_{ol+1+1} + (61893 + 11232 \text{ I}) u_{ol+2+1} + (27482 - 27482 \text{ I}) u_{ol} + (114777 - 70317 \text{ I}) u_{ol+1} + (39834 - 7056 \text{ I}) u_{ol+2} + (783 + 1562 \text{ I}) u_{ol+3}}{78 \Delta x_{ol}^5}, O(\Delta x_{ol}^5)$$

Formula:, 366, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order:, 4, Error:,  $1.0905726075513732501 \times 10^{-8}$ , New Error:,  $1.0839197718398868671 \times 10^{-12}$

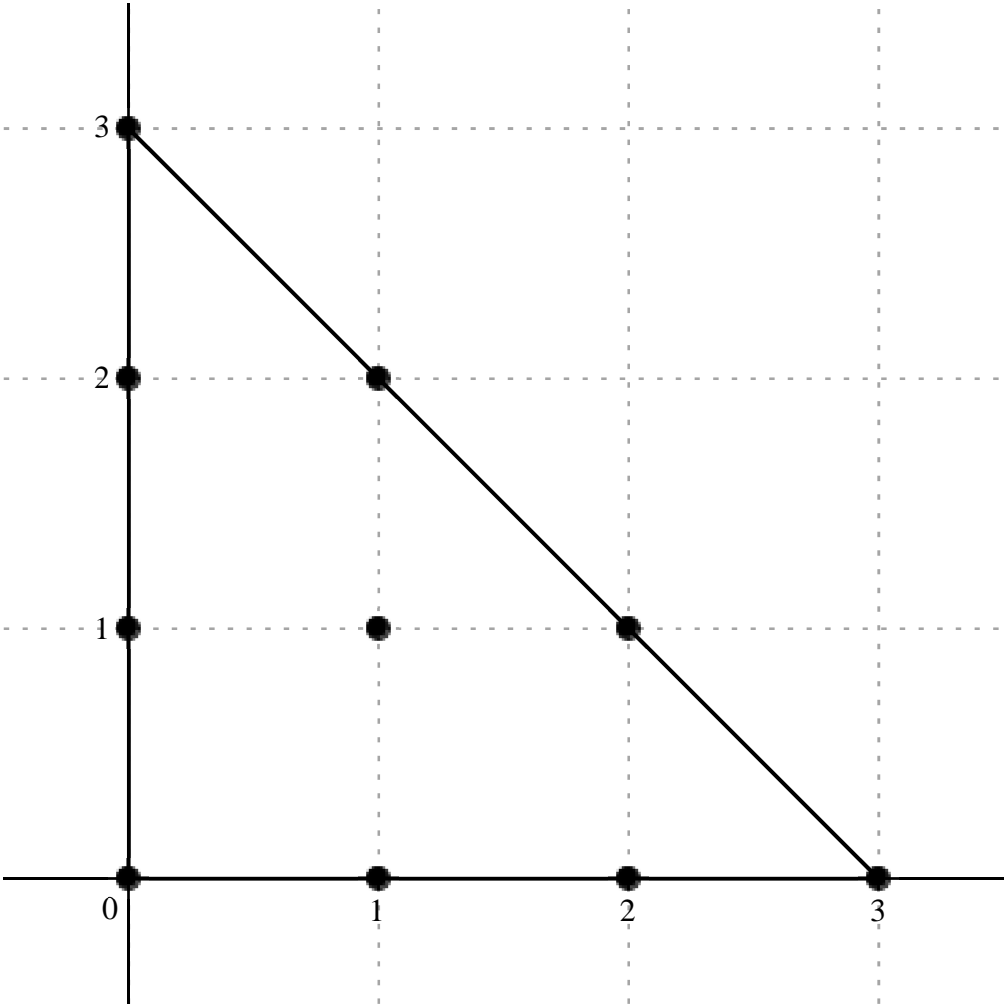
Error order:, 4, Error:,  $1.0839197718398868671 \times 10^{-12}$ , New Error:,  $1.0832529834923385301 \times 10^{-16}$

Error order:, 4, Error:,  $1.0832529834923385301 \times 10^{-16}$ , New Error:,  $1.0831862898412669459 \times 10^{-20}$

Error order:, 4, Error:,  $1.0831862898412669459 \times 10^{-20}$ , New Error:,  $1.0831796203282273739 \times 10^{-24}$

Error order:, 4, Error:,  $1.0831796203282273739 \times 10^{-24}$ , New Error:,  $1.0831789533754443232 \times 10^{-28}$

$$x_o + h., \begin{bmatrix} 3 \text{ I} \\ 2 \text{ I} & 1+2 \text{ I} \\ 1 & 1+\text{I} & 2+\text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$
$$c =, \begin{bmatrix} \frac{796}{13} - \frac{184 \text{ I}}{13} \\ \frac{8622}{13} + \frac{15498 \text{ I}}{13} & 1728 + 1296 \text{ I} \\ 684 + 4104 \text{ I} & -14256 \text{ I} & -1728 + 1296 \text{ I} \\ 1100 \text{ I} & -684 + 4104 \text{ I} & -\frac{8622}{13} + \frac{15498 \text{ I}}{13} & -\frac{796}{13} - \frac{184 \text{ I}}{13} \end{bmatrix}$$

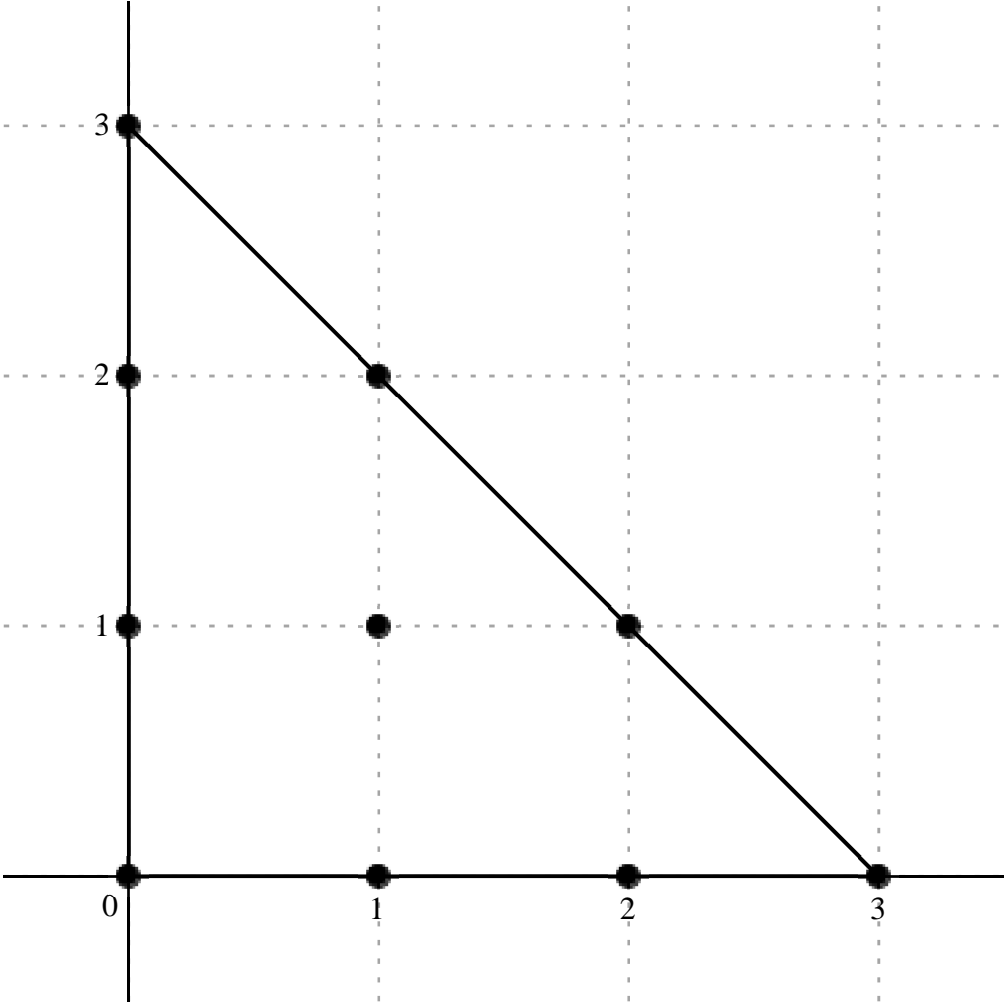


$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} u(x_{ol}) = \frac{2 \left( (398 - 92 \text{ I}) u_{ol+3\text{I}} + (4311 + 7749 \text{ I}) u_{ol+2\text{I}} + (11232 + 8424 \text{ I}) u_{ol+1+2\text{I}} + (4446 + 26676 \text{ I}) u_{ol+1} - 92664 \text{ I} u_{ol+1+1\text{I}} + (-11232 + 8424 \text{ I}) u_{ol+2+1\text{I}} + 7150 \text{ I} u_{ol} + (-4446 + 26676 \text{ I}) u_{ol+1} + (-4311 + 7749 \text{ I}) u_{ol+2} - (398 + 92 \text{ I}) u_{ol+3} \right)}{13 \Delta x_{ol}^6}, O(\Delta x_{ol}^4)$$

Formula:, 367, Var:, 1  
Variavel :,  $x_o$  , Derivada de Ordem :, 7

Error order:, 3, Error:,  $2.1958496131805227503 \times 10^{-6}$ , New Error:,  $2.1698116097823542892 \times 10^{-9}$   
Error order:, 3, Error:,  $2.1698116097823542892 \times 10^{-9}$ , New Error:,  $2.1672160192593524781 \times 10^{-12}$   
Error order:, 3, Error:,  $2.1672160192593524781 \times 10^{-12}$ , New Error:,  $2.1669565424178713194 \times 10^{-15}$   
Error order:, 3, Error:,  $2.1669565424178713194 \times 10^{-15}$ , New Error:,  $2.1669305955559429226 \times 10^{-18}$   
Error order:, 3, Error:,  $2.1669305955559429226 \times 10^{-18}$ , New Error:,  $2.1669280008779723915 \times 10^{-21}$

$$x_o + h., \begin{bmatrix} 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} \\ 1 & 1 + \text{I} & 2 + \text{I} \\ 0 & 1 & 2 & 3 \end{bmatrix}$$
$$c =, \begin{bmatrix} -\frac{1071}{13} + \frac{1351 \text{ I}}{13} \\ -\frac{32382}{13} - \frac{12852 \text{ I}}{13} & -4347 + 441 \text{ I} \\ -5922 - 4788 \text{ I} & 19404 + 19404 \text{ I} & 441 - 4347 \text{ I} \\ -1330 - 1330 \text{ I} & -4788 - 5922 \text{ I} & -\frac{12852}{13} - \frac{32382 \text{ I}}{13} & \frac{1351}{13} - \frac{1071 \text{ I}}{13} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u(x_{ol})=\frac{7\left(( -153+193\,\mathrm{I})\,u_{ol+3\,\mathrm{I}}-(4626+1836\,\mathrm{I})\,u_{ol+2\,\mathrm{I}}+( -8073+819\,\mathrm{I})\,u_{ol+1+2\,\mathrm{I}}-(10998+8892\,\mathrm{I})\,u_{ol+1}+(36036+36036\,\mathrm{I})\,u_{ol+1+1}+(819-8073\,\mathrm{I})\,u_{ol+2+1}-(2470+2470\,\mathrm{I})\,u_{ol}-(8892+10998\,\mathrm{I})\,u_{ol+1}-(1836+4626\,\mathrm{I})\,u_{ol+2}+(193-153\,\mathrm{I})\,u_{ol+3}\right)}{13\,\Delta x_{ol}^7},\,O(\,\Delta x_{ol}^3\,)$$

Formula: 368, Var.: 1

Variavel :  $x_{ol}$  , Derivada de Ordem : 8

Error order.: 2, Error: 0.00045307558402843841529, New Error:  $4.5081091440635779911\times10^{-6}$

Error order.: 2, Error:  $4.5081091440635779911\times10^{-6}$ , New Error:  $4.5058399855563591344\times10^{-8}$

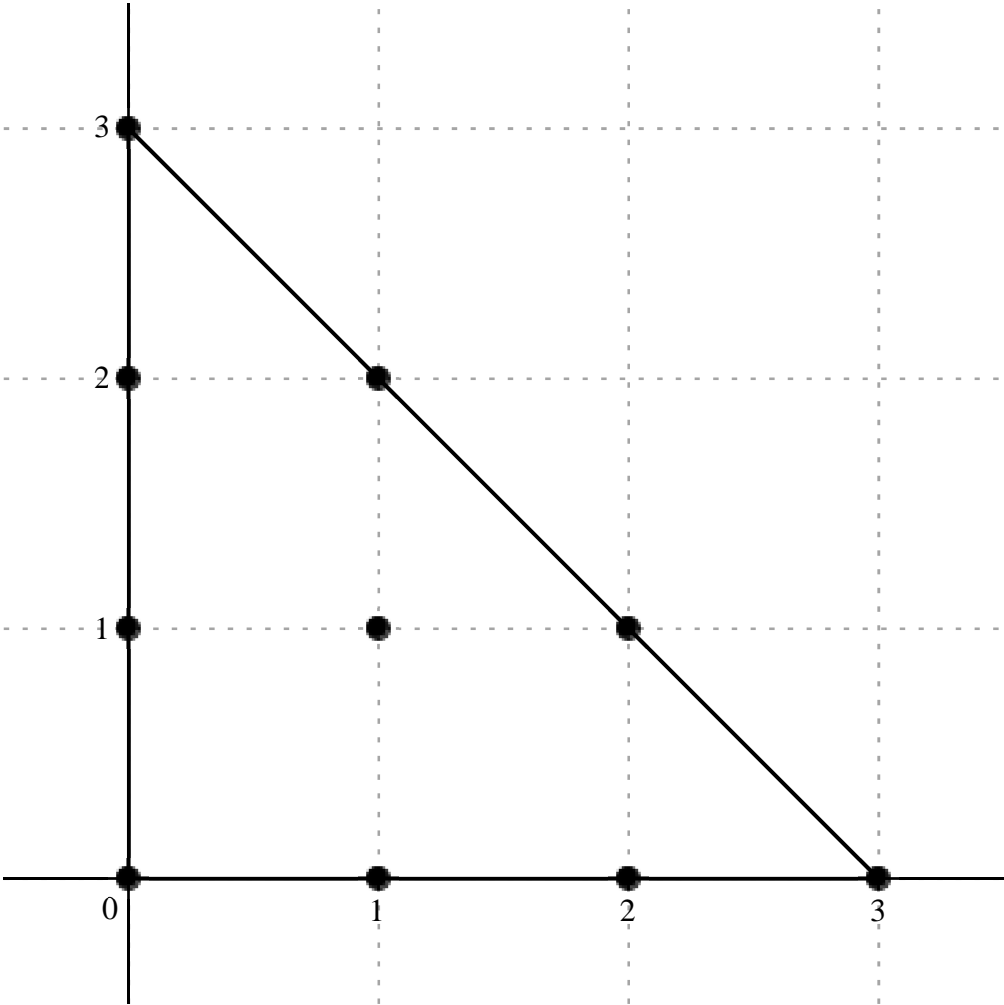
Error order.: 2, Error:  $4.5058399855563591344\times10^{-8}$ , New Error:  $4.5056130254395602371\times10^{-10}$

Error order.: 2, Error:  $4.5056130254395602371\times10^{-10}$ , New Error:  $4.5055903289858406760\times10^{-12}$

Error order.: 2, Error:  $4.5055903289858406760\times10^{-12}$ , New Error:  $4.5055880593360489442\times10^{-14}$

$$x_o\neq h.,\left[\begin{array}{cccc}3\,\mathrm{I}&&&\\2\,\mathrm{I}&1+2\,\mathrm{I}&&\\1&1+\mathrm{I}&2+\mathrm{I}&\\0&1&2&3\end{array}\right]$$

$$c=,\left[\begin{array}{cccc}\frac{56}{13}-\frac{2464\,\mathrm{I}}{13}&&&\\\frac{44352}{13}-\frac{14112\,\mathrm{I}}{13}&4032-4536\,\mathrm{I}&&\\9576-504\,\mathrm{I}&-36288&4032+4536\,\mathrm{I}&\\2240&9576+504\,\mathrm{I}&\frac{44352}{13}+\frac{14112\,\mathrm{I}}{13}&\frac{56}{13}+\frac{2464\,\mathrm{I}}{13}\end{array}\right]$$





$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u\big(x_{ol}\big) = \frac{56 \left( (1-44 \, \mathrm{I}) \, u_{ol+3 \, \mathrm{I}} + (792-252 \, \mathrm{I}) \, u_{ol+2 \, \mathrm{I}} + (936-1053 \, \mathrm{I}) \, u_{ol+1+2 \, \mathrm{I}} + (2223-117 \, \mathrm{I}) \, u_{ol+1} - 8424 \, u_{ol+1+1} + (936+1053 \, \mathrm{I}) \, u_{ol+2+1} + 520 \, u_{ol} + (2223+117 \, \mathrm{I}) \, u_{ol+1} + (792+252 \, \mathrm{I}) \, u_{ol+2} + (1+44 \, \mathrm{I}) \, u_{ol+3} \right)}{13 \, \Delta x_{ol}^8}, \, O(\, \Delta x_{ol}^2 \, )$$

Formula:, 369, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 9

Error order:, 1, Error:, 0.047294152390828793092, New Error:, 0.0046928244109756315182

Error order:, 1, Error:, 0.0046928244109756315182, New Error:, 0.00046891746317661747403

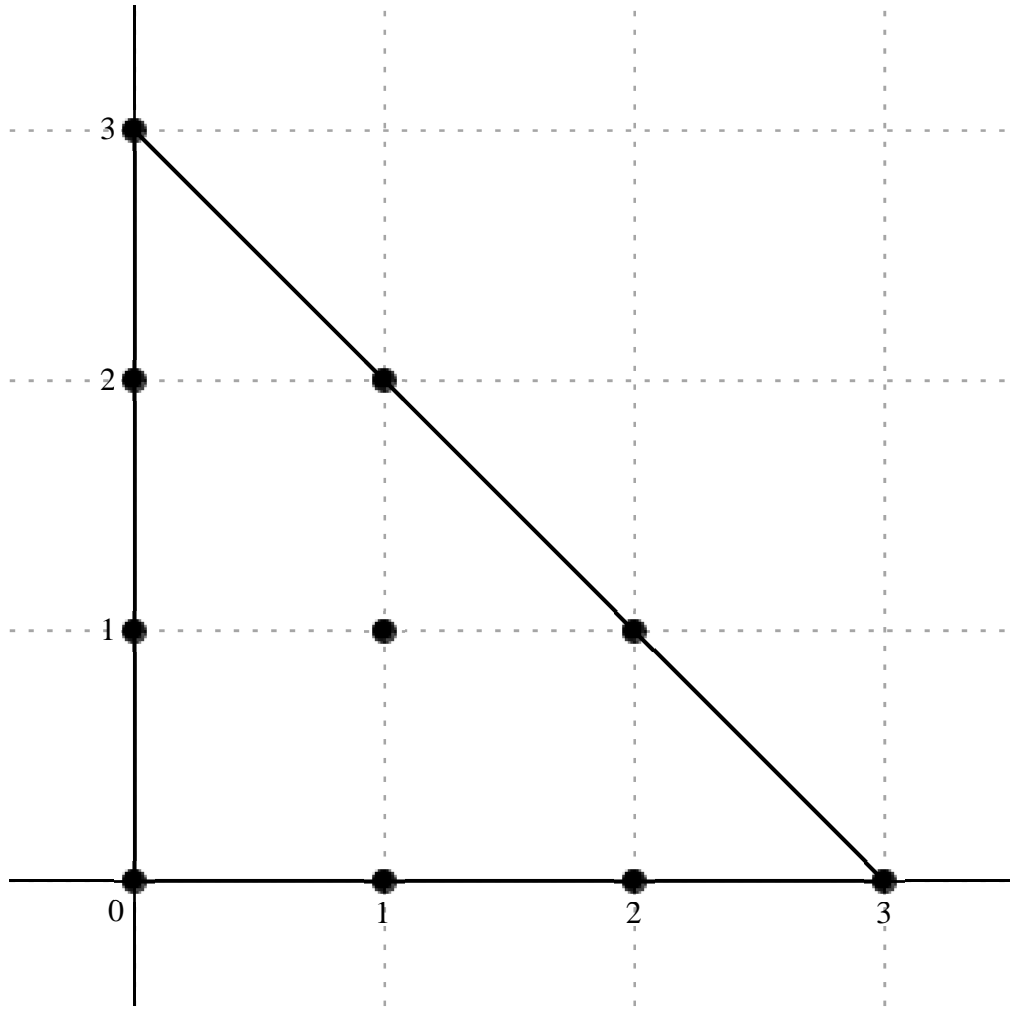
Error order:, 1, Error:, 0.00046891746317661747403, New Error:, 0.000046888097469904838605

Error order:, 1, Error:, 0.000046888097469904838605, New Error:,  $4.6887732594444756263 \times 10^{-6}$

Error order:, 1, Error:,  $4.6887732594444756263 \times 10^{-6}$ , New Error:,  $4.6887696106991905196 \times 10^{-7}$

$$x_o \; + h \; . \; , \; \left[ \begin{array}{cccc} 3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & & \\ 1 & 1+\mathrm{I} & 2+\mathrm{I} & \\ 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \; \left[ \begin{array}{ccccccc} \frac{1008}{13} + \frac{1512 \, \mathrm{I}}{13} & & & & & & \\ -\frac{18144}{13} + \frac{27216 \, \mathrm{I}}{13} & 4536 \, \mathrm{I} & & & & & \\ -4536 + 4536 \, \mathrm{I} & 18144 - 18144 \, \mathrm{I} & -4536 & & & & \\ -1008 + 1008 \, \mathrm{I} & -4536 + 4536 \, \mathrm{I} & -\frac{27216}{13} + \frac{18144 \, \mathrm{I}}{13} & -\frac{1512}{13} - \frac{1008 \, \mathrm{I}}{13} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{504 \left( (2+3 \, \mathrm{I}) \, u_{ol+3 \, \mathrm{I}} + (-36+54 \, \mathrm{I}) \, u_{ol+2 \, \mathrm{I}} + 117 \, \mathrm{I} u_{ol+1+2 \, \mathrm{I}} + (-117+117 \, \mathrm{I}) \, u_{ol+1} + (468-468 \, \mathrm{I}) \, u_{ol+1+1} - 117 \, u_{ol+2+1} + (-26+26 \, \mathrm{I}) \, u_{ol} + (-117+117 \, \mathrm{I}) \, u_{ol+1} + (-54+36 \, \mathrm{I}) \, u_{ol+2} - (3+2 \, \mathrm{I}) \, u_{ol+3} \right)}{13 \, \Delta x_{ol}^9}, \, O( \, \Delta x_{ol} \, )$$

Formula: 370, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 1

Error order.: 9, Error: 4.9680987429404210493 × 10−22, New Error: 4.9837989062855581925 × 10−31

Error order.: 9, Error: 4.9837989062855581925 × 10−31, New Error: 4.9853414210434310079 × 10−40

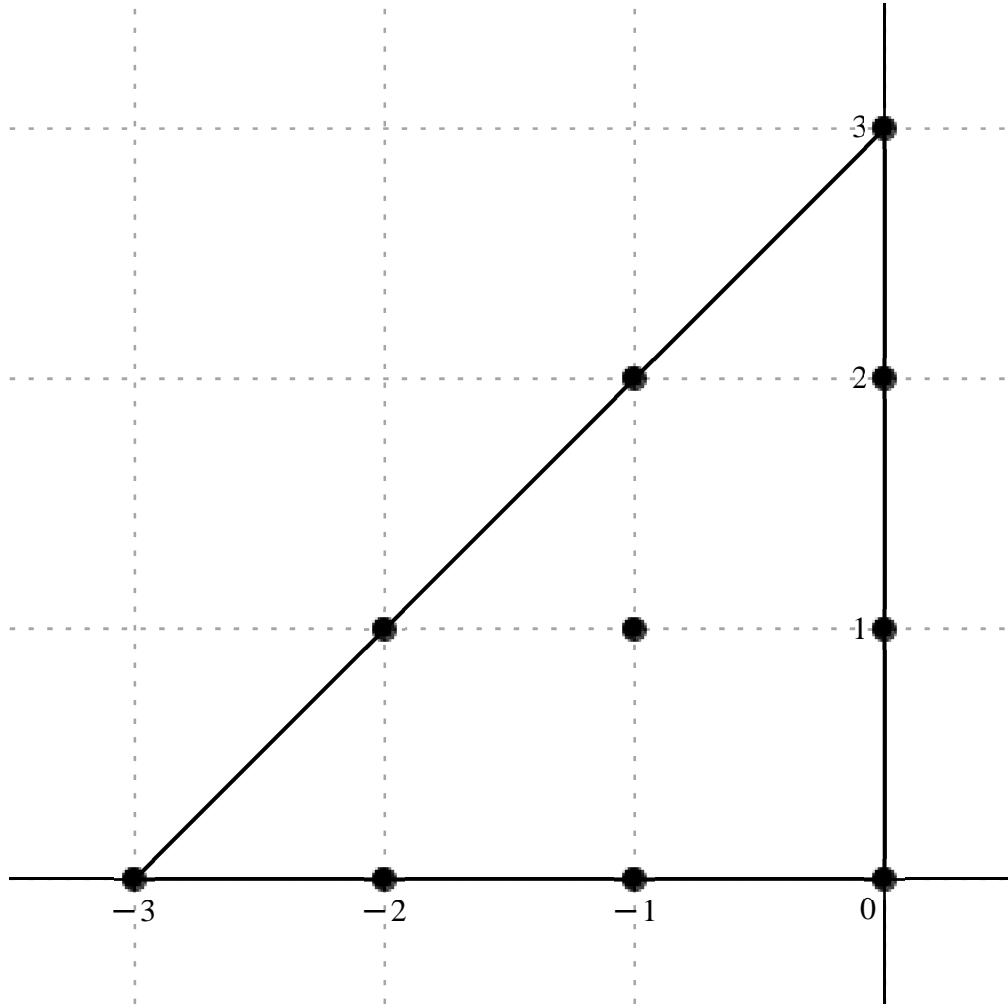
Error order.: 9, Error: 4.9853414210434310079 × 10−40, New Error: 4.9854953954045188811 × 10−49

Error order.: 9, Error: 4.9854953954045188811 × 10−49, New Error: 4.9855107900673765275 × 10−58

Error order.: 9, Error: 4.9855107900673765275 × 10−58, New Error: 4.9855123295059276760 × 10−67

$$x_o+h., \left[ \begin{array}{cccc} & & 3 \, \mathrm{I} & \\ & -1+2 \, \mathrm{I} & 2 \, \mathrm{I} & \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c=, \left[ \begin{array}{cccc} & & & -\frac{5}{156}+\frac{\mathrm{I}}{156} \\ & & -\frac{9}{20}+\frac{27 \, \mathrm{I}}{20} & -\frac{9}{52}+\frac{45 \, \mathrm{I}}{52} \\ & \frac{27}{20}-\frac{9 \, \mathrm{I}}{20} & -9-9 \, \mathrm{I} & \frac{9 \, \mathrm{I}}{2} \\ \frac{1}{156}-\frac{5 \, \mathrm{I}}{156} & \frac{45}{52}-\frac{9 \, \mathrm{I}}{52} & \frac{9}{2} & \frac{44}{15}+\frac{44 \, \mathrm{I}}{15} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{(-25+5\,\mathrm{I})\,u_{ol+3\,\mathrm{I}}+(-351+1053\,\mathrm{I})\,u_{ol-1+2\,\mathrm{I}}+(-135+675\,\mathrm{I})\,u_{ol+2\,\mathrm{I}}+(1053-351\,\mathrm{I})\,u_{ol-2+1}- (7020+7020\,\mathrm{I})\,u_{ol-1+1}+3510\,\mathrm{I}\,u_{ol+1}+(5-25\,\mathrm{I})\,u_{ol-3}+(675-135\,\mathrm{I})\,u_{ol-2}+3510\,u_{ol-1}+(2288+2288\,\mathrm{I})\,u_{ol}}{780\,\Delta x_{ol}},\,O(\,\Delta x_{ol}^{\,9}\,)$$

Formula:, 371, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 2

Error order:, 8, Error:, 4.3491338498200640053 × 10<sup>−19</sup>, New Error:, 4.3958602723968828572 × 10<sup>−27</sup>

Error order:, 8, Error:, 4.3958602723968828572 × 10<sup>−27</sup>, New Error:, 4.4005405399470514907 × 10<sup>−35</sup>

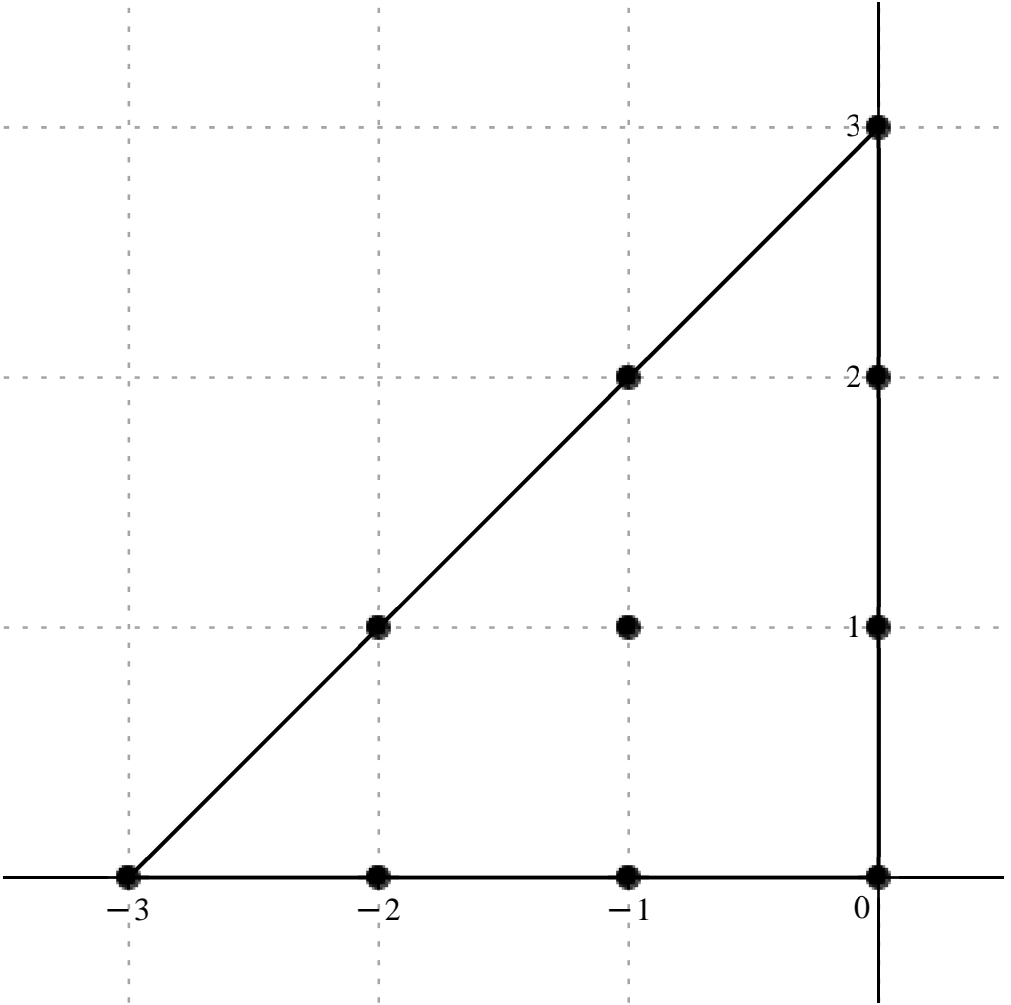
Error order:, 8, Error:, 4.4005405399470514907 × 10<sup>−35</sup>, New Error:, 4.4010086421135042920 × 10<sup>−43</sup>

Error order:, 8, Error:, 4.4010086421135042920 × 10<sup>−43</sup>, New Error:, 4.4010554530834181444 × 10<sup>−51</sup>

Error order:, 8, Error:, 4.4010554530834181444 × 10<sup>−51</sup>, New Error:, 4.4010601341879413691 × 10<sup>−59</sup>

$$x_o+h.\,,\left[\begin{array}{cccc} & & 3\,\mathrm{I} & \\ & -1+2\,\mathrm{I} & 2\,\mathrm{I} & \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & \\ -3 & -2 & -1 & 0 \end{array}\right]$$

$$c =, \begin{bmatrix} & & & -\frac{259}{1170} - \frac{151 \text{ I}}{1170} \\ & & -\frac{93}{10} + \frac{51 \text{ I}}{10} & -\frac{1359}{260} + \frac{1101 \text{ I}}{260} \\ & \frac{93}{10} + \frac{51 \text{ I}}{10} & -\frac{438 \text{ I}}{5} & -\frac{87}{5} + \frac{132 \text{ I}}{5} \\ \frac{259}{1170} - \frac{151 \text{ I}}{1170} & \frac{1359}{260} + \frac{1101 \text{ I}}{260} & \frac{87}{5} + \frac{132 \text{ I}}{5} & \frac{295 \text{ I}}{18} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{-(518 + 302 \text{ I}) \, u_{ol + 3 \text{ I}} + (-21762 + 11934 \text{ I}) \, u_{ol - 1 + 2 \text{ I}} + (-12231 + 9909 \text{ I}) \, u_{ol + 2 \text{ I}} + (21762 + 11934 \text{ I}) \, u_{ol - 2 + \text{ I}} - 204984 \text{ I} \, u_{ol - 1 + \text{ I}} + (-40716 + 61776 \text{ I}) \, u_{ol + \text{ I}} + (518 - 302 \text{ I}) \, u_{ol - 3} + (12231 + 9909 \text{ I}) \, u_{ol - 2} + (40716 + 61776 \text{ I}) \, u_{ol - 1} + 38350 \text{ I} \, u_{ol}}{2340 \, \Delta x_{ol}^2}, \, O( \, \Delta x_{ol}^8 \, )$$

Formula.: 372, Var.: 1

Variavel .:, x\_{ol}, Derivada de Ordem .:, 3

Error order.: 7, Error:., 2.0189749906992557994 × 10−16, New Error:., 2.0251223161710587101 × 10−23

Error order.: 7, Error:., 2.0251223161710587101 × 10−23, New Error:., 2.0257266199643746811 × 10−30

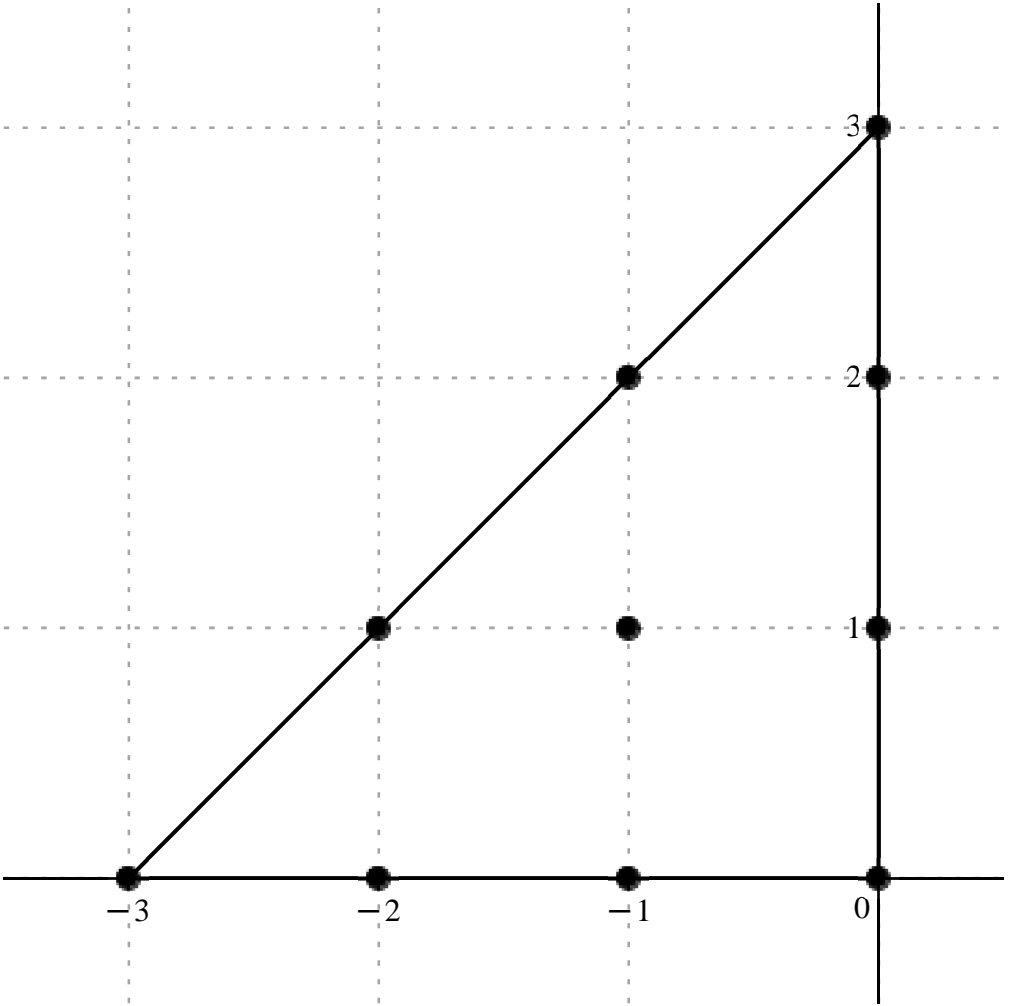
Error order.: 7, Error:., 2.0257266199643746811 × 10−30, New Error:., 2.0257869452859263040 × 10−37

Error order.: 7, Error:., 2.0257869452859263040 × 10−37, New Error:., 2.0257929767667315818 × 10−44

Error order.: 7, Error:., 2.0257929767667315818 × 10−44, New Error:., 2.0257935799042978385 × 10−51

$$x_o \neq h., \left[ \begin{array}{cccc} & & 3 \text{ I} & \\ & -1 + 2 \text{ I} & 2 \text{ I} & \\ -2 + \text{I} & -1 + \text{I} & \text{I} & \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} & & & & -\frac{231}{520} - \frac{2113 \text{ I}}{1560} & \\ & & & -\frac{2187}{40} - \frac{561 \text{ I}}{40} & -\frac{9411}{260} - \frac{87 \text{ I}}{130} & \\ & \frac{561}{40} + \frac{2187 \text{ I}}{40} & \frac{3111}{10} - \frac{3111 \text{ I}}{10} & -\frac{2841}{20} + \frac{261 \text{ I}}{5} & & \\ \frac{2113}{1560} + \frac{231 \text{ I}}{520} & \frac{87}{130} + \frac{9411 \text{ I}}{260} & -\frac{261}{5} + \frac{2841 \text{ I}}{20} & -\frac{499}{12} + \frac{499 \text{ I}}{12} & & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{-(693 + 2113 \, \mathrm{I}) \, u_{ol + 3 \mathrm{I}} - (85293 + 21879 \, \mathrm{I}) \, u_{ol - 1 + 2 \mathrm{I}} - (56466 + 1044 \, \mathrm{I}) \, u_{ol + 2 \mathrm{I}} + (21879 + 85293 \, \mathrm{I}) \, u_{ol - 2 + \mathrm{I}} + (485316 - 485316 \, \mathrm{I}) \, u_{ol - 1 + \mathrm{I}} + (-221598 + 81432 \, \mathrm{I}) \, u_{ol + 1} + (2113 + 693 \, \mathrm{I}) \, u_{ol - 3} + (1044 + 56466 \, \mathrm{I}) \, u_{ol - 2} + (-81432 + 221598 \, \mathrm{I}) \, u_{ol - 1} + (-64870 + 64870 \, \mathrm{I}) \, u_{ol}}{1560 \, \Delta x_{ol}^3}, \, O( \, \Delta x_{ol}^7 \, )$$

Formula:, 373, Var:, 1

Variavel :, x\_oI, Derivada de Ordem :, 4

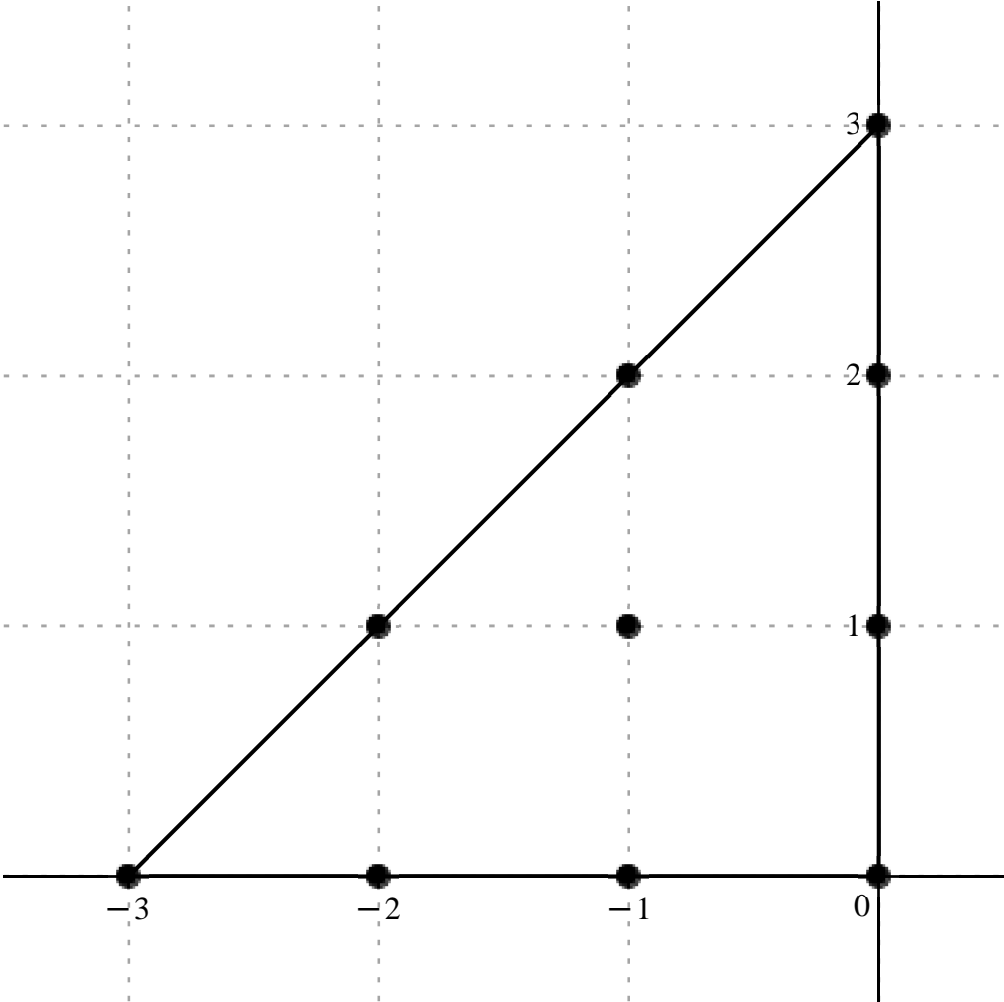
Error order:., 6, Error:., 1.0195930307905660708 × 10−13, New Error:., 1.0300738789013079626 × 10−19

Error order:., 6, Error:., 1.0300738789013079626 × 10−19, New Error:., 1.0311236091675864983 × 10−25

Error order:., 6, Error:., 1.0311236091675864983 × 10−25, New Error:., 1.0312285984736465133 × 10−31

Error order.: 6, Error.:  $1.0312285984736465133 \times 10^{-31}$ , New Error.:  $1.0312390975668708585 \times 10^{-37}$   
Error order.: 6, Error.:  $1.0312390975668708585 \times 10^{-37}$ , New Error.:  $1.0312401474778193004 \times 10^{-43}$

$$x_o + h., \begin{bmatrix} & & 3 \text{ I} \\ & -1 + 2 \text{ I} & 2 \text{ I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \end{bmatrix}$$
$$c =, \begin{bmatrix} & & & \frac{959}{390} - \frac{1132 \text{ I}}{195} \\ & & -\frac{642}{5} - \frac{2007 \text{ I}}{10} & -\frac{7572}{65} - \frac{6522 \text{ I}}{65} \\ & -\frac{642}{5} + \frac{2007 \text{ I}}{10} & \frac{8748}{5} & -\frac{5397}{10} - \frac{1803 \text{ I}}{10} \\ \frac{959}{390} + \frac{1132 \text{ I}}{195} & -\frac{7572}{65} + \frac{6522 \text{ I}}{65} & -\frac{5397}{10} + \frac{1803 \text{ I}}{10} & -\frac{556}{3} \end{bmatrix}$$

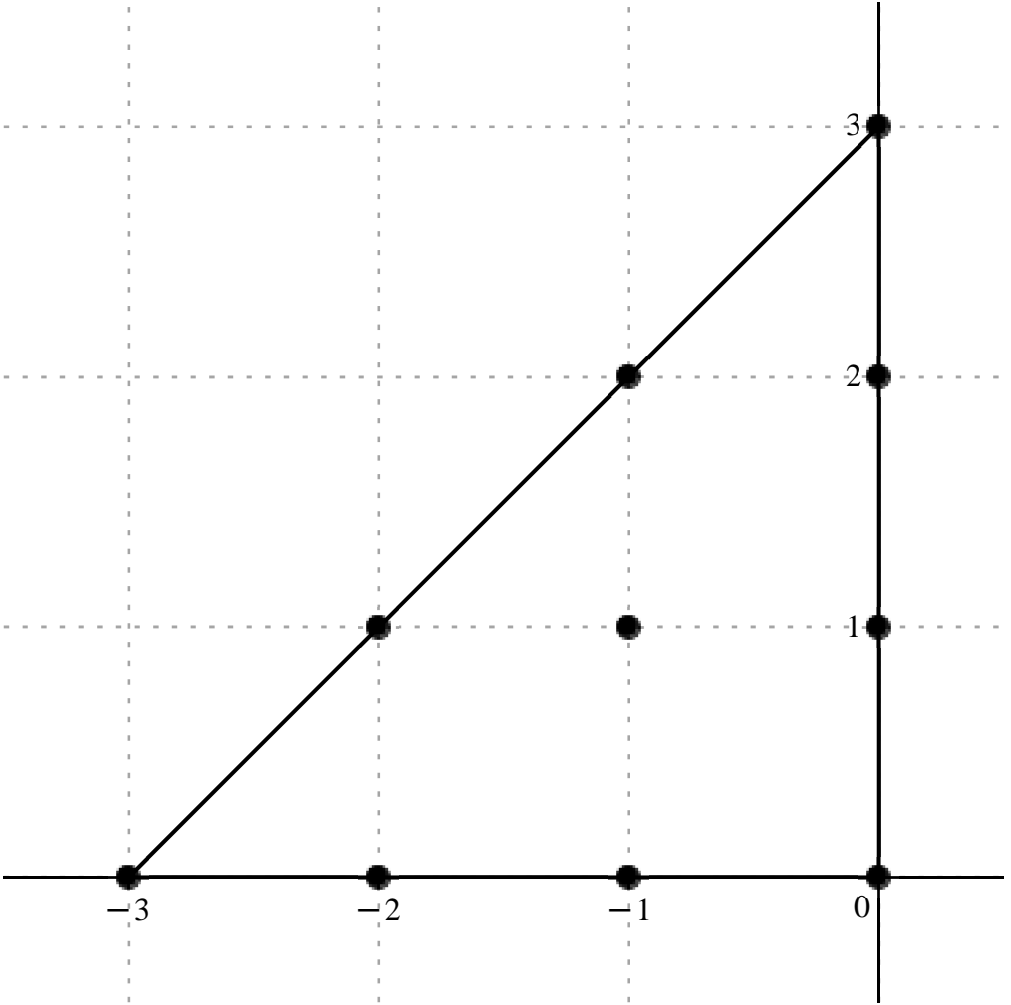


$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} u(x_{ol}) = \frac{(959 - 2264 \text{ I}) u_{ol+3\text{I}} - (50076 + 78273 \text{ I}) u_{ol-1+2\text{I}} - (45432 + 39132 \text{ I}) u_{ol+2\text{I}} + (-50076 + 78273 \text{ I}) u_{ol-2+1} + 682344 u_{ol-1+1} - (210483 + 70317 \text{ I}) u_{ol+1} + (959 + 2264 \text{ I}) u_{ol-3} + (-45432 + 39132 \text{ I}) u_{ol-2} + (-210483 + 70317 \text{ I}) u_{ol-1} - 72280 u_{ol}}{390 \Delta x_{ol}^4}, O(\Delta x_{ol}^6)$$

*Error order:*, 5,    *Error:*,  $3.1454408579562648859 \times 10^{-11}$ ,    *New Error:*,  $3.1544723984199522663 \times 10^{-16}$   
*Error order:*, 5,    *Error:*,  $3.1544723984199522663 \times 10^{-16}$ ,    *New Error:*,  $3.1553609364091732007 \times 10^{-21}$   
*Error order:*, 5,    *Error:*,  $3.1553609364091732007 \times 10^{-21}$ ,    *New Error:*,  $3.1554496430164070941 \times 10^{-26}$   
*Error order:*, 5,    *Error:*,  $3.1554496430164070941 \times 10^{-26}$ ,    *New Error:*,  $3.1554585122041801389 \times 10^{-31}$   
*Error order:*, 5,    *Error:*,  $3.1554585122041801389 \times 10^{-31}$ ,    *New Error:*,  $3.1554593991082269062 \times 10^{-36}$

$$x_o+h., \left[ \begin{array}{cccc} & & & 3 \, \mathrm{I} \\ & & -1+2 \, \mathrm{I} & 2 \, \mathrm{I} \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c=, \left[ \begin{array}{cccc} & & & \frac{781}{39}-\frac{261 \, \mathrm{I}}{26} \\ & & 144-\frac{1587 \, \mathrm{I}}{2} & -\frac{1176}{13}-\frac{6639 \, \mathrm{I}}{13} \\ & -\frac{1587}{2}+144 \, \mathrm{I} & 3966+3966 \, \mathrm{I} & -\frac{1803}{2}-\frac{2943 \, \mathrm{I}}{2} \\ -\frac{261}{26}+\frac{781 \, \mathrm{I}}{39} & -\frac{6639}{13}-\frac{1176 \, \mathrm{I}}{13} & -\frac{2943}{2}-\frac{1803 \, \mathrm{I}}{2} & -\frac{1057}{3}-\frac{1057 \, \mathrm{I}}{3} \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{(1562-783 \, \mathrm{I}) \, u_{ol+3 \, \mathrm{I}} + (11232-61893 \, \mathrm{I}) \, u_{ol-1+2 \, \mathrm{I}} - (7056+39834 \, \mathrm{I}) \, u_{ol+2 \, \mathrm{I}} + (-61893+11232 \, \mathrm{I}) \, u_{ol-2+ \, \mathrm{I}} + (309348+309348 \, \mathrm{I}) \, u_{ol-1+ \, \mathrm{I}} - (70317+114777 \, \mathrm{I}) \, u_{ol+1} + (-783+1562 \, \mathrm{I}) \, u_{ol-3} - (39834+7056 \, \mathrm{I}) \, u_{ol-2} - (114777+70317 \, \mathrm{I}) \, u_{ol-1} - (27482+27482 \, \mathrm{I}) \, u_{ol}}{78 \, \Delta x_{ol}^5}, \, O( \, \Delta x_{ol}^5 \, )$$

Formula:, 375, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 6

Error order:, 4, Error:,  $1.0718851173744886157 \times 10^{-8}$ , New Error:,  $1.0820479923398622232 \times 10^{-12}$

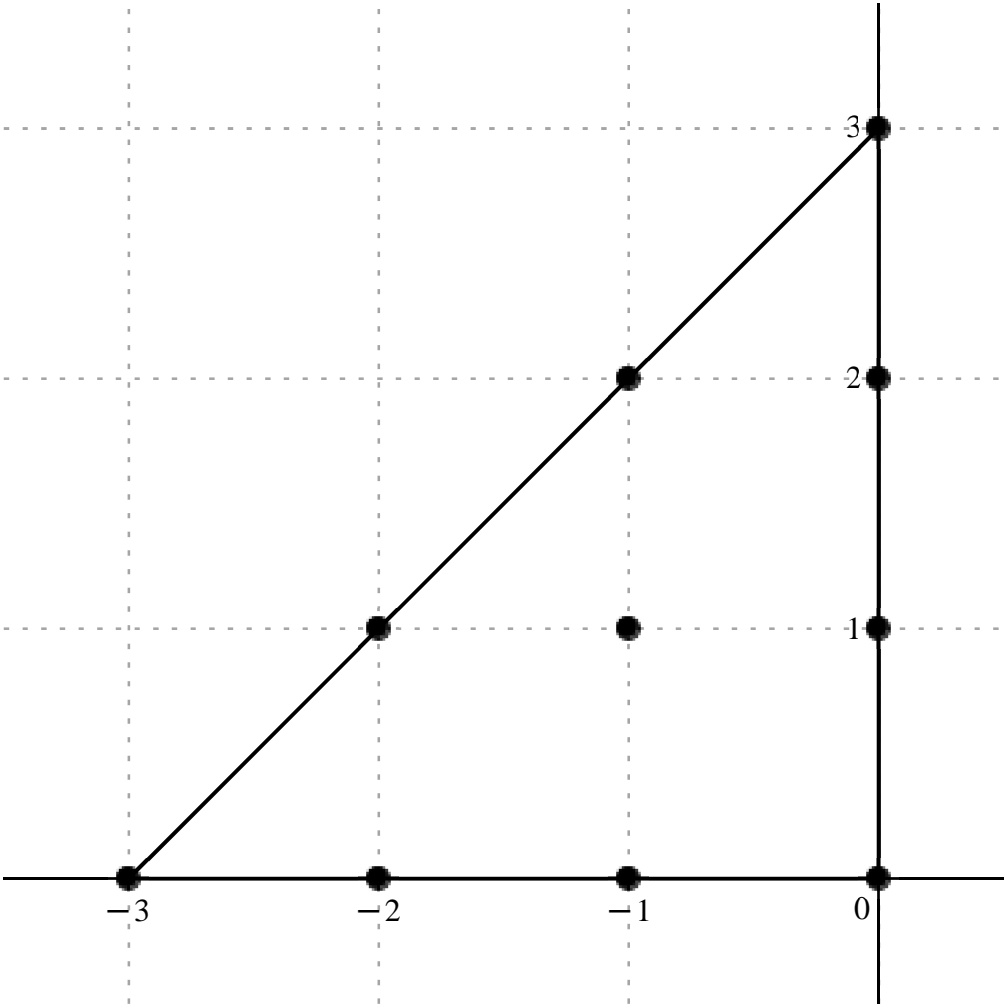
Error order:, 4, Error:,  $1.0820479923398622232 \times 10^{-12}$ , New Error:,  $1.0830657756197117176 \times 10^{-16}$

Error order:, 4, Error:,  $1.0830657756197117176 \times 10^{-16}$ , New Error:,  $1.0831675687551602184 \times 10^{-20}$

Error order:, 4, Error:,  $1.0831675687551602184 \times 10^{-20}$ , New Error:,  $1.0831777482166286429 \times 10^{-24}$

Error order:, 4, Error:,  $1.0831777482166286429 \times 10^{-24}$ , New Error:,  $1.0831787661642545699 \times 10^{-28}$

$$x_o+h., \begin{bmatrix} & & & 3\text{ I} \\ & & -1+2\text{ I} & 2\text{ I} \\ & -2+\text{ I} & -1+\text{ I} & \text{ I} \\ -3 & -2 & -1 & 0 \end{bmatrix}$$
$$c=, \begin{bmatrix} & & & \frac{796}{13}+\frac{184\text{ I}}{13} \\ & & 1728-1296\text{ I} & \frac{8622}{13}-\frac{15498\text{ I}}{13} \\ & -1728-1296\text{ I} & 14256\text{ I} & 684-4104\text{ I} \\ -\frac{796}{13}+\frac{184\text{ I}}{13} & -\frac{8622}{13}-\frac{15498\text{ I}}{13} & -684-4104\text{ I} & -1100\text{ I} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6}u(x_{ol})=\frac{2\left((398+92\text{ I})u_{ol+3\text{ I}}+(11232-8424\text{ I})u_{ol-1+2\text{ I}}+(4311-7749\text{ I})u_{ol+2\text{ I}}-(11232+8424\text{ I})u_{ol-2+1\text{ I}}+92664\text{ I}u_{ol-1+1\text{ I}}+(4446-26676\text{ I})u_{ol+1\text{ I}}+(-398+92\text{ I})u_{ol-3\text{ I}}-(4311+7749\text{ I})u_{ol-2\text{ I}}-(4446+26676\text{ I})u_{ol-1\text{ I}}-7150\text{ I}u_{ol}\right)}{13\Delta_{ol}^6},\text{ }O(\Delta_{ol}^4)$$



Formula:, 376, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 7

Error order:, 3, Error:; 2.1608302806367410682 × 10<sup>−6</sup>, New Error:; 2.1663262154069824559 × 10<sup>−9</sup>

Error order:, 3, Error:; 2.1663262154069824559 × 10<sup>−9</sup>, New Error:; 2.1668676458574397531 × 10<sup>−12</sup>

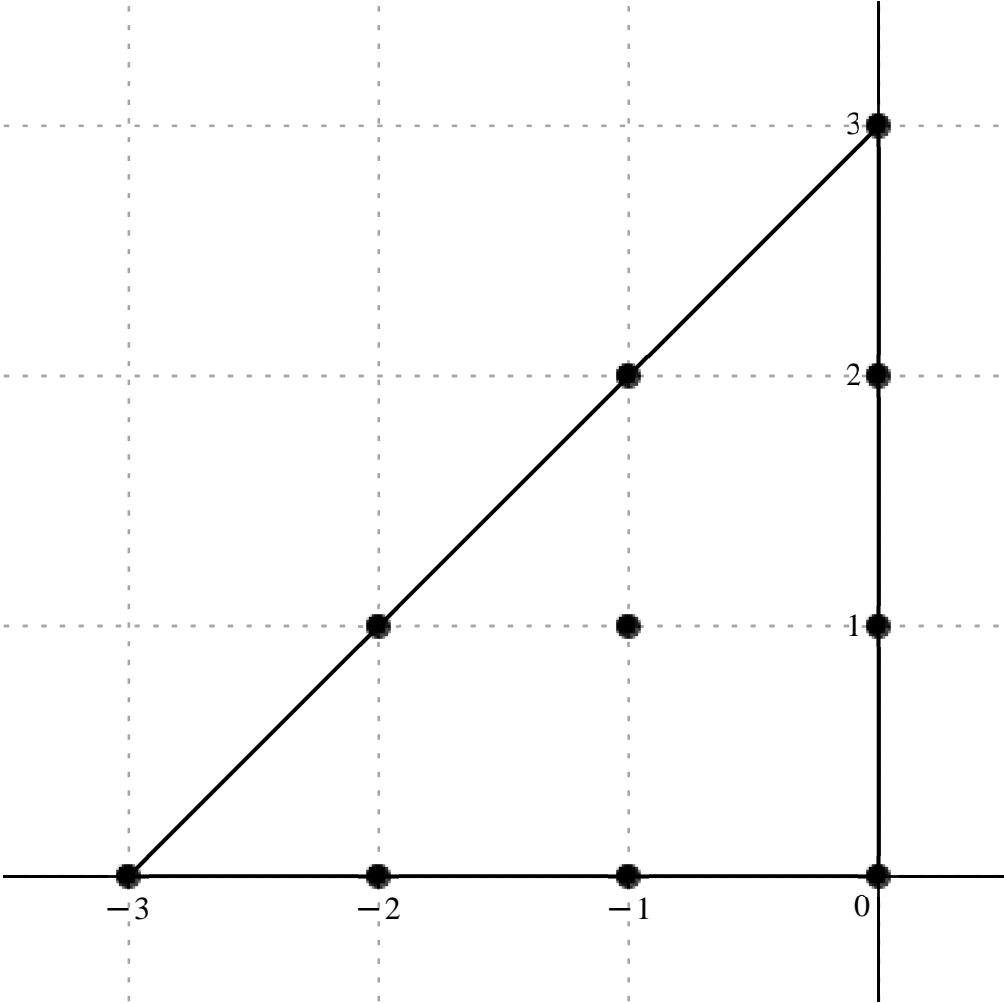
Error order:, 3, Error:; 2.1668676458574397531 × 10<sup>−12</sup>, New Error:; 2.1669217067386831232 × 10<sup>−15</sup>

Error order:, 3, Error:; 2.1669217067386831232 × 10<sup>−15</sup>, New Error:; 2.1669271120046347805 × 10<sup>−18</sup>

Error order:, 3, Error:; 2.1669271120046347805 × 10<sup>−18</sup>, New Error:; 2.1669276525230076847 × 10<sup>−21</sup>

$$x_o+h., \left[ \begin{array}{cccc} & & & 3\text{ I} \\ & & -1+2\text{ I} & 2\text{ I} \\ & -2+\text{I} & -1+\text{I} & \text{I} \\ -3 & -2 & -1 & 0 \end{array} \right]$$

$$c=, \left[ \begin{array}{cccc} & & & \frac{1071}{13}+\frac{1351\text{ I}}{13} \\ & & 4347+441\text{ I} & \frac{32382}{13}-\frac{12852\text{ I}}{13} \\ & -441-4347\text{ I} & -19404+19404\text{ I} & 5922-4788\text{ I} \\ -\frac{1351}{13}-\frac{1071\text{ I}}{13} & \frac{12852}{13}-\frac{32382\text{ I}}{13} & 4788-5922\text{ I} & 1330-1330\text{ I} \end{array} \right]$$



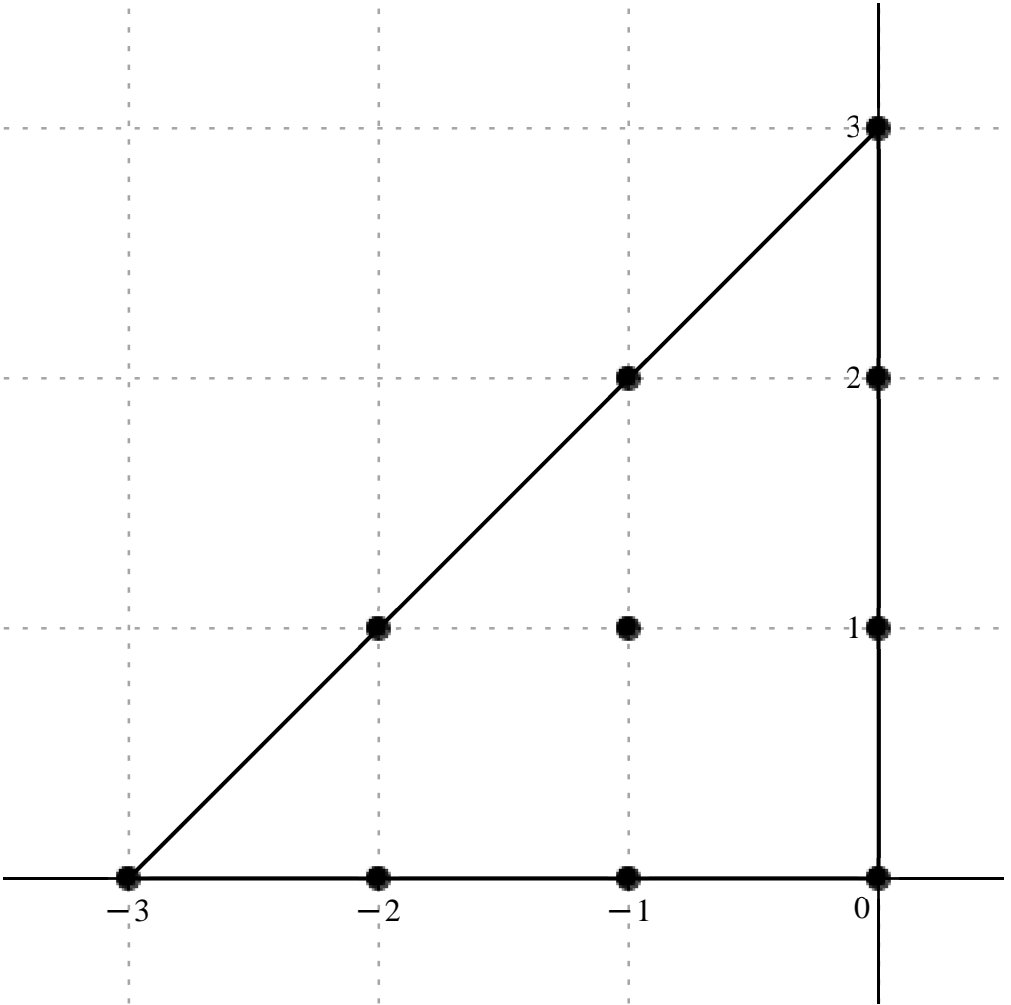
$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u(x_{ol})=\frac{7\left(\left(153+193\text{ I}\right)u_{ol+3\text{ I}}+\left(8073+819\text{ I}\right)u_{ol-1+2\text{ I}}+\left(4626-1836\text{ I}\right)u_{ol+2\text{ I}}-\left(819+8073\text{ I}\right)u_{ol-2+\text{ I}}+\left(-36036+36036\text{ I}\right)u_{ol-1+\text{ I}}+\left(10998-8892\text{ I}\right)u_{ol+\text{ I}}-\left(193+153\text{ I}\right)u_{ol-3}+\left(1836-4626\text{ I}\right)u_{ol-2}+\left(8892-10998\text{ I}\right)u_{ol-1}+\left(2470-2470\text{ I}\right)u_{ol}\right)}{13\text{ }A_{ol}^7},O(\text{ }A_{ol}^3)$$

Formula:, 377, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 2, Error:,  $0.00044671479697478041043$ , New Error:,  $4.5017393140023377258 \times 10^{-6}$   
Error order:, 2, Error:,  $4.5017393140023377258 \times 10^{-6}$ , New Error:,  $4.5052029131489225918 \times 10^{-8}$   
Error order:, 2, Error:,  $4.5052029131489225918 \times 10^{-8}$ , New Error:,  $4.5055493173058322173 \times 10^{-10}$   
Error order:, 2, Error:,  $4.5055493173058322173 \times 10^{-10}$ , New Error:,  $4.5055839581635390592 \times 10^{-12}$   
Error order:, 2, Error:,  $4.5055839581635390592 \times 10^{-12}$ , New Error:,  $4.5055874222537294953 \times 10^{-14}$

$$x_o+h., \left[ \begin{array}{cccc} & & & 3 \text{ I} \\ & & -1+2 \text{ I} & 2 \text{ I} \\ & -2+\text{I} & -1+\text{I} & \text{I} \\ -3 & -2 & -1 & 0 \end{array} \right]$$
$$c=,\left[ \begin{array}{cccc} & & & \frac{56}{13}+\frac{2464 \text{ I}}{13} \\ & & 4032+4536 \text{ I} & \frac{44352}{13}+\frac{14112 \text{ I}}{13} \\ & 4032-4536 \text{ I} & -36288 & 9576+504 \text{ I} \\ \frac{56}{13}-\frac{2464 \text{ I}}{13} & \frac{44352}{13}-\frac{14112 \text{ I}}{13} & 9576-504 \text{ I} & 2240 \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8}u(x_{ol})=\frac{56\left((1+44\text{ I})u_{ol+31}+(936+1053\text{ I})u_{ol-1+21}+(792+252\text{ I})u_{ol+21}+(936-1053\text{ I})u_{ol-2+1}-8424u_{ol-1+1}+(2223+117\text{ I})u_{ol+1}+(1-44\text{ I})u_{ol-3}+(792-252\text{ I})u_{ol-2}+(2223-117\text{ I})u_{ol-1}+520u_{ol}\right)}{13\Delta x_{ol}^8},O(\Delta x_{ol}^2)$$

Formula:, 378, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 9

Error order:, 1, Error:, 0.046802196959595102855, New Error:, 0.0046879236065129765441

Error order:, 1, Error:, 0.0046879236065129765441, New Error:, 0.00046886847394466458759

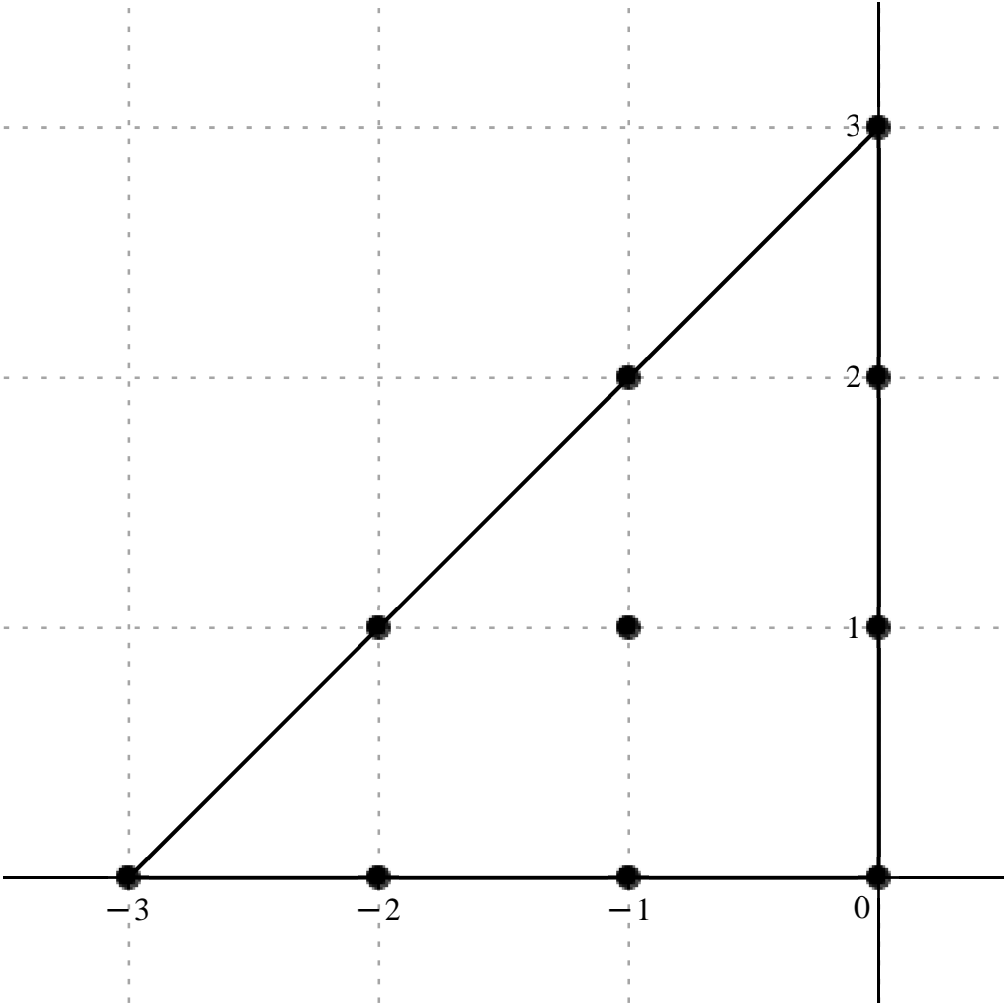
Error order:, 1, Error:, 0.00046886847394466458759, New Error:, 0.000046887607596404265784

Error order:, 1, Error:, 0.000046887607596404265784, New Error:,  $4.6887683607282894824 \times 10^{-6}$

Error order:, 1, Error:,  $4.6887683607282894824 \times 10^{-6}$ , New Error:,  $4.6887691208277601017 \times 10^{-7}$

$$x_o + h., \begin{bmatrix} & & 3 \text{ I} \\ & -1 + 2 \text{ I} & 2 \text{ I} \\ -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c =, \begin{bmatrix} & & & -\frac{1008}{13} + \frac{1512 \text{ I}}{13} \\ & & 4536 \text{ I} & \frac{18144}{13} + \frac{27216 \text{ I}}{13} \\ & 4536 & -18144 - 18144 \text{ I} & 4536 + 4536 \text{ I} \\ \frac{1512}{13} - \frac{1008 \text{ I}}{13} & \frac{27216}{13} + \frac{18144 \text{ I}}{13} & 4536 + 4536 \text{ I} & 1008 + 1008 \text{ I} \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{504 \left( (-2+3 \, \mathrm{I}) \, u_{ol+31} + 117 \, \mathrm{I} u_{ol-1+21} + (36+54 \, \mathrm{I}) \, u_{ol+21} + 117 \, u_{ol-2+1} - (468+468 \, \mathrm{I}) \, u_{ol-1+1} + (117+117 \, \mathrm{I}) \, u_{ol+1} + (3-2 \, \mathrm{I}) \, u_{ol-3} + (54+36 \, \mathrm{I}) \, u_{ol-2} + (117+117 \, \mathrm{I}) \, u_{ol-1} + (26+26 \, \mathrm{I}) \, u_{ol} \right)}{13 \, \Delta x_{ol}^9}, \, O(\, \Delta x_{ol} \, )$$

Formula.: 379, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 1

Error order.: 9, Error.: 5.0023036908914984672 × 10<sup>−22</sup>, New Error.: 4.9872198692664168652 × 10<sup>−31</sup>

Error order.: 9, Error.: 4.9872198692664168652 × 10<sup>−31</sup>, New Error.: 4.9856835178097020698 × 10<sup>−40</sup>

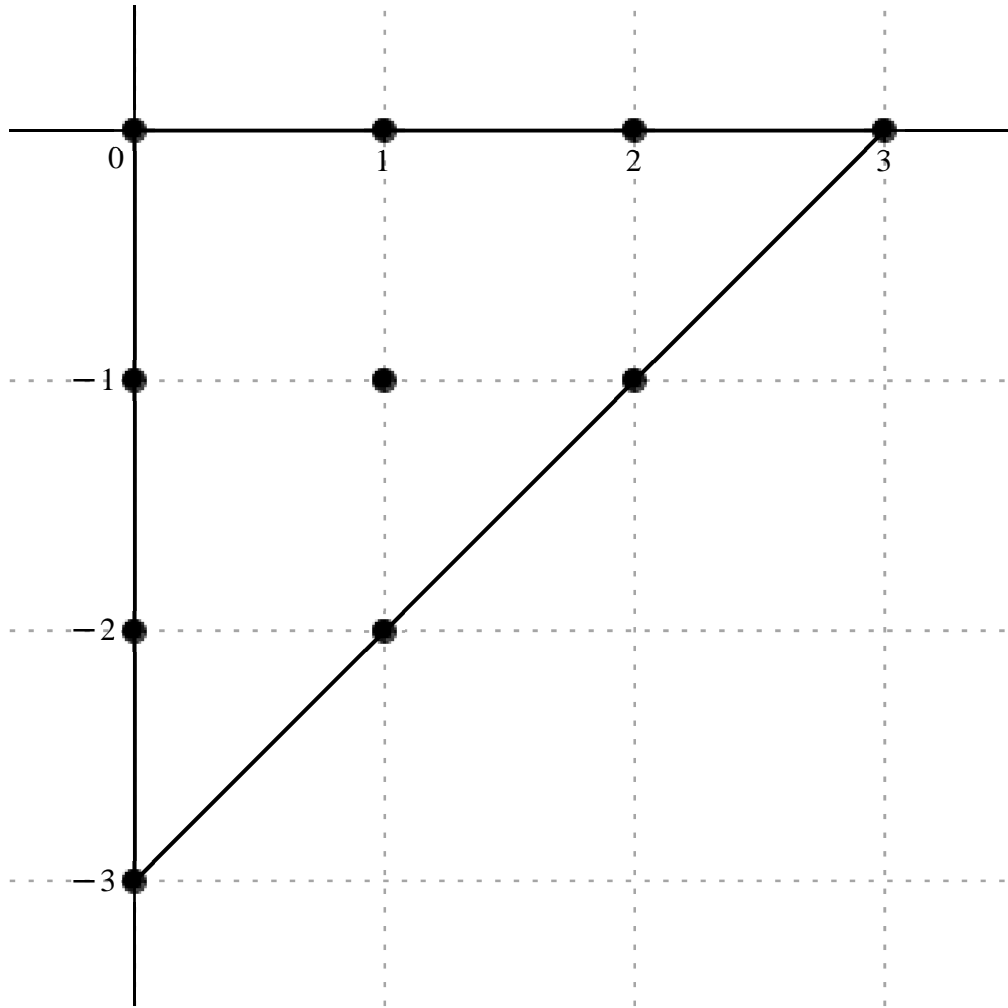
Error order.: 9, Error.: 4.9856835178097020698 × 10<sup>−40</sup>, New Error.: 4.9855296050816141725 × 10<sup>−49</sup>

Error order.: 9, Error.: 4.9855296050816141725 × 10<sup>−49</sup>, New Error.: 4.9855142110350865248 × 10<sup>−58</sup>

Error order.: 9, Error.: 4.9855142110350865248 × 10<sup>−58</sup>, New Error.: 4.9855126716026986762 × 10<sup>−67</sup>

$$x_o+h., \left[ \begin{array}{cccc} 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & \\ -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c=, \left[ \begin{array}{cccc} -\frac{44}{15}-\frac{44 \, \mathrm{I}}{15} & -\frac{9}{2} & -\frac{45}{52}+\frac{9 \, \mathrm{I}}{52} & -\frac{1}{156}+\frac{5 \, \mathrm{I}}{156} \\ -\frac{9 \, \mathrm{I}}{2} & 9+9 \, \mathrm{I} & -\frac{27}{20}+\frac{9 \, \mathrm{I}}{20} & \\ \frac{9}{52}-\frac{45 \, \mathrm{I}}{52} & \frac{9}{20}-\frac{27 \, \mathrm{I}}{20} & & \\ \frac{5}{156}-\frac{\mathrm{I}}{156} & & & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{-(2288+2288\,\mathrm{I})\,u_{ol}-3510\,u_{ol+1}+( -675+135\,\mathrm{I})\,u_{ol+2}+( -5+25\,\mathrm{I})\,u_{ol+3}-3510\,\mathrm{I}u_{ol-1}+(7020+7020\,\mathrm{I})\,u_{ol+1-1}+( -1053+351\,\mathrm{I})\,u_{ol+2-1}+(135-675\,\mathrm{I})\,u_{ol-2\mathrm{I}}+(351-1053\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}+(25-5\,\mathrm{I})\,u_{ol-3\mathrm{I}}}{780\,\Delta x_{ol}}\,,\,O(\,\Delta x_{ol}^{\,9}\,)$$

Formula: 380, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 2

Error order: 8, Error: 4.4531565118744385339 × 10<sup>−19</sup>, New Error: 4.4062627268511427735 × 10<sup>−27</sup>

Error order: 8, Error: 4.4062627268511427735 × 10<sup>−27</sup>, New Error: 4.4015807855807247377 × 10<sup>−35</sup>

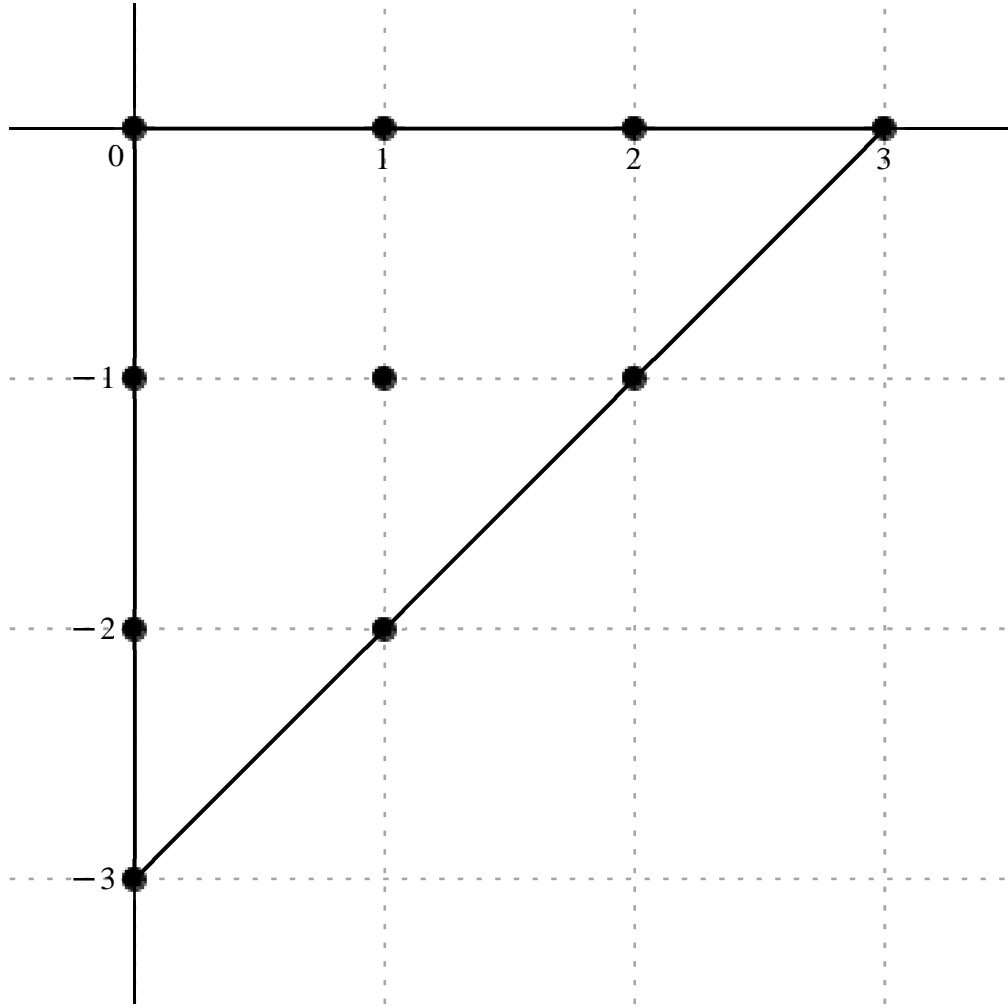
Error order: 8, Error: 4.4015807855807247377 × 10<sup>−35</sup>, New Error: 4.4011126666770598639 × 10<sup>−43</sup>

Error order: 8, Error: 4.4011126666770598639 × 10<sup>−43</sup>, New Error: 4.4010658555397738898 × 10<sup>−51</sup>

Error order: 8, Error: 4.4010658555397738898 × 10<sup>−51</sup>, New Error: 4.4010611744335769439 × 10<sup>−59</sup>

$$x_o+h\,.,\left[\begin{array}{cccc}0&1&2&3\\-1&1-1&2-1\\-2\,\mathrm{I}&1-2\,\mathrm{I}\\-3\,\mathrm{I}\end{array}\right]$$

$$c=,\left[\begin{array}{cccc}\frac{295\,\mathrm{I}}{18}&\frac{87}{5}+\frac{132\,\mathrm{I}}{5}&\frac{1359}{260}+\frac{1101\,\mathrm{I}}{260}&\frac{259}{1170}-\frac{151\,\mathrm{I}}{1170}\\-\frac{87}{5}+\frac{132\,\mathrm{I}}{5}&-\frac{438\,\mathrm{I}}{5}&\frac{93}{10}+\frac{51\,\mathrm{I}}{10}\\-\frac{1359}{260}+\frac{1101\,\mathrm{I}}{260}&-\frac{93}{10}+\frac{51\,\mathrm{I}}{10}\\-\frac{259}{1170}-\frac{151\,\mathrm{I}}{1170}\end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{38350 \operatorname{I} u_{ol} + (40716 + 61776 \operatorname{I}) u_{ol+1} + (12231 + 9909 \operatorname{I}) u_{ol+2} + (518 - 302 \operatorname{I}) u_{ol+3} + (-40716 + 61776 \operatorname{I}) u_{ol-1} - 204984 \operatorname{I} u_{ol+1-1} + (21762 + 11934 \operatorname{I}) u_{ol+2-1} + (-12231 + 9909 \operatorname{I}) u_{ol-21} + (-21762 + 11934 \operatorname{I}) u_{ol+1-21} - (518 + 302 \operatorname{I}) u_{ol-31}}{2340 \Delta x_{ol}^2}, O(\Delta x_{ol}^8)$$

Formula:, 381, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 7, Error:,  $2.0323762864940423424 \times 10^{-16}$ , New Error:,  $2.0264626175424457925 \times 10^{-23}$

Error order:, 7, Error:,  $2.0264626175424457925 \times 10^{-23}$ , New Error:,  $2.0258606502733051115 \times 10^{-30}$

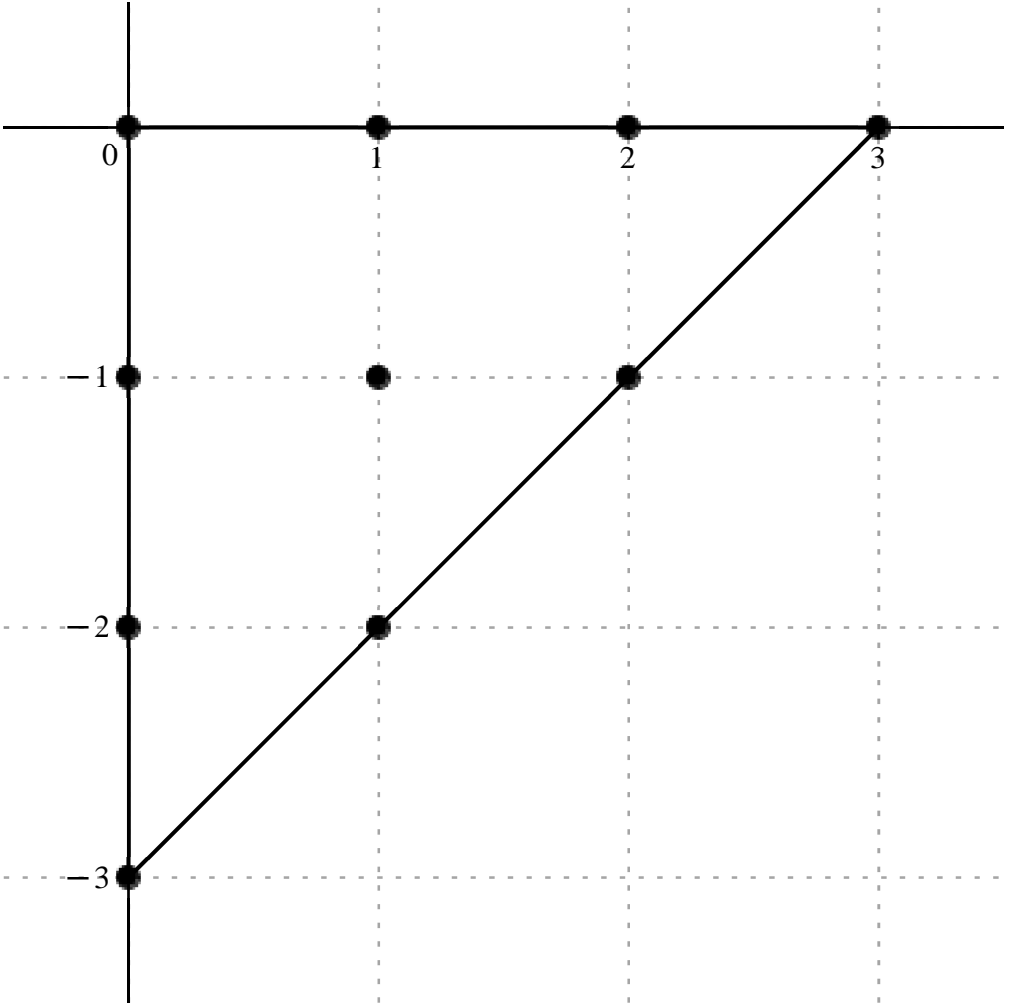
Error order:, 7, Error:,  $2.0258606502733051115 \times 10^{-30}$ , New Error:,  $2.0258003483169911388 \times 10^{-37}$

Error order:, 7, Error:,  $2.0258003483169911388 \times 10^{-37}$ , New Error:,  $2.0257943170698382371 \times 10^{-44}$

Error order:, 7, Error:,  $2.0257943170698382371 \times 10^{-44}$ , New Error:,  $2.0257937139346085042 \times 10^{-51}$

$$x_o + h, \begin{bmatrix} 0 & 1 & 2 & 3 \\ -1 & 1-1 & 2-1 \\ -21 & 1-21 \\ -31 \end{bmatrix}$$

$$c =, \left[ \begin{array}{cccc} \frac{499}{12} - \frac{499 \text{ I}}{12} & \frac{261}{5} - \frac{2841 \text{ I}}{20} & -\frac{87}{130} - \frac{9411 \text{ I}}{260} & -\frac{2113}{1560} - \frac{231 \text{ I}}{520} \\ \frac{2841}{20} - \frac{261 \text{ I}}{5} & -\frac{3111}{10} + \frac{3111 \text{ I}}{10} & -\frac{561}{40} - \frac{2187 \text{ I}}{40} & \\ \frac{9411}{260} + \frac{87 \text{ I}}{130} & \frac{2187}{40} + \frac{561 \text{ I}}{40} & & \\ \frac{231}{520} + \frac{2113 \text{ I}}{1560} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{(64870 - 64870 \text{ I}) \, u_{ol} + (81432 - 221598 \text{ I}) \, u_{ol+1} - (1044 + 56466 \text{ I}) \, u_{ol+2} - (2113 + 693 \text{ I}) \, u_{ol+3} + (221598 - 81432 \text{ I}) \, u_{ol-1} + (-485316 + 485316 \text{ I}) \, u_{ol+1-1} - (21879 + 85293 \text{ I}) \, u_{ol+2-1} + (56466 + 1044 \text{ I}) \, u_{ol-21} + (85293 + 21879 \text{ I}) \, u_{ol+1-21} + (693 + 2113 \text{ I}) \, u_{ol-31}}{1560 \, \Delta x_{ol}^3}, \, O( \, \Delta x_{ol}^7 \, )$$

Formula.: 382, Var.: 1

Variavel .:, x<sub>ol</sub> , Derivada de Ordem .:, 4

Error order.: 6, Error.: 1.0429239935900327685 × 10<sup>−13</sup>, New Error.: 1.0324070143481466531 × 10<sup>−19</sup>

Error order.: 6, Error.: 1.0324070143481466531 × 10<sup>−19</sup>, New Error.: 1.0313569227514369650 × 10<sup>−25</sup>

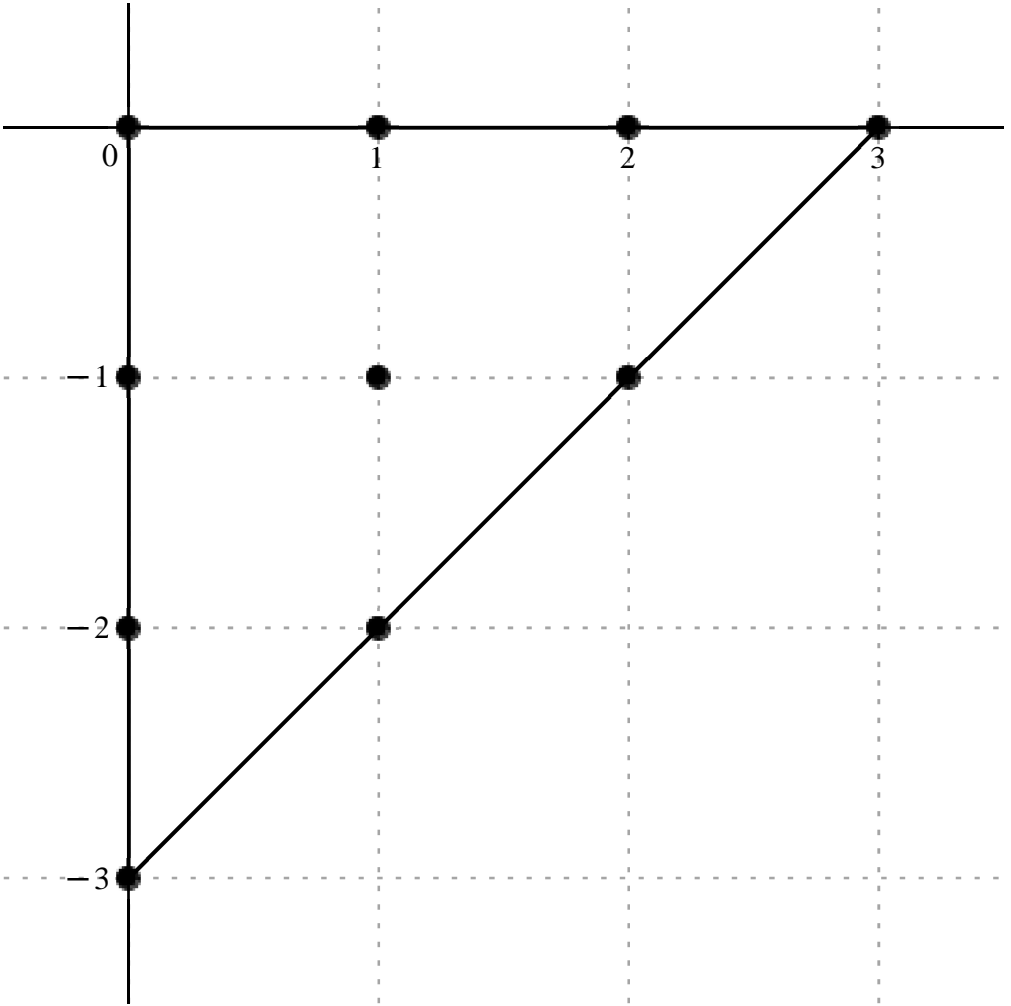
Error order.: 6, Error.: 1.0313569227514369650 × 10<sup>−25</sup>, New Error.: 1.0312519298320707266 × 10<sup>−31</sup>

Error order.: 6, Error.: 1.0312519298320707266 × 10<sup>−31</sup>, New Error.: 1.0312414307027133190 × 10<sup>−37</sup>

Error order.: 6, Error.: 1.0312414307027133190 × 10<sup>−37</sup>, New Error.: 1.0312403807914035465 × 10<sup>−43</sup>

$$x_o + h. , \begin{bmatrix} 0 & 1 & 2 & 3 \\ -1 & 1-1 & 2-1 \\ -2\text{ I} & 1-2\text{ I} \\ -3\text{ I} \end{bmatrix}$$

$$c = , \begin{bmatrix} -\frac{556}{3} & -\frac{5397}{10} + \frac{1803\text{ I}}{10} & -\frac{7572}{65} + \frac{6522\text{ I}}{65} & \frac{959}{390} + \frac{1132\text{ I}}{195} \\ -\frac{5397}{10} - \frac{1803\text{ I}}{10} & \frac{8748}{5} & -\frac{642}{5} + \frac{2007\text{ I}}{10} \\ -\frac{7572}{65} - \frac{6522\text{ I}}{65} & -\frac{642}{5} - \frac{2007\text{ I}}{10} \\ \frac{959}{390} - \frac{1132\text{ I}}{195} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u\big(x_{ol}\big) = \frac{-72280 \, u_{ol} + \left(-210483 + 70317 \, \mathrm{I}\right) u_{ol+1} + \left(-45432 + 39132 \, \mathrm{I}\right) u_{ol+2} + \left(959 + 2264 \, \mathrm{I}\right) u_{ol+3} - \left(210483 + 70317 \, \mathrm{I}\right) u_{ol-1} + 682344 \, u_{ol+1-1} + \left(-50076 + 78273 \, \mathrm{I}\right) u_{ol+2-1} - \left(45432 + 39132 \, \mathrm{I}\right) u_{ol-21} - \left(50076 + 78273 \, \mathrm{I}\right) u_{ol+1-21} + \left(959 - 2264 \, \mathrm{I}\right) u_{ol-31}}{390 \, \Delta x_{ol}^4}, \, O(\, \Delta x_{ol}^6 \, )$$

Formula.: 383, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 5

Error order.: 5, Error.: 3.1651474777099823828 × 10<sup>−11</sup>, New Error.: 3.1564432903417728405 × 10<sup>−16</sup>

Error order.: 5, Error.: 3.1564432903417728405 × 10<sup>−16</sup>, New Error.: 3.1555580258313014870 × 10<sup>−21</sup>

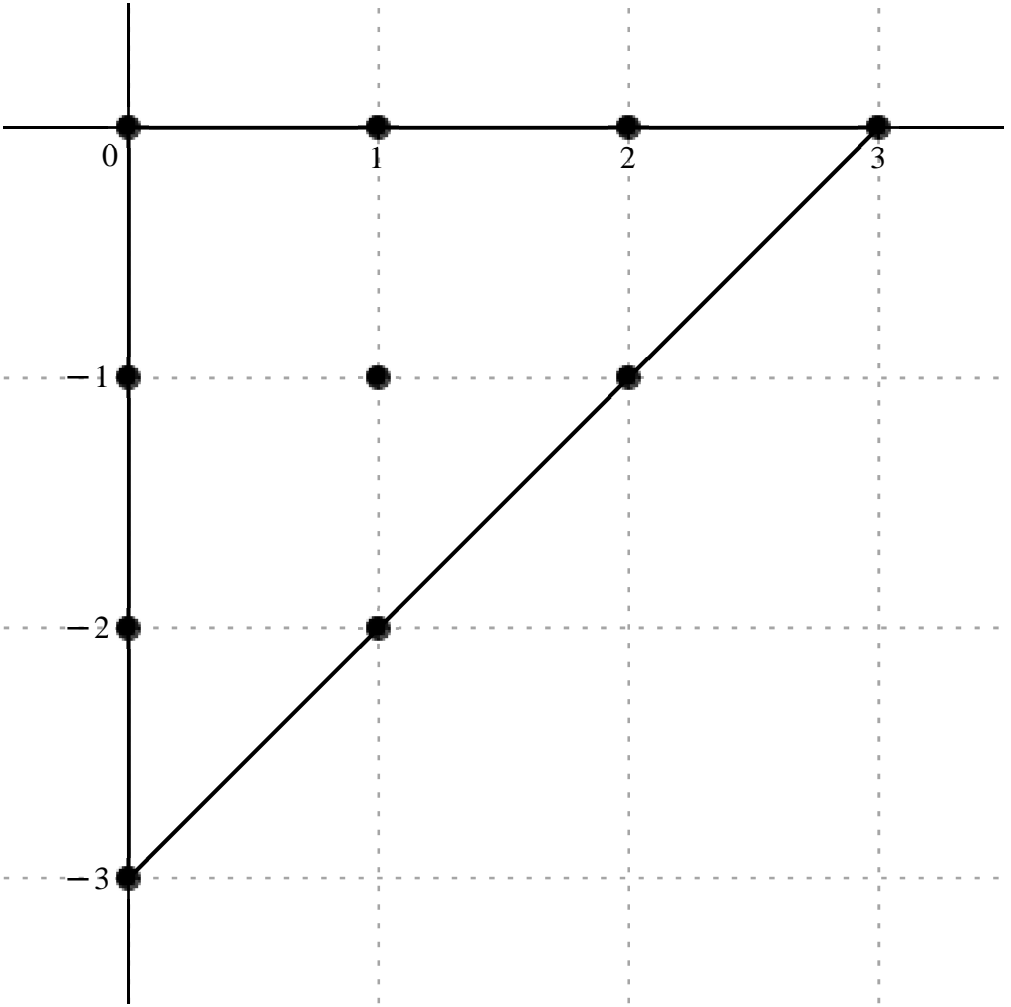
Error order.: 5, Error.: 3.1555580258313014870 × 10<sup>−21</sup>, New Error.: 3.1554693519588498689 × 10<sup>−26</sup>



Error order:, 5, Error:,  $3.1554693519588498689 \times 10^{-26}$ , New Error:,  $3.1554604830984246463 \times 10^{-31}$   
Error order:, 5, Error:,  $3.1554604830984246463 \times 10^{-31}$ , New Error:,  $3.1554595961976513572 \times 10^{-36}$

$$x_o+h., \begin{bmatrix} 0 & 1 & 2 & 3 \\ -I & 1-I & 2-I \\ -2I & 1-2I \\ -3I \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{1057}{3} + \frac{1057I}{3} & \frac{2943}{2} + \frac{1803I}{2} & \frac{6639}{13} + \frac{1176I}{13} & \frac{261}{26} - \frac{781I}{39} \\ \frac{1803}{2} + \frac{2943I}{2} & -3966 - 3966I & \frac{1587}{2} - 144I \\ \frac{1176}{13} + \frac{6639I}{13} & -144 + \frac{1587I}{2} \\ -\frac{781}{39} + \frac{261I}{26} \end{bmatrix}$$

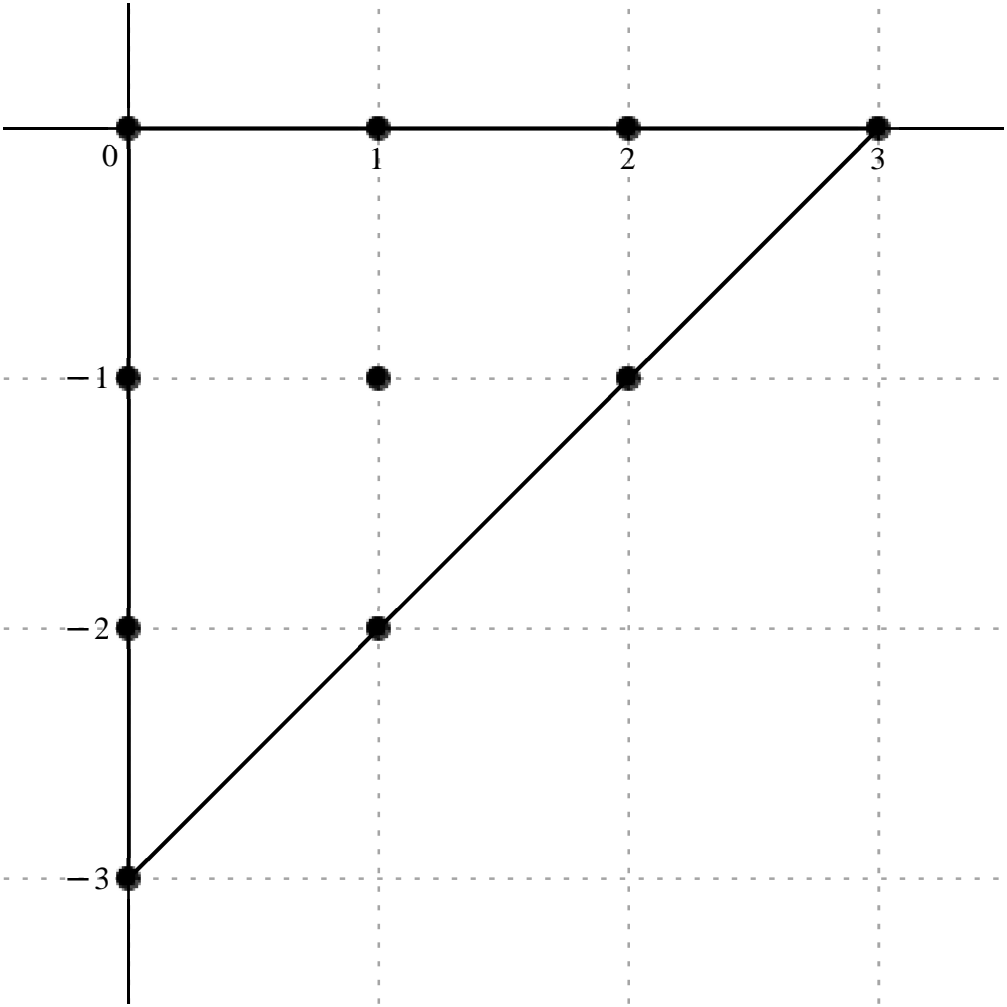


$$\frac{d^5}{dx_{ol}^5} u(x_{ol}) = \frac{(27482 + 27482 I) u_{ol} + (114777 + 70317 I) u_{ol+1} + (39834 + 7056 I) u_{ol+2} + (783 - 1562 I) u_{ol+3} + (70317 + 114777 I) u_{ol-1} - (309348 + 309348 I) u_{ol+1-I} + (61893 - 11232 I) u_{ol+2-I} + (7056 + 39834 I) u_{ol-2I} + (-11232 + 61893 I) u_{ol+1-2I} + (-1562 + 783 I) u_{ol-3I}}{78 \Delta x_{ol}^5}, O(\Delta x_{ol}^5)$$

*Error order:*, 4, *Error:*,  $1.0945058397837398659 \times 10^{-8}$ , *New Error:*,  $1.0843100982008634507 \times 10^{-12}$   
*Error order:*, 4, *Error:*,  $1.0843100982008634507 \times 10^{-12}$ , *New Error:*,  $1.0832919862394317007 \times 10^{-16}$   
*Error order:*, 4, *Error:*,  $1.0832919862394317007 \times 10^{-16}$ , *New Error:*,  $1.0831901898171658366 \times 10^{-20}$   
*Error order:*, 4, *Error:*,  $1.0831901898171658366 \times 10^{-20}$ , *New Error:*,  $1.0831800103228292383 \times 10^{-24}$   
*Error order:*, 4, *Error:*,  $1.0831800103228292383 \times 10^{-24}$ , *New Error:*,  $1.0831789923748746295 \times 10^{-28}$

$$x_o+h.,\left[\begin{array}{cccc}0&1&2&3\\-I&1-I&2-I\\-2I&1-2I\\-3I\end{array}\right]$$

$$c=,\left[\begin{array}{cccc}-1100I&-684-4104I&-\frac{8622}{13}-\frac{15498I}{13}&-\frac{796}{13}+\frac{184I}{13}\\684-4104I&14256I&-1728-1296I\\ \frac{8622}{13}-\frac{15498I}{13}&1728-1296I\\ \frac{796}{13}+\frac{184I}{13}\end{array}\right]$$

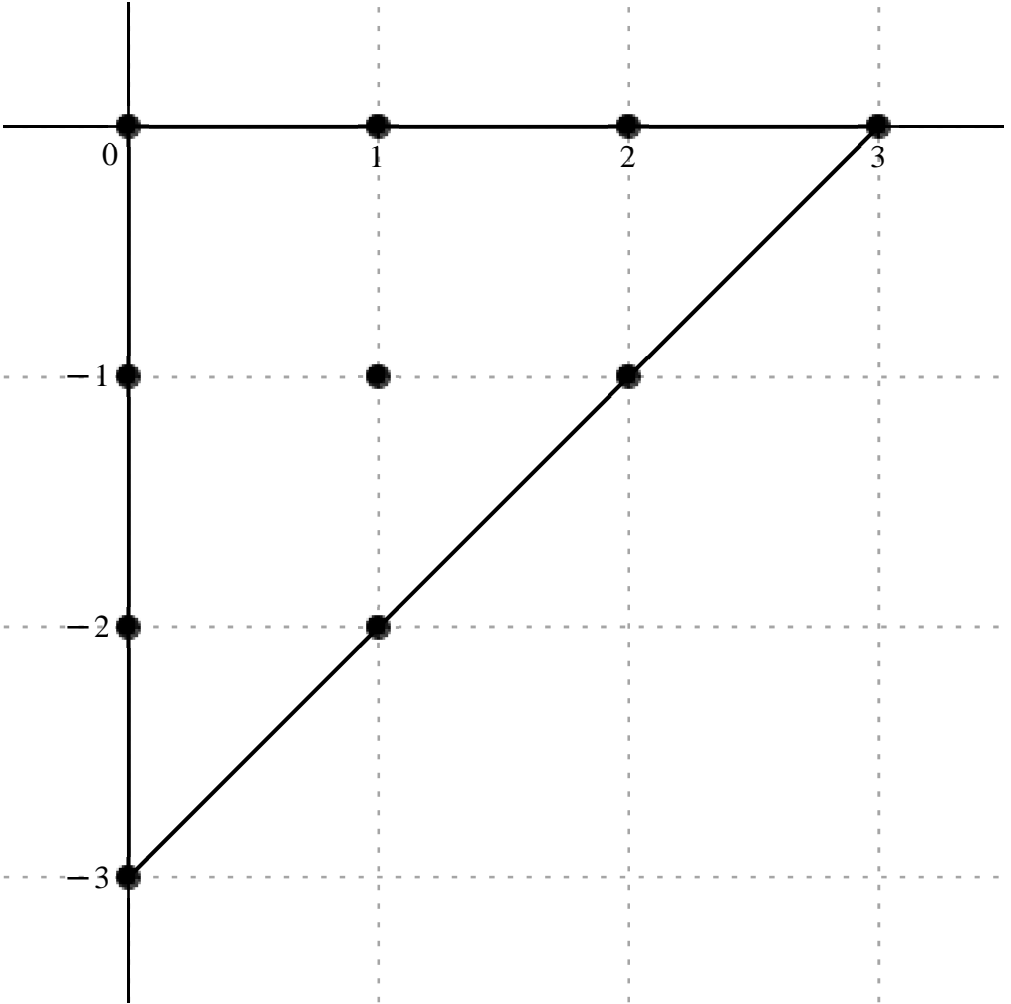


$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6}\,u(x_{ol})=\frac{2\left(-7150Iu_{ol}-(4446+26676I)u_{ol+1}-(4311+7749I)u_{ol+2}+(-398+92I)u_{ol+3}+(4446-26676I)u_{ol-1}+92664Iu_{ol+1-1}-(11232+8424I)u_{ol+2-1}+(4311-7749I)u_{ol-21}+(11232-8424I)u_{ol+1-21}+(398+92I)u_{ol-31}\right)}{13\,\mathcal{A}\mathfrak{x}_{ol}^6},\,O(\,\mathcal{A}\mathfrak{x}_{ol}^4\,)$$

Formula:, 385, Var:, 1  
Variavel :,  $x_{ol}$  , Derivada de Ordem :, 7

Error order:, 3, Error:,  $2.1728405781248144581 \times 10^{-6}$ , New Error:,  $2.1675273641149612576 \times 10^{-9}$   
Error order:, 3, Error:,  $2.1675273641149612576 \times 10^{-9}$ , New Error:,  $2.1669877608471967119 \times 10^{-12}$   
Error order:, 3, Error:,  $2.1669877608471967119 \times 10^{-12}$ , New Error:,  $2.1669337182377777782 \times 10^{-15}$   
Error order:, 3, Error:,  $2.1669337182377777782 \times 10^{-15}$ , New Error:,  $2.1669283131545443650 \times 10^{-18}$   
Error order:, 3, Error:,  $2.1669283131545443650 \times 10^{-18}$ , New Error:,  $2.1669277726379986433 \times 10^{-21}$

$$x_o + h., \left[ \begin{array}{cccc} 0 & 1 & 2 & 3 \\ -I & 1-I & 2-I & \\ -2 I & 1-2 I & & \\ -3 I & & & \end{array} \right]$$
$$c =, \left[ \begin{array}{cccc} -1330 + 1330 I & -4788 + 5922 I & -\frac{12852}{13} + \frac{32382 I}{13} & \frac{1351}{13} + \frac{1071 I}{13} \\ -5922 + 4788 I & 19404 - 19404 I & 441 + 4347 I & \\ -\frac{32382}{13} + \frac{12852 I}{13} & -4347 - 441 I & & \\ -\frac{1071}{13} - \frac{1351 I}{13} & & & \end{array} \right]$$



$$\frac{d^7}{dx_{ol}^7} u(x_{ol}) = \frac{7 \left( (-2470 + 2470 I) u_{ol} + (-8892 + 10998 I) u_{ol+1} + (-1836 + 4626 I) u_{ol+2} + (193 + 153 I) u_{ol+3} + (-10998 + 8892 I) u_{ol-1} + (36036 - 36036 I) u_{ol+1-1} + (819 + 8073 I) u_{ol+2-1} + (-4626 + 1836 I) u_{ol-21} - (8073 + 819 I) u_{ol+1-21} - (153 + 193 I) u_{ol-31} \right)}{13 \Delta x_{ol}^7}, O(\Delta x_{ol}^3)$$

Formula:, 386, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 8

Error order:, 2, Error:, 0.00045441268485798672915, New Error:,  $4.5094372923805075510 \times 10^{-6}$

Error order:, 2, Error:,  $4.5094372923805075510 \times 10^{-6}$ , New Error:,  $4.5059727110772340979 \times 10^{-8}$

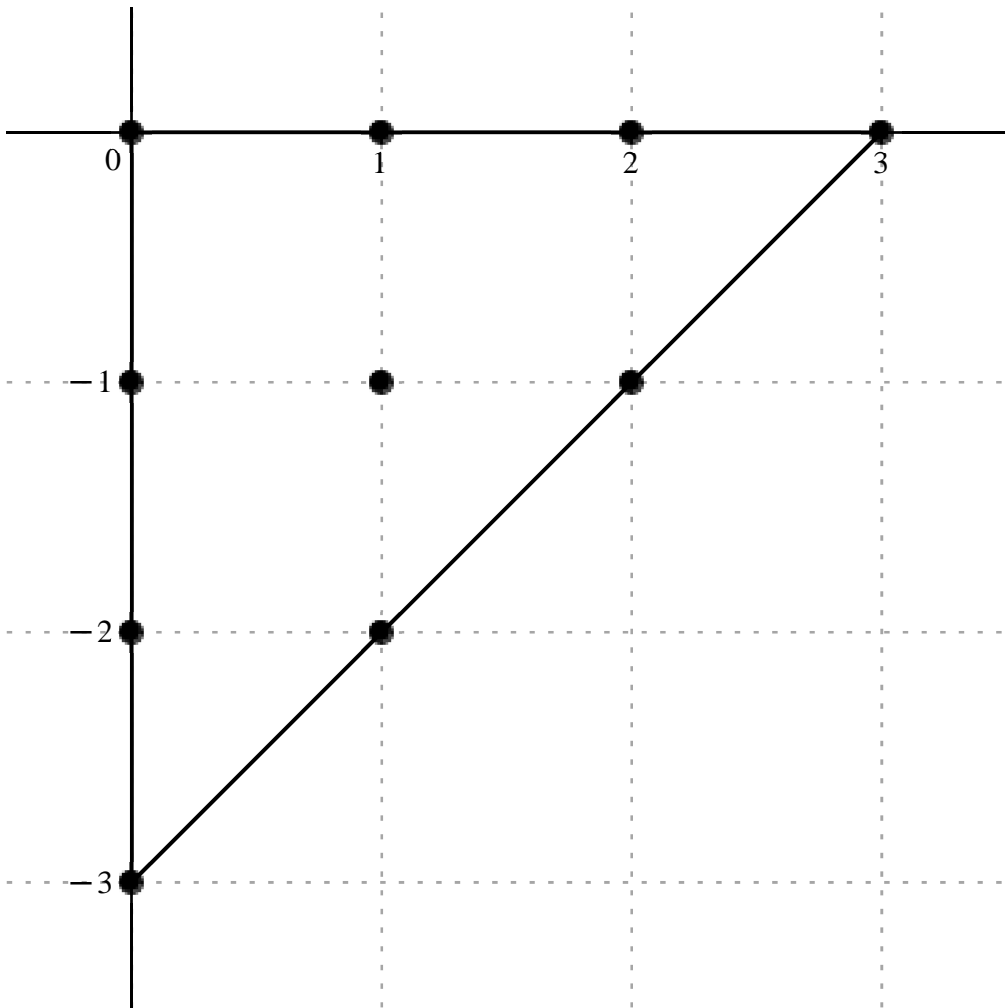
Error order:, 2, Error:,  $4.5059727110772340979 \times 10^{-8}$ , New Error:,  $4.5056262970987538625 \times 10^{-10}$

Error order:, 2, Error:,  $4.5056262970987538625 \times 10^{-10}$ , New Error:,  $4.5055916561428313142 \times 10^{-12}$

Error order:, 2, Error:,  $4.5055916561428313142 \times 10^{-12}$ , New Error:,  $4.5055881920516587209 \times 10^{-14}$

$$x_o+h., \left[ \begin{array}{cccc} 0 & 1 & 2 & 3 \\ -I & 1-I & 2-I & \\ -2\,I & 1-2\,I & & \\ -3\,I & & & \end{array} \right]$$

$$c=, \left[ \begin{array}{cccc} 2240 & 9576-504\,I & \frac{44352}{13}-\frac{14112\,I}{13} & \frac{56}{13}-\frac{2464\,I}{13} \\ 9576+504\,I & -36288 & 4032-4536\,I & \\ \frac{44352}{13}+\frac{14112\,I}{13} & 4032+4536\,I & & \\ \frac{56}{13}+\frac{2464\,I}{13} & & & \end{array} \right]$$



$$\frac{d^8}{dx_{oi}^8}u(x_{oi})=\frac{56\left(520\,u_{oi}+(2223-117\,I)\,u_{oi+1}+(792-252\,I)\,u_{oi+2}+(1-44\,I)\,u_{oi+3}+(2223+117\,I)\,u_{oi-1}-8424\,u_{oi+1-1}+(936-1053\,I)\,u_{oi+2-1}+(792+252\,I)\,u_{oi-21}+(936+1053\,I)\,u_{oi+1-21}+(1+44\,I)\,u_{oi-31}\right)}{13\,\Delta x_{oi}^8},\,O(\,\Delta x_{oi}^2\,)$$

Formula:, 387, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 9

Error order:, 1, Error:, 0.046971096052383844153, New Error:, 0.0046896127129804416861

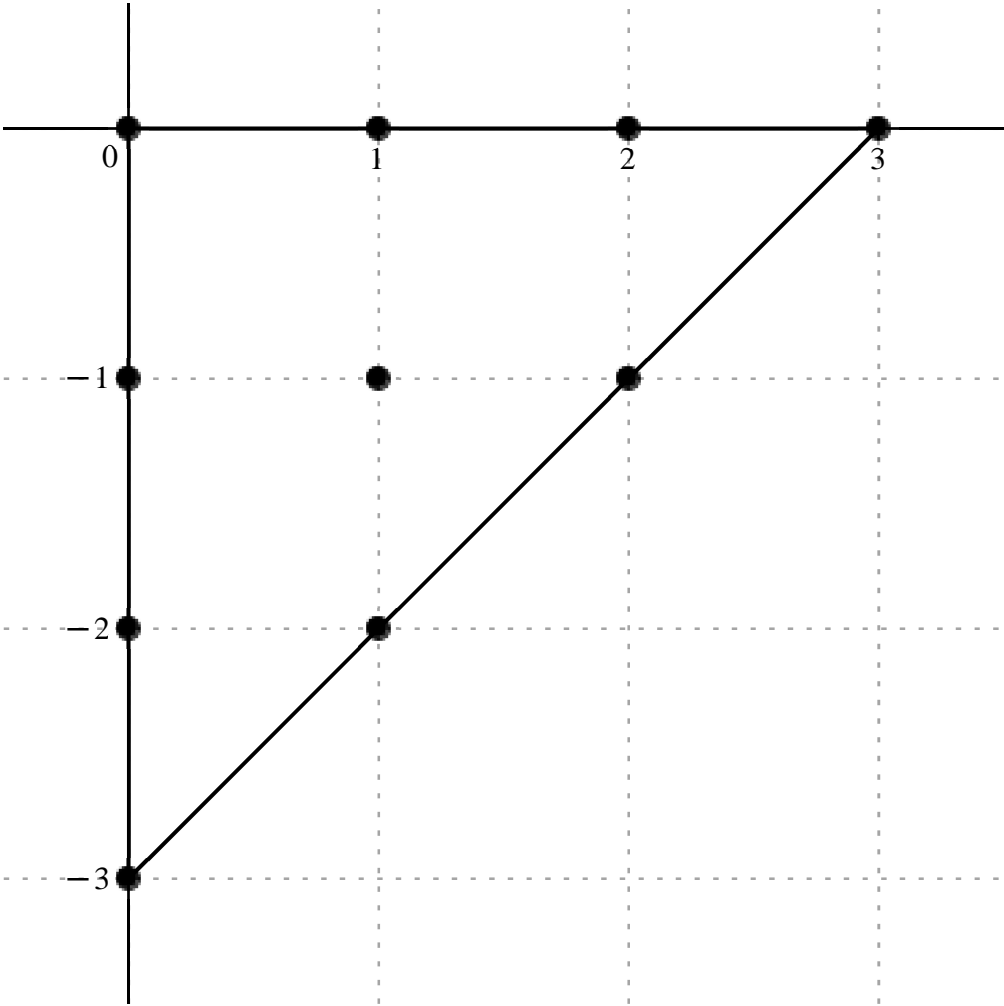
Error order:, 1, Error:, 0.0046896127129804416861, New Error:, 0.00046888536502089319077

Error order:, 1, Error:, 0.00046888536502089319077, New Error:, 0.000046887776507167707211

Error order:, 1, Error:, 0.000046887776507167707211, New Error:,  $4.6887700498359240122 \times 10^{-6}$

Error order:, 1, Error:,  $4.6887700498359240122 \times 10^{-6}$ , New Error:,  $4.6887692897385235548 \times 10^{-7}$

$$x_o + h, \begin{bmatrix} 0 & 1 & 2 & 3 \\ -I & 1-I & 2-I & \\ -2\,I & 1-2\,I & & \\ -3\,I & & & \end{bmatrix}$$
$$c =, \begin{bmatrix} -1008-1008\,I & -4536-4536\,I & -\frac{27216}{13}-\frac{18144\,I}{13} & -\frac{1512}{13}+\frac{1008\,I}{13} \\ -4536-4536\,I & 18144+18144\,I & -4536 & \\ -\frac{18144}{13}-\frac{27216\,I}{13} & -4536\,I & & \\ \frac{1008}{13}-\frac{1512\,I}{13} & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} u(x_{ol}) = \frac{504 \left( -(26+26\,I) u_{ol} - (117+117\,I) u_{ol+1} - (54+36\,I) u_{ol+2} + (-3+2\,I) u_{ol+3} - (117+117\,I) u_{ol-1} + (468+468\,I) u_{ol+1-1} - 117 u_{ol+2-1} - (36+54\,I) u_{ol-21} - 117\,I u_{ol+1-21} + (2-3\,I) u_{ol-31} \right)}{13\,\Delta x_{ol}^9}, O(\Delta x_{ol})$$

Formula:, 388, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 1

Error order:, 9, Error:,  $4.9037149245004672965 \times 10^{-22}$ , New Error:,  $4.9773046797675614458 \times 10^{-31}$

Error order:, 9, Error:,  $4.9773046797675614458 \times 10^{-31}$ , New Error:,  $4.9846914382769595433 \times 10^{-40}$

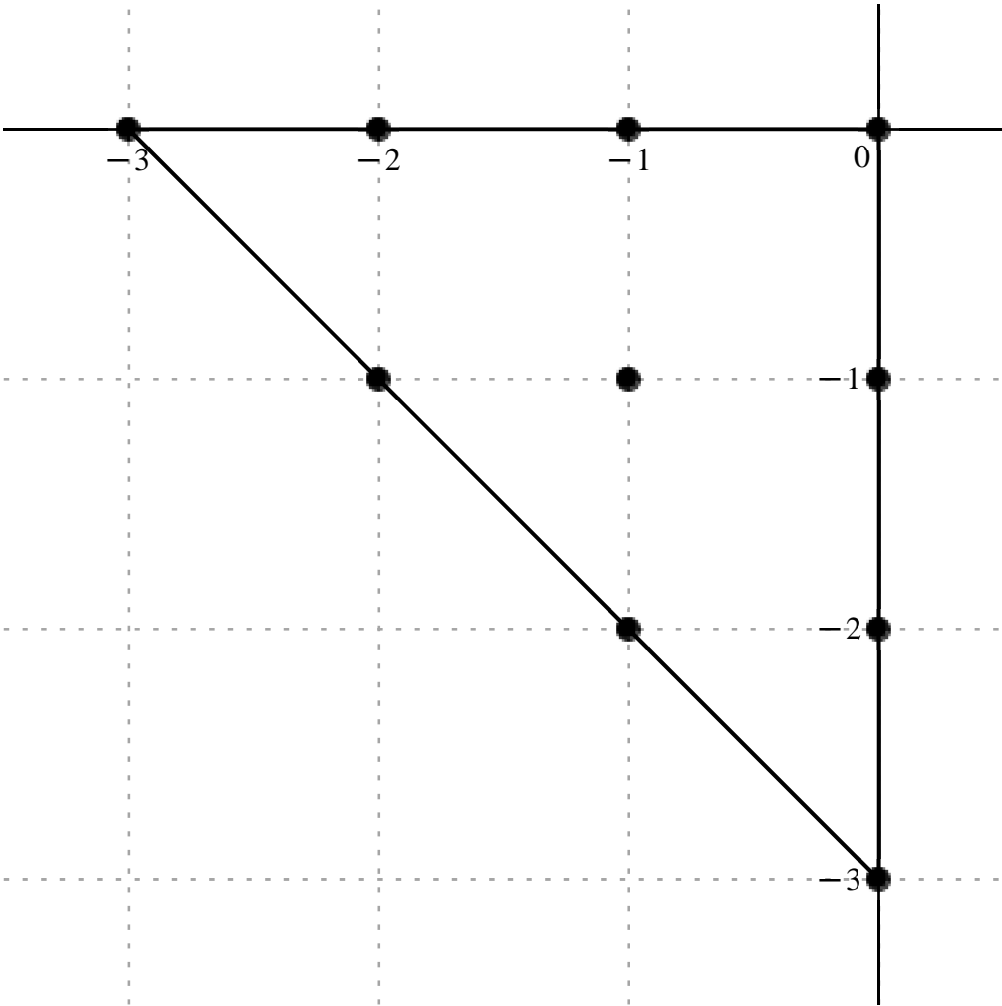
Error order:, 9, Error:,  $4.9846914382769595433 \times 10^{-40}$ , New Error:,  $4.9854303915250570745 \times 10^{-49}$

Error order:, 9, Error:,  $4.9854303915250570745 \times 10^{-49}$ , New Error:,  $4.9855042896234005323 \times 10^{-58}$

Error order:, 9, Error:,  $4.9855042896234005323 \times 10^{-58}$ , New Error:,  $4.9855116794609697767 \times 10^{-67}$

$$x_o + h., \begin{bmatrix} -3 & -2 & -1 & 0 \\ -2 - I & -1 - I & -I & \\ & -1 - 2 I & -2 I & \\ & & -3 I & \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{1}{156} + \frac{5 I}{156} & \frac{45}{52} + \frac{9 I}{52} & \frac{9}{2} & \frac{44}{15} - \frac{44 I}{15} \\ & \frac{27}{20} + \frac{9 I}{20} & -9 + 9 I & -\frac{9 I}{2} \\ & & -\frac{9}{20} - \frac{27 I}{20} & -\frac{9}{52} - \frac{45 I}{52} \\ & & & -\frac{5}{156} - \frac{I}{156} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{(5+25\,\mathrm{I})\, u_{ol-3} + (675+135\,\mathrm{I})\, u_{ol-2} + 3510\, u_{ol-1} + (2288-2288\,\mathrm{I})\, u_{ol} + (1053+351\,\mathrm{I})\, u_{ol-2-1} + (-7020+7020\,\mathrm{I})\, u_{ol-1-1} - 3510\,\mathrm{I}\, u_{ol-1} - (351+1053\,\mathrm{I})\, u_{ol-1-21} - (135+675\,\mathrm{I})\, u_{ol-21} - (25+5\,\mathrm{I})\, u_{ol-31}}{780\,\Delta x_{ol}},\, O(\,\Delta x_{ol}^9\,)$$

Formula.: 389, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 2

Error order.: 8, Error.: 4.3668994514679302084 × 10<sup>−19</sup>, New Error.: 4.3976519986752818286 × 10<sup>−27</sup>

Error order.: 8, Error.: 4.3976519986752818286 × 10<sup>−27</sup>, New Error.: 4.4007198646818315696 × 10<sup>−35</sup>

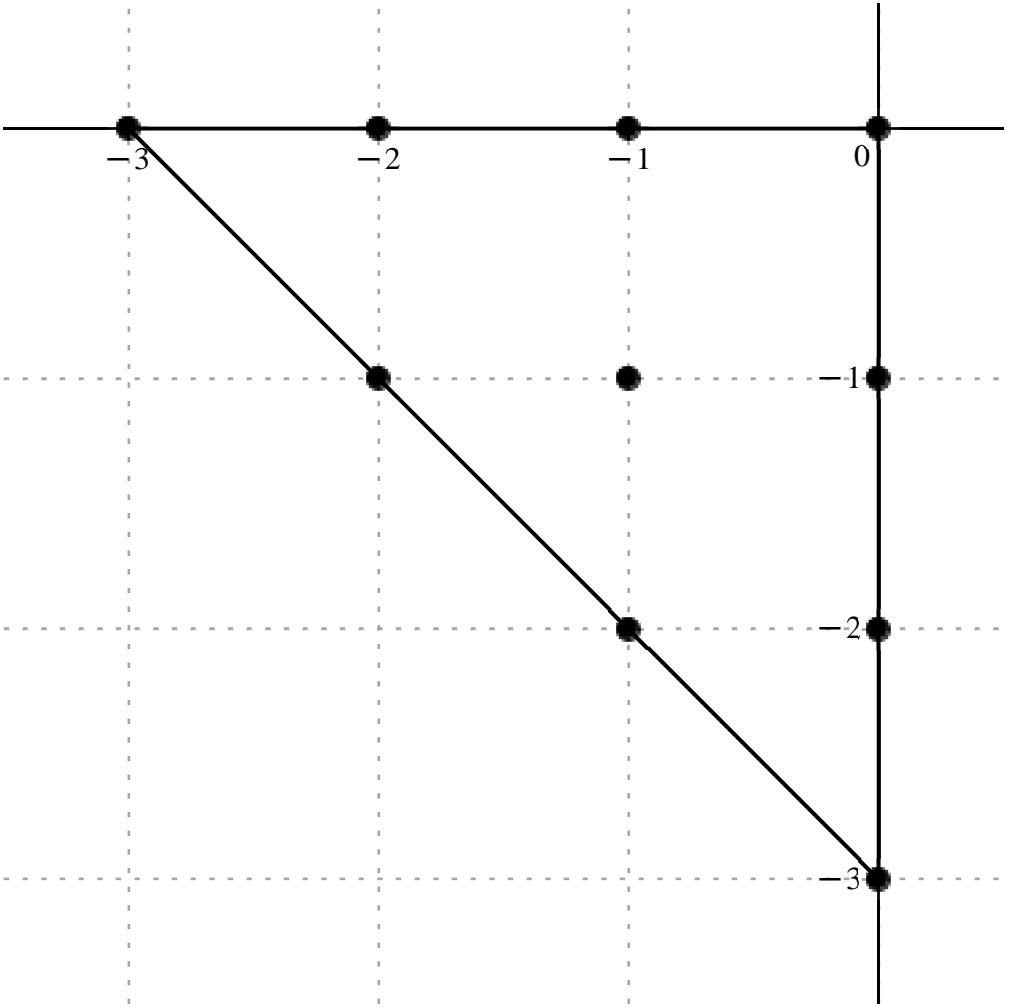
Error order.: 8, Error.: 4.4007198646818315696 × 10<sup>−35</sup>, New Error.: 4.4010265761084975084 × 10<sup>−43</sup>

Error order.: 8, Error.: 4.4010265761084975084 × 10<sup>−43</sup>, New Error.: 4.4010572464981330639 × 10<sup>−51</sup>

Error order.: 8, Error.: 4.4010572464981330639 × 10<sup>−51</sup>, New Error.: 4.4010603135295650175 × 10<sup>−59</sup>

$$x_o \neq h. , \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ & & -1 - 2\,\mathrm{I} & -2\,\mathrm{I} \\ & & & -3\,\mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} \frac{259}{1170} + \frac{151\,\mathrm{I}}{1170} & \frac{1359}{260} - \frac{1101\,\mathrm{I}}{260} & \frac{87}{5} - \frac{132\,\mathrm{I}}{5} & -\frac{295\,\mathrm{I}}{18} \\ & \frac{93}{10} - \frac{51\,\mathrm{I}}{10} & \frac{438\,\mathrm{I}}{5} & -\frac{87}{5} - \frac{132\,\mathrm{I}}{5} \\ & & -\frac{93}{10} - \frac{51\,\mathrm{I}}{10} & -\frac{1359}{260} - \frac{1101\,\mathrm{I}}{260} \\ & & & -\frac{259}{1170} + \frac{151\,\mathrm{I}}{1170} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{(518 + 302 \, \mathrm{I}) \, u_{ol-3} + (12231 - 9909 \, \mathrm{I}) \, u_{ol-2} + (40716 - 61776 \, \mathrm{I}) \, u_{ol-1} - 38350 \, \mathrm{I} u_{ol} + (21762 - 11934 \, \mathrm{I}) \, u_{ol-2-1} + 204984 \, \mathrm{I} u_{ol-1-1} - (40716 + 61776 \, \mathrm{I}) \, u_{ol-1} - (21762 + 11934 \, \mathrm{I}) \, u_{ol-1-21} - (12231 + 9909 \, \mathrm{I}) \, u_{ol-21} + (-518 + 302 \, \mathrm{I}) \, u_{ol-31}, \, O(\, \Delta x_{ol}^8 \, )}$$

Formula:, 390, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 7, Error:, 1.9937421612807208939 × 10<sup>-16</sup>, New Error:, 2.0225778601059712129 × 10<sup>-23</sup>

Error order:, 7, Error:, 2.0225778601059712129 × 10<sup>-23</sup>, New Error:, 2.0254719620146171610 × 10<sup>-30</sup>

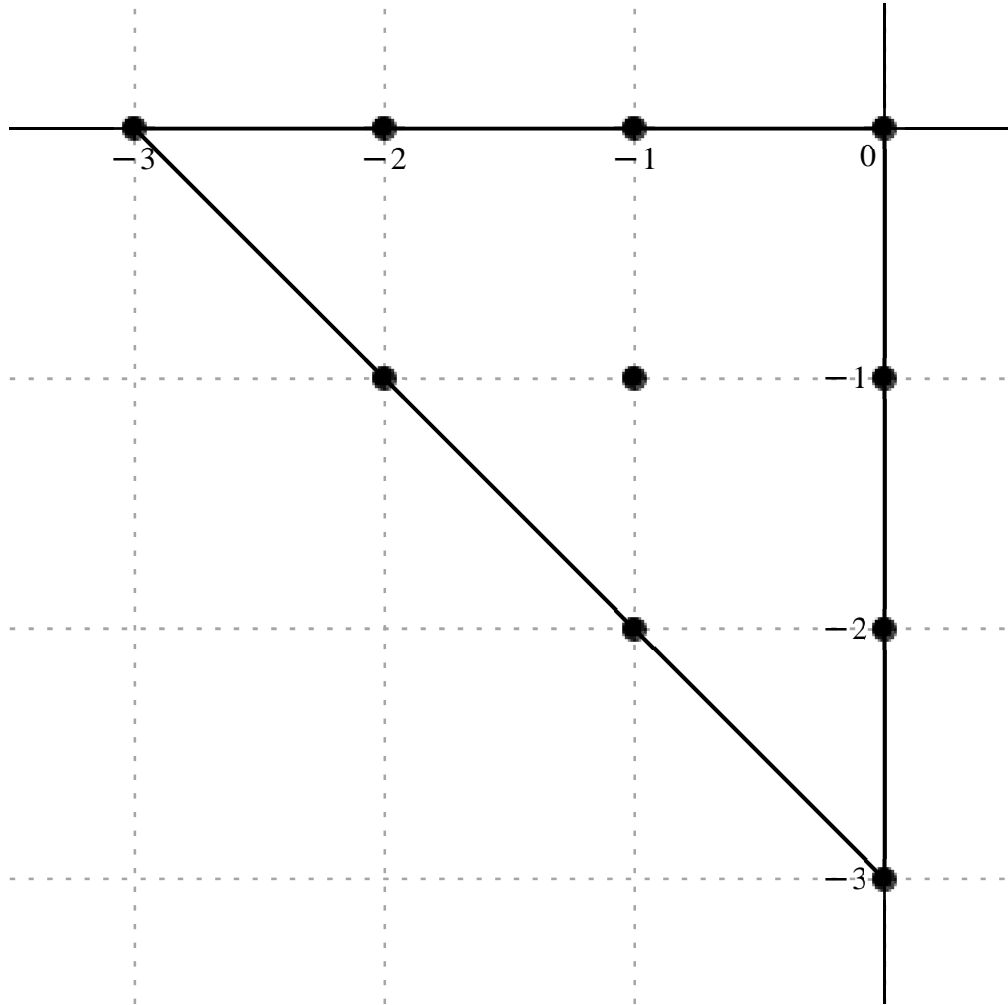
Error order:, 7, Error:, 2.0254719620146171610 × 10<sup>-30</sup>, New Error:, 2.0257614773669060444 × 10<sup>-37</sup>

Error order:, 7, Error:, 2.0257614773669060444 × 10<sup>-37</sup>, New Error:, 2.0257904299535884988 × 10<sup>-44</sup>

Error order:, 7, Error:, 2.0257904299535884988 × 10<sup>-44</sup>, New Error:, 2.0257933252227711190 × 10<sup>-51</sup>

$$x_o \, + h \, . \, , \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & \\ & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & \\ & & -3 \, \mathrm{I} & \end{array} \right]$$
  
$$c = , \left[ \begin{array}{cccccc} \frac{2113}{1560} - \frac{231 \, \mathrm{I}}{520} & \frac{87}{130} - \frac{9411 \, \mathrm{I}}{260} & -\frac{261}{5} - \frac{2841 \, \mathrm{I}}{20} & -\frac{499}{12} - \frac{499 \, \mathrm{I}}{12} & & \\ & \frac{561}{40} - \frac{2187 \, \mathrm{I}}{40} & \frac{3111}{10} + \frac{3111 \, \mathrm{I}}{10} & -\frac{2841}{20} - \frac{261 \, \mathrm{I}}{5} & & \\ & & -\frac{2187}{40} + \frac{561 \, \mathrm{I}}{40} & -\frac{9411}{260} + \frac{87 \, \mathrm{I}}{130} & & \\ & & & -\frac{231}{520} + \frac{2113 \, \mathrm{I}}{1560} & & \end{array} \right]$$





$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \; u(x_{ol}) = \frac{(2113-693 \; \mathrm{I}) \; u_{ol-3} + (1044-56466 \; \mathrm{I}) \; u_{ol-2} - (81432+221598 \; \mathrm{I}) \; u_{ol-1} - (64870+64870 \; \mathrm{I}) \; u_{ol} + (21879-85293 \; \mathrm{I}) \; u_{ol-2-1} + (485316+485316 \; \mathrm{I}) \; u_{ol-1-1} - (221598+81432 \; \mathrm{I}) \; u_{ol-1} + (-85293+21879 \; \mathrm{I}) \; u_{ol-1-21} + (-56466+1044 \; \mathrm{I}) \; u_{ol-21} + (-693+2113 \; \mathrm{I}) \; u_{ol-31}}{1560 \; \Delta x_{ol}^3}, \; O( \; \Delta x_{ol}^7 \; )$$

Formula:, 391, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 4

Error order:, 6, Error:, 1.0235790368982014762 × 10−13, New Error:, 1.0304757540299508821 × 10−19

Error order:, 6, Error:, 1.0304757540299508821 × 10−19, New Error:, 1.0311638295183833329 × 10−25

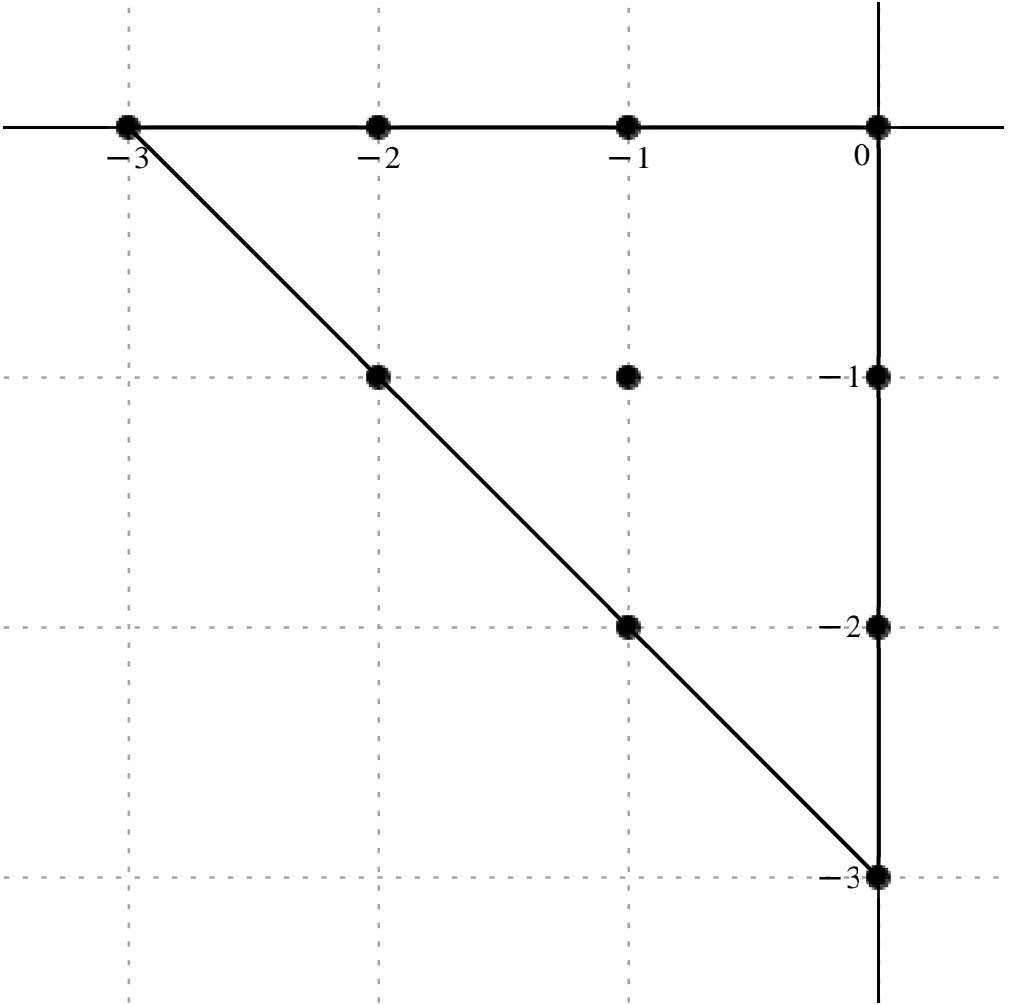
Error order:, 6, Error:, 1.0311638295183833329 × 10−25, New Error:, 1.0312326208371982764 × 10−31

Error order:, 6, Error:, 1.0312326208371982764 × 10−31, New Error:, 1.0312394998065108483 × 10−37

Error order:, 6, Error:, 1.0312394998065108483 × 10−37, New Error:, 1.0312401877018161476 × 10−43

$$x_o \; + h \; , \; \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ & -2 \; -\mathrm{I} & -1 \; -\mathrm{I} & -\mathrm{I} \\ & & -1 \; -2 \; \mathrm{I} & -2 \; \mathrm{I} \\ & & & -3 \; \mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} \frac{959}{390} - \frac{1132 \text{ I}}{195} & -\frac{7572}{65} - \frac{6522 \text{ I}}{65} & -\frac{5397}{10} - \frac{1803 \text{ I}}{10} & -\frac{556}{3} \\ & -\frac{642}{5} - \frac{2007 \text{ I}}{10} & \frac{8748}{5} & -\frac{5397}{10} + \frac{1803 \text{ I}}{10} \\ & & -\frac{642}{5} + \frac{2007 \text{ I}}{10} & -\frac{7572}{65} + \frac{6522 \text{ I}}{65} \\ & & & \frac{959}{390} + \frac{1132 \text{ I}}{195} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \; u(x_{ol}) = \frac{(959 - 2264 \text{ I}) \; u_{ol-3} - (45432 + 39132 \text{ I}) \; u_{ol-2} - (210483 + 70317 \text{ I}) \; u_{ol-1} - 72280 \; u_{ol} - (50076 + 78273 \text{ I}) \; u_{ol-2-1} + 682344 \; u_{ol-1-1} + (-210483 + 70317 \text{ I}) \; u_{ol-1} + (-50076 + 78273 \text{ I}) \; u_{ol-1-21} + (-45432 + 39132 \text{ I}) \; u_{ol-21} + (959 + 2264 \text{ I}) \; u_{ol-31}}{390 \; \Delta x_{ol}^4}, \; O( \; \Delta x_{ol}^6 \; )$$

Formula.: 392, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 5

Error order.: 5, Error:; 3.1083200789770374455 × 10<sup>−11</sup>, New Error:; 3.1507306526508434641 × 10<sup>−16</sup>

Error order.: 5, Error:; 3.1507306526508434641 × 10<sup>−16</sup>, New Error:; 3.1549864643343551857 × 10<sup>−21</sup>

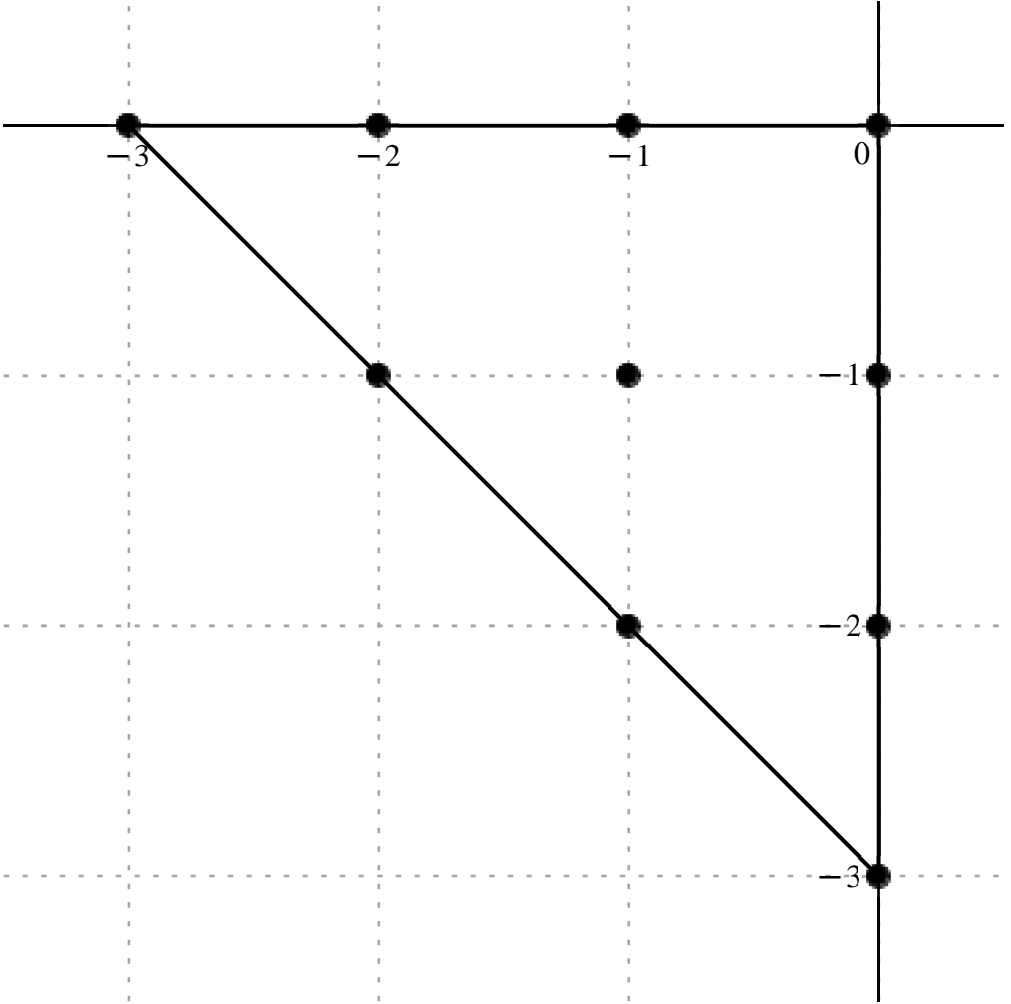
Error order.: 5, Error:; 3.1549864643343551857 × 10<sup>−21</sup>, New Error:; 3.1554121928331270218 × 10<sup>−26</sup>

Error order.: 5, Error:; 3.1554121928331270218 × 10<sup>−26</sup>, New Error:; 3.1554547671560933297 × 10<sup>−31</sup>

Error order.: 5, Error:; 3.1554547671560933297 × 10<sup>−31</sup>, New Error:; 3.1554590246031206365 × 10<sup>−36</sup>

$$x_o \neq h., \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} & \\ & -1 - 2 \text{ I} & -2 \text{ I} & \\ & & & -3 \text{ I} \end{array} \right]$$

$$c =, \left[ \begin{array}{cccc} -\frac{261}{26} - \frac{781 \text{ I}}{39} & -\frac{6639}{13} + \frac{1176 \text{ I}}{13} & -\frac{2943}{2} + \frac{1803 \text{ I}}{2} & -\frac{1057}{3} + \frac{1057 \text{ I}}{3} \\ & -\frac{1587}{2} - 144 \text{ I} & 3966 - 3966 \text{ I} & -\frac{1803}{2} + \frac{2943 \text{ I}}{2} \\ & & 144 + \frac{1587 \text{ I}}{2} & -\frac{1176}{13} + \frac{6639 \text{ I}}{13} \\ & & & \frac{781}{39} + \frac{261 \text{ I}}{26} \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u\big(x_{ol}\big) = \frac{-(783 + 1562 \, \text{I}) \, u_{ol-3} + (-39834 + 7056 \, \text{I}) \, u_{ol-2} + (-114777 + 70317 \, \text{I}) \, u_{ol-1} + (-27482 + 27482 \, \text{I}) \, u_{ol} - (61893 + 11232 \, \text{I}) \, u_{ol-2-1} + (309348 - 309348 \, \text{I}) \, u_{ol-1-1} + (-70317 + 114777 \, \text{I}) \, u_{ol-1} + (11232 + 61893 \, \text{I}) \, u_{ol-1-21} + (-7056 + 39834 \, \text{I}) \, u_{ol-21} + (1562 + 783 \, \text{I}) \, u_{ol-31}}{78 \, \Delta x_{ol}^5}, \, O(\, \Delta x_{ol}^5 \, )$$

Formula:, 393, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 6

Error order:, 4, Error:, 1.0757519492557681769 × 10−8, New Error:, 1.0824376546973279297 × 10−12

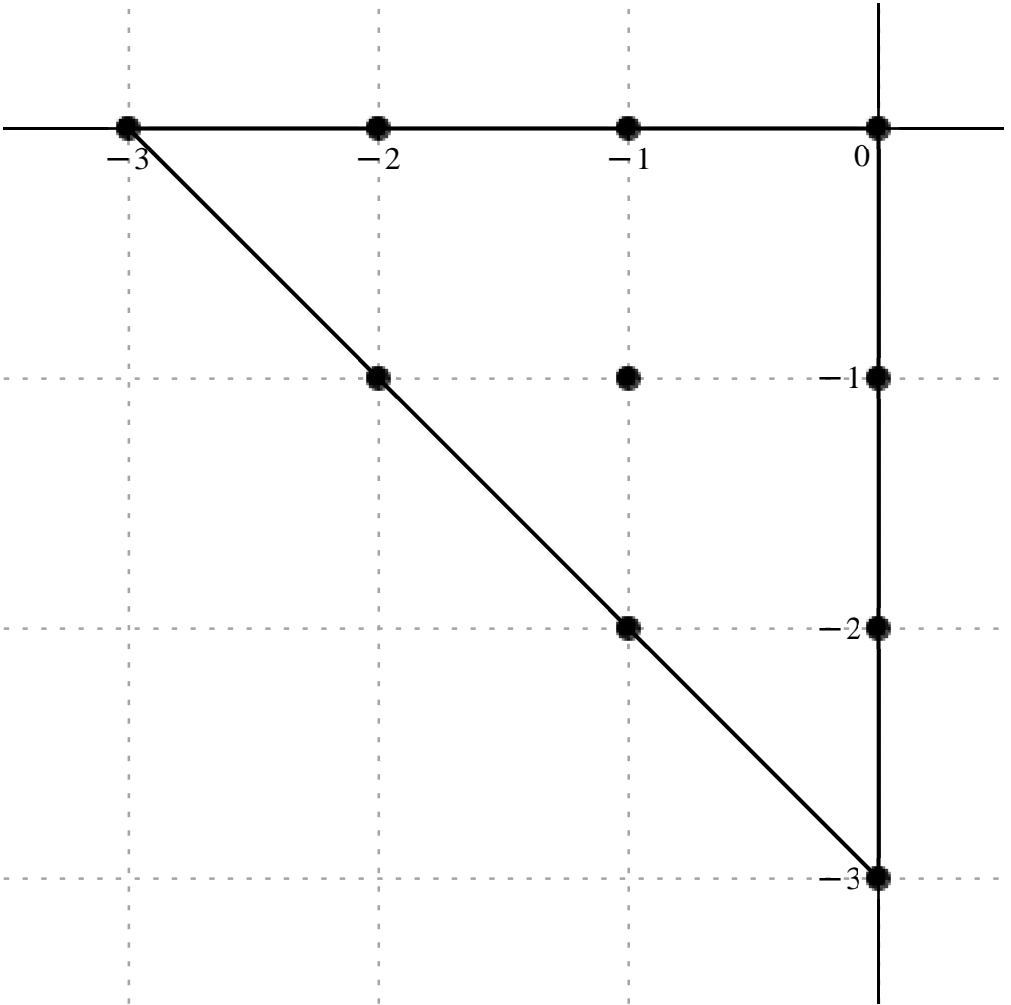
Error order:, 4, Error:, 1.0824376546973279297 × 10−12, New Error:, 1.0831047717267697794 × 10−16

Error order:, 4, Error:, 1.0831047717267697794 × 10−16, New Error:, 1.0831714686646587580 × 10−20

Error order: 4, Error: 1.0831714686646587580 × 10<sup>-20</sup>, New Error: 1.0831781382105665038 × 10<sup>-24</sup>  
 Error order: 4, Error: 1.0831781382105665038 × 10<sup>-24</sup>, New Error: 1.0831788051636782362 × 10<sup>-28</sup>

$$x_o + h., \begin{bmatrix} -3 & -2 & -1 & 0 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} & \\ -1 - 2 \text{ I} & -2 \text{ I} & & \\ & -3 \text{ I} & & \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{796}{13} - \frac{184 \text{ I}}{13} & -\frac{8622}{13} + \frac{15498 \text{ I}}{13} & -684 + 4104 \text{ I} & 1100 \text{ I} \\ & -1728 + 1296 \text{ I} & -14256 \text{ I} & 684 + 4104 \text{ I} \\ & & 1728 + 1296 \text{ I} & \frac{8622}{13} + \frac{15498 \text{ I}}{13} \\ & & & \frac{796}{13} - \frac{184 \text{ I}}{13} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d} x_{ol}^6} \, u(x_{ol}) = \frac{2 \left( -(398 + 92 \, \text{I}) \, u_{ol-3} + (-4311 + 7749 \, \text{I}) \, u_{ol-2} + (-4446 + 26676 \, \text{I}) \, u_{ol-1} + 7150 \, \text{I} u_{ol} + (-11232 + 8424 \, \text{I}) \, u_{ol-2-1} - 92664 \, \text{I} u_{ol-1-1} + (4446 + 26676 \, \text{I}) \, u_{ol-1} + (11232 + 8424 \, \text{I}) \, u_{ol-1-21} + (4311 + 7749 \, \text{I}) \, u_{ol-21} + (398 - 92 \, \text{I}) \, u_{ol-31} \right)}{13 \, \Delta x_{ol}^6}, \, O( \, \Delta x_{ol}^4 \, )$$

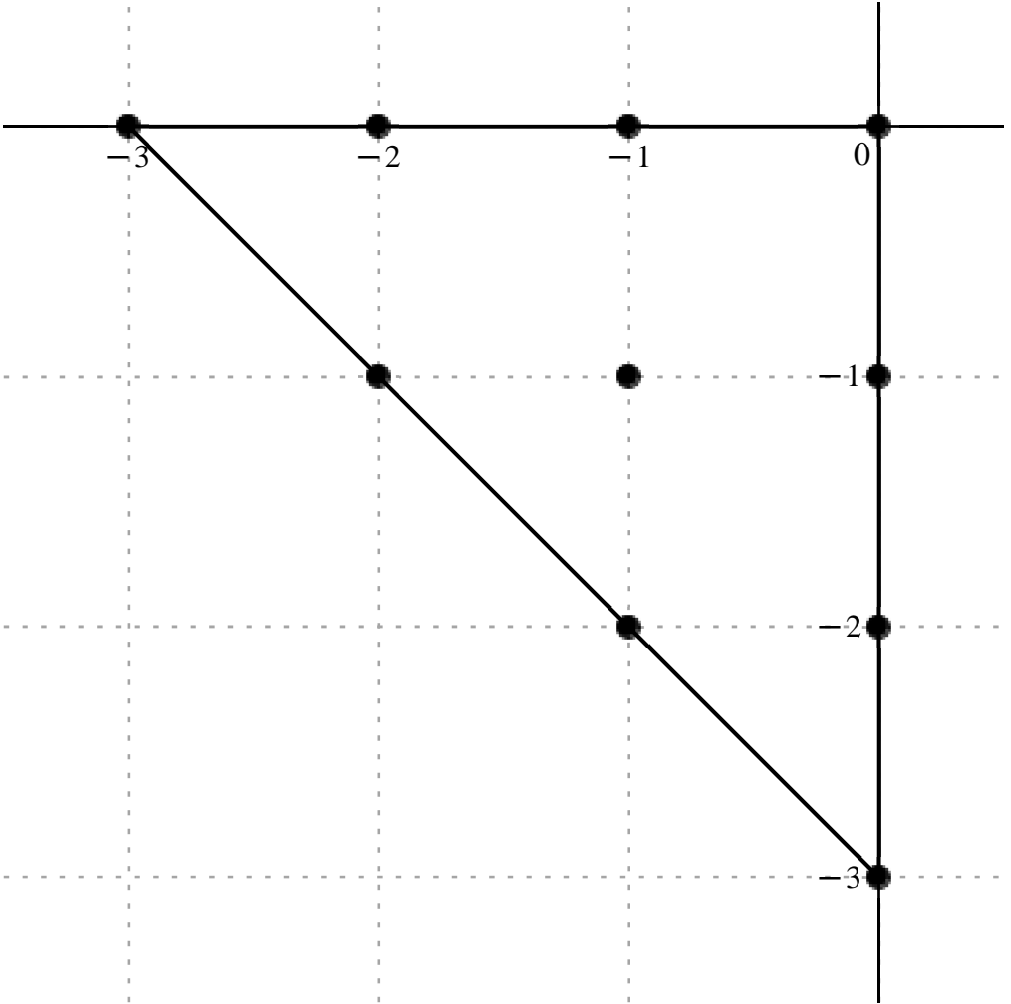
Formula: 394, Var.: 1  
 Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 7

Error order: 3, Error: 2.1381903733469142276 × 10<sup>-6</sup>, New Error: 2.1640456610172482603 × 10<sup>-9</sup>

*Error order:*, 3,   *Error:*,  $2.1640456610172482603 \times 10^{-9}$ ,   *New Error:*,  $2.1666394243580605753 \times 10^{-12}$   
*Error order:*, 3,   *Error:*,  $2.1666394243580605753 \times 10^{-12}$ ,   *New Error:*,  $2.1668988829277173479 \times 10^{-15}$   
*Error order:*, 3,   *Error:*,  $2.1668988829277173479 \times 10^{-15}$ ,   *New Error:*,  $2.1669248296069275006 \times 10^{-18}$   
*Error order:*, 3,   *Error:*,  $2.1669248296069275006 \times 10^{-18}$ ,   *New Error:*,  $2.1669274242830708493 \times 10^{-21}$

$$x_o+h., \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ & -2-I & -1-I & -I \\ & & -1-2I & -2I \\ & & & -3I \end{array} \right]$$

$$c=, \left[ \begin{array}{cccc} -\frac{1351}{13}+\frac{1071I}{13} & \frac{12852}{13}+\frac{32382I}{13} & 4788+5922I & 1330+1330I \\ & -441+4347I & -19404-19404I & 5922+4788I \\ & & 4347-441I & \frac{32382}{13}+\frac{12852I}{13} \\ & & & \frac{1071}{13}-\frac{1351I}{13} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{7 \left( (-193+153\, \mathrm{i}) \, u_{ol-3} + (1836+4626\, \mathrm{i}) \, u_{ol-2} + (8892+10998\, \mathrm{i}) \, u_{ol-1} + (2470+2470\, \mathrm{i}) \, u_{ol} + (-819+8073\, \mathrm{i}) \, u_{ol-2-1} - (36036+36036\, \mathrm{i}) \, u_{ol-1-1} + (10998+8892\, \mathrm{i}) \, u_{ol-1} + (8073-819\, \mathrm{i}) \, u_{ol-1-21} + (4626+1836\, \mathrm{i}) \, u_{ol-21} + (153-193\, \mathrm{i}) \, u_{ol-31} \right)}{13 \, \Delta x_{ol}^7}, \, O(\, \Delta x_{ol}^3 \, )$$

$$\text{Variavel : } x_{oi}, \text{ Derivada de Ordem : } 8$$

$$\text{Error order: } 2, \text{ Error: } 0.00044803205624746507992, \text{ New Error: } 4.5030654781635809181 \times 10^{-6}$$

$$\text{Error order: } 2, \text{ Error: } 4.5030654781635809181 \times 10^{-6}, \text{ New Error: } 4.5053356188282406916 \times 10^{-8}$$

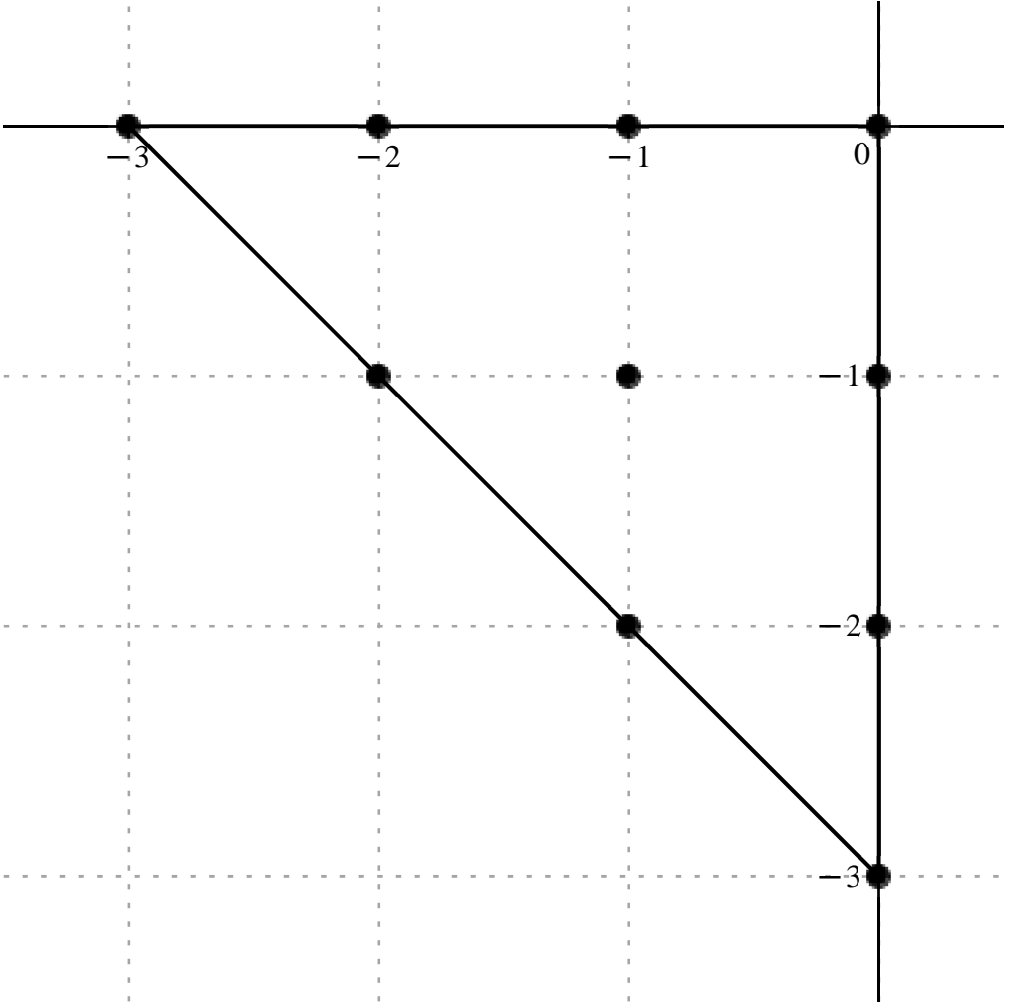
$$\text{Error order: } 2, \text{ Error: } 4.5053356188282406916 \times 10^{-8}, \text{ New Error: } 4.5055625887666102741 \times 10^{-10}$$

$$\text{Error order: } 2, \text{ Error: } 4.5055625887666102741 \times 10^{-10}, \text{ New Error: } 4.5055852853185455416 \times 10^{-12}$$

$$\text{Error order: } 2, \text{ Error: } 4.5055852853185455416 \times 10^{-12}, \text{ New Error: } 4.5055875549693194306 \times 10^{-14}$$

$$x_o \neq h. , \left[ \begin{array}{cccc} -3 & -2 & -1 & 0 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -3 \text{ I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} \frac{56}{13} + \frac{2464 \text{ I}}{13} & \frac{44352}{13} + \frac{14112 \text{ I}}{13} & 9576 + 504 \text{ I} & 2240 \\ & 4032 + 4536 \text{ I} & -36288 & 9576 - 504 \text{ I} \\ & & 4032 - 4536 \text{ I} & \frac{44352}{13} - \frac{14112 \text{ I}}{13} \\ & & & \frac{56}{13} - \frac{2464 \text{ I}}{13} \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{oi}^8} \, u(x_{oi}) = \frac{56 \left( (1 + 44 \, \text{I}) \, u_{oi-3} + (792 + 252 \, \text{I}) \, u_{oi-2} + (2223 + 117 \, \text{I}) \, u_{oi-1} + 520 \, u_{oi} + (936 + 1053 \, \text{I}) \, u_{oi-2-1} - 8424 \, u_{oi-1-1} + (2223 - 117 \, \text{I}) \, u_{oi-1} + (936 - 1053 \, \text{I}) \, u_{oi-1-21} + (792 - 252 \, \text{I}) \, u_{oi-21} + (1 - 44 \, \text{I}) \, u_{oi-31} \right)}{13 \, \Delta x_{oi}^8}, \, O( \, \Delta x_{oi}^2 \, )$$

Formula:, 396, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 9

Error order:, 1, Error:, 0.046483322766502681619, New Error:, 0.0046847160906631392293

Error order:, 1, Error:, 0.0046847160906631392293, New Error:, 0.00046883637997108565685

Error order:, 1, Error:, 0.00046883637997108565685, New Error:, 0.000046887286637849279744

Error order:, 1, Error:, 0.000046887286637849279744, New Error:,  $4.6887651511239200136 \times 10^{-6}$

Error order:, 1, Error:,  $4.6887651511239200136 \times 10^{-6}$ , New Error:,  $4.6887687998671349583 \times 10^{-7}$

$$x_o + h.$$

$-3$

$-2$

$-1$

$0$

$-2 - I$

$-1 - I$

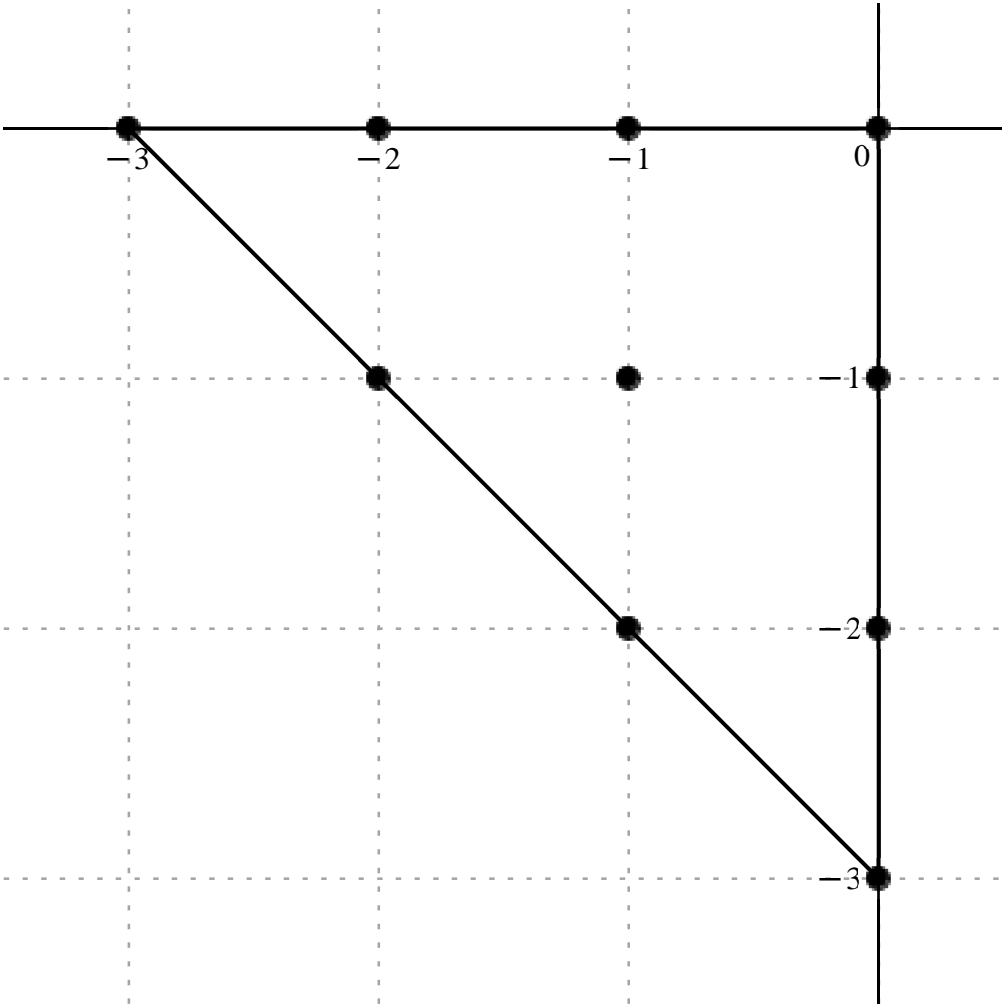
$-I$

$-1 - 2 I$

$-2 I$

$-3 I$

$$c = , \left[ \begin{array}{cccc} \frac{1512}{13} + \frac{1008 I}{13} & \frac{27216}{13} - \frac{18144 I}{13} & 4536 - 4536 I & 1008 - 1008 I \\ & 4536 & -18144 + 18144 I & 4536 - 4536 I \\ & & -4536 I & \frac{18144}{13} - \frac{27216 I}{13} \\ & & & -\frac{1008}{13} - \frac{1512 I}{13} \end{array} \right]$$



$$\frac{d^9}{dx_{ol}^9} u(x_{ol}) = \frac{504 \left( (3 + 2 I) u_{ol-3} + (54 - 36 I) u_{ol-2} + (117 - 117 I) u_{ol-1} + (26 - 26 I) u_{ol} + 117 u_{ol-2-1} + (-468 + 468 I) u_{ol-1-1} + (117 - 117 I) u_{ol-1} - 117 I u_{ol-1-21} + (36 - 54 I) u_{ol-21} - (2 + 3 I) u_{ol-31} \right)}{13 \Delta x_{ol}^9}, O(\Delta x_{ol})$$

Not square - Triangle: Interval , 4

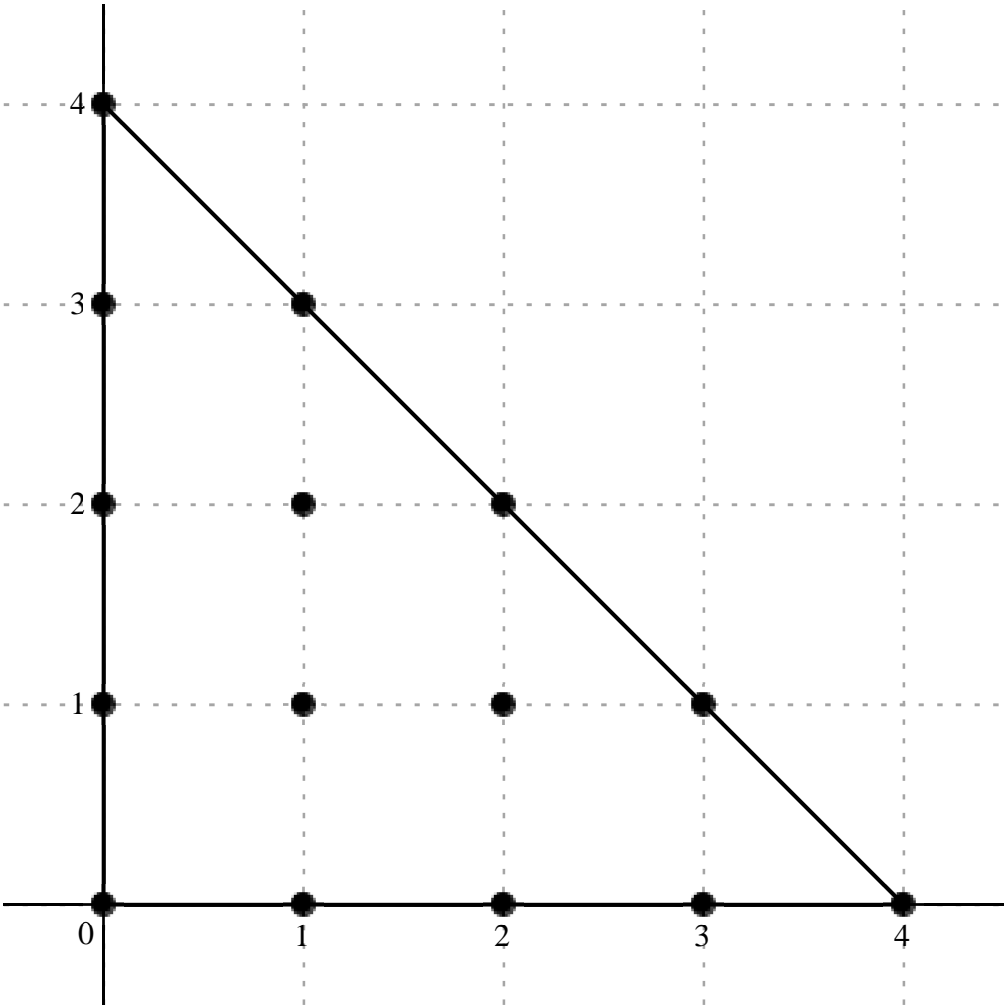
Formula:, 397, Var:, 1

Variavel :,  $x_{oi}$  , Derivada de Ordem :, 1

Error order:, 14, Error:,  $1.1635019816545432561 \times 10^{-34}$ , New Error:,  $1.1523253812054085108 \times 10^{-48}$   
Error order:, 14, Error:,  $1.1523253812054085108 \times 10^{-48}$ , New Error:,  $1.1512037069153025037 \times 10^{-62}$   
Error order:, 14, Error:,  $1.1512037069153025037 \times 10^{-62}$ , New Error:,  $1.1510915003258823067 \times 10^{-76}$   
Error order:, 14, Error:,  $1.1510915003258823067 \times 10^{-76}$ , New Error:,  $1.1510802792763132060 \times 10^{-90}$   
Error order:, 14, Error:,  $1.1510802792763132060 \times 10^{-90}$ , New Error:,  $1.1510791571674510016 \times 10^{-104}$

$$x_o + h . , \left[ \begin{array}{ccccc} 4 I & & & & \\ 3 I & 1 + 3 I & & & \\ 2 I & 1 + 2 I & 2 + 2 I & & \\ I & 1 + I & 2 + I & 3 + I & \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{43}{8840} - \frac{19 I}{8840} & & & & & \\ -\frac{32}{195} - \frac{64 I}{195} & \frac{32}{65} - \frac{56 I}{65} & & & & \\ -\frac{54}{13} - \frac{36 I}{13} & -\frac{2016}{65} + \frac{1152 I}{65} & -\frac{9}{2} + \frac{9 I}{2} & & & \\ -\frac{160}{17} + \frac{96 I}{17} & 72 - 72 I & -\frac{1152}{65} + \frac{2016 I}{65} & \frac{56}{65} - \frac{32 I}{65} & & \\ -\frac{23}{6} + \frac{23 I}{6} & -\frac{96}{17} + \frac{160 I}{17} & \frac{36}{13} + \frac{54 I}{13} & \frac{64}{195} + \frac{32 I}{195} & \frac{19}{8840} + \frac{43 I}{8840} & \end{array} \right]$$





$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u\big(x_{ol}\big)=\frac{1}{26520\,\mathcal{A}\mathfrak{x}_{ol}}\Big( -(129+57\,\mathrm{I})\,u_{ol+4\mathrm{I}}-(4352+8704\,\mathrm{I})\,u_{ol+3\mathrm{I}}+(13056-22848\,\mathrm{I})\,u_{ol+1+3\mathrm{I}}-(110160+73440\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(-822528+470016\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+(-119340+119340\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}+(-249600+149760\,\mathrm{I})\,u_{ol+1}+(1909440-1909440\,\mathrm{I})\,u_{ol+1+\mathrm{I}}+(-470016+822528\,\mathrm{I})\,u_{ol+2+\mathrm{I}}+(22848-13056\,\mathrm{I})\,u_{ol+3+\mathrm{I}}+(-101660+101660\,\mathrm{I})\,u_{ol}+(-149760+249600\,\mathrm{I})\,u_{ol+1}+(73440+110160\,\mathrm{I})\,u_{ol+2}+(8704+4352\,\mathrm{I})\,u_{ol+3}+(57+129\,\mathrm{I})\,u_{ol+4}\Big),\,\,O(\,\mathcal{A}\mathfrak{x}_{ol}^{\,14}\,)$$

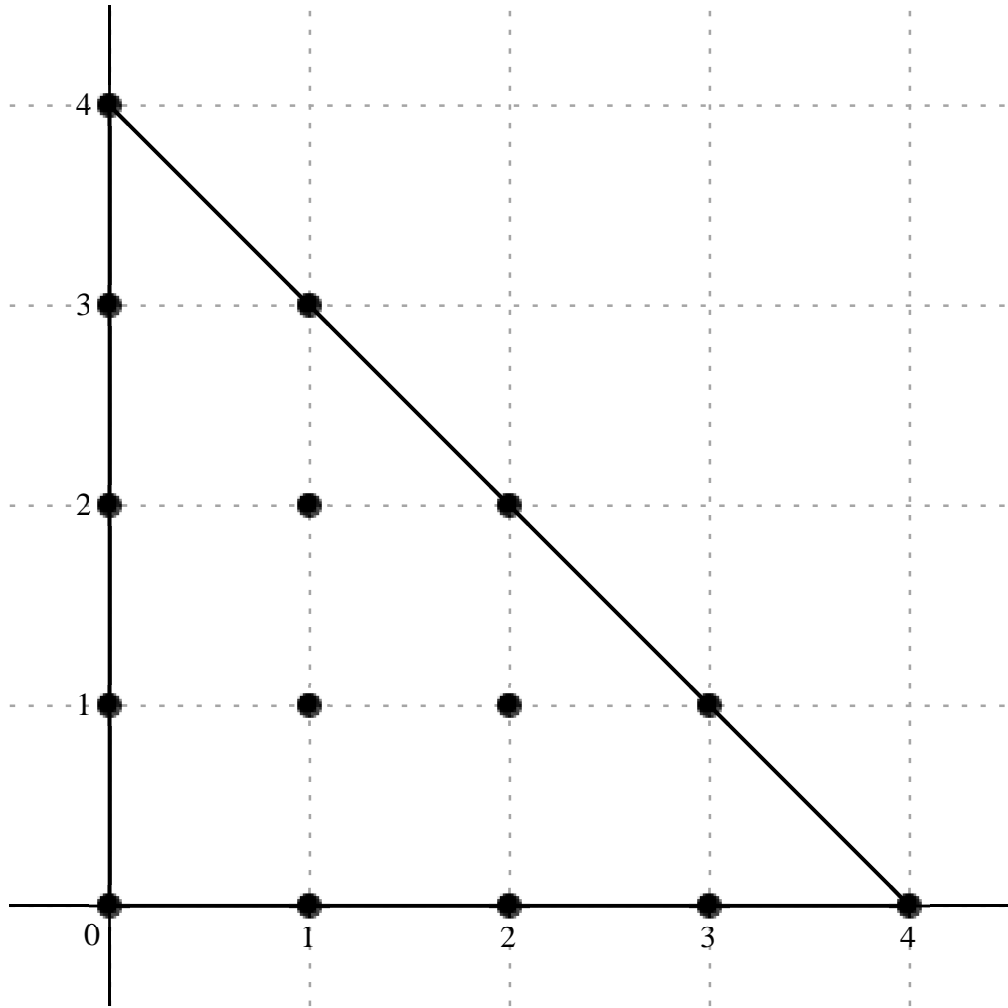
Formula:, 398, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 13, Error:,  $9.9131754206300384069\times 10^{-32}$ , New Error:,  $9.7157584451629271457\times 10^{-45}$   
 Error order:, 13, Error:,  $9.7157584451629271457\times 10^{-45}$ , New Error:,  $9.6961186245884810811\times 10^{-58}$   
 Error order:, 13, Error:,  $9.6961186245884810811\times 10^{-58}$ , New Error:,  $9.6941556636502344801\times 10^{-71}$   
 Error order:, 13, Error:,  $9.6941556636502344801\times 10^{-71}$ , New Error:,  $9.6939593777699098690\times 10^{-84}$   
 Error order:, 13, Error:,  $9.6939593777699098690\times 10^{-84}$ , New Error:,  $9.6939397492840147124\times 10^{-97}$

$$x_o\neq h\,.\,,\left[\begin{array}{ccccc}4\,\mathrm{I}&&&&\\3\,\mathrm{I}&1+3\,\mathrm{I}&&&\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&&\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}&\\0&1&2&3&4\end{array}\right]$$

$$c=,\left[\begin{array}{ccccc} \frac{43}{816}-\frac{5\,\mathrm{I}}{272}&&&&\\ \frac{32}{9}+\frac{160\,\mathrm{I}}{117}&\frac{784}{325}+\frac{9664\,\mathrm{I}}{975}&&&\\ \frac{654}{13}-\frac{84\,\mathrm{I}}{13}&\frac{2592}{25}-\frac{8544\,\mathrm{I}}{25}&-\frac{129\,\mathrm{I}}{2}&&\\ \frac{2048}{51}-\frac{4928\,\mathrm{I}}{51}&960\,\mathrm{I}&-\frac{2592}{25}-\frac{8544\,\mathrm{I}}{25}&-\frac{784}{325}+\frac{9664\,\mathrm{I}}{975}&\\ -\frac{50983\,\mathrm{I}}{1800}&-\frac{2048}{51}-\frac{4928\,\mathrm{I}}{51}&-\frac{654}{13}-\frac{84\,\mathrm{I}}{13}&-\frac{32}{9}+\frac{160\,\mathrm{I}}{117}&-\frac{43}{816}-\frac{5\,\mathrm{I}}{272}\end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{795600 \, \Delta x_{ol}^2} \Big( (41925 - 14625 \, \mathrm{I}) \, u_{ol+41} + (2828800 + 1088000 \, \mathrm{I}) \, u_{ol+31} + (1919232 + 7885824 \, \mathrm{I}) \, u_{ol+1+31} + (40024800 - 5140800 \, \mathrm{I}) \, u_{ol+21} + (82487808 - 271904256 \, \mathrm{I}) \, u_{ol+1+21} - 51316200 \, \mathrm{I} u_{ol+2+21} + (31948800 - 76876800 \, \mathrm{I}) \, u_{ol+1} + 763776000 \, \mathrm{I} u_{ol+1+1} - (82487808 + 271904256 \, \mathrm{I}) \, u_{ol+2+1} + (-1919232 + 7885824 \, \mathrm{I}) \, u_{ol+3+1} - 22534486 \, \mathrm{I} u_{ol} - (31948800 + 76876800 \, \mathrm{I}) \, u_{ol+1} - (40024800 + 5140800 \, \mathrm{I}) \, u_{ol+2} + (-2828800 + 1088000 \, \mathrm{I}) \, u_{ol+3} - (41925 + 14625 \, \mathrm{I}) \, u_{ol+4} \Big), \, O( \, \Delta x_{ol}^{13} \, )$$

Formula:, 399, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 3

Error order:, 12, Error:, 8.1694598803596894005 × 10<sup>−29</sup>, New Error:, 8.0920310203153267234 × 10<sup>−41</sup>

Error order:, 12, Error:, 8.0920310203153267234 × 10<sup>−41</sup>, New Error:, 8.0842606841704411235 × 10<sup>−53</sup>

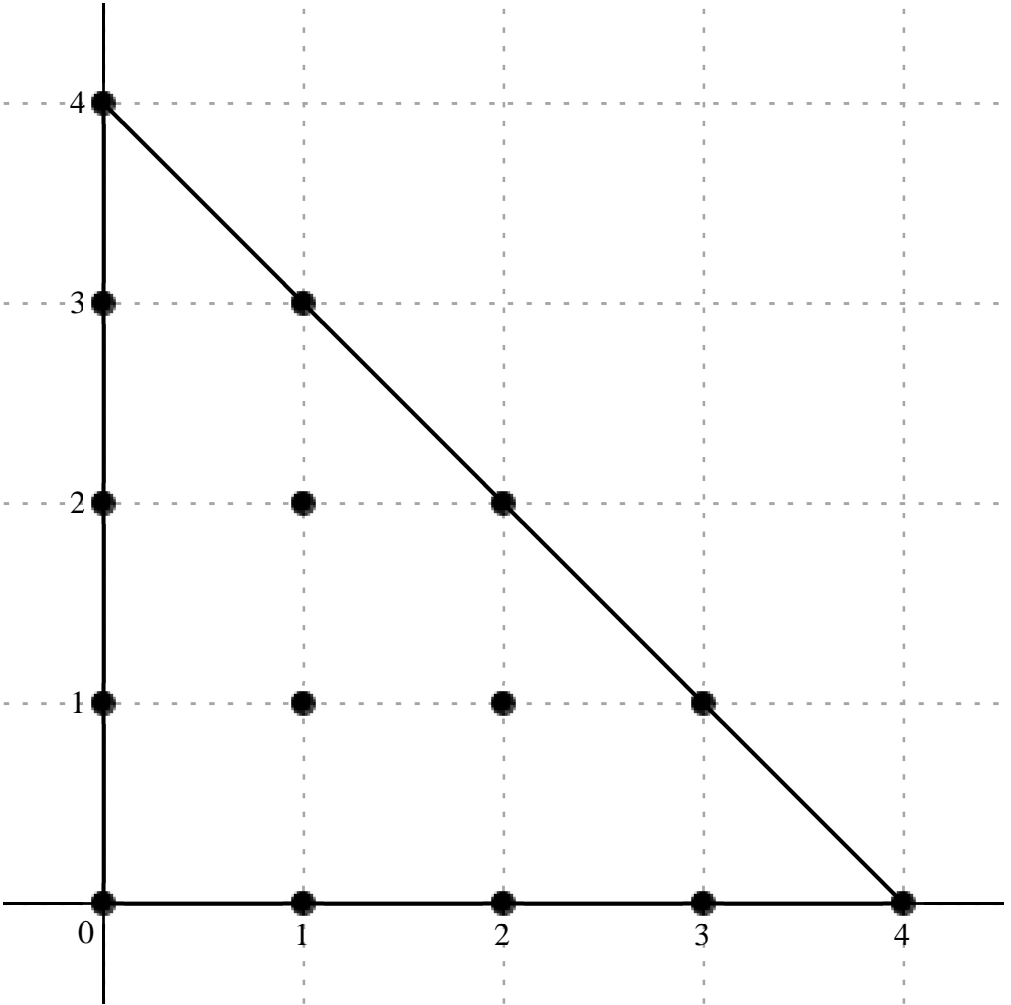
Error order:, 12, Error:, 8.0842606841704411235 × 10<sup>−53</sup>, New Error:, 8.0834833826906943307 × 10<sup>−65</sup>

Error order:, 12, Error:, 8.0834833826906943307 × 10<sup>−65</sup>, New Error:, 8.0834056498706696520 × 10<sup>−77</sup>

Error order:, 12, Error:, 8.0834056498706696520 × 10<sup>−77</sup>, New Error:, 8.0833978765619532834 × 10<sup>−89</sup>

$$x_o \neq h. , \left[ \begin{array}{cccccc} 4 \, \mathrm{I} & & & & & \\ 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & & & & \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & & & \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & & \\ 0 & 1 & 2 & 3 & 4 & \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccccccc} -\frac{520901}{2652000} + \frac{495661 \text{ I}}{1326000} & & & & & & & & \\ -\frac{43096}{1625} + \frac{50644 \text{ I}}{4875} & -\frac{61973}{975} - \frac{40004 \text{ I}}{975} & & & & & & & \\ -\frac{159249}{650} + \frac{360747 \text{ I}}{1300} & \frac{376368}{325} + \frac{749436 \text{ I}}{325} & \frac{133599}{400} + \frac{133599 \text{ I}}{400} & & & & & & \\ \frac{80732}{425} + \frac{173212 \text{ I}}{255} & -\frac{116949}{25} - \frac{116949 \text{ I}}{25} & \frac{749436}{325} + \frac{376368 \text{ I}}{325} & -\frac{40004}{975} - \frac{61973 \text{ I}}{975} & & & & & \\ \frac{47413}{480} + \frac{47413 \text{ I}}{480} & \frac{173212}{255} + \frac{80732 \text{ I}}{425} & \frac{360747}{1300} - \frac{159249 \text{ I}}{650} & \frac{50644}{4875} - \frac{43096 \text{ I}}{1625} & \frac{495661}{1326000} - \frac{520901 \text{ I}}{2652000} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{2652000 \, \mathcal{A}x_{ol}^3} \Big( (-520901 + 991322 \, \text{I}) \, u_{ol+41} + (-70332672 + 27550336 \, \text{I}) \, u_{ol+31} - (168566560 + 108810880 \, \text{I}) \, u_{ol+1+31} + (-649735920 + 735923880 \, \text{I}) \, u_{ol+21} + (3071162880 + 6115397760 \, \text{I}) \, u_{ol+1+21} + (885761370 + 885761370 \, \text{I}) \, u_{ol+2+21} + (503767680 + 1801404800 \, \text{I}) \, u_{ol+1} - (12405949920 + 12405949920 \, \text{I}) \, u_{ol+1+1} + (6115397760 + 3071162880 \, \text{I}) \, u_{ol+2+1} - (108810880 + 168566560 \, \text{I}) \, u_{ol+3+1} + (261956825 + 261956825 \, \text{I}) \, u_{ol} + (1801404800 + 503767680 \, \text{I}) \, u_{ol+1} + (735923880 - 649735920 \, \text{I}) \, u_{ol+2} + (27550336 - 70332672 \, \text{I}) \, u_{ol+3} + (991322 - 520901 \, \text{I}) \, u_{ol+4} \Big), \, O(\, \mathcal{A}x_{ol}^{12} \, )$$

Formula: , 400, Var.: 1

Variavel : ,  $x_{ol}$  , Derivada de Ordem : , 4

Error order.: 11, Error.: 4.2207677990410095838 × 10<sup>−26</sup>, New Error.: 4.1379594275569949139 × 10<sup>−37</sup>

Error order.: 11, Error.: 4.1379594275569949139 × 10<sup>−37</sup>, New Error.: 4.1297207382478758866 × 10<sup>−48</sup>

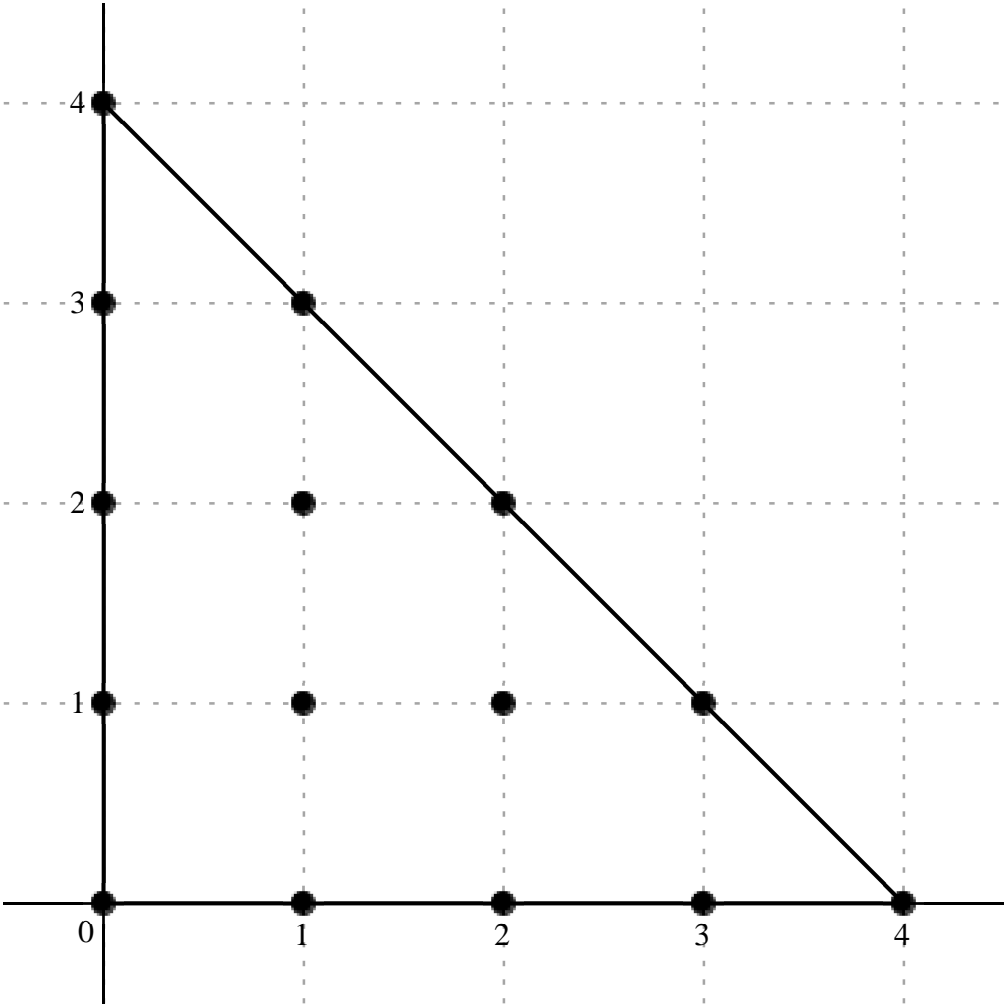
Error order.: 11, Error.: 4.1297207382478758866 × 10<sup>−48</sup>, New Error.: 4.1288972917543420818 × 10<sup>−59</sup>

Error order.: 11, Error.: 4.1288972917543420818 × 10<sup>−59</sup>, New Error.: 4.1288149513303047836 × 10<sup>−70</sup>

Error order.: 11, Error.: 4.1288149513303047836 × 10<sup>−70</sup>, New Error.: 4.1288067173301551552 × 10<sup>−81</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccc} 4 \text{ I} & & & \\ 3 \text{ I} & 1 + 3 \text{ I} & & \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{926729}{1326000} - \frac{1138019 \text{ I}}{442000} & & & & & \\ \frac{383612}{4875} - \frac{775876 \text{ I}}{4875} & \frac{149583}{325} - \frac{83873 \text{ I}}{975} & & & & \\ \frac{10299}{1300} - \frac{2918979 \text{ I}}{1300} & -\frac{4758324}{325} - \frac{1709508 \text{ I}}{325} & -\frac{144399}{50} & & & \\ -\frac{824368}{255} - \frac{2865304 \text{ I}}{1275} & \frac{954594}{25} & -\frac{4758324}{325} + \frac{1709508 \text{ I}}{325} & \frac{149583}{325} + \frac{83873 \text{ I}}{975} & & \\ & -\frac{76859}{120} & -\frac{824368}{255} + \frac{2865304 \text{ I}}{1275} & \frac{10299}{1300} + \frac{2918979 \text{ I}}{1300} & \frac{383612}{4875} + \frac{775876 \text{ I}}{4875} & -\frac{926729}{1326000} + \frac{1138019 \text{ I}}{442000} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d} x_{o l}^4} \, u(x_{o l}) = \frac{1}{1326000 \, \Delta x_{o l}^4} \Big( \, \big( - (926729 + 3414057 \, \mathrm{I}) \, u_{o l + 4 \, 1} + (104342464 - 211038272 \, \mathrm{I}) \, u_{o l + 3 \, 1} + (610298640 - 114067280 \, \mathrm{I}) \, u_{o l + 1 + 3 \, 1} + (10504980 - 2977358580 \, \mathrm{I}) \, u_{o l + 2 \, 1} - (19413961920 + 6974792640 \, \mathrm{I}) \, u_{o l + 1 + 2 \, 1} - 3829461480 \, u_{o l + 2 + 2 \, 1} - (4286713600 + 2979916160 \, \mathrm{I}) \, u_{o l + 1} + 50631665760 \, u_{o l + 1 + 1} + ( - 19413961920$$

$$+ 6974792640 \, \mathrm{I}) \, u_{o l + 2 + 1} + (610298640 + 114067280 \, \mathrm{I}) \, u_{o l + 3 + 1} - 849291950 \, u_{o l} + ( - 4286713600 + 2979916160 \, \mathrm{I}) \, u_{o l + 1} + (10504980 + 2977358580 \, \mathrm{I}) \, u_{o l + 2} + (104342464 + 211038272 \, \mathrm{I}) \, u_{o l + 3} + ( - 926729 + 3414057 \, \mathrm{I}) \, u_{o l + 4} \Big) \cdot \, O( \, \Delta x_{o l}^{\, 11} \, )$$

$$\text{Variavel : } x_{ol}, \text{ Derivada de Ordem : } 5$$

$$\text{Error order:}, 10, \text{ Error:}, 2.5441182549893520521 \times 10^{-23}, \text{ New Error:}, 2.5204227495493457462 \times 10^{-33}$$

$$\text{Error order:}, 10, \text{ Error:}, 2.5204227495493457462 \times 10^{-33}, \text{ New Error:}, 2.5180449354434641480 \times 10^{-43}$$

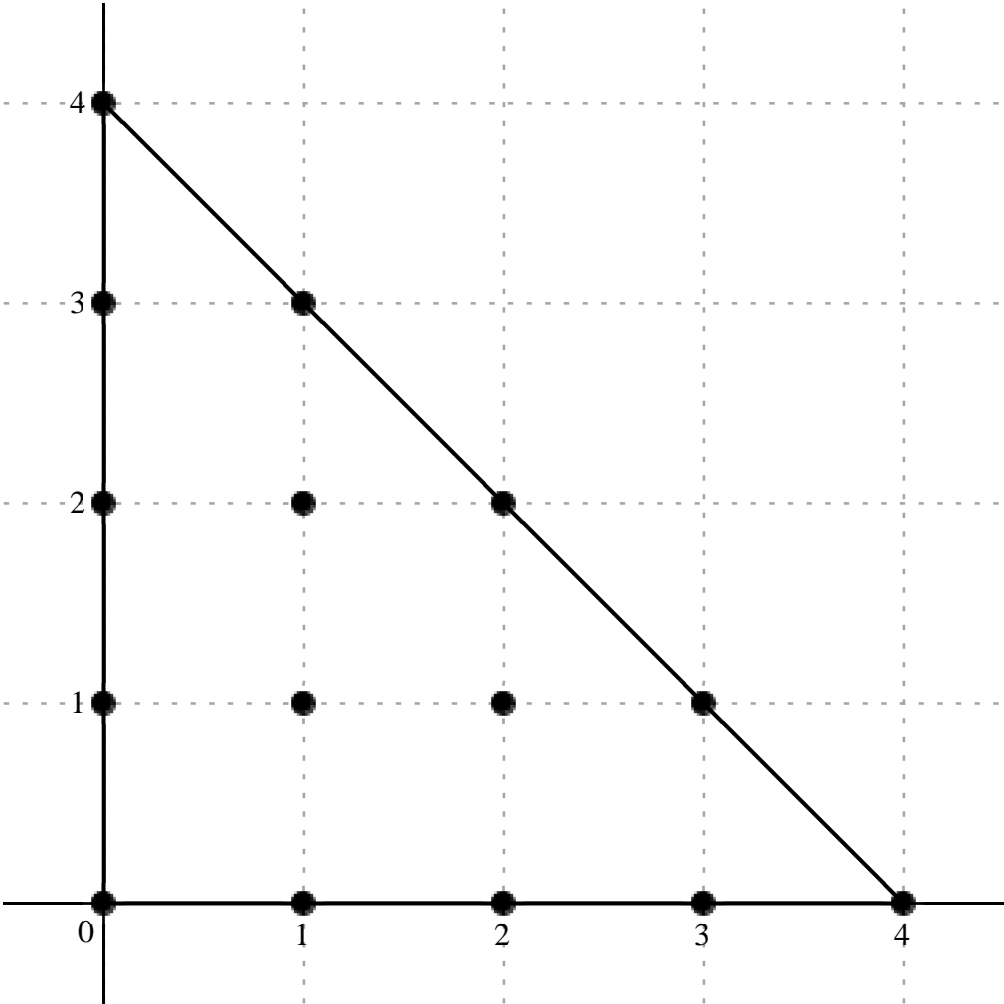
$$\text{Error order:}, 10, \text{ Error:}, 2.5180449354434641480 \times 10^{-43}, \text{ New Error:}, 2.5178070733659110957 \times 10^{-53}$$

$$\text{Error order:}, 10, \text{ Error:}, 2.5178070733659110957 \times 10^{-53}, \text{ New Error:}, 2.5177832863534449839 \times 10^{-63}$$

$$\text{Error order:}, 10, \text{ Error:}, 2.5177832863534449839 \times 10^{-63}, \text{ New Error:}, 2.5177809076441532225 \times 10^{-73}$$

$$x_o \neq h., \left[ \begin{array}{ccccc} 4 \text{ I} & & & & \\ 3 \text{ I} & 1 + 3 \text{ I} & & & \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & & \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} & \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccccccc} \frac{3277657}{265200} + \frac{1371389 \text{ I}}{176800} & & & & & & & & \\ \frac{253768}{975} + \frac{298972 \text{ I}}{325} & -\frac{287723}{195} + \frac{131667 \text{ I}}{65} & & & & & & & \\ \frac{3998331}{520} + \frac{4601241 \text{ I}}{520} & \frac{4820688}{65} - \frac{2127804 \text{ I}}{65} & \frac{864087}{80} - \frac{864087 \text{ I}}{80} & & & & & & \\ \frac{4820596}{255} - \frac{97940 \text{ I}}{51} & -\frac{675588}{5} + \frac{675588 \text{ I}}{5} & \frac{2127804}{65} - \frac{4820688 \text{ I}}{65} & -\frac{131667}{65} + \frac{287723 \text{ I}}{195} & & & & & \\ \frac{183127}{96} - \frac{183127 \text{ I}}{96} & \frac{97940}{51} - \frac{4820596 \text{ I}}{255} & -\frac{4601241}{520} - \frac{3998331 \text{ I}}{520} & -\frac{298972}{325} - \frac{253768 \text{ I}}{975} & -\frac{1371389}{176800} - \frac{3277657 \text{ I}}{265200} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{530400 \, \Delta x_{ol}^5} \big( (6555314 + 4114167 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (138049792 + 487922304 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (-782606560 + 1074402720 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (4078297620 + 4693265820 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (39336814080 - 17362880640 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (5728896810 - 5728896810 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (10026839680 - 1018576000 \, \mathrm{I}) \, u_{ol+1} + (-71666375040 + 71666375040 \, \mathrm{I}) \, u_{ol+1+1} + (17362880640 - 39336814080 \, \mathrm{I}) \, u_{ol+2+1} + (-1074402720 + 782606560 \, \mathrm{I}) \, u_{ol+3+1} + (1011776675 - 1011776675 \, \mathrm{I}) \, u_{ol} + (1018576000 - 10026839680 \, \mathrm{I}) \, u_{ol+1} - (4693265820 + 4078297620 \, \mathrm{I}) \, u_{ol+2} - (487922304 + 138049792 \, \mathrm{I}) \, u_{ol+3} - (4114167 + 6555314 \, \mathrm{I}) \, u_{ol+4} \big), \, O(\, \Delta x_{ol}^{10} \, )$$

Formula:, 402, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 6

Error order:, 9, Error:,  $1.0100048765787647705 \times 10^{-20}$ , New Error:,  $9.9059689971407876334 \times 10^{-30}$

Error order:, 9, Error:,  $9.9059689971407876334 \times 10^{-30}$ , New Error:,  $9.8866579812319291957 \times 10^{-39}$

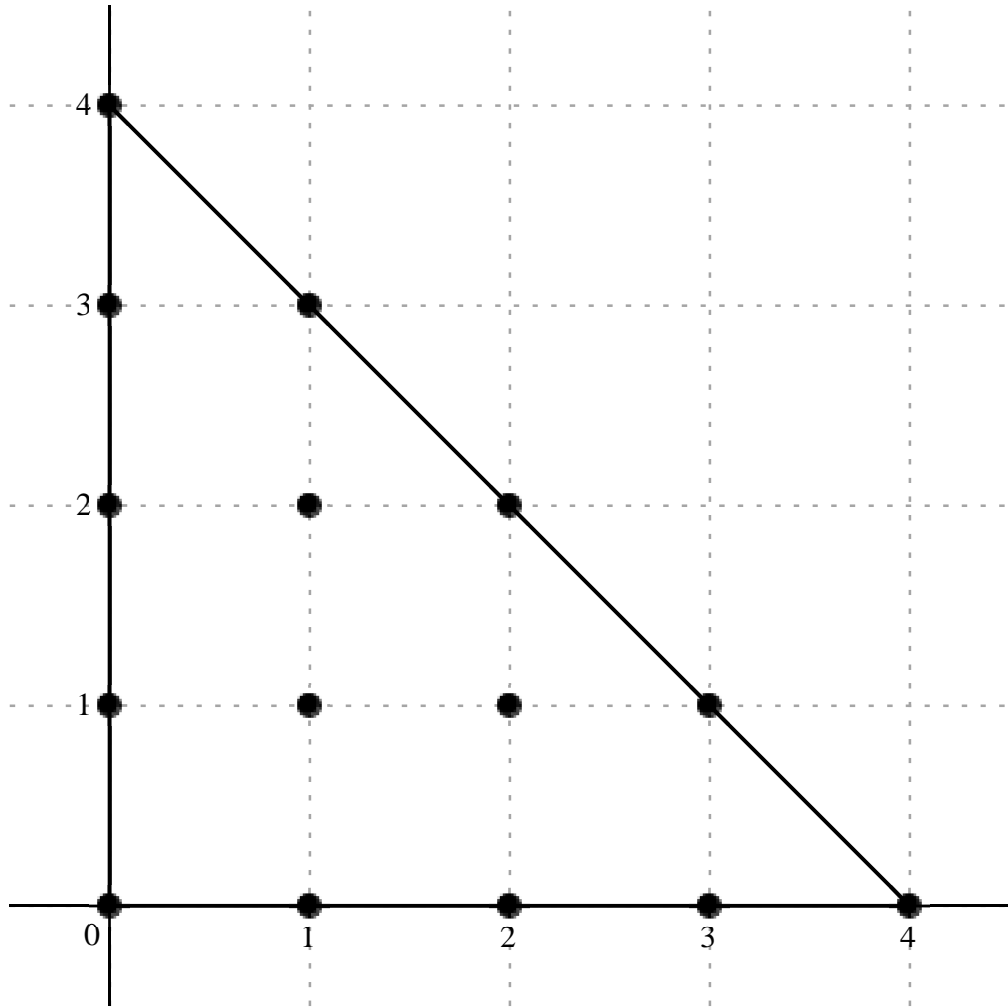
Error order:, 9, Error:,  $9.8866579812319291957 \times 10^{-39}$ , New Error:,  $9.8847278514179793869 \times 10^{-48}$

Error order:, 9, Error:,  $9.8847278514179793869 \times 10^{-48}$ , New Error:,  $9.8845348481564840588 \times 10^{-57}$

Error order:, 9, Error:,  $9.8845348481564840588 \times 10^{-57}$ , New Error:,  $9.8845155479275356492 \times 10^{-66}$

$$x_o + h \cdot \begin{bmatrix} 4 \text{ I} \\ 3 \text{ I} & 1 + 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ 0 & 1 & 2 & 3 & 4 \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{12135259}{176800} + \frac{2216153 \text{ I}}{176800} \\ -\frac{1233326}{325} - \frac{779602 \text{ I}}{325} & -\frac{190469}{130} - \frac{1511129 \text{ I}}{130} \\ -\frac{6849963}{130} - \frac{1877139 \text{ I}}{260} & -\frac{9210762}{65} + \frac{4427226 \text{ I}}{13} & \frac{2824227 \text{ I}}{40} \\ -\frac{928388}{17} + \frac{5008968 \text{ I}}{85} & -\frac{4187187 \text{ I}}{5} & \frac{9210762}{65} + \frac{4427226 \text{ I}}{13} & \frac{190469}{130} - \frac{1511129 \text{ I}}{130} \\ \frac{825769 \text{ I}}{80} & \frac{928388}{17} + \frac{5008968 \text{ I}}{85} & \frac{6849963}{130} - \frac{1877139 \text{ I}}{260} & \frac{1233326}{325} - \frac{779602 \text{ I}}{325} & \frac{12135259}{176800} + \frac{2216153 \text{ I}}{176800} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{176800 \, \Delta x_{ol}^6} \, \big( (-12135259 + 2216153 \, \mathrm{I}) \, u_{_{ol+4\mathrm{I}}} - (670929344 + 424103488 \, \mathrm{I}) \, u_{_{ol+3\mathrm{I}}} - (259037840 + 2055135440 \, \mathrm{I}) \, u_{_{ol+1+3\mathrm{I}}} - (9315949680 + 1276454520 \, \mathrm{I}) \, u_{_{ol+2\mathrm{I}}} + (-25053272640 + 60210273600 \, \mathrm{I}) \, u_{_{ol+1+2\mathrm{I}}} + 12483083340 \, \mathrm{I} u_{_{ol+2+2\mathrm{I}}} + (-9655235200 + 10418653440 \, \mathrm{I}) \, u_{_{ol+1}} - 148058932320 \, \mathrm{I} u_{_{ol+1+\mathrm{I}}} + (25053272640 + 60210273600 \, \mathrm{I}) \, u_{_{ol+2+1}} + (259037840 - 2055135440 \, \mathrm{I}) \, u_{_{ol+3+1}} + 1824949490 \, \mathrm{I} u_{_{ol}} + (9655235200 + 10418653440 \, \mathrm{I}) \, u_{_{ol+1}} + (9315949680 - 1276454520 \, \mathrm{I}) \, u_{_{ol+2}} + (670929344 - 424103488 \, \mathrm{I}) \, u_{_{ol+3}} + (12135259 + 2216153 \, \mathrm{I}) \, u_{_{ol+4}} \big), \, O( \, \Delta x_{ol}^9 \, )$$

Formula:, 403, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order:., 8, Error:.,  $4.7426523308659703344 \times 10^{-18}$ , New Error:.,  $4.6995860877181876701 \times 10^{-26}$

Error order:., 8, Error:.,  $4.6995860877181876701 \times 10^{-26}$ , New Error:.,  $4.6952647858909149524 \times 10^{-34}$

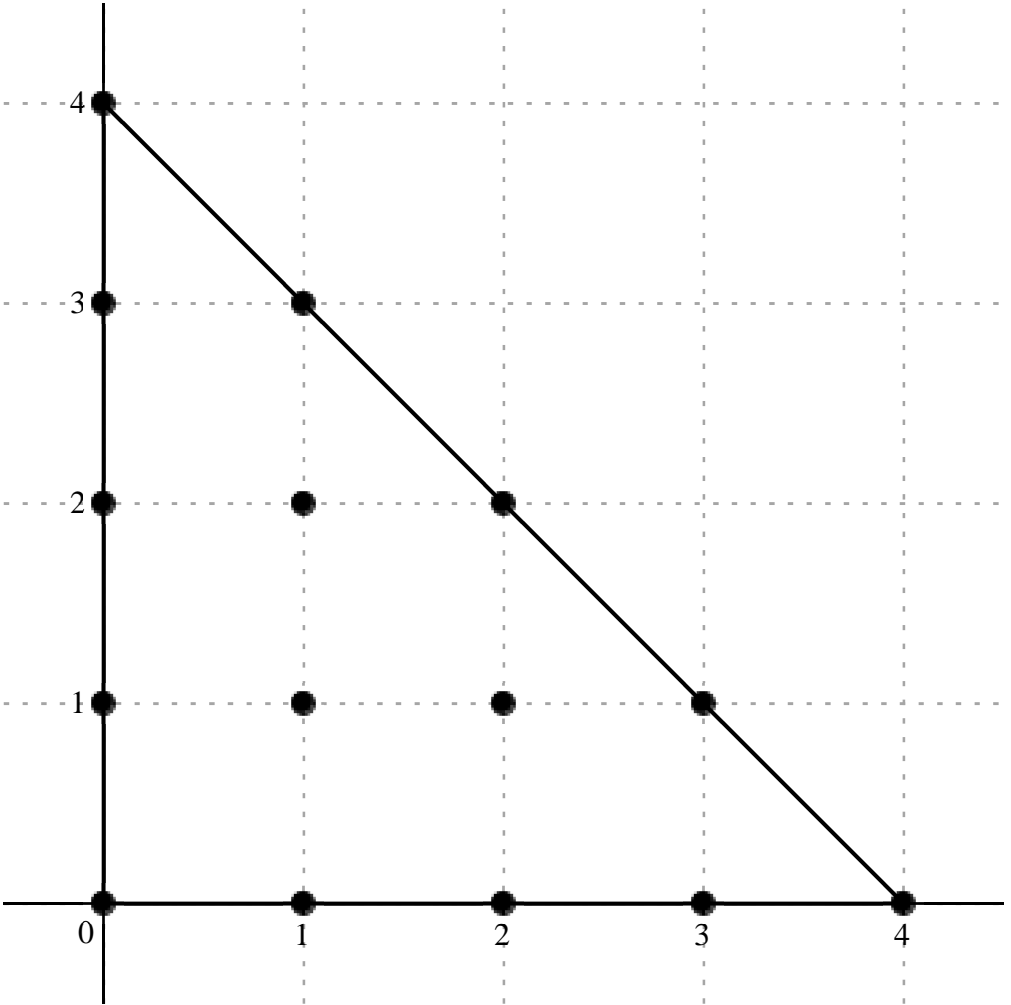
Error order:., 8, Error:.,  $4.6952647858909149524 \times 10^{-34}$ , New Error:.,  $4.6948325123607564172 \times 10^{-42}$

Error order:., 8, Error:.,  $4.6948325123607564172 \times 10^{-42}$ , New Error:.,  $4.6947892835776771904 \times 10^{-50}$

Error order:., 8, Error:.,  $4.6947892835776771904 \times 10^{-50}$ , New Error:.,  $4.6947849606850720432 \times 10^{-58}$

$$x_o \, + h \, . \, , \, \left[ \begin{array}{ccccc} 4 \, \mathrm{I} & & & & \\ 3 \, \mathrm{I} & 1 + 3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & 2 + 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & 3 + \mathrm{I} & \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} \frac{31335087}{176800} - \frac{20451207 \text{ I}}{88400} & & & & & & & & \\ \frac{5888106}{325} - \frac{975828 \text{ I}}{325} & \frac{4785837}{130} + \frac{3966501 \text{ I}}{130} & & & & & & & \\ \frac{90906921}{520} - \frac{60170859 \text{ I}}{520} & - \frac{34151418}{65} - \frac{88884936 \text{ I}}{65} & - \frac{16126929}{80} - \frac{16126929 \text{ I}}{80} & & & & & & \\ \frac{380478}{85} - \frac{5062050 \text{ I}}{17} & \frac{11356569}{5} + \frac{11356569 \text{ I}}{5} & - \frac{88884936}{65} - \frac{34151418 \text{ I}}{65} & \frac{3966501}{130} + \frac{4785837 \text{ I}}{130} & & & & & \\ - \frac{802011}{32} - \frac{802011 \text{ I}}{32} & - \frac{5062050}{17} + \frac{380478 \text{ I}}{85} & - \frac{60170859}{520} + \frac{90906921 \text{ I}}{520} & - \frac{975828}{325} + \frac{5888106 \text{ I}}{325} & - \frac{20451207}{88400} + \frac{31335087 \text{ I}}{176800} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{176800 \, \Delta x_{ol}^7} \, \big( 21 \, \big( (1492147 - 1947734 \, \text{I}) \, u_{ol+4 \text{I}} + (152529984 - 25278592 \, \text{I}) \, u_{ol+3 \text{I}} + (309939920 + 256878160 \, \text{I}) \, u_{ol+1+3 \text{I}} + ( \, 1471826340 - 974194860 \, \text{I}) \, u_{ol+2 \text{I}} - (4423421760 + 11512715520 \, \text{I}) \, u_{ol+1+2 \text{I}} - (1697167290 + 1697167290 \, \text{I}) \, u_{ol+2+2 \text{I}} + (37685440 - 2506920000 \, \text{I}) \, u_{ol+1 \text{I}} + (19122299040 \\ + 19122299040 \, \text{I}) \, u_{ol+1+1 \text{I}} - (11512715520 + 4423421760 \, \text{I}) \, u_{ol+2+1 \text{I}} + (256878160 + 309939920 \, \text{I}) \, u_{ol+3+1 \text{I}} - (211005275 + 211005275 \, \text{I}) \, u_{ol} + ( -2506920000 + 37685440 \, \text{I}) \, u_{ol+1} + ( -974194860 + 1471826340 \, \text{I}) \, u_{ol+2} + ( -25278592 + 152529984 \, \text{I}) \, u_{ol+3} + ( -1947734 + 1492147 \, \text{I}) \, u_{ol+4} \big) \big), \, O( \, \Delta x_{ol}^8 \, )$$

Formula:, 404, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 8

Error order:., 7, Error:., 1.4612802421317301824 × 10<sup>−15</sup>, New Error:., 1.4340687065247897078 × 10<sup>−22</sup>

Error order:., 7, Error:., 1.4340687065247897078 × 10<sup>−22</sup>, New Error:., 1.4313607869619338253 × 10<sup>−29</sup>

Error order:., 7, Error:., 1.4313607869619338253 × 10<sup>−29</sup>, New Error:., 1.4310901276342455234 × 10<sup>−36</sup>

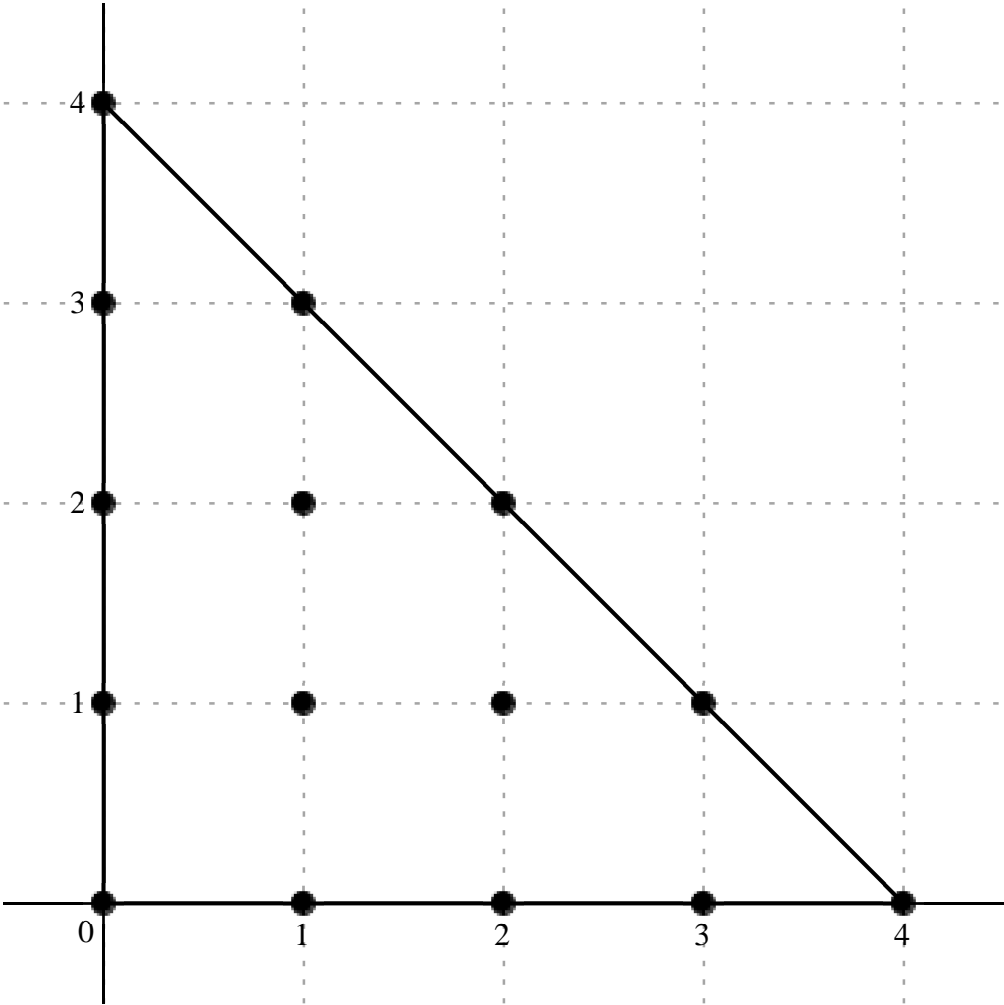
Error order:., 7, Error:., 1.4310901276342455234 × 10<sup>−36</sup>, New Error:., 1.4310630630280464562 × 10<sup>−43</sup>

Error order:., 7, Error:., 1.4310630630280464562 × 10<sup>−43</sup>, New Error:., 1.4310603565806925304 × 10<sup>−50</sup>



$$x_o \neq h \text{ , } \left[ \begin{array}{cccc} 4 \text{ I} & & & \\ 3 \text{ I} & 1+3 \text{ I} & & \\ 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} & \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} \frac{3609123}{44200} + \frac{46488309 \text{ I}}{44200} & & & & & & & \\ -\frac{13295688}{325} + \frac{16378824 \text{ I}}{325} & -\frac{10970106}{65} + \frac{655662 \text{ I}}{65} & & & & & & \\ -\frac{12040182}{65} + \frac{44772777 \text{ I}}{65} & \frac{296118648}{65} + \frac{140303016 \text{ I}}{65} & \frac{9981783}{10} & & & & & \\ \frac{10832304}{17} + \frac{61117056 \text{ I}}{85} & -\frac{53509428}{5} & \frac{296118648}{65} - \frac{140303016 \text{ I}}{65} & -\frac{10970106}{65} - \frac{655662 \text{ I}}{65} & & & & \\ & \frac{430563}{4} & \frac{10832304}{17} - \frac{61117056 \text{ I}}{85} & -\frac{12040182}{65} - \frac{44772777 \text{ I}}{65} & -\frac{13295688}{325} - \frac{16378824 \text{ I}}{325} & \frac{3609123}{44200} - \frac{46488309 \text{ I}}{44200} & & \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_o l^8} \, u(x_o l) = \frac{1}{44200 \, \Delta x_o l^8} \, \big( 21 \, \big( (171863 + 2213729 \, \mathrm{I}) \, u_{o l + 41} + (-86105408 + 106072384 \, \mathrm{I}) \, u_{o l + 31} + (-355222480 + 21230960 \, \mathrm{I}) \, u_{o l + 1 + 31} + (-389872560 + 1449785160 \, \mathrm{I}) \, u_{o l + 21} + (9588603840 + 4543145280 \, \mathrm{I}) \, u_{o l + 1 + 21} + 2100927660 \, u_{o l + 2 + 21} + (1341142400 + 1513374720 \, \mathrm{I}) \, u_{o l + 1} - 22524921120 \, u_{o l + 1 + 1} + (9588603840 - 4543145280 \, \mathrm{I}) \, u_{o l + 2 + 1} - (355222480 + 21230960 \, \mathrm{I}) \, u_{o l + 3 + 1} + 226558150 \, u_{o l} + (1341142400 - 1513374720 \, \mathrm{I}) \, u_{o l + 1} - (389872560 + 1449785160 \, \mathrm{I}) \, u_{o l + 2} - (86105408 + 106072384 \, \mathrm{I}) \, u_{o l + 3} + (171863 - 2213729 \, \mathrm{I}) \, u_{o l + 4} \big) \big) , \, O( \, \Delta x_o l^7 \, )$$

$$Variavel \, :, x_{ol} \, , \, Derivada \, de \, Ordem \, :, 9$$

$$Error \, order:, 6, \, Error:, 5.2530803287477079264 \times 10^{-13}, \, New \, Error:, 5.2072584409201900922 \times 10^{-19}$$

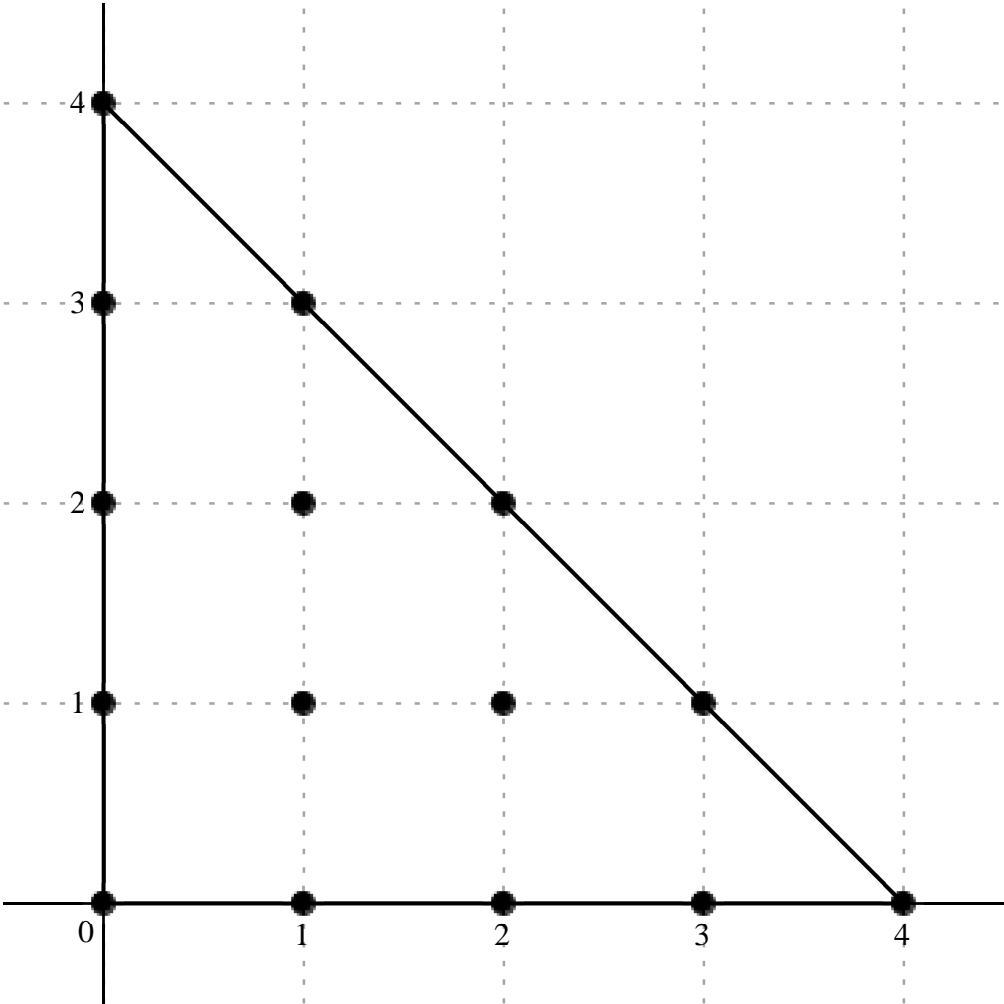
$$Error \, order:, 6, \, Error:, 5.2072584409201900922 \times 10^{-19}, \, New \, Error:, 5.2026611630983839307 \times 10^{-25}$$

$$Error \, order:, 6, \, Error:, 5.2026611630983839307 \times 10^{-25}, \, New \, Error:, 5.2022012878505585173 \times 10^{-31}$$

$$Error \, order:, 6, \, Error:, 5.2022012878505585173 \times 10^{-31}, \, New \, Error:, 5.2021552988545279767 \times 10^{-37}$$

$$Error \, order:, 6, \, Error:, 5.2021552988545279767 \times 10^{-37}, \, New \, Error:, 5.2021506999402158495 \times 10^{-43}$$

$$c =, \begin{bmatrix} -\frac{25921539}{11050} - \frac{12519171 \, I}{5525} & & & & & & & & \\ -\frac{2531088}{325} - \frac{63448056 \, I}{325} & \frac{22897728}{65} - \frac{24041556 \, I}{65} & & & & & & & \\ -\frac{60089526}{65} - \frac{120197196 \, I}{65} & -\frac{914929344}{65} + \frac{302537592 \, I}{65} & -\frac{10567746}{5} + \frac{10567746 \, I}{5} & & & & & & \\ -\frac{224959896}{85} - \frac{4489128 \, I}{17} & \frac{107963604}{5} - \frac{107963604 \, I}{5} & -\frac{302537592}{65} + \frac{914929344 \, I}{65} & \frac{24041556}{65} - \frac{22897728 \, I}{65} & & & & & \\ -\frac{401247}{2} + \frac{401247 \, I}{2} & \frac{4489128}{17} + \frac{224959896 \, I}{85} & \frac{120197196}{65} + \frac{60089526 \, I}{65} & \frac{63448056}{325} + \frac{2531088 \, I}{325} & \frac{12519171}{5525} + \frac{25921539 \, I}{11050} & & & & \end{bmatrix}$$



$$\frac{d^9}{dx_{ol}^9} \, u(x_{ol}) = \frac{1}{11050 \, \Delta x_{ol}^9} \Big( 189 \, \Big( -(137151 + 132478 \, I) \, u_{ol+41} - (455328 + 11413936 \, I) \, u_{ol+31} + (20595840 - 21624680 \, I) \, u_{ol+1+31} - (54048780 + 108113880 \, I) \, u_{ol+21} + (-822952320 + 272123760 \, I) \, u_{ol+1+21} + (-123569940 + 123569940 \, I) \, u_{ol+2+21} - (154734320 + 15438800 \, I) \, u_{ol+1} + (1262431560 - 1262431560 \, I) \, u_{ol+1+1}$$

$$+ (-272123760 + 822952320 \, I) \, u_{ol+2+1} + (21624680 - 20595840 \, I) \, u_{ol+3+1} + (-11729575 + 11729575 \, I) \, u_{ol} + (15438800 + 154734320 \, I) \, u_{ol+1} + (108113880 + 54048780 \, I) \, u_{ol+2} + (11413936 + 455328 \, I) \, u_{ol+3} + (132478 + 137151 \, I) \, u_{ol+4} \Big) \Big), \, O(\, \Delta x_{ol}^6 \, )$$

Formula:, 406, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

*Error order:*, 5, *Error:*,  $1.2070819834967956254 \times 10^{-10}$ , *New Error:*,  $1.1857640284302388289 \times 10^{-15}$

*Error order:*, 5, *Error:*,  $1.1857640284302388289 \times 10^{-15}$ , *New Error:*,  $1.1836421722669402867 \times 10^{-20}$

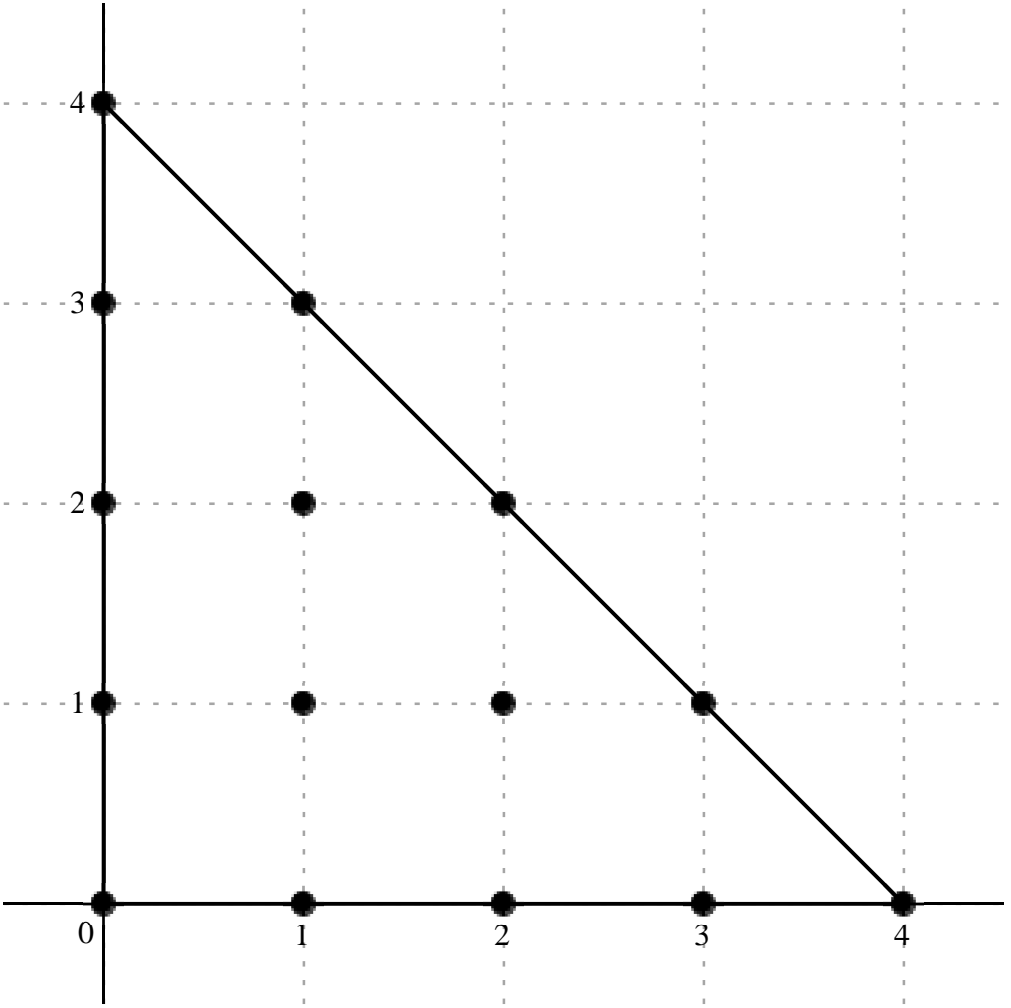
*Error order:*, 5, *Error:*,  $1.1836421722669402867 \times 10^{-20}$ , *New Error:*,  $1.1834300862530473486 \times 10^{-25}$

*Error order:*, 5, *Error:*,  $1.1834300862530473486 \times 10^{-25}$ , *New Error:*,  $1.1834088786478880398 \times 10^{-30}$

*Error order:*, 5, *Error:*,  $1.1834088786478880398 \times 10^{-30}$ , *New Error:*,  $1.1834067578973346141 \times 10^{-35}$

$$x_o \neq h., \left[ \begin{array}{ccccc} 4\text{I} & & & & \\ 3\text{I} & 1+3\text{I} & & & \\ 2\text{I} & 1+2\text{I} & 2+2\text{I} & & \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = \left[ \begin{array}{cccccccc} \frac{37154943}{4420} + \frac{1846719 \text{ I}}{4420} & & & & & & & \\ \frac{21900816}{65} + \frac{23087232 \text{ I}}{65} & -\frac{215460}{13} + \frac{16762788 \text{ I}}{13} & & & & & & \\ \frac{60363954}{13} + \frac{23977296 \text{ I}}{13} & \frac{222735744}{13} - \frac{418191984 \text{ I}}{13} & -7488369 \text{ I} & & & & & \\ \frac{83507760}{17} - \frac{63676368 \text{ I}}{17} & 72970632 \text{ I} & -\frac{222735744}{13} - \frac{418191984 \text{ I}}{13} & \frac{215460}{13} + \frac{16762788 \text{ I}}{13} & & & & \\ & -\frac{1265229 \text{ I}}{2} & -\frac{83507760}{17} - \frac{63676368 \text{ I}}{17} & -\frac{60363954}{13} + \frac{23977296 \text{ I}}{13} & -\frac{21900816}{65} + \frac{23087232 \text{ I}}{65} & -\frac{37154943}{4420} + \frac{1846719 \text{ I}}{4420} & & \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\,u(x_{ol})=\frac{1}{4420\,\Delta x_{ol}^{10}}\left(63\left((589761+29313\,\mathrm{I})\,u_{ol+4\mathrm{I}}+(23638976+24919552\,\mathrm{I})\,u_{ol+3\mathrm{I}}+(-1162800+90465840\,\mathrm{I})\,u_{ol+1+3\mathrm{I}}+(325773720+129401280\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(1202065920-2256909120\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}-525374460\,\mathrm{I}u_{ol+2+2\mathrm{I}}+(344635200-262791360\,\mathrm{I})\,u_{ol+1}+5119526880\,\mathrm{I}u_{ol+1+1}-(1202065920\right.$$
  
$$\left.+2256909120\,\mathrm{I})\,u_{ol+2+1}+(1162800+90465840\,\mathrm{I})\,u_{ol+3+1}-44383430\,\mathrm{I}u_{ol}-(344635200+262791360\,\mathrm{I})\,u_{ol+1}+(-325773720+129401280\,\mathrm{I})\,u_{ol+2}+(-23638976+24919552\,\mathrm{I})\,u_{ol+3}+(-589761+29313\,\mathrm{I})\,u_{ol+4}\right)\Big),\,\,O(\,\Delta x_{ol}^5\,)$$

Formula:, 407, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 11

Error order:., 4, Error:.,  $3.1162915556340351176\times 10^{-8}$ , New Error:.,  $3.0910471632622963486\times 10^{-12}$

Error order:., 4, Error:.,  $3.0910471632622963486\times 10^{-12}$ , New Error:.,  $3.0885148734376620763\times 10^{-16}$

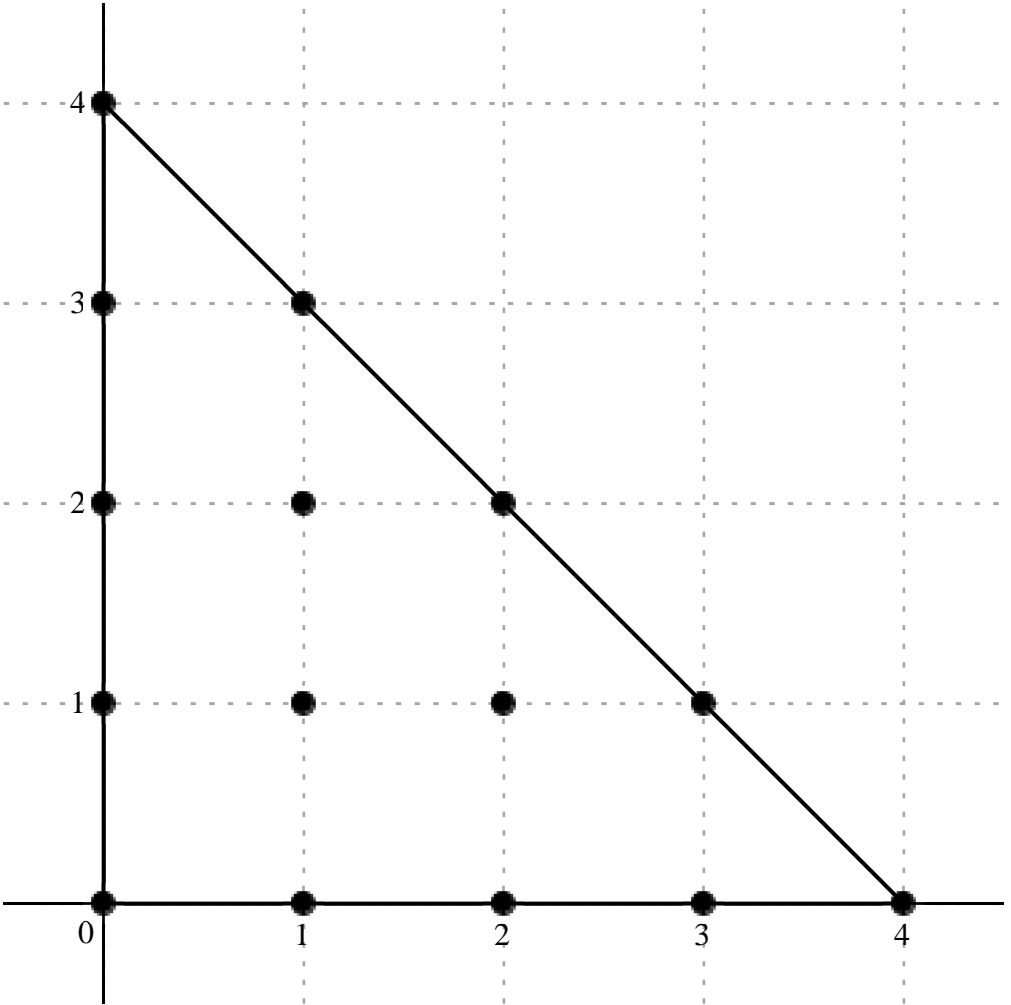
Error order:., 4, Error:.,  $3.0885148734376620763\times 10^{-16}$ , New Error:.,  $3.0882615676540536570\times 10^{-20}$

Error order:., 4, Error:.,  $3.0882615676540536570\times 10^{-20}$ , New Error:.,  $3.0882362363093782951\times 10^{-24}$

Error order:., 4, Error:.,  $3.0882362363093782951\times 10^{-24}$ , New Error:.,  $3.0882337031672493098\times 10^{-28}$

$$x_o+h\cdot,\left[\begin{array}{ccccc}4\,\mathrm{I}&&&&\\3\,\mathrm{I}&1+3\,\mathrm{I}&&&\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&&\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}&\\0&1&2&3&4\end{array}\right]$$

$$c = \begin{bmatrix} -\frac{30514869}{2210} + \frac{11859309 \text{ I}}{1105} \\ -\frac{63800352}{65} - \frac{6076224 \text{ I}}{65} & -\frac{22857912}{13} - \frac{25385976 \text{ I}}{13} \\ -\frac{118640214}{13} + \frac{43771266 \text{ I}}{13} & \frac{253272096}{13} + \frac{905712192 \text{ I}}{13} & 10721403 + 10721403 \text{ I} \\ -\frac{32399136}{17} + \frac{194816160 \text{ I}}{17} & -99692208 - 99692208 \text{ I} & \frac{905712192}{13} + \frac{253272096 \text{ I}}{13} & -\frac{25385976}{13} - \frac{22857912 \text{ I}}{13} \\ \frac{1625085}{2} + \frac{1625085 \text{ I}}{2} & \frac{194816160}{17} - \frac{32399136 \text{ I}}{17} & \frac{43771266}{13} - \frac{118640214 \text{ I}}{13} & -\frac{6076224}{65} - \frac{63800352 \text{ I}}{65} & \frac{11859309}{1105} - \frac{30514869 \text{ I}}{2210} \end{bmatrix}$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d} x_{o l}^{11}} \; u(x_{o l}) = \frac{1}{2210 \; \Delta x_{o l}^{11}} \left( 693 \left( \left( -44033 + 34226 \; \text{I} \right) u_{o l + 4 \text{ I}} - \left( 3130176 + 298112 \; \text{I} \right) u_{o l + 3 \text{ I}} - \left( 5607280 + 6227440 \; \text{I} \right) u_{o l + 1 + 3 \text{ I}} + \left( -29103660 + 10737540 \; \text{I} \right) u_{o l + 2 \text{ I}} + \left( 62130240 + 222180480 \; \text{I} \right) u_{o l + 1 + 2 \text{ I}} + \left( 34190910 + 34190910 \; \text{I} \right) u_{o l + 2 + 2 \text{ I}} + \left( -6077760 + 36545600 \; \text{I} \right) u_{o l + 1} - \left( 317921760 + 317921760 \; \text{I} \right) u_{o l + 1 + 1} + \left( 222180480 \right. \right. \\ \left. \left. + 62130240 \; \text{I} \right) u_{o l + 2 + 1} - \left( 6227440 + 5607280 \; \text{I} \right) u_{o l + 3 + 1} + \left( 2591225 + 2591225 \; \text{I} \right) u_{o l} + \left( 36545600 - 6077760 \; \text{I} \right) u_{o l + 1} + \left( 10737540 - 29103660 \; \text{I} \right) u_{o l + 2} - \left( 298112 + 3130176 \; \text{I} \right) u_{o l + 3} + \left( 34226 - 44033 \; \text{I} \right) u_{o l + 4} \right) \Big) , \; O( \; \Delta x_{o l}^4 \; )$$

Formula: , 408, Var.: 1

Variavel : , x\_{o l} , Derivada de Ordem : , 12

Error order.: 3, Error: 4.8382536344979164960 × 10−6, New Error.: 4.7617510855971119710 × 10−9

Error order.: 3, Error: 4.7617510855971119710 × 10−9, New Error.: 4.7541338633909254354 × 10−12

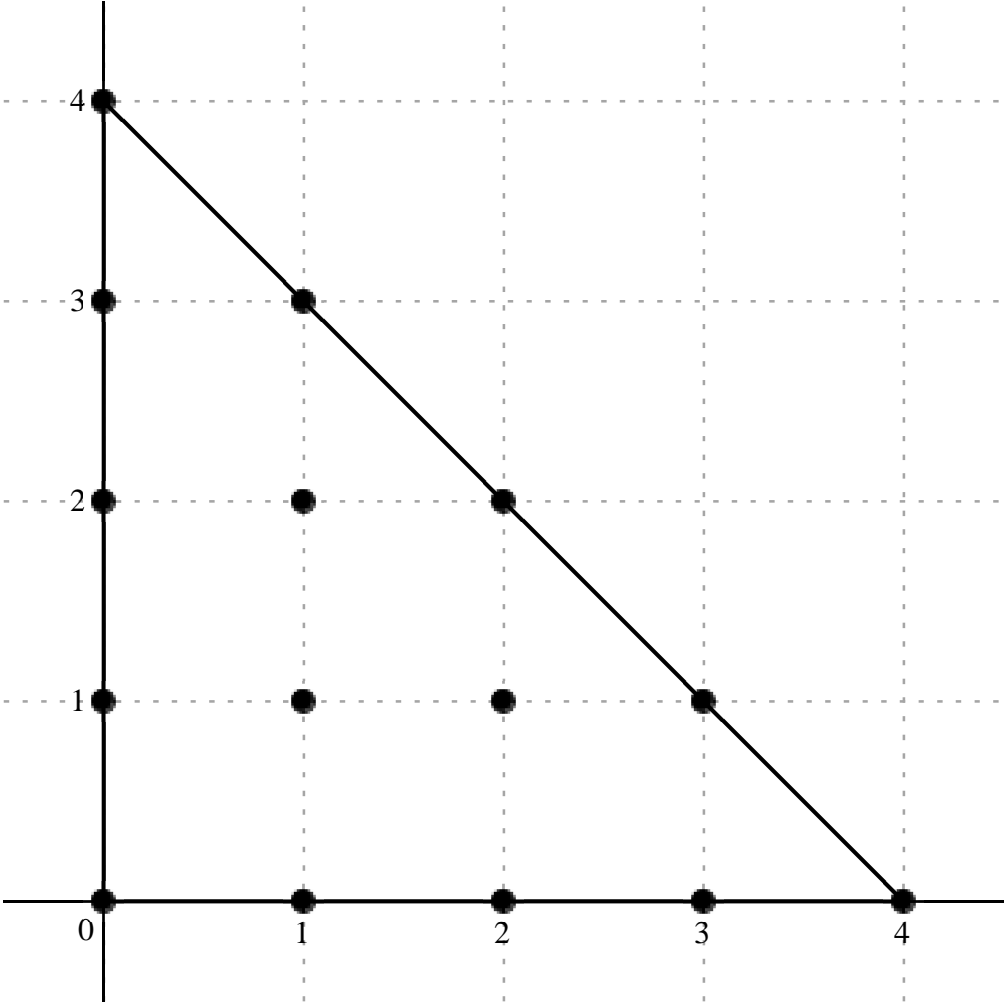
Error order.: 3, Error: 4.7541338633909254354 × 10−12, New Error.: 4.7533724721512919114 × 10−15

Error order.: 3, Error: 4.7533724721512919114 × 10−15, New Error.: 4.7532963363377824586 × 10−18

Error order.: 3, Error: 4.7532963363377824586 × 10−18, New Error.: 4.7532887227895366953 × 10−21

$$c = , \left[ \begin{array}{cccccc} \frac{372141}{65} - \frac{1752597 \, \mathrm{i}}{65} & & & & & \\ \frac{79700544}{65} - \frac{56814912 \, \mathrm{i}}{65} & \frac{52789968}{13} + \frac{5022864 \, \mathrm{i}}{13} & & & & \\ \frac{87118416}{13} - \frac{165704616 \, \mathrm{i}}{13} & - \frac{1222651584}{13} - \frac{726884928 \, \mathrm{i}}{13} & -23426172 & & & \\ -9313920 - 13837824 \, \mathrm{i} & 207766944 & - \frac{1222651584}{13} + \frac{726884928 \, \mathrm{i}}{13} & \frac{52789968}{13} - \frac{5022864 \, \mathrm{i}}{13} & & \\ -1600830 & -9313920 + 13837824 \, \mathrm{i} & \frac{87118416}{13} + \frac{165704616 \, \mathrm{i}}{13} & \frac{79700544}{65} + \frac{56814912 \, \mathrm{i}}{65} & \frac{372141}{65} + \frac{1752597 \, \mathrm{i}}{65} & \end{array} \right]$$

$$x_o + h . , \left[ \begin{array}{cccc} 4 \, \mathrm{i} & & & \\ 3 \, \mathrm{i} & 1 + 3 \, \mathrm{i} & & \\ 2 \, \mathrm{i} & 1 + 2 \, \mathrm{i} & 2 + 2 \, \mathrm{i} & \\ \mathrm{i} & 1 + \mathrm{i} & 2 + \mathrm{i} & 3 + \mathrm{i} \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d} x_{o l}^{12}} \, u(x_{o l}) = \frac{1}{65 \, \Delta x_{o l}^{12}} \Big( 2079 \, \Big( (179 - 843 \, \mathrm{i}) \, u_{o l + 4 \, \mathrm{i}} + (38336 - 27328 \, \mathrm{i}) \, u_{o l + 3 \, \mathrm{i}} + (126960 + 12080 \, \mathrm{i}) \, u_{o l + 1 + 3 \, \mathrm{i}} + (209520 - 398520 \, \mathrm{i}) \, u_{o l + 2 \, \mathrm{i}} - (2940480 + 1748160 \, \mathrm{i}) \, u_{o l + 1 + 2 \, \mathrm{i}} - 732420 \, u_{o l + 2 + 2 \, \mathrm{i}} - (291200 + 432640 \, \mathrm{i}) \, u_{o l + 1} + 6495840 \, u_{o l + 1 + 1} + (-2940480 + 1748160 \, \mathrm{i}) \, u_{o l + 2 + 1} + (126960 - 12080 \, \mathrm{i}) \, u_{o l + 3 + 1} - 50050 \, u_{o l} \\ + (-291200 + 432640 \, \mathrm{i}) \, u_{o l + 1} + (209520 + 398520 \, \mathrm{i}) \, u_{o l + 2} + (38336 + 27328 \, \mathrm{i}) \, u_{o l + 3} + (179 + 843 \, \mathrm{i}) \, u_{o l + 4} \Big) \Big) , \, O( \, \Delta x_{o l}^{\, 3} \, )$$

$$\text{Variavel } :, x_{ol}, \text{ Derivada de Ordem } :, 13$$

$$\text{Error order:}, 2, \text{ Error:}, 0.00076900941736041161555, \text{ New Error:}, 7.6385059432798403518 \times 10^{-6}$$

$$\text{Error order:}, 2, \text{ Error:}, 7.6385059432798403518 \times 10^{-6}, \text{ New Error:}, 7.6333328548565272172 \times 10^{-8}$$

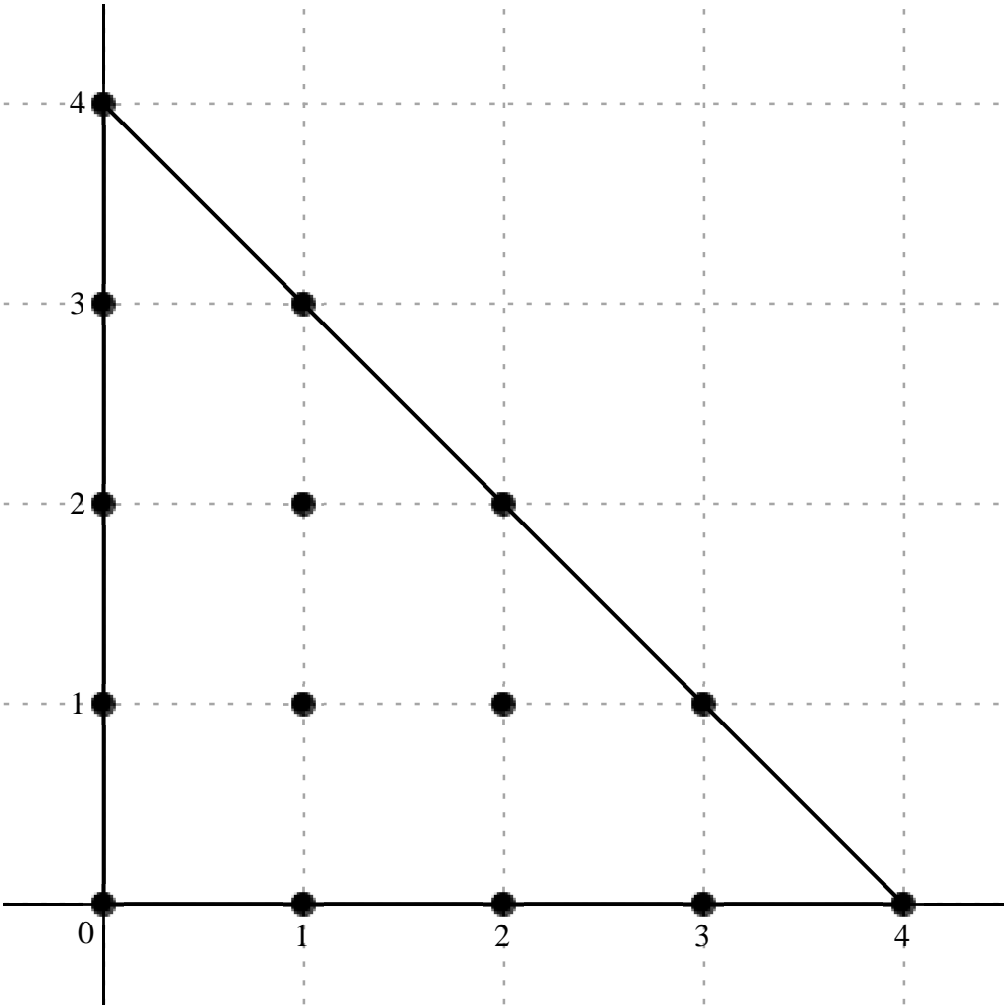
$$\text{Error order:}, 2, \text{ Error:}, 7.6333328548565272172 \times 10^{-8}, \text{ New Error:}, 7.6328154062213605901 \times 10^{-10}$$

$$\text{Error order:}, 2, \text{ Error:}, 7.6328154062213605901 \times 10^{-10}, \text{ New Error:}, 7.6327636599627643680 \times 10^{-12}$$

$$\text{Error order:}, 2, \text{ Error:}, 7.6327636599627643680 \times 10^{-12}, \text{ New Error:}, 7.6327584853229567977 \times 10^{-14}$$

$$x_o \neq h \text{ , } \left[ \begin{array}{ccccc} 4 \text{ I} & & & & \\ 3 \text{ I} & 1 + 3 \text{ I} & & & \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & & \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} & \\ 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccc} \frac{1155924}{85} + \frac{2220372 \text{ I}}{85} & & & & & & \\ -\frac{1862784}{5} + \frac{7584192 \text{ I}}{5} & -3459456 + 2594592 \text{ I} & & & & & \\ 3592512 + 14070672 \text{ I} & 110170368 - 25147584 \text{ I} & 17513496 - 17513496 \text{ I} & & & & \\ \frac{271567296}{17} + \frac{60540480 \text{ I}}{17} & -147891744 + 147891744 \text{ I} & 25147584 - 110170368 \text{ I} & -2594592 + 3459456 \text{ I} & & & \\ 1081080 - 1081080 \text{ I} & -\frac{60540480}{17} - \frac{271567296 \text{ I}}{17} & -14070672 - 3592512 \text{ I} & -\frac{7584192}{5} + \frac{1862784 \text{ I}}{5} & -\frac{2220372}{85} - \frac{1155924 \text{ I}}{85} & & \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d} x_{ol}^{13}}\; u(x_{ol}) = \frac{1}{85 \; \Delta x_{ol}^{13}} \Big( 8316 \Big( (139 + 267 \; \mathrm{I}) \; u_{ol+41} + (-3808 + 15504 \; \mathrm{I}) \; u_{ol+31} + (-35360 + 26520 \; \mathrm{I}) \; u_{ol+1+31} + (36720 + 143820 \; \mathrm{I}) \; u_{ol+21} + (1126080 - 257040 \; \mathrm{I}) \; u_{ol+1+21} + (179010 - 179010 \; \mathrm{I}) \; u_{ol+2+21} + (163280 + 36400 \; \mathrm{I}) \; u_{ol+1} + (-1511640 + 1511640 \; \mathrm{I}) \; u_{ol+1+1} + (257040 - 1126080 \; \mathrm{I}) \; u_{ol+2+1} + (-26520 + 35360 \; \mathrm{I}) \; u_{ol+3+1} + (11050 - 11050 \; \mathrm{I}) \; u_{ol} - (36400 + 163280 \; \mathrm{I}) \; u_{ol+1} - (143820 + 36720 \; \mathrm{I}) \; u_{ol+2} + (-15504 + 3808 \; \mathrm{I}) \; u_{ol+3} - (267 + 139 \; \mathrm{I}) \; u_{ol+4} \Big) \Big) , \; O( \; \Delta x_{ol}^{\; 2} \; )$$

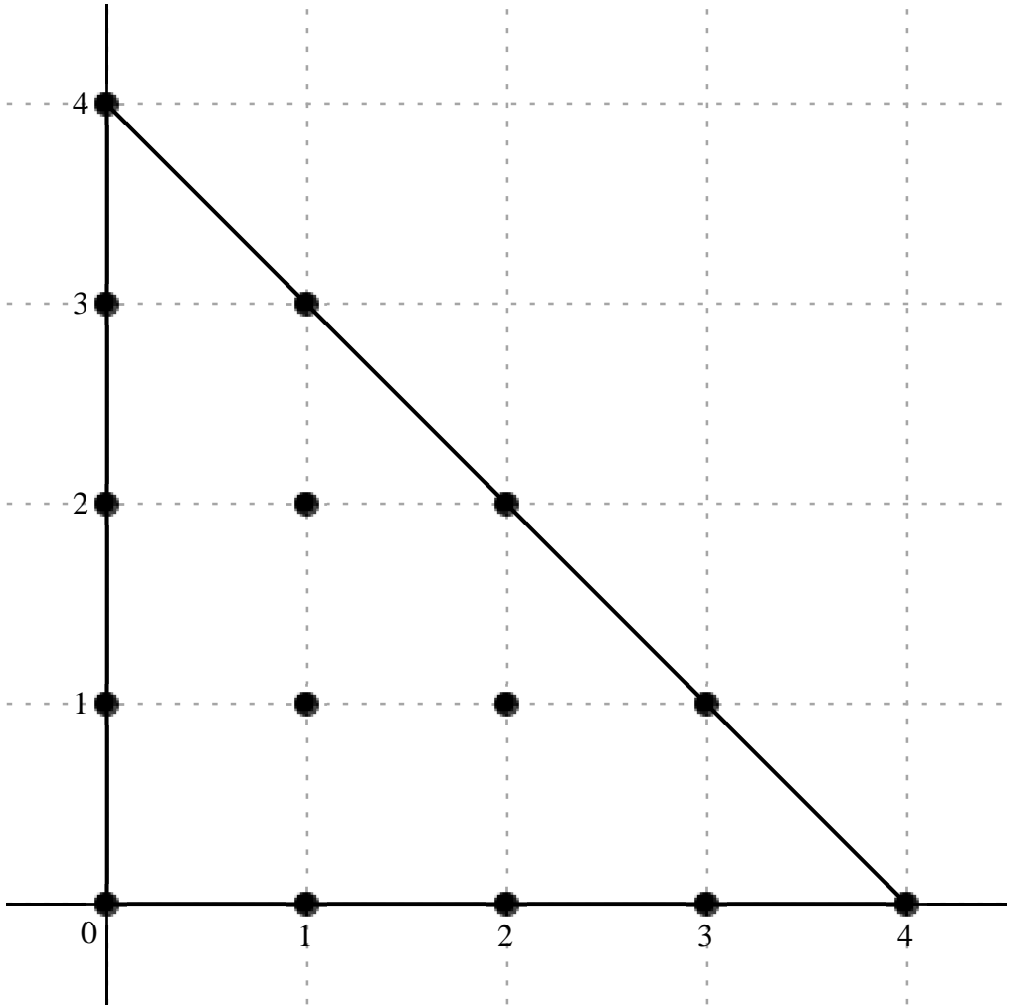
Formula:, 410, Var.: 1

Variavel :,  $x_o$ !, Derivada de Ordem :, 14

Error order:, 1, Error:, 0.061696085453383676097, New Error:, 0.0061048831241675612191  
Error order:, 1, Error:, 0.0061048831241675612191, New Error:, 0.00060984336235147084938  
Error order:, 1, Error:, 0.00060984336235147084938, New Error:, 0.000060977889042681613762  
Error order:, 1, Error:, 0.000060977889042681613762, New Error:,  $6.0977244346520924191 \times 10^{-6}$   
Error order:, 1, Error:,  $6.0977244346520924191 \times 10^{-6}$ , New Error:,  $6.0977179877135717788 \times 10^{-7}$

$$x_o + h., \begin{bmatrix} 4 \text{ I} \\ 3 \text{ I} & 1 + 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ 0 & 1 & 2 & 3 & 4 \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{1251558}{85} - \frac{553014 \text{ I}}{85} & & & & \\ -\frac{1862784}{5} - \frac{3725568 \text{ I}}{5} & 465696 - 2328480 \text{ I} & & & \\ -6286896 - 4191264 \text{ I} & -33530112 + 50295168 \text{ I} & 13621608 \text{ I} & & \\ -\frac{121080960}{17} + \frac{72648576 \text{ I}}{17} & -108972864 \text{ I} & 33530112 + 50295168 \text{ I} & -465696 - 2328480 \text{ I} & \\ 756756 \text{ I} & \frac{121080960}{17} + \frac{72648576 \text{ I}}{17} & 6286896 - 4191264 \text{ I} & \frac{1862784}{5} - \frac{3725568 \text{ I}}{5} & \frac{1251558}{85} - \frac{553014 \text{ I}}{85} \end{bmatrix}$$





$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}}\;u(x_{ol})=\frac{1}{85\,\mathcal{A}_{ol}^{14}}\Big(29106\left(-(43+19\,\mathrm{I})\,u_{ol+4\mathrm{I}}-(1088+2176\,\mathrm{I})\,u_{ol+3\mathrm{I}}+(1360-6800\,\mathrm{I})\,u_{ol+1+3\mathrm{I}}-(18360+12240\,\mathrm{I})\,u_{ol+2\mathrm{I}}+( -97920+146880\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+39780\,\mathrm{I}u_{ol+2+2\mathrm{I}}+( -20800+12480\,\mathrm{I})\,u_{ol+1}-318240\,\mathrm{I}u_{ol+1+1\mathrm{I}}+(97920+146880\,\mathrm{I})\,u_{ol+2+1\mathrm{I}}-(1360+6800\,\mathrm{I})\,u_{ol+3+1\mathrm{I}}+2210\,\mathrm{I}u_{ol}+(20800+12480\,\mathrm{I})\,u_{ol+1}\right.\\ \left.+(18360-12240\,\mathrm{I})\,u_{ol+2}+(1088-2176\,\mathrm{I})\,u_{ol+3}+(43-19\,\mathrm{I})\,u_{ol+4}\right)\Big),\;O(\;\mathcal{A}_{ol}\;)$$

Formula:, 411, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 1

Error order:, 14, Error:, 1.1320942684783649160 × 10−34, New Error:, 1.1491765408604711942 × 10−48

Error order:, 14, Error:, 1.1491765408604711942 × 10−48, New Error:, 1.1508887438084058583 × 10−62

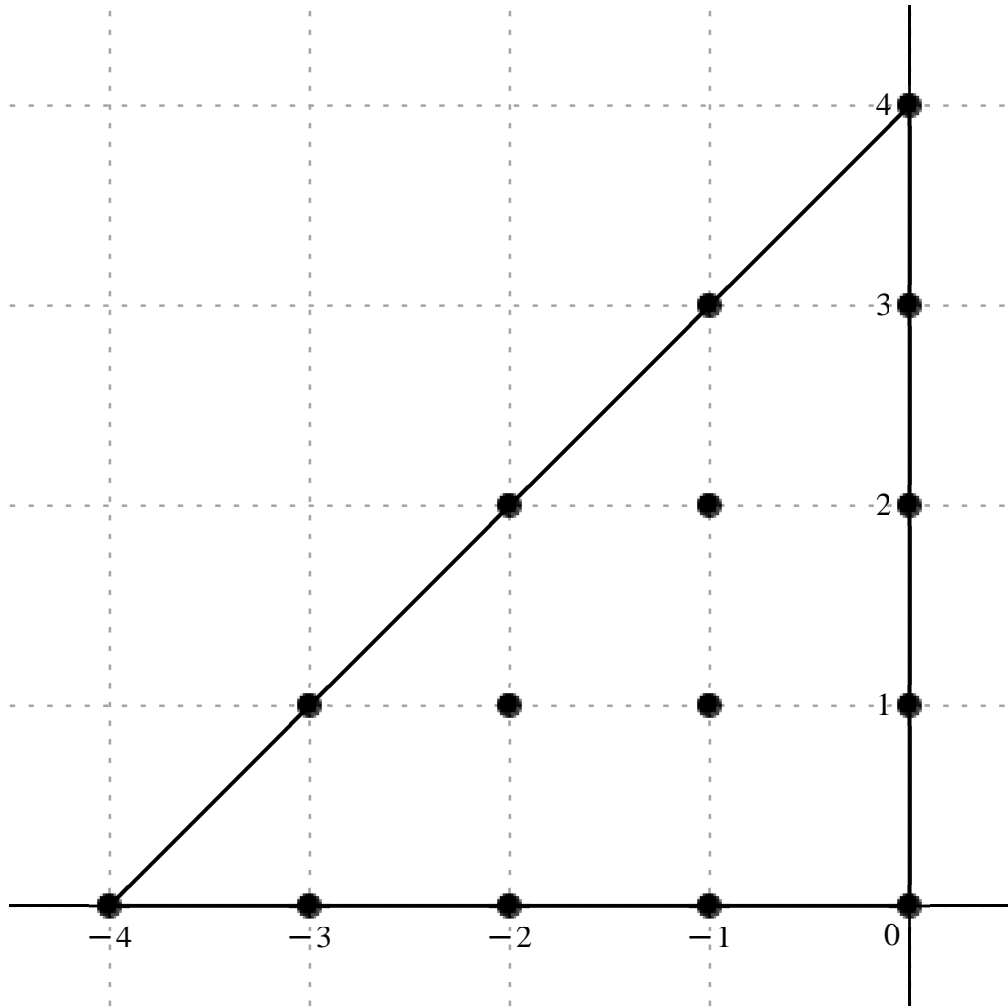
Error order:, 14, Error:, 1.1508887438084058583 × 10−62, New Error:, 1.1510600032260864572 × 10−76

Error order:, 14, Error:, 1.1510600032260864572 × 10−76, New Error:, 1.1510771295584441770 × 10−90

Error order:, 14, Error:, 1.1510771295584441770 × 10−90, New Error:, 1.1510788421955852059 × 10−104

$$x_o\;+h\;, \left[\begin{array}{cccccc} & & & & & 4\,\mathrm{I} \\ & & & & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ & & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & \\ & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & \\ -4 & -3 & -2 & -1 & 0 & \end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} & & & & & \frac{43}{8840}-\frac{19\,\mathrm{I}}{8840} \\ & & & & -\frac{32}{65}-\frac{56\,\mathrm{I}}{65} & \frac{32}{195}-\frac{64\,\mathrm{I}}{195} \\ & & \frac{9}{2}+\frac{9\,\mathrm{I}}{2} & \frac{2016}{65}+\frac{1152\,\mathrm{I}}{65} & \frac{54}{13}-\frac{36\,\mathrm{I}}{13} & \\ & -\frac{56}{65}-\frac{32\,\mathrm{I}}{65} & \frac{1152}{65}+\frac{2016\,\mathrm{I}}{65} & -72-72\,\mathrm{I} & \frac{160}{17}+\frac{96\,\mathrm{I}}{17} & \\ -\frac{19}{8840}+\frac{43\,\mathrm{I}}{8840} & -\frac{64}{195}+\frac{32\,\mathrm{I}}{195} & -\frac{36}{13}+\frac{54\,\mathrm{I}}{13} & \frac{96}{17}+\frac{160\,\mathrm{I}}{17} & \frac{23}{6}+\frac{23\,\mathrm{I}}{6} & \end{array}\right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{1}{26520\,\Delta x_{ol}}\, \big( (129 - 57\,\mathrm{I})\, u_{ol+4\mathrm{I}} - (13056 + 22848\,\mathrm{I})\, u_{ol-1+3\mathrm{I}} + (4352 - 8704\,\mathrm{I})\, u_{ol+3\mathrm{I}} + (119340 + 119340\,\mathrm{I})\, u_{ol-2+2\mathrm{I}} + (822528 + 470016\,\mathrm{I})\, u_{ol-1+2\mathrm{I}} + (110160 - 73440\,\mathrm{I})\, u_{ol+2\mathrm{I}} - (22848 + 13056\,\mathrm{I})\, u_{ol-3+1} + (470016 + 822528\,\mathrm{I})\, u_{ol-2+1} - (1909440 + 1909440\,\mathrm{I})\, u_{ol-1+1} + (249600 + 149760\,\mathrm{I})\, u_{ol+1} + (-57 + 129\,\mathrm{I})\, u_{ol-4} + (-8704 + 4352\,\mathrm{I})\, u_{ol-3} + (-73440 + 110160\,\mathrm{I})\, u_{ol-2} + (149760 + 249600\,\mathrm{I})\, u_{ol-1} + (101660 + 101660\,\mathrm{I})\, u_{ol} \big),\, O(\,\Delta x_{ol}^{14}\,)$$

Formula:, 412, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 2

Error order:, 13, Error:, 9.6473707201573191346 × 10<sup>−32</sup>, New Error:, 9.6893828275534184268 × 10<sup>−45</sup>

Error order:, 13, Error:, 9.6893828275534184268 × 10<sup>−45</sup>, New Error:, 9.6934831247265418197 × 10<sup>−58</sup>

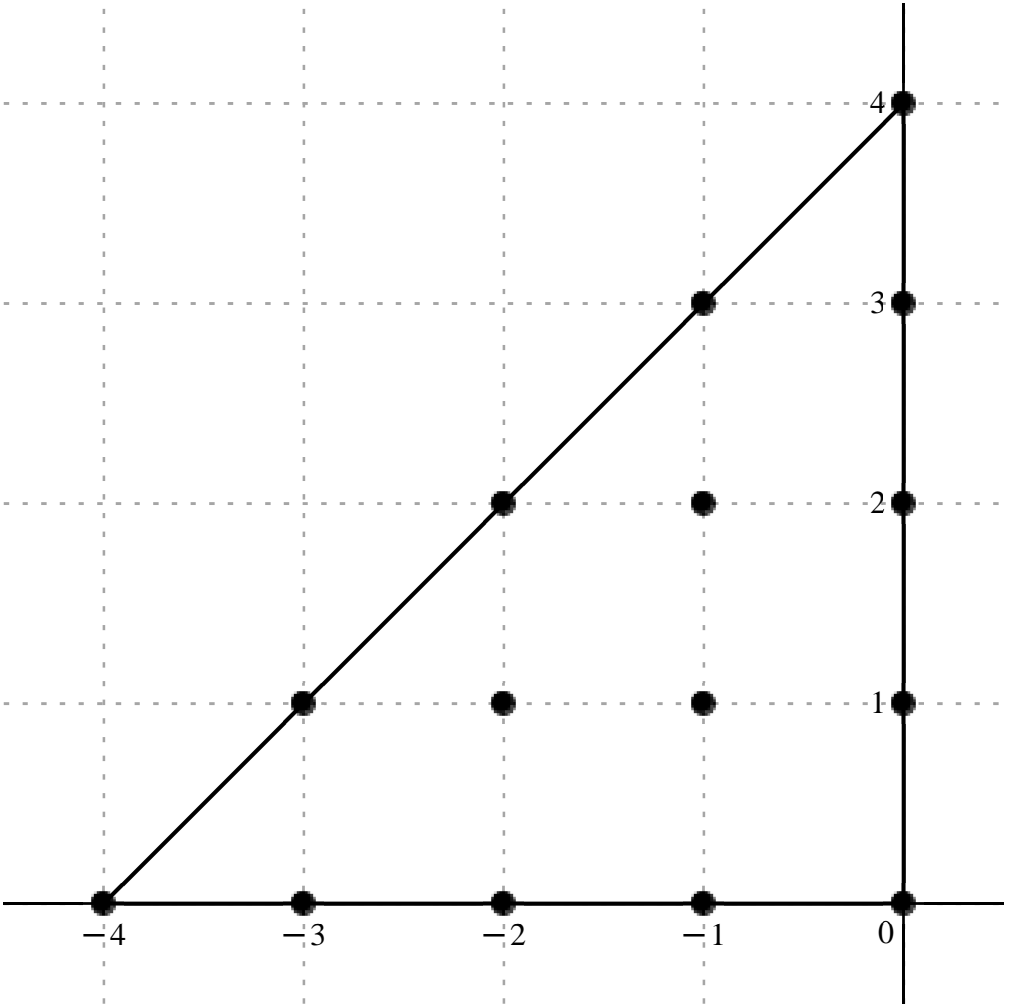
Error order:, 13, Error:, 9.6934831247265418197 × 10<sup>−58</sup>, New Error:, 9.6938921342964050898 × 10<sup>−71</sup>

Error order:, 13, Error:, 9.6938921342964050898 × 10<sup>−71</sup>, New Error:, 9.6939330250408639498 × 10<sup>−84</sup>

Error order:, 13, Error:, 9.6939330250408639498 × 10<sup>−84</sup>, New Error:, 9.6939371140131735040 × 10<sup>−97</sup>

$$x_o \neq h. , \left[ \begin{array}{ccccc} & & & & 4\,\mathrm{I} \\ & & & -1 + 3\,\mathrm{I} & 3\,\mathrm{I} \\ & & -2 + 2\,\mathrm{I} & -1 + 2\,\mathrm{I} & 2\,\mathrm{I} \\ & -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} & & & & & \frac{43}{816} + \frac{5 \text{ I}}{272} \\ & & & & \frac{784}{325} - \frac{9664 \text{ I}}{975} & \frac{32}{9} - \frac{160 \text{ I}}{117} \\ & & \frac{129 \text{ I}}{2} & \frac{2592}{25} + \frac{8544 \text{ I}}{25} & -960 \text{ I} & \frac{654}{13} + \frac{84 \text{ I}}{13} \\ & -\frac{784}{325} - \frac{9664 \text{ I}}{975} & -\frac{2592}{25} + \frac{8544 \text{ I}}{25} & & & \frac{2048}{51} + \frac{4928 \text{ I}}{51} \\ -\frac{43}{816} + \frac{5 \text{ I}}{272} & -\frac{32}{9} - \frac{160 \text{ I}}{117} & -\frac{654}{13} + \frac{84 \text{ I}}{13} & -\frac{2048}{51} + \frac{4928 \text{ I}}{51} & & \frac{50983 \text{ I}}{1800} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \; u(x_{ol}) = \frac{1}{795600 \; \Delta x_{ol}^2} \big( (41925 + 14625 \text{ I}) \; u_{ol+41} + (1919232 - 7885824 \text{ I}) \; u_{ol-1+31} + (2828800 - 1088000 \text{ I}) \; u_{ol+31} + 51316200 \text{ I} u_{ol-2+21} + (82487808 + 271904256 \text{ I}) \; u_{ol-1+21} + (40024800 + 5140800 \text{ I}) \; u_{ol+21} - (1919232 + 7885824 \text{ I}) \; u_{ol-3+1} + (-82487808 + 271904256 \text{ I}) \; u_{ol-2+1} - 763776000 \text{ I} u_{ol-1+1} + (31948800 + 76876800 \text{ I}) \; u_{ol+1} + (-41925 + 14625 \text{ I}) \; u_{ol-4} - (2828800 + 1088000 \text{ I}) \; u_{ol-3} + (-40024800 + 5140800 \text{ I}) \; u_{ol-2} + (-31948800 + 76876800 \text{ I}) \; u_{ol-1} + 22534486 \text{ I} u_{ol} \big), \; O( \; \Delta x_{ol}^{13} \; )$$

Formula:, 413, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 3

Error order:, 12, Error:, 7.9518778274428507862 × 10−29, New Error:, 8.0702176341972083925 × 10−41

Error order:, 12, Error:, 8.0702176341972083925 × 10−41, New Error:, 8.0820788046838646451 × 10−53

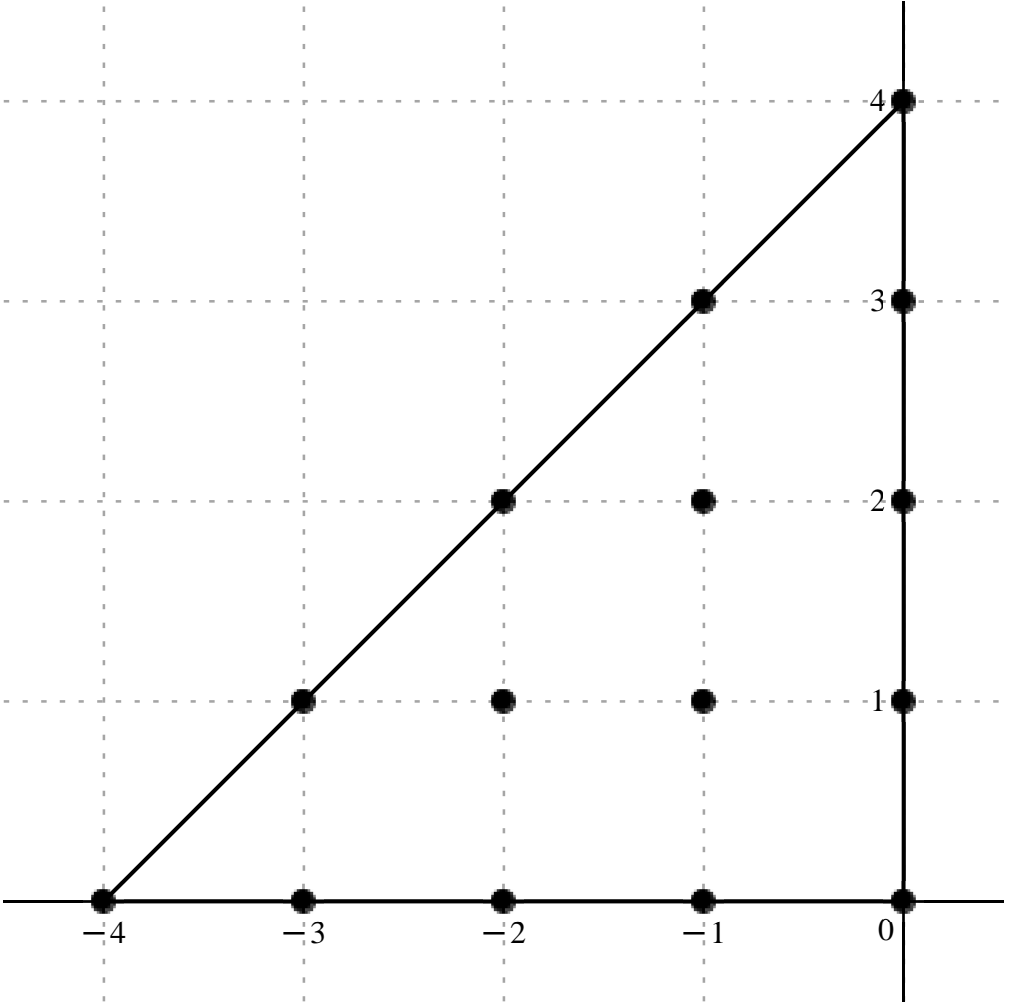
Error order:, 12, Error:, 8.0820788046838646451 × 10−53, New Error:, 8.0832651893442223637 × 10−65

Error order:, 12, Error:, 8.0832651893442223637 × 10−65, New Error:, 8.0833838304820552454 × 10−77

Error order:, 12, Error:, 8.0833838304820552454 × 10−77, New Error:, 8.0833956946225521815 × 10−89

$$x_o + h \cdot , \left[ \begin{array}{ccccc} & & & & 4 \text{ I} \\ & & & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} & & & & & & & \frac{520901}{2652000} + \frac{495661 \text{ I}}{1326000} \\ & & & & & & \frac{61973}{975} - \frac{40004 \text{ I}}{975} & \frac{43096}{1625} + \frac{50644 \text{ I}}{4875} \\ & & & & -\frac{133599}{400} + \frac{133599 \text{ I}}{400} & -\frac{376368}{325} + \frac{749436 \text{ I}}{325} & \frac{159249}{650} + \frac{360747 \text{ I}}{1300} \\ & & \frac{40004}{975} - \frac{61973 \text{ I}}{975} & -\frac{749436}{325} + \frac{376368 \text{ I}}{325} & \frac{116949}{25} - \frac{116949 \text{ I}}{25} & -\frac{80732}{425} + \frac{173212 \text{ I}}{255} \\ -\frac{495661}{1326000} - \frac{520901 \text{ I}}{2652000} & -\frac{50644}{4875} - \frac{43096 \text{ I}}{1625} & -\frac{360747}{1300} - \frac{159249 \text{ I}}{650} & -\frac{173212}{255} + \frac{80732 \text{ I}}{425} & -\frac{47413}{480} + \frac{47413 \text{ I}}{480} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{2652000 \, \Delta x_{ol}^3} \big( (520901 + 991322 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (168566560 - 108810880 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (70332672 + 27550336 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (-885761370 + 885761370 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (-3071162880 + 6115397760 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (649735920 + 735923880 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (108810880 - 168566560 \, \mathrm{I}) \, u_{ol-3+1} + (-6115397760 + 3071162880 \, \mathrm{I}) \, u_{ol-2+1} + (12405949920 - 12405949920 \, \mathrm{I}) \, u_{ol-1+1} + (-503767680 + 1801404800 \, \mathrm{I}) \, u_{ol+1} - (991322 + 520901 \, \mathrm{I}) \, u_{ol-4} - (27550336 + 70332672 \, \mathrm{I}) \, u_{ol-3} - (735923880 + 649735920 \, \mathrm{I}) \, u_{ol-2} + (-1801404800 + 503767680 \, \mathrm{I}) \, u_{ol-1} + (-261956825 + 261956825 \, \mathrm{I}) \, u_{ol} \big), \, O( \, \Delta x_{ol}^{12} \, )$$

Variavel  $:\ x_{oi}$ , Derivada de Ordem  $:\ 4$

*Error order*., 11, *Error*.,  $4.1092778670923049060 \times 10^{-26}$ , *New Error*.,  $4.1268951896709206922 \times 10^{-37}$

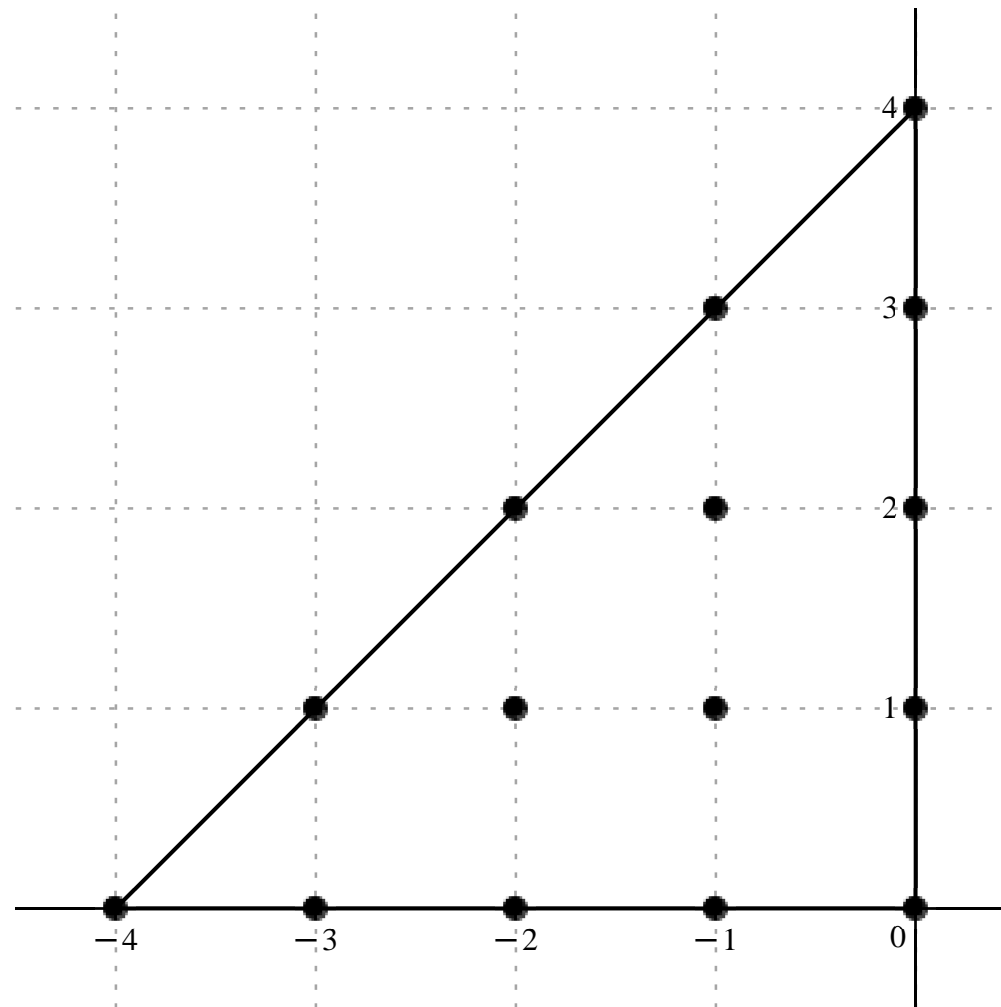
*Error order*., 11, *Error*.,  $4.1268951896709206922 \times 10^{-37}$ , *New Error*.,  $4.1286151674728759442 \times 10^{-48}$

*Error order:*, 11, *Error:*,  $4.1286151674728759442 \times 10^{-48}$ , *New Error:*,  $4.1287867432124385967 \times 10^{-59}$

*Error order*., 11, *Error*.,  $4.1287867432124385967 \times 10^{-59}$ , *New Error*.,  $4.1288038965614758606 \times 10^{-70}$

*Error order*., 11, *Error*.,  $4.1288038965614758606 \times 10^{-70}$ , *New Error*.,  $4.1288056118541258826 \times 10^{-81}$

$$x_o \neq h., \quad \begin{bmatrix} & & & 4I \\ & & -1+3I & 3I \\ & -2+2I & -1+2I & 2I \\ -3+I & -2+I & -1+I & I \\ -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$
$$c = , \quad \left[ \begin{array}{ccccccc} & & & & & & -\frac{926729}{1326000} + \frac{1138019I}{442000} \\ & & & & & & \\ & & & & \frac{149583}{325} + \frac{83873I}{975} & & \frac{383612}{4875} + \frac{775876I}{4875} \\ & & & & & & \\ & & & -\frac{144399}{50} & & -\frac{4758324}{325} + \frac{1709508I}{325} & \frac{10299}{1300} + \frac{2918979I}{1300} \\ & & & & & & \\ & & \frac{149583}{325} - \frac{83873I}{975} & -\frac{4758324}{325} - \frac{1709508I}{325} & \frac{954594}{25} & & -\frac{824368}{255} + \frac{2865304I}{1275} \\ -\frac{926729}{1326000} - \frac{1138019I}{442000} & \frac{383612}{4875} - \frac{775876I}{4875} & \frac{10299}{1300} - \frac{2918979I}{1300} & -\frac{824368}{255} - \frac{2865304I}{1275} & & & -\frac{76859}{120} \end{array} \right]$$



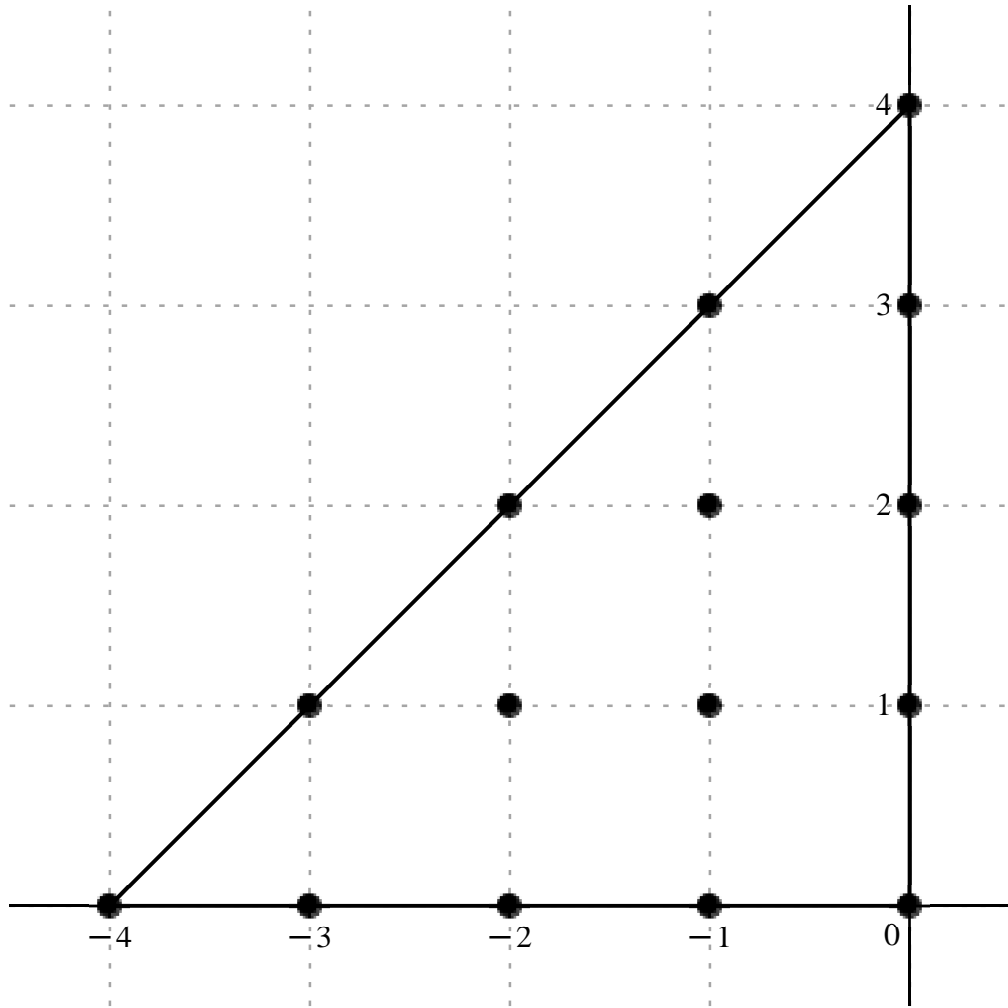
$$\frac{d^4}{dx_{ol}^4} u(x_{ol}) = \frac{1}{1326000 \Delta x_{ol}^4} \left( (-926729 + 3414057 I) u_{ol+41} + (610298640 + 114067280 I) u_{ol-1+31} + (104342464 + 211038272 I) u_{ol+31} - 3829461480 u_{ol-2+21} + (-19413961920 + 6974792640 I) u_{ol-1+21} + (10504980 + 2977358580 I) u_{ol+21} + (610298640 - 114067280 I) u_{ol-3+1} - (19413961920 + 6974792640 I) u_{ol-2+1} \right. \\ \left. + 50631665760 u_{ol-1+1} + (-4286713600 + 2979916160 I) u_{ol+1} - (926729 + 3414057 I) u_{ol-4} + (104342464 - 211038272 I) u_{ol-3} + (10504980 - 2977358580 I) u_{ol-2} - (4286713600 + 2979916160 I) u_{ol-1} - 849291950 u_{ol} \right), O(\Delta x_{ol}^{11})$$

Formula:, 415, Var:, 1  
Variavel :,  $x_o$  , Derivada de Ordem :, 5

Error order:, 10, Error:,  $2.4775329741234388757 \times 10^{-23}$ , New Error:,  $2.5137476086567254091 \times 10^{-33}$   
Error order:, 10, Error:,  $2.5137476086567254091 \times 10^{-33}$ , New Error:,  $2.5173772584698978930 \times 10^{-43}$   
Error order:, 10, Error:,  $2.5173772584698978930 \times 10^{-43}$ , New Error:,  $2.5177403040429551344 \times 10^{-53}$   
Error order:, 10, Error:,  $2.5177403040429551344 \times 10^{-53}$ , New Error:,  $2.5177766094048966381 \times 10^{-63}$   
Error order:, 10, Error:,  $2.5177766094048966381 \times 10^{-63}$ , New Error:,  $2.5177802399491358637 \times 10^{-73}$

$$x_o + h \cdot \begin{bmatrix} & & & & 4 \text{ I} \\ & & & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c =, \begin{bmatrix} & & & & & & & & -\frac{3277657}{265200} + \frac{1371389 \text{ I}}{176800} \\ & & & & & & & \frac{287723}{195} + \frac{131667 \text{ I}}{65} & -\frac{253768}{975} + \frac{298972 \text{ I}}{325} \\ & & & & -\frac{864087}{80} - \frac{864087 \text{ I}}{80} & -\frac{4820688}{65} - \frac{2127804 \text{ I}}{65} & -\frac{3998331}{520} + \frac{4601241 \text{ I}}{520} \\ & & \frac{131667}{65} + \frac{287723 \text{ I}}{195} & -\frac{2127804}{65} - \frac{4820688 \text{ I}}{65} & \frac{675588}{5} + \frac{675588 \text{ I}}{5} & -\frac{4820596}{255} - \frac{97940 \text{ I}}{51} \\ \frac{1371389}{176800} - \frac{3277657 \text{ I}}{265200} & \frac{298972}{325} - \frac{253768 \text{ I}}{975} & \frac{4601241}{520} - \frac{3998331 \text{ I}}{520} & -\frac{97940}{51} - \frac{4820596 \text{ I}}{255} & -\frac{183127}{96} - \frac{183127 \text{ I}}{96} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{530400 \, \Delta x_{ol}^5} \big( (-6555314 + 4114167 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (782606560 + 1074402720 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (-138049792 + 487922304 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (5728896810 + 5728896810 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} - (39336814080 + 17362880640 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (-4078297620 + 4693265820 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (1074402720 + 782606560 \, \mathrm{I}) \, u_{ol-3+\mathrm{I}} - (17362880640 + 39336814080 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} + (71666375040 + 71666375040 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} - (10026839680 + 1018576000 \, \mathrm{I}) \, u_{ol+1} + (4114167 - 6555314 \, \mathrm{I}) \, u_{ol-4} + (487922304 - 138049792 \, \mathrm{I}) \, u_{ol-3} + (4693265820 - 4078297620 \, \mathrm{I}) \, u_{ol-2} - (1018576000 + 10026839680 \, \mathrm{I}) \, u_{ol-1} - (1011776675 + 1011776675 \, \mathrm{I}) \, u_{ol} \big), \, O( \, \Delta x_{ol}^{10} \, )$$

Formula:, 416, Var.: 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 6

Error order:., 9, Error:., 9.8387608007901900591 × 10<sup>−21</sup>, New Error:., 9.8800351953390122956 × 10<sup>−30</sup>

Error order:., 9, Error:., 9.8800351953390122956 × 10<sup>−30</sup>, New Error:., 9.8840665633439113999 × 10<sup>−39</sup>

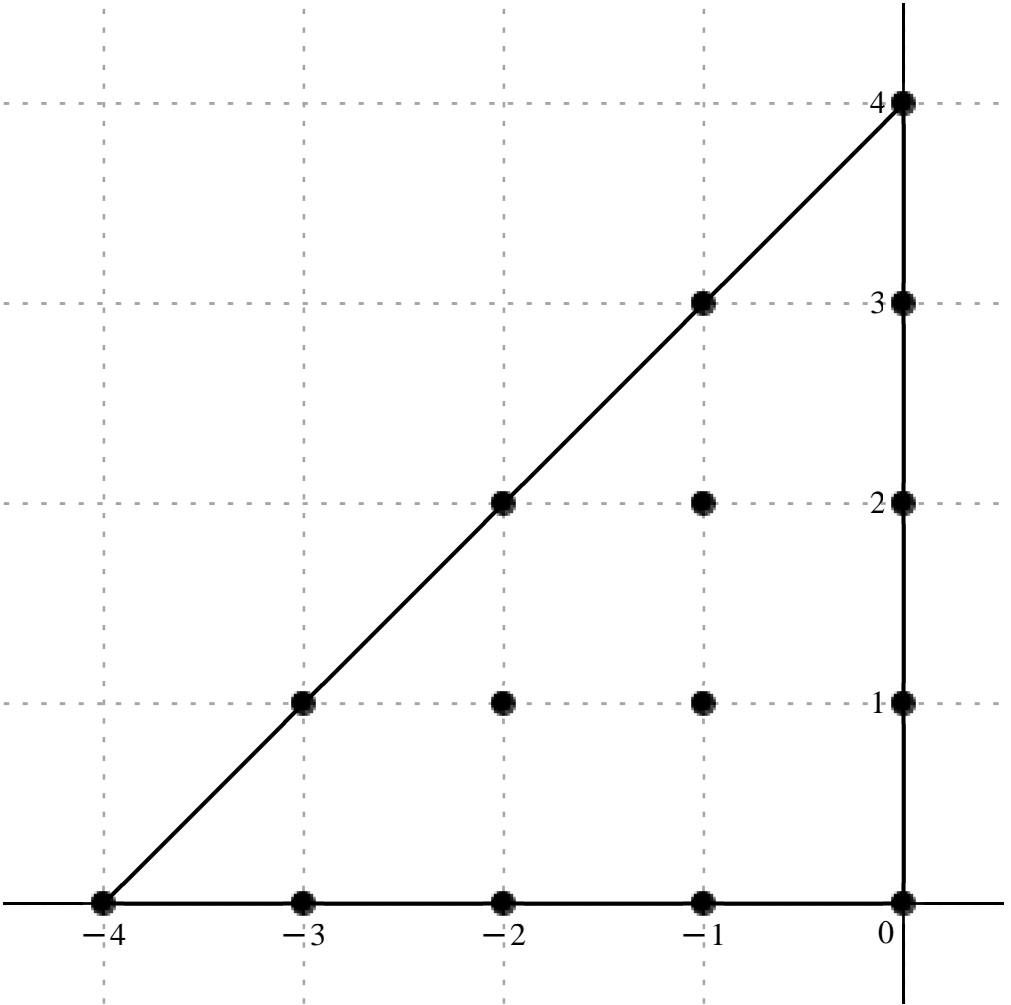
Error order:., 9, Error:., 9.8840665633439113999 × 10<sup>−39</sup>, New Error:., 9.8844687292644441987 × 10<sup>−48</sup>

Error order:., 9, Error:., 9.8844687292644441987 × 10<sup>−48</sup>, New Error:., 9.8845089361374955509 × 10<sup>−57</sup>

Error order:., 9, Error:., 9.8845089361374955509 × 10<sup>−57</sup>, New Error:., 9.8845129567276004608 × 10<sup>−66</sup>

$$x_o \neq h. , \left[ \begin{array}{ccccc} & & & & 4 \, \mathrm{I} \\ & & & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ & & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ & -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} & & & & -\frac{12135259}{176800} - \frac{2216153 \text{ I}}{176800} & \\ & & & -\frac{190469}{130} + \frac{1511129 \text{ I}}{130} & -\frac{1233326}{325} + \frac{779602 \text{ I}}{325} & \\ & & -\frac{2824227 \text{ I}}{40} & -\frac{9210762}{65} - \frac{4427226 \text{ I}}{13} & -\frac{6849963}{130} + \frac{1877139 \text{ I}}{260} & \\ & \frac{190469}{130} + \frac{1511129 \text{ I}}{130} & \frac{9210762}{65} - \frac{4427226 \text{ I}}{13} & \frac{4187187 \text{ I}}{5} & -\frac{928388}{17} - \frac{5008968 \text{ I}}{85} & \\ \frac{12135259}{176800} - \frac{2216153 \text{ I}}{176800} & \frac{1233326}{325} + \frac{779602 \text{ I}}{325} & \frac{6849963}{130} + \frac{1877139 \text{ I}}{260} & \frac{928388}{17} - \frac{5008968 \text{ I}}{85} & -\frac{825769 \text{ I}}{80} & \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{176800 \, \Delta x_{ol}^6} \, \big( -(12135259 + 2216153 \, \mathrm{I}) \, u_{ol+41} + (-259037840 + 2055135440 \, \mathrm{I}) \, u_{ol-1+31} + (-670929344 + 424103488 \, \mathrm{I}) \, u_{ol+31} - 12483083340 \, \mathrm{I} u_{ol-2+21} - (25053272640 + 60210273600 \, \mathrm{I}) \, u_{ol-1+21} + (-9315949680 + 1276454520 \, \mathrm{I}) \, u_{ol+21} + (259037840 + 2055135440 \, \mathrm{I}) \, u_{ol-3+1} + (25053272640 - 60210273600 \, \mathrm{I}) \, u_{ol-2+1} + 148058932320 \, \mathrm{I} u_{ol-1+1} - (9655235200 + 10418653440 \, \mathrm{I}) \, u_{ol+1} + (12135259 - 2216153 \, \mathrm{I}) \, u_{ol-4} + (670929344 + 424103488 \, \mathrm{I}) \, u_{ol-3} + (9315949680 + 1276454520 \, \mathrm{I}) \, u_{ol-2} + (9655235200 - 10418653440 \, \mathrm{I}) \, u_{ol-1} - 1824949490 \, \mathrm{I} u_{ol} \big), \, O( \, \Delta x_{ol}^9 \, )$$

Formula: 417, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 7

Error order: 8, Error: 4.6216375670170380126 × 10<sup>−18</sup>, New Error: 4.6874551012152855101 × 10<sup>−26</sup>

Error order: 8, Error: 4.6874551012152855101 × 10<sup>−26</sup>, New Error: 4.6940513977878663708 × 10<sup>−34</sup>

Error order: 8, Error: 4.6940513977878663708 × 10<sup>−34</sup>, New Error: 4.6947111706615723140 × 10<sup>−42</sup>

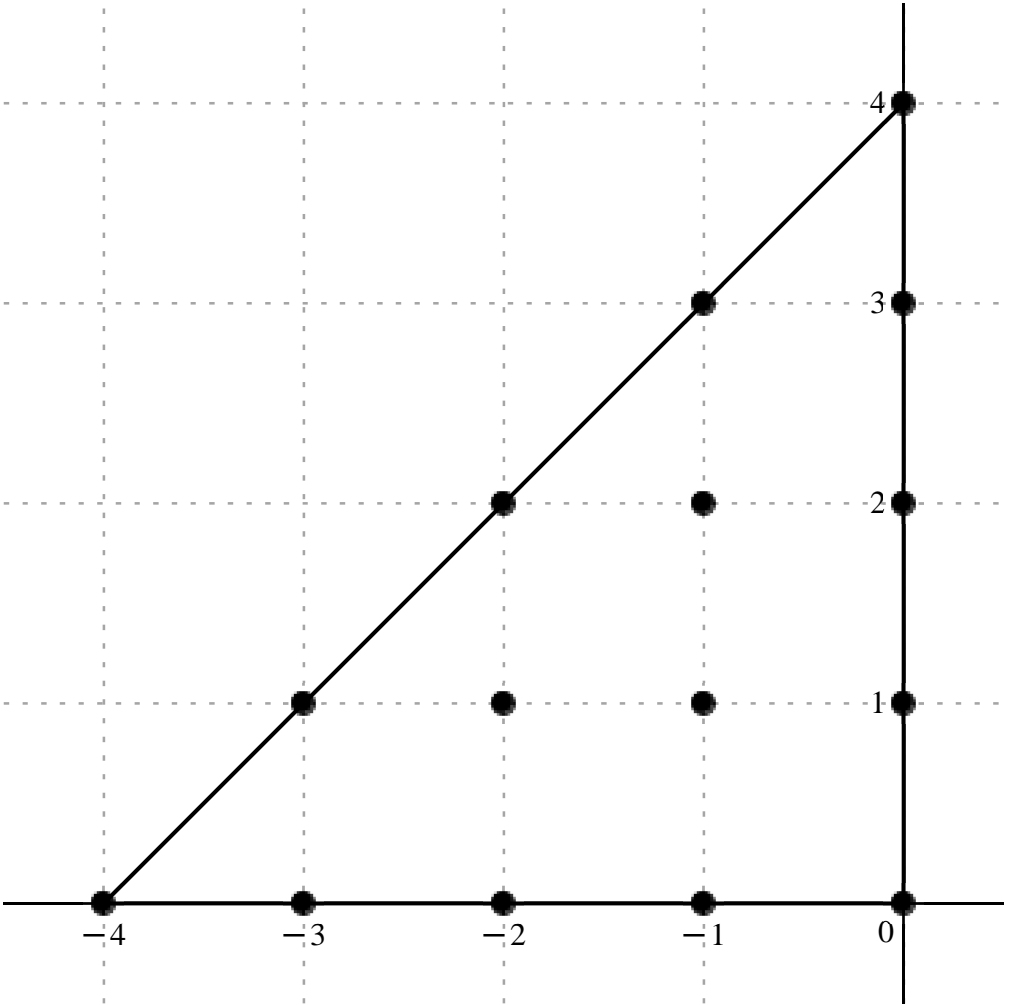
Error order: 8, Error: 4.6947111706615723140 × 10<sup>−42</sup>, New Error: 4.6947771493788756360 × 10<sup>−50</sup>

Error order: 8, Error: 4.6947771493788756360 × 10<sup>−50</sup>, New Error: 4.6947837472649030620 × 10<sup>−58</sup>



$$x_o \neq h \text{ , } \left[ \begin{array}{ccccc} & & & & 4 \text{ I} \\ & & & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} & & & & & & & -\frac{31335087}{176800} & -\frac{20451207 \text{ I}}{88400} \\ & & & & & & & & \\ & & & & & & -\frac{4785837}{130} + \frac{3966501 \text{ I}}{130} & -\frac{5888106}{325} & -\frac{975828 \text{ I}}{325} \\ & & & & & \frac{16126929}{80} - \frac{16126929 \text{ I}}{80} & \frac{34151418}{65} - \frac{88884936 \text{ I}}{65} & -\frac{90906921}{520} & -\frac{60170859 \text{ I}}{520} \\ & & & & & & & & \\ & & & & & -\frac{3966501}{130} + \frac{4785837 \text{ I}}{130} & \frac{88884936}{65} - \frac{34151418 \text{ I}}{65} & -\frac{11356569}{5} + \frac{11356569 \text{ I}}{5} & -\frac{380478}{85} - \frac{5062050 \text{ I}}{17} \\ \frac{20451207}{88400} + \frac{31335087 \text{ I}}{176800} & \frac{975828}{325} + \frac{5888106 \text{ I}}{325} & \frac{60170859}{520} + \frac{90906921 \text{ I}}{520} & \frac{5062050}{17} + \frac{380478 \text{ I}}{85} & & & & \frac{802011}{32} - \frac{802011 \text{ I}}{32} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d} x_{o l}^7} \; u(x_{o l}) = \frac{1}{176800 \; \Delta x_{o l}^7} \big( 21 \; \big( -(1492147 + 1947734 \; \mathrm{I}) \; u_{o l + 4 \mathrm{I}} + (-309939920 + 256878160 \; \mathrm{I}) \; u_{o l - 1 + 3 \mathrm{I}} - (152529984 + 25278592 \; \mathrm{I}) \; u_{o l + 3 \mathrm{I}} + (1697167290 - 1697167290 \; \mathrm{I}) \; u_{o l - 2 + 2 \mathrm{I}} + (4423421760 - 11512715520 \; \mathrm{I}) \; u_{o l - 1 + 2 \mathrm{I}} - (1471826340 + 974194860 \; \mathrm{I}) \; u_{o l + 2 \mathrm{I}} + (-256878160 + 309939920 \; \mathrm{I}) \; u_{o l - 3 + 1} + (11512715520 \\ - 4423421760 \; \mathrm{I}) \; u_{o l - 2 + 1} + (-19122299040 + 19122299040 \; \mathrm{I}) \; u_{o l - 1 + 1} - (37685440 + 2506920000 \; \mathrm{I}) \; u_{o l + 1} + (1947734 + 1492147 \; \mathrm{I}) \; u_{o l - 4} + (25278592 + 152529984 \; \mathrm{I}) \; u_{o l - 3} + (974194860 + 1471826340 \; \mathrm{I}) \; u_{o l - 2} + (2506920000 + 37685440 \; \mathrm{I}) \; u_{o l - 1} + (211005275 - 211005275 \; \mathrm{I}) \; u_{o l} \big) \big), \; O( \; \Delta x_{o l}^8 \; )$$

$$Variavel \, ; \, x_{oi} \, , \, Derivada \, de \, Ordem \, ; \, 8$$

$$Error \, order.; \, 7, \, Error.; \, 1.4246482346282680690 \times 10^{-15}, \, New \, Error.; \, 1.4304321230607067249 \times 10^{-22}$$

$$Error \, order.; \, 7, \, Error.; \, 1.4304321230607067249 \times 10^{-22}, \, New \, Error.; \, 1.4309973964330398229 \times 10^{-29}$$

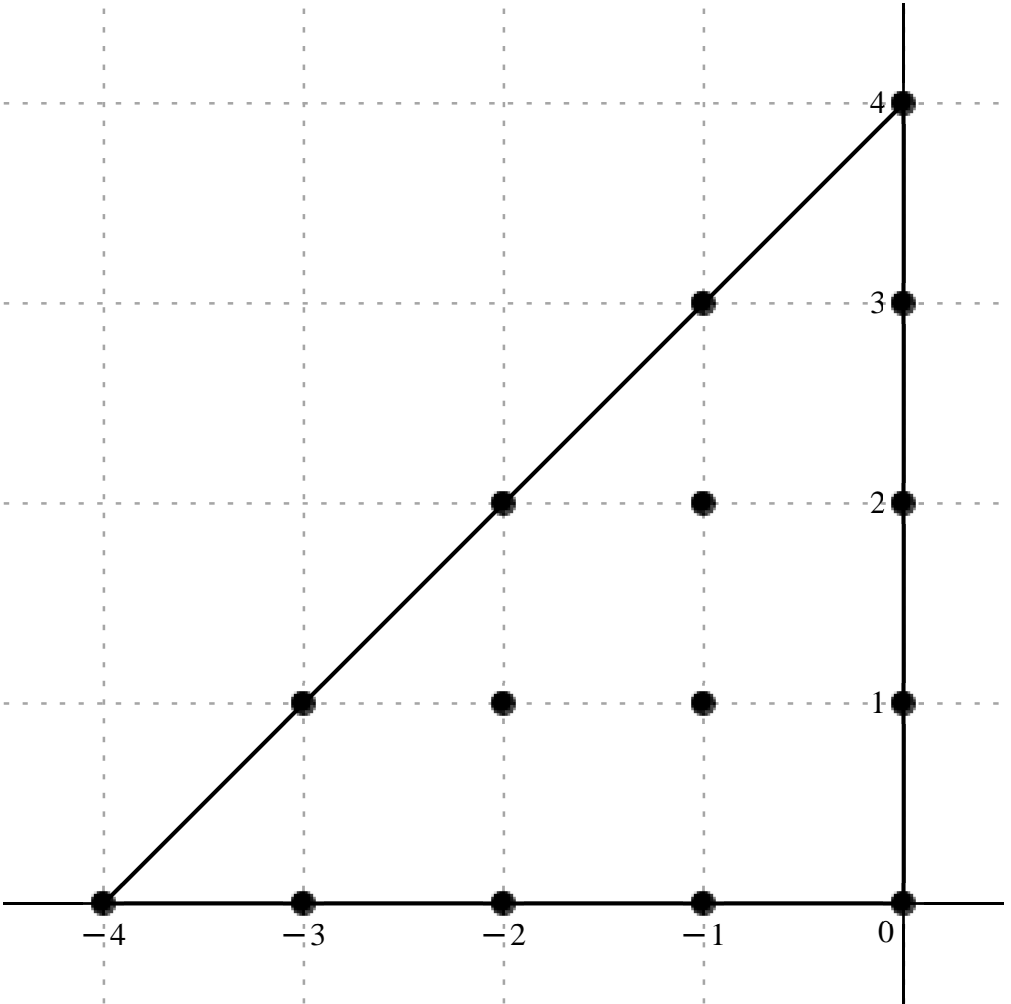
$$Error \, order.; \, 7, \, Error.; \, 1.4309973964330398229 \times 10^{-29}, \, New \, Error.; \, 1.4310537912611758942 \times 10^{-36}$$

$$Error \, order.; \, 7, \, Error.; \, 1.4310537912611758942 \times 10^{-36}, \, New \, Error.; \, 1.4310594294175393356 \times 10^{-43}$$

$$Error \, order.; \, 7, \, Error.; \, 1.4310594294175393356 \times 10^{-43}, \, New \, Error.; \, 1.4310599932199098184 \times 10^{-50}$$

$$x_o \, + h \, . \, , \, \left[ \begin{array}{cccccc} & & & & & 4 \, \text{I} \\ & & & & -1 + 3 \, \text{I} & 3 \, \text{I} \\ & & -2 + 2 \, \text{I} & -1 + 2 \, \text{I} & 2 \, \text{I} & \\ & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & \\ -4 & -3 & -2 & -1 & 0 & \end{array} \right]$$

$$c = , \, \left[ \begin{array}{cccccc} & & & & & \frac{3609123}{44200} - \frac{46488309 \, \text{I}}{44200} \\ & & & & -\frac{10970106}{65} - \frac{655662 \, \text{I}}{65} & -\frac{13295688}{325} - \frac{16378824 \, \text{I}}{325} \\ & & \frac{9981783}{10} & \frac{296118648}{65} - \frac{140303016 \, \text{I}}{65} & -\frac{12040182}{65} - \frac{44772777 \, \text{I}}{65} & \\ & -\frac{10970106}{65} + \frac{655662 \, \text{I}}{65} & \frac{296118648}{65} + \frac{140303016 \, \text{I}}{65} & -\frac{53509428}{5} & \frac{10832304}{17} - \frac{61117056 \, \text{I}}{85} & \\ \frac{3609123}{44200} + \frac{46488309 \, \text{I}}{44200} & -\frac{13295688}{325} + \frac{16378824 \, \text{I}}{325} & -\frac{12040182}{65} + \frac{44772777 \, \text{I}}{65} & \frac{10832304}{17} + \frac{61117056 \, \text{I}}{85} & & \frac{430563}{4} \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{oi}^8} \, u(x_{oi}) = \frac{1}{44200 \, \Delta x_{oi}^8} \, (21 \, ( (171863 - 2213729 \, \text{I}) \, u_{oi+4\text{I}} - (355222480 + 21230960 \, \text{I}) \, u_{oi-1+3\text{I}} - (86105408 + 106072384 \, \text{I}) \, u_{oi+3\text{I}} + 2100927660 \, u_{oi-2+2\text{I}} + (9588603840 - 4543145280 \, \text{I}) \, u_{oi-1+2\text{I}} - (389872560 + 1449785160 \, \text{I}) \, u_{oi+2\text{I}} + (-355222480 + 21230960 \, \text{I}) \, u_{oi-3+1} + (9588603840 + 4543145280 \, \text{I}) \, u_{oi-2+1} - 22524921120 \, u_{oi-1+1} + (1341142400 - 1513374720 \, \text{I}) \, u_{oi+1} + (171863 + 2213729 \, \text{I}) \, u_{oi-4} + (-86105408 + 106072384 \, \text{I}) \, u_{oi-3} + (-389872560 + 1449785160 \, \text{I}) \, u_{oi-2} + (1341142400 + 1513374720 \, \text{I}) \, u_{oi-1} + 226558150 \, u_{oi} ) ) , \, O( \, \Delta x_{oi}^7 \, )$$

Formula:, 419, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 9

Error order:, 6, Error:,  $5.1243269778365822880 \times 10^{-13}$ , New Error:,  $5.1943527641425740532 \times 10^{-19}$

Error order:, 6, Error:,  $5.1943527641425740532 \times 10^{-19}$ , New Error:,  $5.2013702976481318235 \times 10^{-25}$

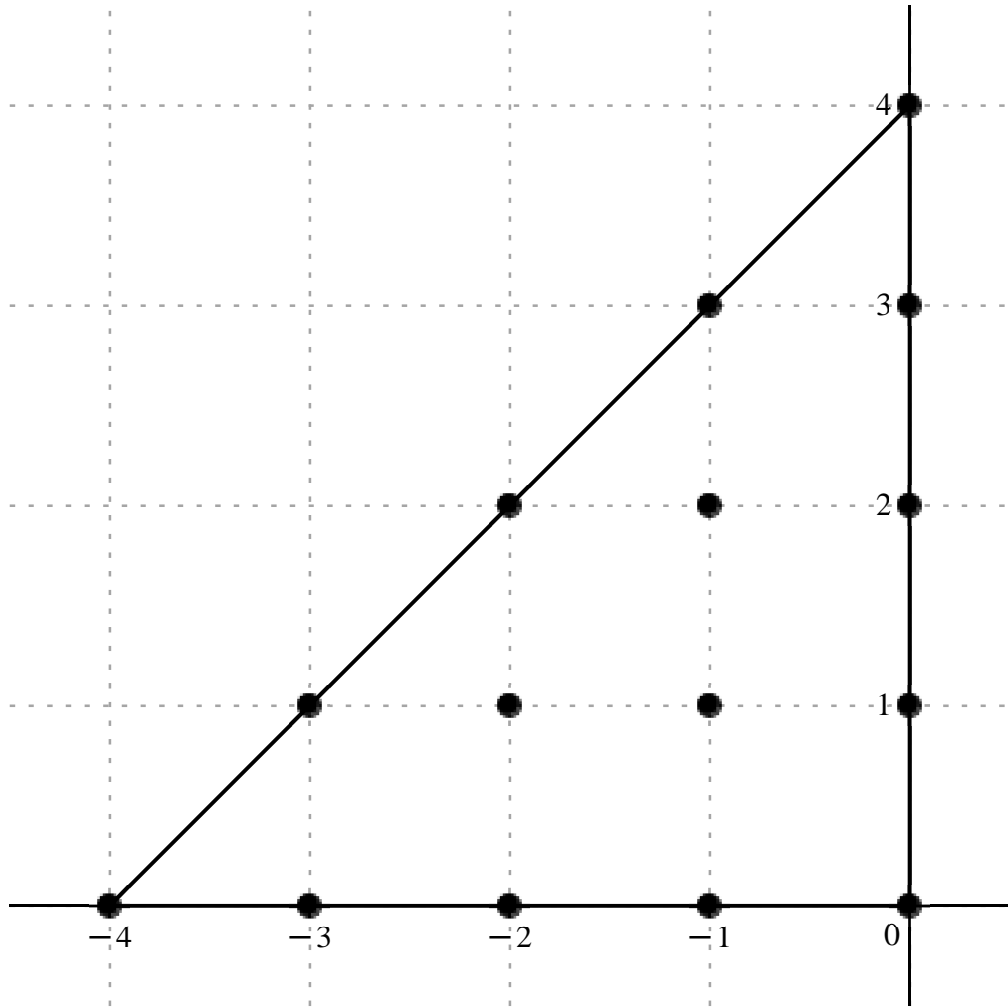
Error order:, 6, Error:,  $5.2013702976481318235 \times 10^{-25}$ , New Error:,  $5.2020721983334526974 \times 10^{-31}$

Error order:, 6, Error:,  $5.2020721983334526974 \times 10^{-31}$ , New Error:,  $5.2021423898731022329 \times 10^{-37}$

Error order:, 6, Error:,  $5.2021423898731022329 \times 10^{-37}$ , New Error:,  $5.2021494090417761291 \times 10^{-43}$

$$x_o + h, \begin{bmatrix} & & & & 4 \text{ I} \\ & & & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & \\ -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c =, \begin{bmatrix} & & & & & & & & \frac{25921539}{11050} - \frac{12519171 \text{ I}}{5525} \\ & & & & & & & -\frac{22897728}{65} - \frac{24041556 \text{ I}}{65} & \frac{2531088}{325} - \frac{63448056 \text{ I}}{325} \\ & & & & \frac{10567746}{5} + \frac{10567746 \text{ I}}{5} & \frac{914929344}{65} + \frac{302537592 \text{ I}}{65} & \frac{60089526}{65} - \frac{120197196 \text{ I}}{65} \\ & & -\frac{24041556}{65} - \frac{22897728 \text{ I}}{65} & \frac{302537592}{65} + \frac{914929344 \text{ I}}{65} & -\frac{107963604}{5} - \frac{107963604 \text{ I}}{5} & \frac{224959896}{85} - \frac{4489128 \text{ I}}{17} \\ -\frac{12519171}{5525} + \frac{25921539 \text{ I}}{11050} & -\frac{63448056}{325} + \frac{2531088 \text{ I}}{325} & -\frac{120197196}{65} + \frac{60089526 \text{ I}}{65} & -\frac{4489128}{17} + \frac{224959896 \text{ I}}{85} & \frac{401247}{2} + \frac{401247 \text{ I}}{2} \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{11050 \, \Delta x_{ol}^9} \Big( 189 \, \big( (137151 - 132478 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} - (20595840 + 21624680 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (455328 - 11413936 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (123569940 + 123569940 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (822952320 + 272123760 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (54048780 - 108113880 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} - (21624680 + 20595840 \, \mathrm{I}) \, u_{ol-3+1} + (272123760 + 822952320 \, \mathrm{I}) \, u_{ol-2+1} \\ - (1262431560 + 1262431560 \, \mathrm{I}) \, u_{ol-1+1} + (154734320 - 15438800 \, \mathrm{I}) \, u_{ol+1} + (-132478 + 137151 \, \mathrm{I}) \, u_{ol-4} + (-11413936 + 455328 \, \mathrm{I}) \, u_{ol-3} + (-108113880 + 54048780 \, \mathrm{I}) \, u_{ol-2} + (-15438800 + 154734320 \, \mathrm{I}) \, u_{ol-1} + (11729575 + 11729575 \, \mathrm{I}) \, u_{ol} \big) \Big), \, O( \, \Delta x_{ol}^6 \, )$$

Formula: 420, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 10

Error order.: 5, Error.:  $1.1783870358476912888 \times 10^{-10}$ , New Error.:  $1.1829145275758440952 \times 10^{-15}$

Error order.: 5, Error.:  $1.1829145275758440952 \times 10^{-15}$ , New Error.:  $1.1833574233122844714 \times 10^{-20}$

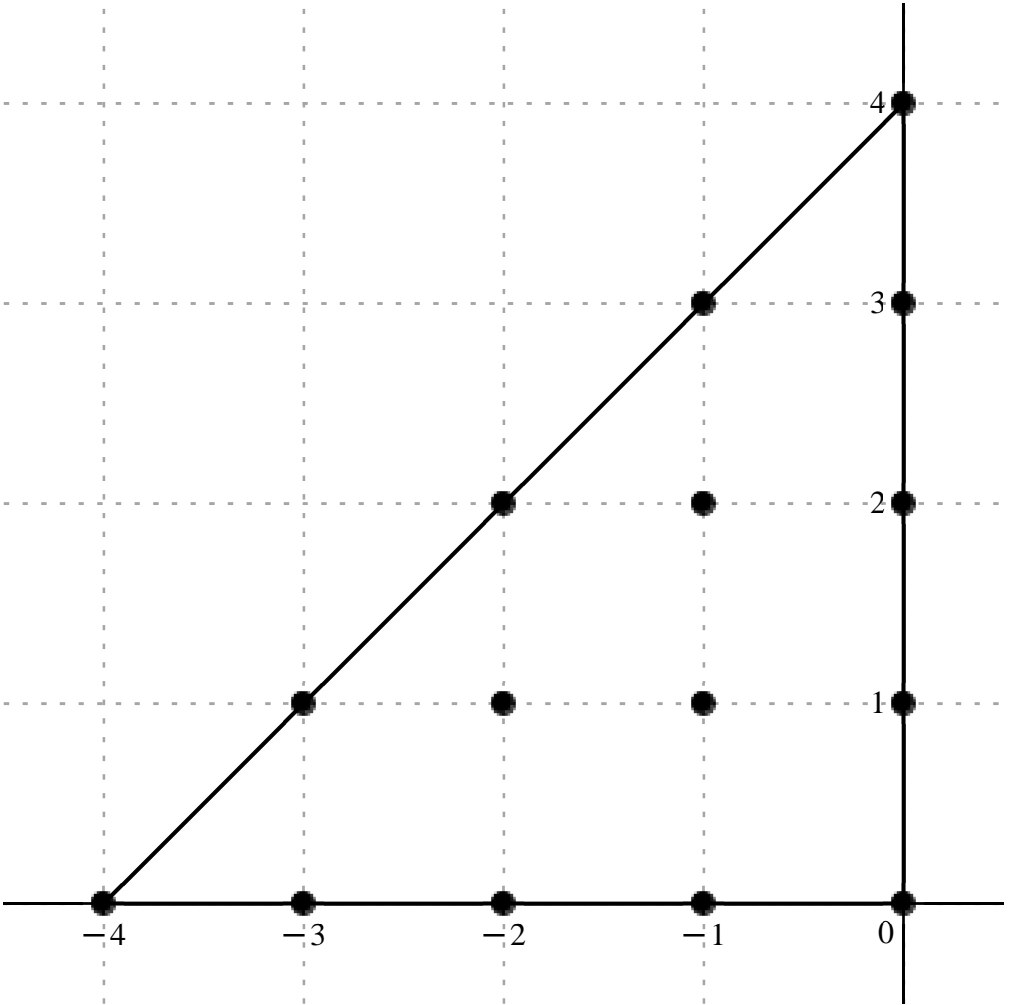
Error order.: 5, Error.:  $1.1833574233122844714 \times 10^{-20}$ , New Error.:  $1.1834016133700812660 \times 10^{-25}$

Error order.: 5, Error.:  $1.1834016133700812660 \times 10^{-25}$ , New Error.:  $1.1834060313797176182 \times 10^{-30}$

Error order.: 5, Error.:  $1.1834060313797176182 \times 10^{-30}$ , New Error.:  $1.1834064731707188350 \times 10^{-35}$

$$x_o \neq h. , \left[ \begin{array}{ccccc} & & & & 4 \, \mathrm{I} \\ & & & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ & & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ & -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} & & & & & & & \frac{37154943}{4420} - \frac{1846719 \text{ I}}{4420} & \\ & & & & & & -\frac{215460}{13} - \frac{16762788 \text{ I}}{13} & \frac{21900816}{65} - \frac{23087232 \text{ I}}{65} & \\ & & & & & 7488369 \text{ I} & \frac{222735744}{13} + \frac{418191984 \text{ I}}{13} & \frac{60363954}{13} - \frac{23977296 \text{ I}}{13} & \\ & & \frac{215460}{13} - \frac{16762788 \text{ I}}{13} & -\frac{222735744}{13} + \frac{418191984 \text{ I}}{13} & & & -72970632 \text{ I} & \frac{83507760}{17} + \frac{63676368 \text{ I}}{17} & \\ -\frac{37154943}{4420} - \frac{1846719 \text{ I}}{4420} & -\frac{21900816}{65} - \frac{23087232 \text{ I}}{65} & -\frac{60363954}{13} - \frac{23977296 \text{ I}}{13} & -\frac{83507760}{17} + \frac{63676368 \text{ I}}{17} & & & \frac{1265229 \text{ I}}{2} & \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}} \; u(x_{ol}) = \frac{1}{4420 \; \Delta x_{ol}^{10}} \Big( 63 \; \big( (589761 - 29313 \; \text{I}) \; u_{ol+4\text{I}} - (1162800 + 90465840 \; \text{I}) \; u_{ol-1+3\text{I}} + (23638976 - 24919552 \; \text{I}) \; u_{ol+3\text{I}} + 525374460 \; \text{I} u_{ol-2+2\text{I}} + (1202065920 + 2256909120 \; \text{I}) \; u_{ol-1+2\text{I}} + (325773720 - 129401280 \; \text{I}) \; u_{ol+2\text{I}} + (1162800 - 90465840 \; \text{I}) \; u_{ol-3+1\text{I}} + (-1202065920 + 2256909120 \; \text{I}) \; u_{ol-2+1\text{I}} \\ - 5119526880 \; \text{I} u_{ol-1+1\text{I}} + (344635200 + 262791360 \; \text{I}) \; u_{ol+1\text{I}} - (589761 + 29313 \; \text{I}) \; u_{ol-4\text{I}} - (23638976 + 24919552 \; \text{I}) \; u_{ol-3\text{I}} - (325773720 + 129401280 \; \text{I}) \; u_{ol-2\text{I}} + (-344635200 + 262791360 \; \text{I}) \; u_{ol-1\text{I}} + 44383430 \; \text{I} u_{ol\text{I}} \big) \Big), \; O(\; \Delta x_{ol}^{\; 5} \; )$$

Formula: 421, Var.: 1

Variavel : x<sub>ol</sub>, Derivada de Ordem : 11

Error order.: 4, Error: 3.0453623052908762189 × 10<sup>−8</sup>, New Error: 3.0839384486939814204 × 10<sup>−12</sup>

Error order.: 4, Error: 3.0839384486939814204 × 10<sup>−12</sup>, New Error: 3.0878038468956530155 × 10<sup>−16</sup>

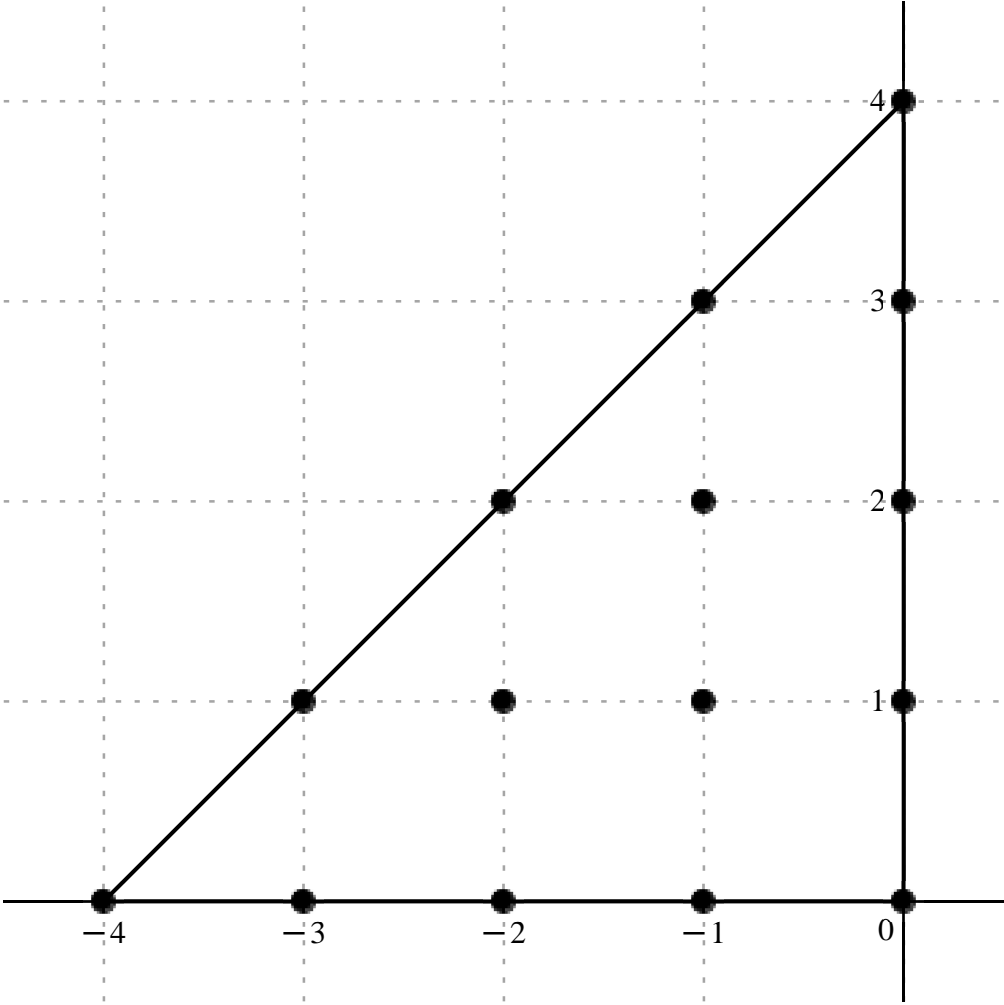
Error order.: 4, Error: 3.0878038468956530155 × 10<sup>−16</sup>, New Error: 3.0881904634518111014 × 10<sup>−20</sup>

Error order.: 4, Error: 3.0881904634518111014 × 10<sup>−20</sup>, New Error: 3.0882291258736764331 × 10<sup>−24</sup>

Error order.: 4, Error: 3.0882291258736764331 × 10<sup>−24</sup>, New Error: 3.0882329921235243504 × 10<sup>−28</sup>

$$x_o + h \cdot , \left[ \begin{array}{ccccc} & & & & 4 \text{ I} \\ & & & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccc} & & & & & & \frac{30514869}{2210} + \frac{11859309 \text{ I}}{1105} \\ & & & & & \frac{22857912}{13} - \frac{25385976 \text{ I}}{13} & \frac{63800352}{65} - \frac{6076224 \text{ I}}{65} \\ & & & & -10721403 + 10721403 \text{ I} & -\frac{253272096}{13} + \frac{905712192 \text{ I}}{13} & \frac{118640214}{13} + \frac{43771266 \text{ I}}{13} \\ & & \frac{25385976}{13} - \frac{22857912 \text{ I}}{13} & -\frac{905712192}{13} + \frac{253272096 \text{ I}}{13} & 99692208 - 99692208 \text{ I} & \frac{32399136}{17} + \frac{194816160 \text{ I}}{17} \\ -\frac{11859309}{1105} - \frac{30514869 \text{ I}}{2210} & \frac{6076224}{65} - \frac{63800352 \text{ I}}{65} & -\frac{43771266}{13} - \frac{118640214 \text{ I}}{13} & -\frac{194816160}{17} - \frac{32399136 \text{ I}}{17} & -\frac{1625085}{2} + \frac{1625085 \text{ I}}{2} \end{array} \right]$$



$$\frac{\mathrm{d} \mathfrak{u}}{\mathrm{d} x_{o l}^{\mathfrak{u}}} \; u(x_o) = \frac{1}{2210 \; \Delta \mathfrak{x}_{o l}^{\mathfrak{u}}} \Big( 693 \Big( (44033 + 34226 \; \mathrm{I}) \; u_{o l + 4 \mathfrak{I}} + (5607280 - 6227440 \; \mathrm{I}) \; u_{o l - 1 + 3 \mathfrak{I}} + (3130176 - 298112 \; \mathrm{I}) \; u_{o l + 3 \mathfrak{I}} + (-34190910 + 34190910 \; \mathrm{I}) \; u_{o l - 2 + 2 \mathfrak{I}} + (-62130240 + 222180480 \; \mathrm{I}) \; u_{o l - 1 + 2 \mathfrak{I}} + (29103660 + 10737540 \; \mathrm{I}) \; u_{o l + 2 \mathfrak{I}} + (6227440 - 5607280 \; \mathrm{I}) \; u_{o l - 3 + \mathfrak{I}} + (-222180480 + 62130240 \; \mathrm{I}) \; u_{o l - 2 + \mathfrak{I}} + (317921760 - 317921760 \; \mathrm{I}) \; u_{o l - 1 + \mathfrak{I}} + (6077760 + 36545600 \; \mathrm{I}) \; u_{o l + \mathfrak{I}} - (34226 + 44033 \; \mathrm{I}) \; u_{o l - 4} + (298112 - 3130176 \; \mathrm{I}) \; u_{o l - 3} - (10737540 + 29103660 \; \mathrm{I}) \; u_{o l - 2} - (36545600 + 6077760 \; \mathrm{I}) \; u_{o l - 1} + (-2591225 + 2591225 \; \mathrm{I}) \; u_o \Big) \Big), \; O( \; \Delta \mathfrak{x}_{o l}^{\; 4} \; )$$

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

Error order:, 3, Error:,  $4.7352971480790574107 \times 10^{-6}$ , New Error:,  $4.7515219014774586709 \times 10^{-9}$

Error order:, 3, Error:,  $4.7515219014774586709 \times 10^{-9}$ , New Error:,  $4.7531116133571864866 \times 10^{-12}$

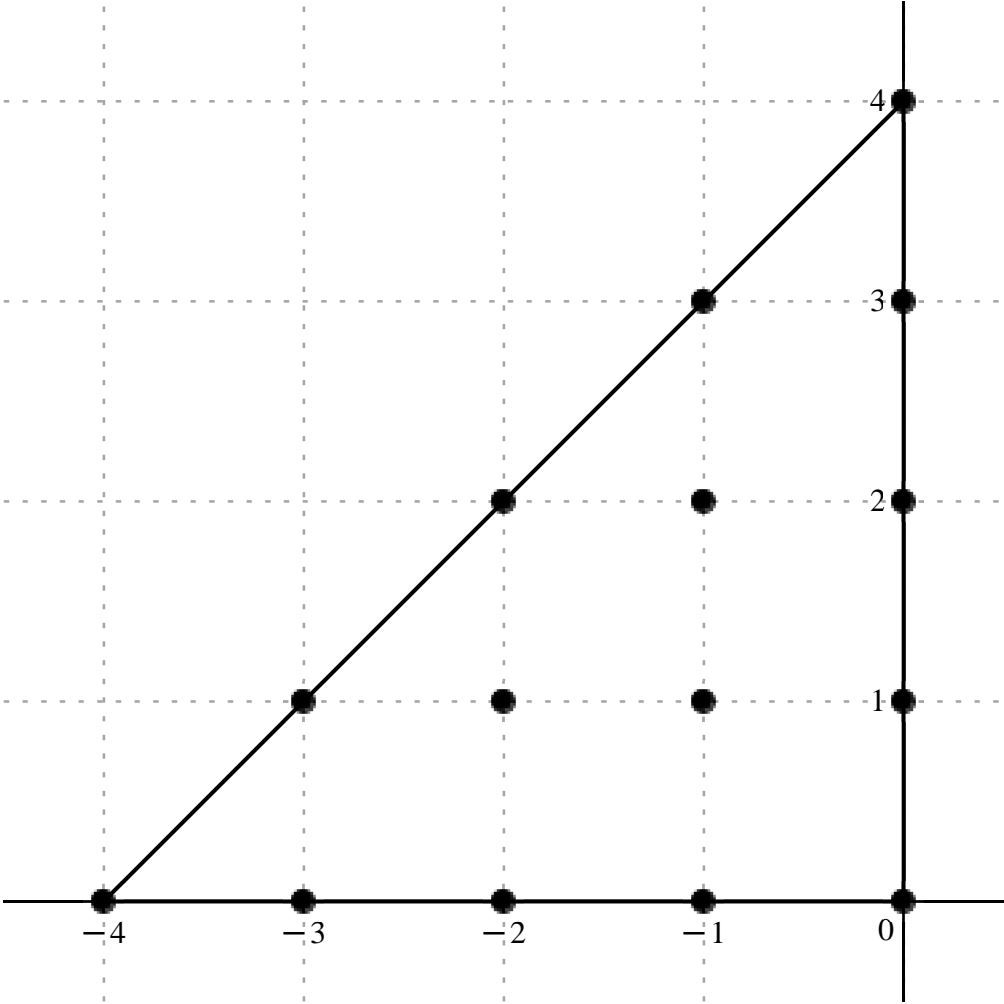
Error order:, 3, Error:,  $4.7531116133571864866 \times 10^{-12}$ , New Error:,  $4.7532702538354332385 \times 10^{-15}$

Error order:, 3, Error:,  $4.7532702538354332385 \times 10^{-15}$ , New Error:,  $4.7532861145730754765 \times 10^{-18}$

Error order:, 3, Error:,  $4.7532861145730754765 \times 10^{-18}$ , New Error:,  $4.7532877006137347897 \times 10^{-21}$

$$x_o + h , \left[ \begin{array}{cccccc} & & & & & 4 \text{ I} \\ & & & & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & \\ & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & \\ -4 & -3 & -2 & -1 & 0 & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} & & & & & & & & \frac{372141}{65} + \frac{1752597 \text{ I}}{65} \\ & & & & & & & \frac{52789968}{13} - \frac{5022864 \text{ I}}{13} & \frac{79700544}{65} + \frac{56814912 \text{ I}}{65} \\ & & & & -23426172 & -\frac{1222651584}{13} + \frac{726884928 \text{ I}}{13} & \frac{87118416}{13} + \frac{165704616 \text{ I}}{13} \\ & & \frac{52789968}{13} + \frac{5022864 \text{ I}}{13} & -\frac{1222651584}{13} - \frac{726884928 \text{ I}}{13} & 207766944 & -9313920 + 13837824 \text{ I} \\ \frac{372141}{65} - \frac{1752597 \text{ I}}{65} & \frac{79700544}{65} - \frac{56814912 \text{ I}}{65} & \frac{87118416}{13} - \frac{165704616 \text{ I}}{13} & -9313920 - 13837824 \text{ I} & & -1600830 \end{array} \right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}} \; u(x_{ol}) = \frac{1}{65 \; \Delta x_{ol}^{12}} \Big( 2079 \; \Big( (179 + 843 \; \text{I}) \; u_{ol+4 \text{ I}} + (126960 - 12080 \; \text{I}) \; u_{ol-1+3 \text{ I}} + (38336 + 27328 \; \text{I}) \; u_{ol+3 \text{ I}} - 732420 \; u_{ol-2+2 \text{ I}} + (-2940480 + 1748160 \; \text{I}) \; u_{ol-1+2 \text{ I}} + (209520 + 398520 \; \text{I}) \; u_{ol+2 \text{ I}} + (126960 + 12080 \; \text{I}) \; u_{ol-3+1} - (2940480 + 1748160 \; \text{I}) \; u_{ol-2+1} + 6495840 \; u_{ol-1+1} + (-291200 + 432640 \; \text{I}) \; u_{ol+1} + (179 - 843 \; \text{I}) \; u_{ol-4}$$

$$+ (38336 - 27328 \; \text{I}) \; u_{ol-3} + (209520 - 398520 \; \text{I}) \; u_{ol-2} - (291200 + 432640 \; \text{I}) \; u_{ol-1} - 50050 \; u_{ol} \Big) \Big) \cdot O(\; \Delta x_{ol}^3 \; )$$

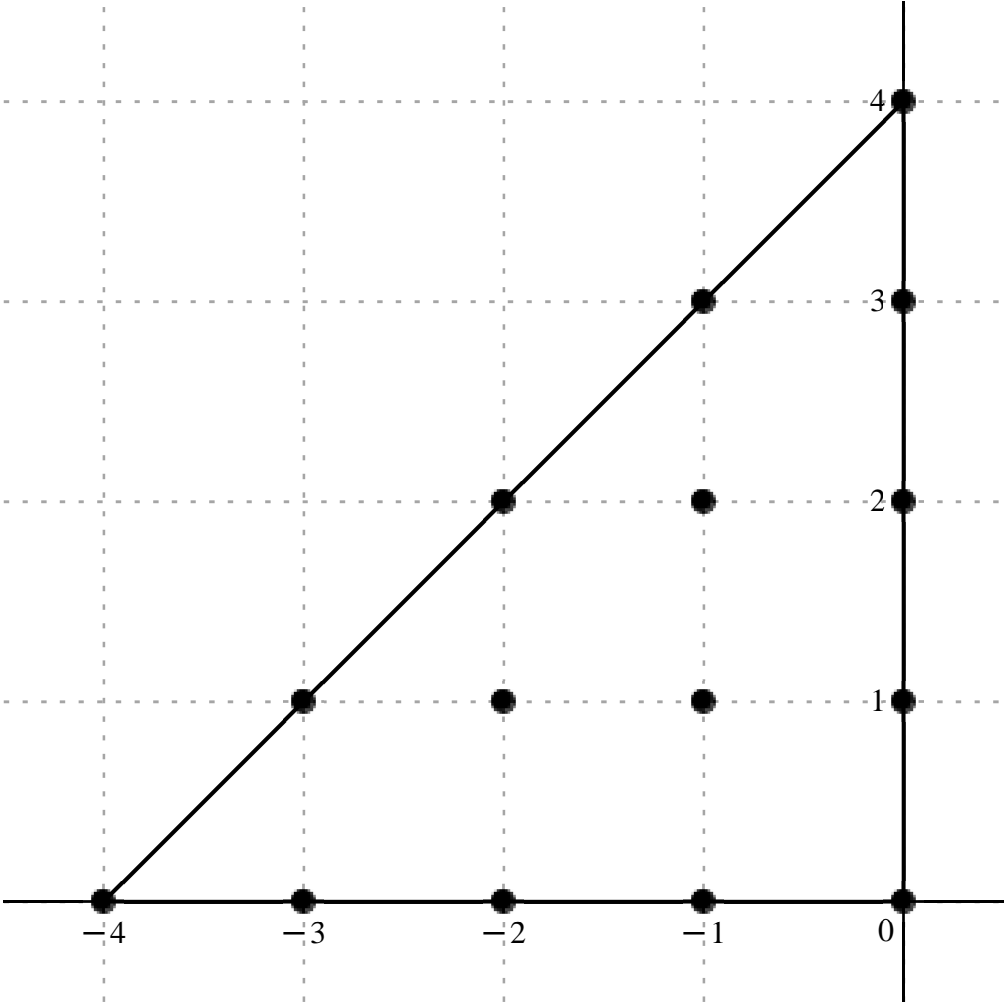
Formula:, 423, Var:, 1

Variavel :,  $x_o$ , Derivada de Ordem :, 13

Error order:, 2, Error:, 0.00075451623029074003135, New Error:,  $7.6239840549746079497 \times 10^{-6}$   
Error order:, 2, Error:,  $7.6239840549746079497 \times 10^{-6}$ , New Error:,  $7.6318803837314712084 \times 10^{-8}$   
Error order:, 2, Error:,  $7.6318803837314712084 \times 10^{-8}$ , New Error:,  $7.6326701562906274304 \times 10^{-10}$   
Error order:, 2, Error:,  $7.6326701562906274304 \times 10^{-10}$ , New Error:,  $7.6327491349415134942 \times 10^{-12}$   
Error order:, 2, Error:,  $7.6327491349415134942 \times 10^{-12}$ , New Error:,  $7.6327570328205499395 \times 10^{-14}$

$$x_o + h \cdot \begin{bmatrix} & & & & 4 \text{ I} \\ & & & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$$c =, \begin{bmatrix} & & & & -\frac{1155924}{85} + \frac{2220372 \text{ I}}{85} \\ & & & 3459456 + 2594592 \text{ I} & \frac{1862784}{5} + \frac{7584192 \text{ I}}{5} \\ & & -17513496 - 17513496 \text{ I} & -110170368 - 25147584 \text{ I} & -3592512 + 14070672 \text{ I} \\ & 2594592 + 3459456 \text{ I} & -25147584 - 110170368 \text{ I} & 147891744 + 147891744 \text{ I} & -\frac{271567296}{17} + \frac{60540480 \text{ I}}{17} \\ \frac{2220372}{85} - \frac{1155924 \text{ I}}{85} & \frac{7584192}{5} + \frac{1862784 \text{ I}}{5} & 14070672 - 3592512 \text{ I} & \frac{60540480}{17} - \frac{271567296 \text{ I}}{17} & -1081080 - 1081080 \text{ I} \end{bmatrix}$$





$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\,u(x_{ol})=\frac{1}{85\,\mathbb{A}_{ol}^{13}}\Big(8316\,\big((\,-139+267\,\mathrm{I}\,)\,u_{ol+4\mathrm{I}}+(35360+26520\,\mathrm{I})\,u_{ol-1+3\mathrm{I}}+(3808+15504\,\mathrm{I})\,u_{ol+3\mathrm{I}}-(179010+179010\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}-(1126080+257040\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+(\,-36720+143820\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(26520+35360\,\mathrm{I})\,u_{ol-3+1\mathrm{I}}-(257040+1126080\,\mathrm{I})\,u_{ol-2+1\mathrm{I}}+(1511640+1511640\,\mathrm{I})\,u_{ol-1+1\mathrm{I}}+(\,-163280+36400\,\mathrm{I})\,u_{ol+1\mathrm{I}}\\ + (267-139\,\mathrm{I})\,u_{ol-4\mathrm{I}}+(15504+3808\,\mathrm{I})\,u_{ol-3\mathrm{I}}+(143820-36720\,\mathrm{I})\,u_{ol-2\mathrm{I}}+(36400-163280\,\mathrm{I})\,u_{ol-1\mathrm{I}}-(11050+11050\,\mathrm{I})\,u_{ol}\big)\Big),\,O(\,\mathbb{A}_{ol}^2\,)$$

Formula:, 424, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:., 1, Error:., 0.060825379531409559086, New Error:., 0.0060962224473411048923

Error order:., 1, Error:., 0.0060962224473411048923, New Error:., 0.00060975680219653593447

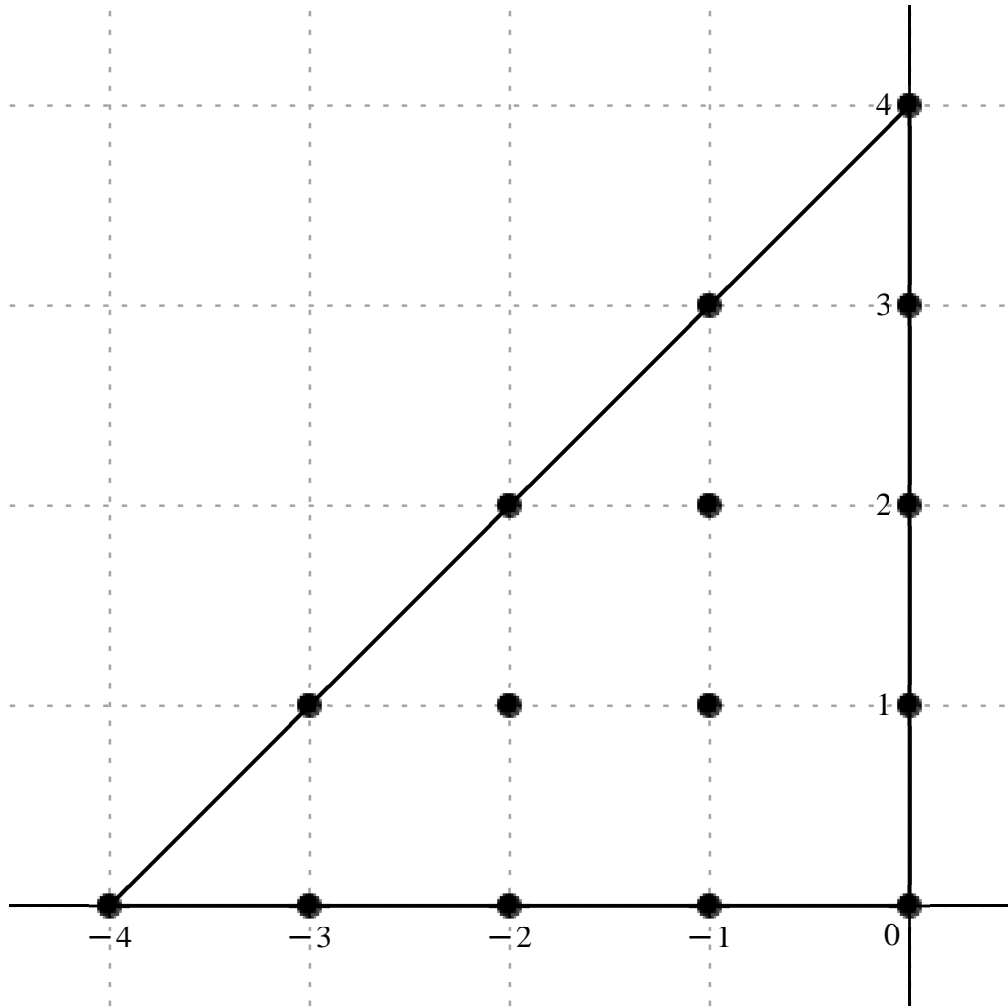
Error order:., 1, Error:., 0.00060975680219653593447, New Error:., 0.000060977023487768687657

Error order:., 1, Error:., 0.000060977023487768687657, New Error:., 6.0977157791496018905 × 10<sup>−6</sup>

Error order:., 1, Error:., 6.0977157791496018905 × 10<sup>−6</sup>, New Error:., 6.0977171221637891155 × 10<sup>−7</sup>

$$x_o\neq h\, ,\,\left[\begin{array}{ccccccccc} & & & & & & & & 4\,\mathrm{I}\\ & & & & & & & -1+3\,\mathrm{I} & 3\,\mathrm{I}\\ & & & & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & & \\ & & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & & & \\ -4 & -3 & -2 & -1 & 0 & & & & \end{array}\right]$$

$$c=,\left[\begin{array}{ccccccccccc} & & & & & & & & & & -\frac{1251558}{85}+\frac{553014\,\mathrm{I}}{85}\\ & & & & & & & & & & \\ & & & & & & 465696+2328480\,\mathrm{I} & & & & -\frac{1862784}{5}+\frac{3725568\,\mathrm{I}}{5}\\ & & & & -13621608\,\mathrm{I} & -33530112-50295168\,\mathrm{I} & & & & & -6286896+4191264\,\mathrm{I}\\ & & -465696+2328480\,\mathrm{I} & 33530112-50295168\,\mathrm{I} & 108972864\,\mathrm{I} & & & & & & -\frac{121080960}{17}-\frac{72648576\,\mathrm{I}}{17}\\ \frac{1251558}{85}+\frac{553014\,\mathrm{I}}{85} & \frac{1862784}{5}+\frac{3725568\,\mathrm{I}}{5} & 6286896+4191264\,\mathrm{I} & \frac{121080960}{17}-\frac{72648576\,\mathrm{I}}{17} & & & & & & & -756756\,\mathrm{I}\end{array}\right]$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}}\;u(x_{ol})=\frac{1}{85\,\Delta x_{ol}^{14}}\Big(29106\left((\,-43+19\,\mathrm{I}\,)\,u_{ol+4\,\mathrm{I}}+(1360+6800\,\mathrm{I})\,u_{ol-1+3\,\mathrm{I}}+(\,-1088+2176\,\mathrm{I})\,u_{ol+3\,\mathrm{I}}-39780\,\mathrm{I}u_{ol-2+2\,\mathrm{I}}-(97920+146880\,\mathrm{I})\,u_{ol-1+2\,\mathrm{I}}+(\,-18360+12240\,\mathrm{I})\,u_{ol+2\,\mathrm{I}}+(\,-1360+6800\,\mathrm{I})\,u_{ol-3+1}+(97920-146880\,\mathrm{I})\,u_{ol-2+1}+318240\,\mathrm{I}u_{ol-1+1}-(20800+12480\,\mathrm{I})\,u_{ol+1}+(43+19\,\mathrm{I})\,u_{ol-4}+(1088\right.\\ \left.+2176\,\mathrm{I})\,u_{ol-3}+(18360+12240\,\mathrm{I})\,u_{ol-2}+(20800-12480\,\mathrm{I})\,u_{ol-1}-2210\,\mathrm{I}u_{ol}\right)\Big),\;O(\;\Delta x_{ol}\;)$$

Formula:, 425, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 1

Error order:, 14, Error:, 1.1701514437164511678 × 10<sup>−34</sup>, New Error:, 1.1529824007006070222 × 10<sup>−48</sup>

Error order:, 14, Error:, 1.1529824007006070222 × 10<sup>−48</sup>, New Error:, 1.1512693299347326012 × 10<sup>−62</sup>

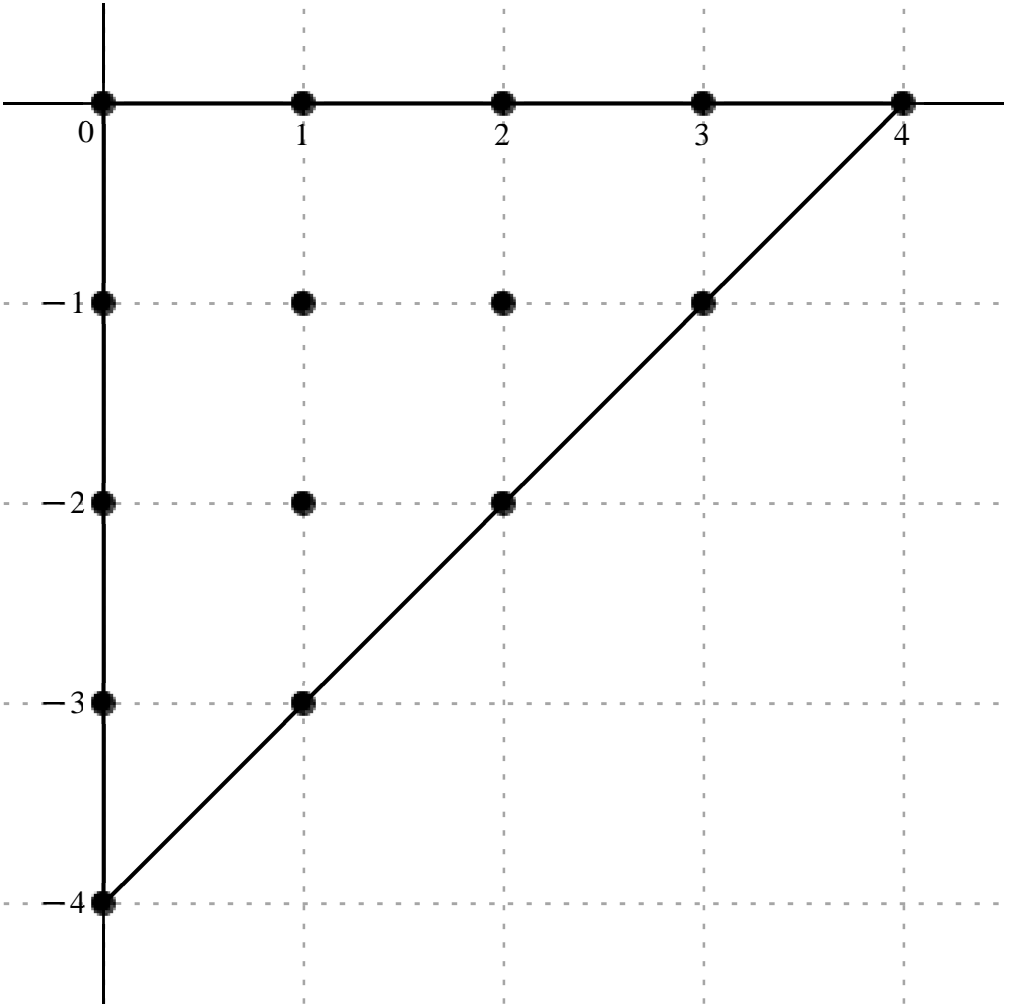
Error order:, 14, Error:, 1.1512693299347326012 × 10<sup>−62</sup>, New Error:, 1.1510980618388614446 × 10<sup>−76</sup>

Error order:, 14, Error:, 1.1510980618388614446 × 10<sup>−76</sup>, New Error:, 1.1510809354197218181 × 10<sup>−90</sup>

Error order:, 14, Error:, 1.1510809354197218181 × 10<sup>−90</sup>, New Error:, 1.1510792227817129701 × 10<sup>−104</sup>

$$x_o+h.,\left[\begin{array}{ccccc}0&1&2&3&4\\-1&1-1&2-1&3-1&\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}&&\\-3\,\mathrm{I}&1-3\,\mathrm{I}&&&\\-4\,\mathrm{I}&&&&\end{array}\right]$$

$$c =, \left[ \begin{array}{cccc} -\frac{23}{6} - \frac{23 \text{ I}}{6} & -\frac{96}{17} - \frac{160 \text{ I}}{17} & \frac{36}{13} - \frac{54 \text{ I}}{13} & \frac{64}{195} - \frac{32 \text{ I}}{195} \quad \frac{19}{8840} - \frac{43 \text{ I}}{8840} \\ -\frac{160}{17} - \frac{96 \text{ I}}{17} & 72 + 72 \text{ I} & -\frac{1152}{65} - \frac{2016 \text{ I}}{65} & \frac{56}{65} + \frac{32 \text{ I}}{65} \\ -\frac{54}{13} + \frac{36 \text{ I}}{13} & -\frac{2016}{65} - \frac{1152 \text{ I}}{65} & -\frac{9}{2} - \frac{9 \text{ I}}{2} & \\ -\frac{32}{195} + \frac{64 \text{ I}}{195} & \frac{32}{65} + \frac{56 \text{ I}}{65} & & \\ -\frac{43}{8840} + \frac{19 \text{ I}}{8840} & & & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\; u(x_{ol}) = \frac{1}{26520 \; \Delta x_{ol}} \Big( -(101660 + 101660 \text{ I}) \; u_{ol} - (149760 + 249600 \text{ I}) \; u_{ol+1} + (73440 - 110160 \text{ I}) \; u_{ol+2} + (8704 - 4352 \text{ I}) \; u_{ol+3} + (57 - 129 \text{ I}) \; u_{ol+4} - (249600 + 149760 \text{ I}) \; u_{ol-1} + (1909440 + 1909440 \text{ I}) \; u_{ol+1-1} - (470016 + 822528 \text{ I}) \; u_{ol+2-1} + (22848 + 13056 \text{ I}) \; u_{ol+3-1} + (-110160 + 73440 \text{ I}) \; u_{ol-21} - (822528 + 470016 \text{ I}) \; u_{ol+1-21} - (119340 + 119340 \text{ I}) \; u_{ol+2-21} + (-4352 + 8704 \text{ I}) \; u_{ol-31} + (13056 + 22848 \text{ I}) \; u_{ol+1-31} + (-129 + 57 \text{ I}) \; u_{ol-41} \Big), \; O( \; \Delta x_{ol}^{14} \; )$$

Formula:, 426, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 2

Error order:, 13, Error:, 9.7382116738152258042 × 10−32, New Error:, 9.6984693826212375443 × 10−45

Error order:, 13, Error:, 9.6984693826212375443 × 10−45, New Error:, 9.6943917826930183804 × 10−58

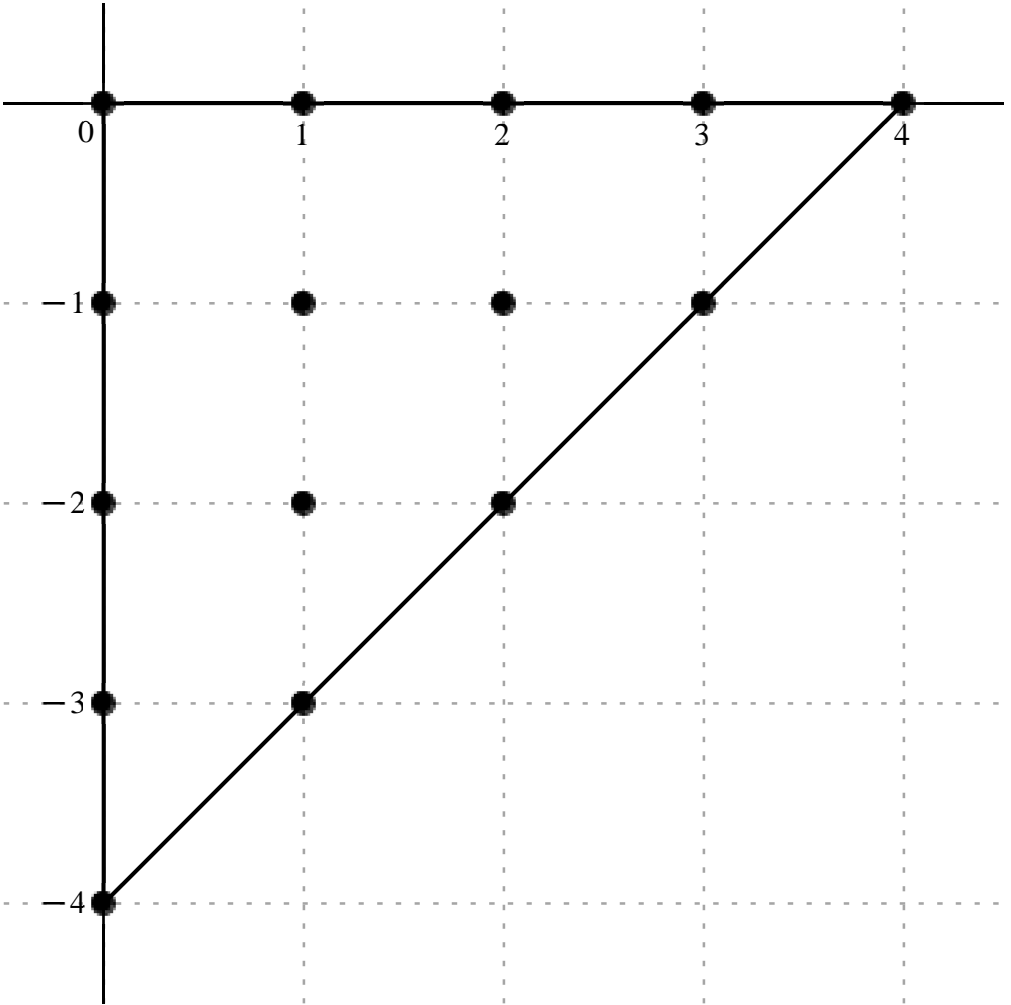
Error order:, 13, Error:, 9.6943917826930183804 × 10−58, New Error:, 9.6939830000955124404 × 10−71

Error order:, 13, Error:, 9.6939830000955124404 × 10−71, New Error:, 9.6939421116207771445 × 10−84

Error order:, 13, Error:, 9.6939421116207771445 × 10−84, New Error:, 9.6939380226711648259 × 10−97

$$x_o \neq h., \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -1 & 1-1 & 2-1 & 3-1 & \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & & \\ -3 \text{ I} & 1-3 \text{ I} & & & \\ -4 \text{ I} & & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccc} \frac{50983 \text{ I}}{1800} & -\frac{2048}{51} + \frac{4928 \text{ I}}{51} & -\frac{654}{13} + \frac{84 \text{ I}}{13} & -\frac{32}{9} - \frac{160 \text{ I}}{117} & -\frac{43}{816} + \frac{5 \text{ I}}{272} \\ \frac{2048}{51} + \frac{4928 \text{ I}}{51} & -960 \text{ I} & -\frac{2592}{25} + \frac{8544 \text{ I}}{25} & -\frac{784}{325} - \frac{9664 \text{ I}}{975} & \\ \frac{654}{13} + \frac{84 \text{ I}}{13} & \frac{2592}{25} + \frac{8544 \text{ I}}{25} & \frac{129 \text{ I}}{2} & & \\ \frac{32}{9} - \frac{160 \text{ I}}{117} & \frac{784}{325} - \frac{9664 \text{ I}}{975} & & & \\ \frac{43}{816} + \frac{5 \text{ I}}{272} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d} x_{o l}^2} \; u(x_{o l}) = \frac{1}{795600 \; \Delta x_{o l}^2} \big( 22534486 \text{ I} u_{o l} + (-31948800 + 76876800 \text{ I}) \; u_{o l+1} + (-40024800 + 5140800 \text{ I}) \; u_{o l+2} - (2828800 + 1088000 \text{ I}) \; u_{o l+3} + (-41925 + 14625 \text{ I}) \; u_{o l+4} + (31948800 + 76876800 \text{ I}) \; u_{o l-1} - 763776000 \text{ I} u_{o l+1-1} + (-82487808 + 271904256 \text{ I}) \; u_{o l+2-1} - (1919232 + 7885824 \text{ I}) \; u_{o l+3-1} + (40024800 \\ + 5140800 \text{ I}) \; u_{o l-21} + (82487808 + 271904256 \text{ I}) \; u_{o l+1-21} + 51316200 \text{ I} u_{o l+2-21} + (2828800 - 1088000 \text{ I}) \; u_{o l-31} + (1919232 - 7885824 \text{ I}) \; u_{o l+1-31} + (41925 + 14625 \text{ I}) \; u_{o l-41} \big), \; O( \; \Delta x_{o l}^{\; 13} \; )$$

$Variavel \, :, x_{ol} \, , \, Derivada \, de \, Ordem \, :, 3$

$Error \, order:, 12, \, Error:, 8.2155157451774323596 \times 10^{-29}, \, New \, Error:, 8.0965823877383072433 \times 10^{-41}$

$Error \, order:, 12, \, Error:, 8.0965823877383072433 \times 10^{-41}, \, New \, Error:, 8.0847152809997212992 \times 10^{-53}$

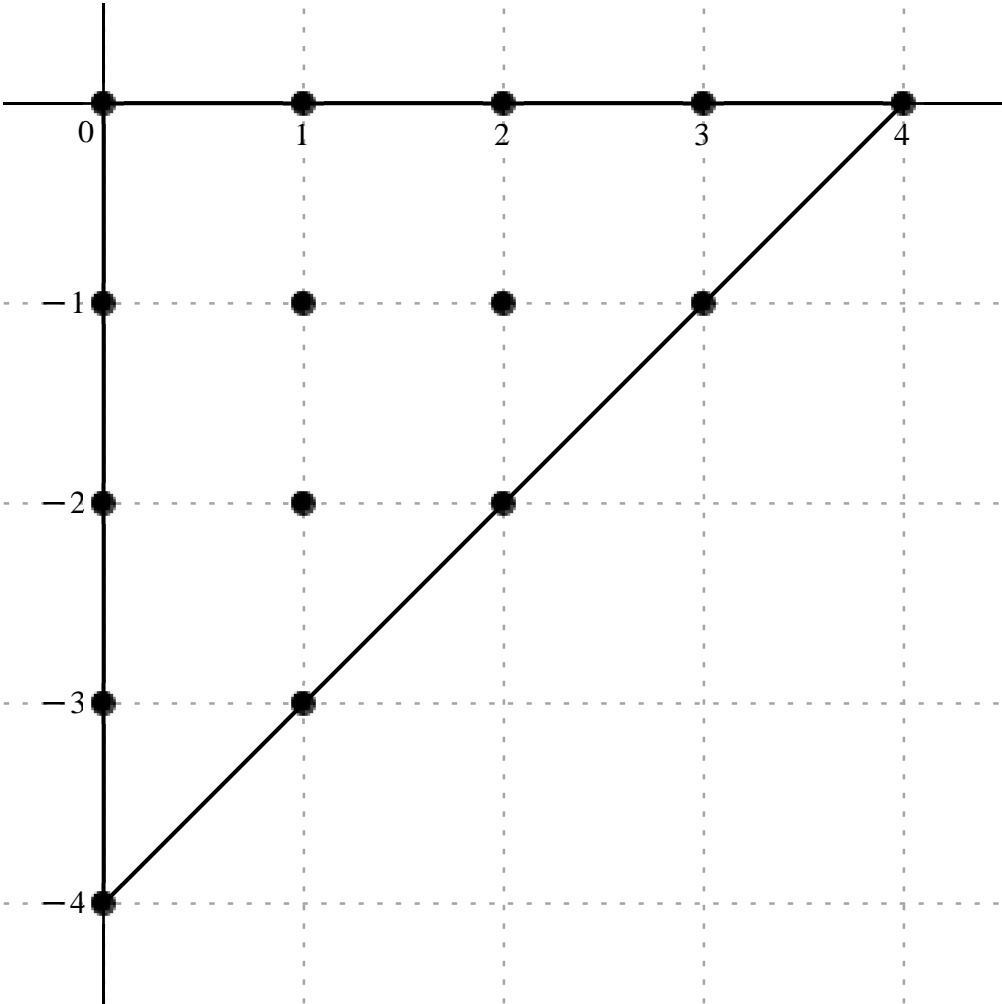
$Error \, order:, 12, \, Error:, 8.0847152809997212992 \times 10^{-53}, \, New \, Error:, 8.0835288369767697756 \times 10^{-65}$

$Error \, order:, 12, \, Error:, 8.0835288369767697756 \times 10^{-65}, \, New \, Error:, 8.0834101952453109484 \times 10^{-77}$

$Error \, order:, 12, \, Error:, 8.0834101952453109484 \times 10^{-77}, \, New \, Error:, 8.0833983310988777528 \times 10^{-89}$

$$x_o \, + h \, . \, , \, \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -I & 1-I & 2-I & 3-I & \\ -2 \, I & 1-2 \, I & 2-2 \, I & & \\ -3 \, I & 1-3 \, I & & & \\ -4 \, I & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{47413}{480} - \frac{47413 \, I}{480} & \frac{173212}{255} - \frac{80732 \, I}{425} & \frac{360747}{1300} + \frac{159249 \, I}{650} & \frac{50644}{4875} + \frac{43096 \, I}{1625} & \frac{495661}{1326000} + \frac{520901 \, I}{2652000} & \\ \frac{80732}{425} - \frac{173212 \, I}{255} & -\frac{116949}{25} + \frac{116949 \, I}{25} & \frac{749436}{325} - \frac{376368 \, I}{325} & -\frac{40004}{975} + \frac{61973 \, I}{975} & & \\ -\frac{159249}{650} - \frac{360747 \, I}{1300} & \frac{376368}{325} - \frac{749436 \, I}{325} & \frac{133599}{400} - \frac{133599 \, I}{400} & & & \\ -\frac{43096}{1625} - \frac{50644 \, I}{4875} & -\frac{61973}{975} + \frac{40004 \, I}{975} & & & & \\ -\frac{520901}{2652000} - \frac{495661 \, I}{1326000} & & & & & \end{array} \right]$$



$$\frac{d^3}{dx_{ol}^3} \, u(x_{ol}) = \frac{1}{2652000 \, \Delta x_{ol}^3} \, \big( (261956825 - 261956825 \, I) \, u_{ol} + (1801404800 - 503767680 \, I) \, u_{ol+1} + (735923880 + 649735920 \, I) \, u_{ol+2} + (27550336 + 70332672 \, I) \, u_{ol+3} + (991322 + 520901 \, I) \, u_{ol+4} + (503767680 - 1801404800 \, I) \, u_{ol-1} + (-12405949920 + 12405949920 \, I) \, u_{ol+1-1} + (6115397760 - 3071162880 \, I) \, u_{ol+2-1}$$

$$+ (-108810880 + 168566560 \, I) \, u_{ol+3-1} - (649735920 + 735923880 \, I) \, u_{ol-21} + (3071162880 - 6115397760 \, I) \, u_{ol+1-21} + (885761370 - 885761370 \, I) \, u_{ol+2-21} - (70332672 + 27550336 \, I) \, u_{ol-31} + (-168566560 + 108810880 \, I) \, u_{ol+1-31} - (520901 + 991322 \, I) \, u_{ol-41} \big), \, O( \, \Delta x_{ol}^{12} \, )$$

Formula:, 428, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 4

Error order:, 11, Error:,  $4.1473852334334341552 \times 10^{-26}$ , New Error:,  $4.1307069305385448897 \times 10^{-37}$

Error order:, 11, Error:,  $4.1307069305385448897 \times 10^{-37}$ , New Error:,  $4.1289963425638689425 \times 10^{-48}$

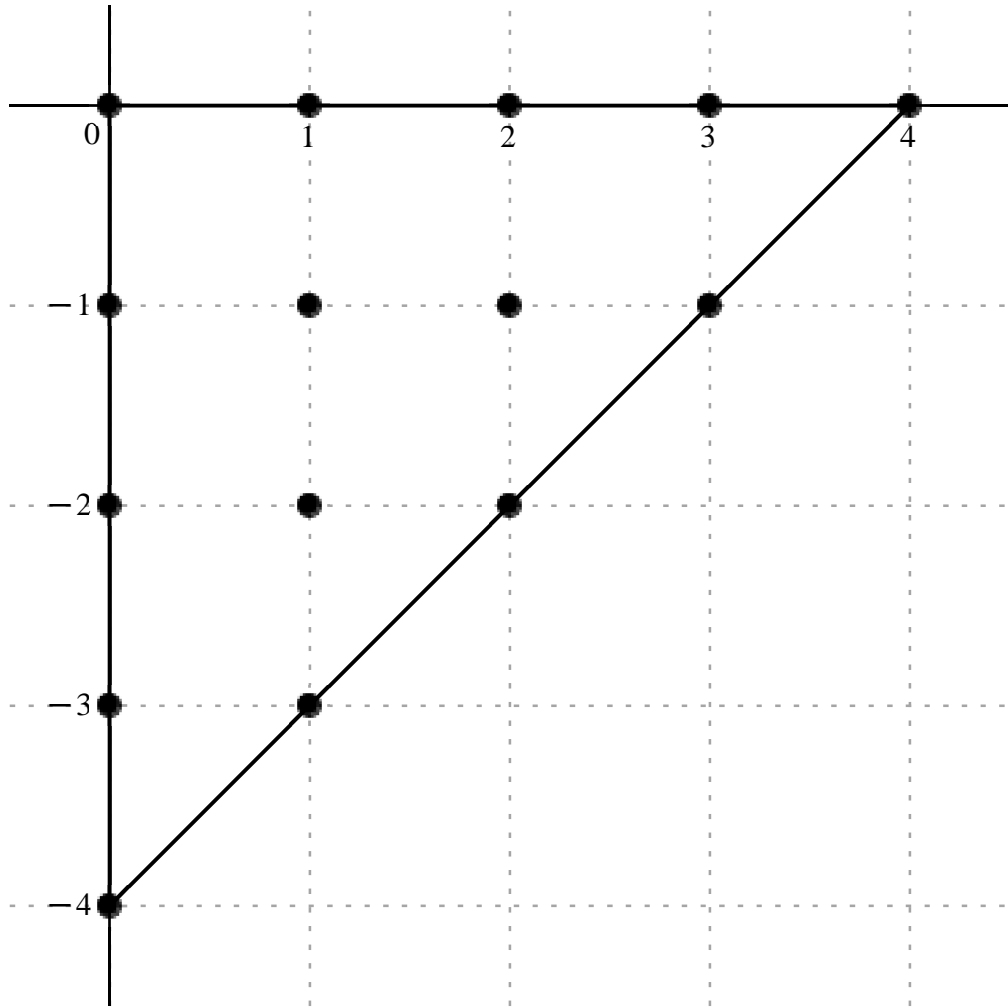
Error order:, 11, Error:,  $4.1289963425638689425 \times 10^{-48}$ , New Error:,  $4.1288248607225421271 \times 10^{-59}$

Error order:, 11, Error:,  $4.1288248607225421271 \times 10^{-59}$ , New Error:,  $4.1288077083124872178 \times 10^{-70}$

Error order:, 11, Error:,  $4.1288077083124872178 \times 10^{-70}$ , New Error:,  $4.1288059930292270193 \times 10^{-81}$

$$x_o + h, , \begin{bmatrix} 0 & 1 & 2 & 3 & 4 \\ -1 & 1 -1 & 2 -1 & 3 -1 \\ -2 \text{ I} & 1 -2 \text{ I} & 2 -2 \text{ I} \\ -3 \text{ I} & 1 -3 \text{ I} \\ -4 \text{ I} \end{bmatrix}$$

$$c = , \begin{bmatrix} -\frac{76859}{120} & -\frac{824368}{255} - \frac{2865304 \text{ I}}{1275} & \frac{10299}{1300} - \frac{2918979 \text{ I}}{1300} & \frac{383612}{4875} - \frac{775876 \text{ I}}{4875} & -\frac{926729}{1326000} - \frac{1138019 \text{ I}}{442000} \\ -\frac{824368}{255} + \frac{2865304 \text{ I}}{1275} & \frac{954594}{25} & -\frac{4758324}{325} - \frac{1709508 \text{ I}}{325} & \frac{149583}{325} - \frac{83873 \text{ I}}{975} \\ \frac{10299}{1300} + \frac{2918979 \text{ I}}{1300} & -\frac{4758324}{325} + \frac{1709508 \text{ I}}{325} & -\frac{144399}{50} \\ \frac{383612}{4875} + \frac{775876 \text{ I}}{4875} & \frac{149583}{325} + \frac{83873 \text{ I}}{975} \\ -\frac{926729}{1326000} + \frac{1138019 \text{ I}}{442000} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{1326000 \, \Delta x_{ol}^4} \, \big( -849291950 \, u_{ol} - (4286713600 + 2979916160 \, \mathrm{I}) \, u_{ol+1} + (10504980 - 2977358580 \, \mathrm{I}) \, u_{ol+2} + (104342464 - 211038272 \, \mathrm{I}) \, u_{ol+3} - (926729 + 3414057 \, \mathrm{I}) \, u_{ol+4} + ( -4286713600 + 2979916160 \, \mathrm{I}) \, u_{ol-1} + 50631665760 \, u_{ol+1-1} - (19413961920 + 6974792640 \, \mathrm{I}) \, u_{ol+2-1} + (610298640 - 114067280 \, \mathrm{I}) \, u_{ol+3-1} \\ + (10504980 + 2977358580 \, \mathrm{I}) \, u_{ol-21} + ( -19413961920 + 6974792640 \, \mathrm{I}) \, u_{ol+1-21} - 3829461480 \, u_{ol+2-21} + (104342464 + 211038272 \, \mathrm{I}) \, u_{ol-31} + (610298640 + 114067280 \, \mathrm{I}) \, u_{ol+1-31} + ( -926729 + 3414057 \, \mathrm{I}) \, u_{ol-41} \big), \, O( \, \Delta x_{ol}^{11} \, )$$

Formula:, 429, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 5

Error order:, 10, Error:, 2.5582088726613453855 × 10<sup>−23</sup>, New Error:, 2.5218154838481619033 × 10<sup>−33</sup>

Error order:, 10, Error:, 2.5218154838481619033 × 10<sup>−33</sup>, New Error:, 2.5181840462743731802 × 10<sup>−43</sup>

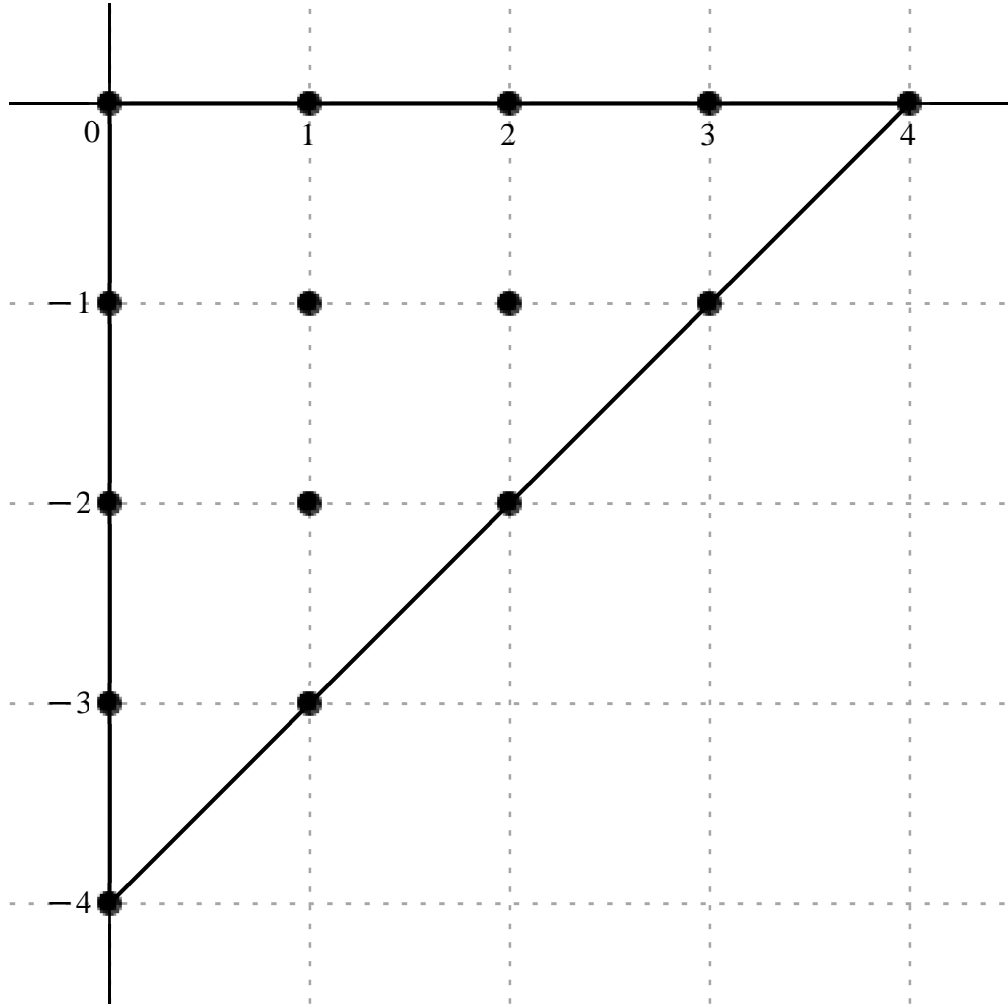
Error order:, 10, Error:, 2.5181840462743731802 × 10<sup>−43</sup>, New Error:, 2.5178209828236879947 × 10<sup>−53</sup>

Error order:, 10, Error:, 2.5178209828236879947 × 10<sup>−53</sup>, New Error:, 2.5177846772829702095 × 10<sup>−63</sup>

Error order:, 10, Error:, 2.5177846772829702095 × 10<sup>−63</sup>, New Error:, 2.5177810467369432211 × 10<sup>−73</sup>

$$x_o \, + h \, . \, , \, \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & & \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & & & \\ -4\,\mathrm{I} & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{183127}{96} + \frac{183127 \text{ I}}{96} & \frac{97940}{51} + \frac{4820596 \text{ I}}{255} & -\frac{4601241}{520} + \frac{3998331 \text{ I}}{520} & -\frac{298972}{325} + \frac{253768 \text{ I}}{975} & -\frac{1371389}{176800} + \frac{3277657 \text{ I}}{265200} \\ \frac{4820596}{255} + \frac{97940 \text{ I}}{51} & -\frac{675588}{5} - \frac{675588 \text{ I}}{5} & \frac{2127804}{65} + \frac{4820688 \text{ I}}{65} & -\frac{131667}{65} - \frac{287723 \text{ I}}{195} & \\ \frac{3998331}{520} - \frac{4601241 \text{ I}}{520} & \frac{4820688}{65} + \frac{2127804 \text{ I}}{65} & \frac{864087}{80} + \frac{864087 \text{ I}}{80} & & \\ \frac{253768}{975} - \frac{298972 \text{ I}}{325} & -\frac{287723}{195} - \frac{131667 \text{ I}}{65} & & & \\ \frac{3277657}{265200} - \frac{1371389 \text{ I}}{176800} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^s} \, u(x_{ol}) = \frac{1}{530400 \, \Delta x_{ol}^s} \big( (1011776675 + 1011776675 \, \mathrm{I}) \, u_{ol} + (1018576000 + 10026839680 \, \mathrm{I}) \, u_{ol+1} + (-4693265820 + 4078297620 \, \mathrm{I}) \, u_{ol+2} + (-487922304 + 138049792 \, \mathrm{I}) \, u_{ol+3} + (-4114167 + 6555314 \, \mathrm{I}) \, u_{ol+4} + (10026839680 + 1018576000 \, \mathrm{I}) \, u_{ol-1} - (71666375040 + 71666375040 \, \mathrm{I}) \, u_{ol+1-1} + (17362880640 + 39336814080 \, \mathrm{I}) \, u_{ol+2-1} - (1074402720 + 782606560 \, \mathrm{I}) \, u_{ol+3-1} + (4078297620 - 4693265820 \, \mathrm{I}) \, u_{ol-21} + (39336814080 + 17362880640 \, \mathrm{I}) \, u_{ol+1-21} + (5728896810 + 5728896810 \, \mathrm{I}) \, u_{ol+2-21} + (138049792 - 487922304 \, \mathrm{I}) \, u_{ol-31} - (782606560 + 1074402720 \, \mathrm{I}) \, u_{ol+1-31} + (6555314 - 4114167 \, \mathrm{I}) \, u_{ol-41} \big), \, O( \, \Delta x_{ol}^{10} \, )$$

Formula:, 430, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 6

Error order:, 9, Error:, 9.9280840744422442184 × 10<sup>−21</sup>, New Error:, 9.8889697930832230968 × 10<sup>−30</sup>

Error order:, 9, Error:, 9.8889697930832230968 × 10<sup>−30</sup>, New Error:, 9.8849600253887050793 × 10<sup>−39</sup>

Error order:, 9, Error:, 9.8849600253887050793 × 10<sup>−39</sup>, New Error:, 9.8845580754711939392 × 10<sup>−48</sup>

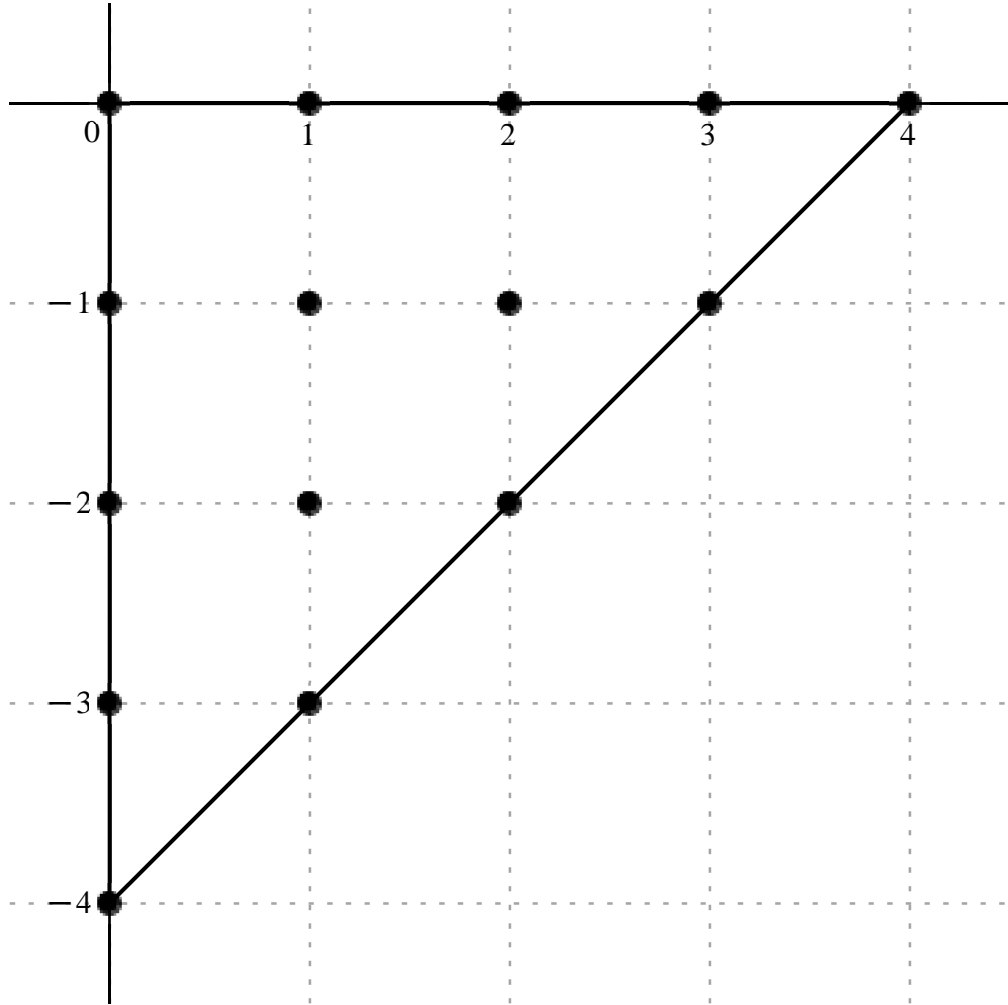
Error order:, 9, Error:, 9.8845580754711939392 × 10<sup>−48</sup>, New Error:, 9.8845178707581727953 × 10<sup>−57</sup>

Error order:, 9, Error:, 9.8845178707581727953 × 10<sup>−57</sup>, New Error:, 9.8845138501896681875 × 10<sup>−66</sup>



$$x_o+h., \begin{bmatrix} 0 & 1 & 2 & 3 & 4 \\ -1 & 1-1 & 2-1 & 3-1 & \\ -2\,1 & 1-2\,1 & 2-2\,1 & & \\ -3\,1 & 1-3\,1 & & & \\ -4\,1 & & & & \end{bmatrix}$$

$$c=,\begin{bmatrix} -\frac{825769\,1}{80} & \frac{928388}{17}-\frac{5008968\,1}{85} & \frac{6849963}{130}+\frac{1877139\,1}{260} & \frac{1233326}{325}+\frac{779602\,1}{325} & \frac{12135259}{176800}-\frac{2216153\,1}{176800} \\ -\frac{928388}{17}-\frac{5008968\,1}{85} & \frac{4187187\,1}{5} & \frac{9210762}{65}-\frac{4427226\,1}{13} & \frac{190469}{130}+\frac{1511129\,1}{130} & \\ -\frac{6849963}{130}+\frac{1877139\,1}{260} & -\frac{9210762}{65}-\frac{4427226\,1}{13} & -\frac{2824227\,1}{40} & & \\ -\frac{1233326}{325}+\frac{779602\,1}{325} & -\frac{190469}{130}+\frac{1511129\,1}{130} & & & \\ -\frac{12135259}{176800}-\frac{2216153\,1}{176800} & & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{176800 \, \Delta x_{ol}^6} \big( -1824949490 \, \mathrm{I} u_{ol} + (9655235200 - 10418653440 \, \mathrm{I}) \, u_{ol+1} + (9315949680 + 1276454520 \, \mathrm{I}) \, u_{ol+2} + (670929344 + 424103488 \, \mathrm{I}) \, u_{ol+3} + (12135259 - 2216153 \, \mathrm{I}) \, u_{ol+4} - (9655235200 + 10418653440 \, \mathrm{I}) \, u_{ol-1} + 148058932320 \, \mathrm{I} u_{ol+1-1} + (25053272640 - 60210273600 \, \mathrm{I}) \, u_{ol+2-1} + (259037840$$

$$+ 2055135440 \, \mathrm{I}) \, u_{ol+3-1} + (-9315949680 + 1276454520 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} - (25053272640 + 60210273600 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} - 12483083340 \, \mathrm{I} u_{ol+2-2\mathrm{I}} + (-670929344 + 424103488 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + (-259037840 + 2055135440 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} - (12135259 + 2216153 \, \mathrm{I}) \, u_{ol-4\mathrm{I}} \big), \, O(\, \Delta x_{ol}^9 \, )$$

$$\text{Variavel : } x_{oi}, \text{ Derivada de Ordem : } 7$$

$$\text{Error order:}, 8, \text{ Error:}, 4.7682522729847454064 \times 10^{-18}, \text{ New Error:}, 4.7021170686764811118 \times 10^{-26}$$

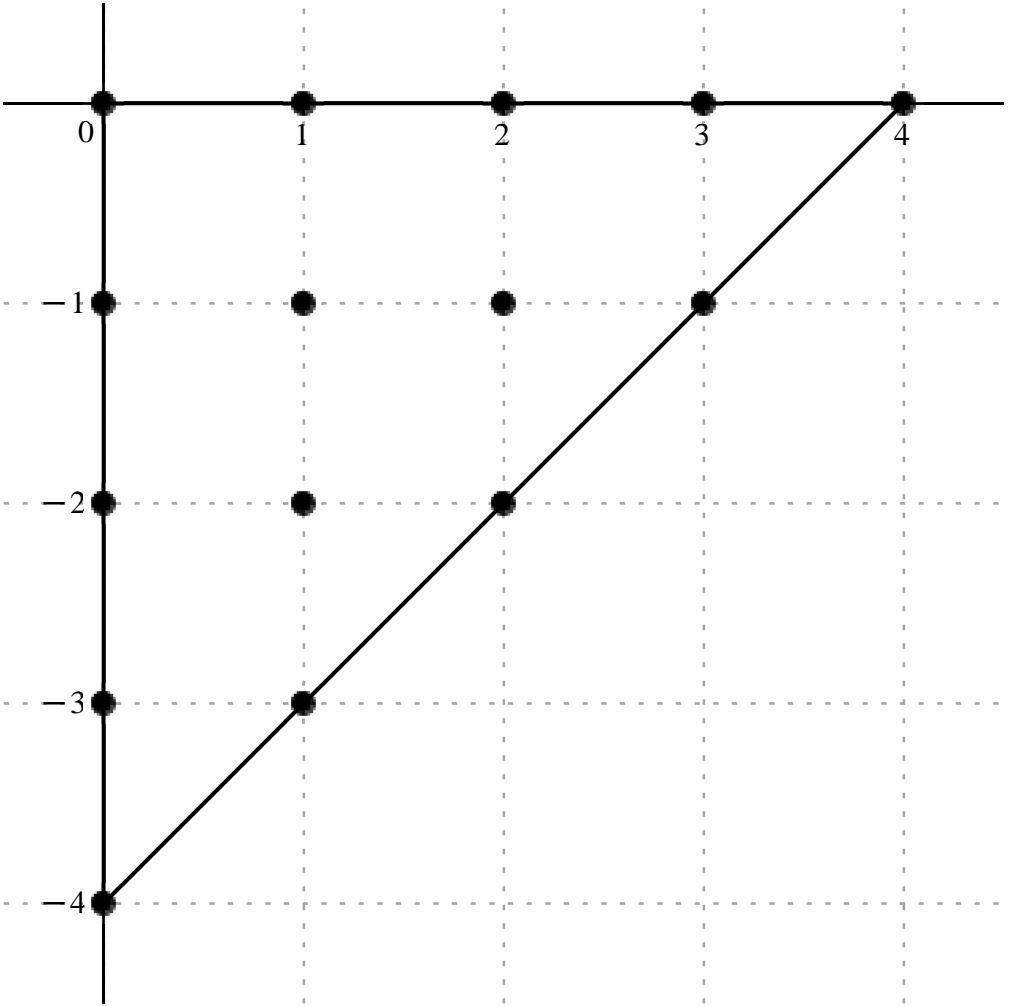
$$\text{Error order:}, 8, \text{ Error:}, 4.7021170686764811118 \times 10^{-26}, \text{ New Error:}, 4.6955175950308402997 \times 10^{-34}$$

$$\text{Error order:}, 8, \text{ Error:}, 4.6955175950308402997 \times 10^{-34}, \text{ New Error:}, 4.6948577903863665612 \times 10^{-42}$$

$$\text{Error order:}, 8, \text{ Error:}, 4.6948577903863665612 \times 10^{-42}, \text{ New Error:}, 4.6947918113513555575 \times 10^{-50}$$

$$\text{Error order:}, 8, \text{ Error:}, 4.6947918113513555575 \times 10^{-50}, \text{ New Error:}, 4.6947852134621510547 \times 10^{-58}$$

$$c = , \left[ \begin{array}{ccccccccc} x_o & +h & . & , & \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -1 & 1-1 & 2-1 & 3-1 & \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & & \\ -3 \text{ I} & 1-3 \text{ I} & & & \\ -4 \text{ I} & & & & \end{array} \right] \\ \frac{-\frac{802011}{32} + \frac{802011 \text{ I}}{32}}{\frac{380478}{85} + \frac{5062050 \text{ I}}{17}} & \frac{-\frac{5062050}{17} - \frac{380478 \text{ I}}{85}}{\frac{11356569}{5} - \frac{11356569 \text{ I}}{5}} & \frac{-\frac{60170859}{520} - \frac{90906921 \text{ I}}{520}}{\frac{88884936}{65} + \frac{34151418 \text{ I}}{65}} & \frac{-\frac{975828}{325} - \frac{5888106 \text{ I}}{325}}{\frac{3966501}{130} - \frac{4785837 \text{ I}}{130}} & \frac{-\frac{20451207}{88400} - \frac{31335087 \text{ I}}{176800}}{\frac{90906921}{520} + \frac{60170859 \text{ I}}{520}} & \frac{-\frac{34151418}{65} + \frac{88884936 \text{ I}}{65}}{\frac{5888106}{325} + \frac{975828 \text{ I}}{325}} & \frac{-\frac{16126929}{80} + \frac{16126929 \text{ I}}{80}}{\frac{4785837}{130} - \frac{3966501 \text{ I}}{130}} & \frac{\frac{16126929}{80} + \frac{16126929 \text{ I}}{80}}{\frac{31335087}{176800} + \frac{20451207 \text{ I}}{88400}} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{oi}^7} \, u(x_{oi}) = \frac{1}{176800 \, \Delta x_{oi}^7} \Big( 21 \, \Big( (-211005275 + 211005275 \, \mathrm{I}) \, u_{oi} - (2506920000 + 37685440 \, \mathrm{I}) \, u_{oi+1} - (974194860 + 1471826340 \, \mathrm{I}) \, u_{oi+2} - (25278592 + 152529984 \, \mathrm{I}) \, u_{oi+3} - (1947734 + 1492147 \, \mathrm{I}) \, u_{oi+4} + (37685440 + 2506920000 \, \mathrm{I}) \, u_{oi-1} + (19122299040 - 19122299040 \, \mathrm{I}) \, u_{oi+1-1} + (-11512715520 + 4423421760 \, \mathrm{I}) \, u_{oi+2-1} \\ + (256878160 - 309939920 \, \mathrm{I}) \, u_{oi+3-1} + (1471826340 + 974194860 \, \mathrm{I}) \, u_{oi-21} + (-4423421760 + 11512715520 \, \mathrm{I}) \, u_{oi+1-21} + (-1697167290 + 1697167290 \, \mathrm{I}) \, u_{oi+2-21} + (152529984 + 25278592 \, \mathrm{I}) \, u_{oi-31} + (309939920 - 256878160 \, \mathrm{I}) \, u_{oi+1-31} + (1492147 + 1947734 \, \mathrm{I}) \, u_{oi-41} \Big) \Big), \, O(\, \Delta x_{oi}^8 \, )$$

Formula.: 432, Var.: 1

Variavel .:  $x_{oi}$  , Derivada de Ordem .: 8

Error order.: 7, Error.:  $1.4371740882372229058 \times 10^{-15}$ , New Error.:  $1.4316850108865863405 \times 10^{-22}$

Error order.: 7, Error.:  $1.4316850108865863405 \times 10^{-22}$ , New Error.:  $1.4311226855180919535 \times 10^{-29}$

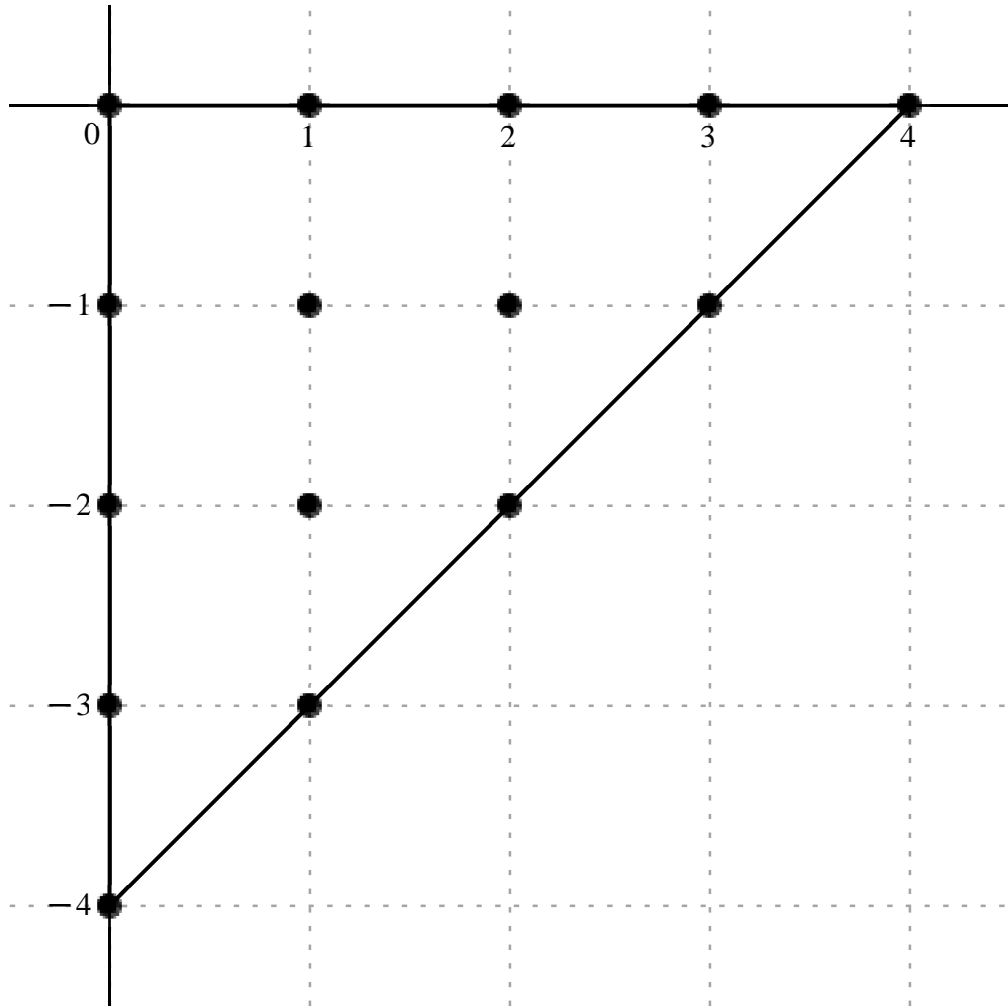
Error order.: 7, Error.:  $1.4311226855180919535 \times 10^{-29}$ , New Error.:  $1.4310663201699835714 \times 10^{-36}$

Error order.: 7, Error.:  $1.4310663201699835714 \times 10^{-36}$ , New Error.:  $1.4310606823084204058 \times 10^{-43}$

Error order.: 7, Error.:  $1.4310606823084204058 \times 10^{-43}$ , New Error.:  $1.4310601185089979257 \times 10^{-50}$

$$x_o + h . , \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -I & 1 - I & 2 - I & 3 - I & \\ -2 I & 1 - 2 I & 2 - 2 I & & \\ -3 I & 1 - 3 I & & & \\ -4 I & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{430563}{4} & \frac{10832304}{17} + \frac{61117056 I}{85} & -\frac{12040182}{65} + \frac{44772777 I}{65} & -\frac{13295688}{325} + \frac{16378824 I}{325} & \frac{3609123}{44200} + \frac{46488309 I}{44200} & \\ \frac{10832304}{17} - \frac{61117056 I}{85} & -\frac{53509428}{5} & \frac{296118648}{65} + \frac{140303016 I}{65} & -\frac{10970106}{65} + \frac{655662 I}{65} & & \\ -\frac{12040182}{65} - \frac{44772777 I}{65} & \frac{296118648}{65} - \frac{140303016 I}{65} & \frac{9981783}{10} & & & \\ -\frac{13295688}{325} - \frac{16378824 I}{325} & -\frac{10970106}{65} - \frac{655662 I}{65} & & & & \\ \frac{3609123}{44200} - \frac{46488309 I}{44200} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{44200 \, \Delta x_{ol}^8} \Big( 21 \, \big( 226558150 \, u_{_{ol}} + (1341142400 + 1513374720 \, \mathrm{I}) \, u_{_{ol+1}} + ( \, -389872560 + 1449785160 \, \mathrm{I}) \, u_{_{ol+2}} + ( \, -86105408 + 106072384 \, \mathrm{I}) \, u_{_{ol+3}} + (171863 + 2213729 \, \mathrm{I}) \, u_{_{ol+4}} + (1341142400 - 1513374720 \, \mathrm{I}) \, u_{_{ol-1}} - 22524921120 \, u_{_{ol+1-1}} + (9588603840 + 4543145280 \, \mathrm{I}) \, u_{_{ol+2-1}} + ( \, -355222480$$

$$+ 21230960 \, \mathrm{I}) \, u_{_{ol+3-1}} - (389872560 + 1449785160 \, \mathrm{I}) \, u_{_{ol-21}} + (9588603840 - 4543145280 \, \mathrm{I}) \, u_{_{ol+1-21}} + 2100927660 \, u_{_{ol+2-21}} - (86105408 + 106072384 \, \mathrm{I}) \, u_{_{ol-31}} - (355222480 + 21230960 \, \mathrm{I}) \, u_{_{ol+1-31}} + (171863 - 2213729 \, \mathrm{I}) \, u_{_{ol-41}} \Big) \Big), \, O( \, \Delta x_{ol}^7 \, )$$

Formula:, 433, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 9

Error order:., 6, Error:., 5.2803035250069211446 × 10<sup>−13</sup>, New Error:., 5.2099509153678754864 × 10<sup>−19</sup>

Error order:., 6, Error:., 5.2099509153678754864 × 10<sup>−19</sup>, New Error:., 5.2029301132671607114 × 10<sup>−25</sup>

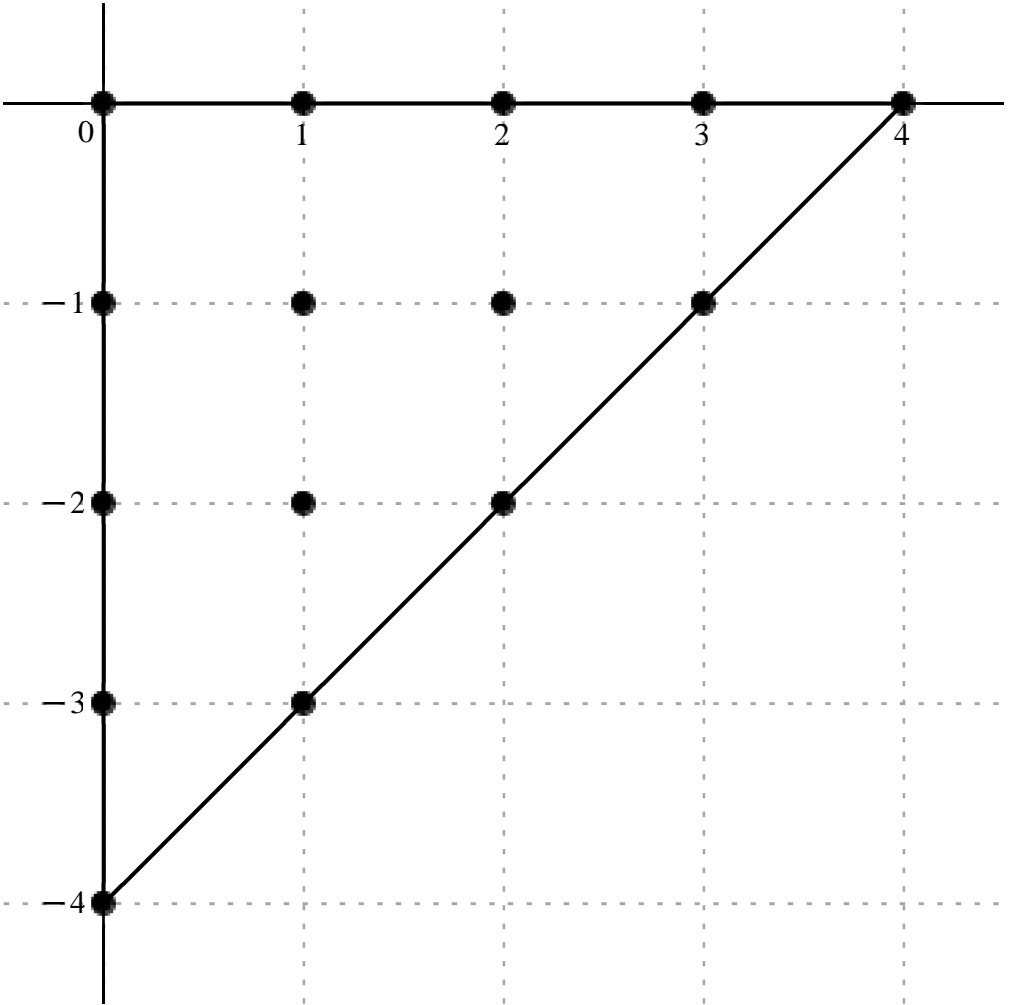
Error order:., 6, Error:., 5.2029301132671607114 × 10<sup>−25</sup>, New Error:., 5.2022281798958520848 × 10<sup>−31</sup>

Error order:., 6, Error:., 5.2022281798958520848 × 10<sup>−31</sup>, New Error:., 5.2021579880293426682 × 10<sup>−37</sup>

Error order:., 6, Error:., 5.2021579880293426682 × 10<sup>−37</sup>, New Error:., 5.2021509688574001732 × 10<sup>−43</sup>

$$x_o \, + h \, . \, , \, \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & & \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & & & \\ -4\,\mathrm{I} & & & & \end{array} \right]$$

$$c = \begin{bmatrix} -\frac{401247}{2} - \frac{401247 \text{ I}}{2} & \frac{4489128}{17} - \frac{224959896 \text{ I}}{85} & \frac{120197196}{65} - \frac{60089526 \text{ I}}{65} & \frac{63448056}{325} - \frac{2531088 \text{ I}}{325} & \frac{12519171}{5525} - \frac{25921539 \text{ I}}{11050} \\ -\frac{224959896}{85} + \frac{4489128 \text{ I}}{17} & \frac{107963604}{5} + \frac{107963604 \text{ I}}{5} & -\frac{302537592}{65} - \frac{914929344 \text{ I}}{65} & \frac{24041556}{65} + \frac{22897728 \text{ I}}{65} & \\ -\frac{60089526}{65} + \frac{120197196 \text{ I}}{65} & -\frac{914929344}{65} - \frac{302537592 \text{ I}}{65} & -\frac{10567746}{5} - \frac{10567746 \text{ I}}{5} & & \\ -\frac{2531088}{325} + \frac{63448056 \text{ I}}{325} & \frac{22897728}{65} + \frac{24041556 \text{ I}}{65} & & & \\ -\frac{25921539}{11050} + \frac{12519171 \text{ I}}{5525} & & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{11050 \, \mathcal{A}x_{ol}^9} \big( 189 \, \big( -(11729575 + 11729575 \, \text{I}) \, u_{ol} + (15438800 - 154734320 \, \text{I}) \, u_{ol+1} + (108113880 - 54048780 \, \text{I}) \, u_{ol+2} + (11413936 - 455328 \, \text{I}) \, u_{ol+3} + (132478 - 137151 \, \text{I}) \, u_{ol+4} + (-154734320 + 15438800 \, \text{I}) \, u_{ol-1} + (1262431560 + 1262431560 \, \text{I}) \, u_{ol+1-1} - (272123760 + 822952320 \, \text{I}) \, u_{ol+2-1} + (21624680$$

$$+ 20595840 \, \text{I}) \, u_{ol+3-1} + (-54048780 + 108113880 \, \text{I}) \, u_{ol-21} - (822952320 + 272123760 \, \text{I}) \, u_{ol+1-21} - (123569940 + 123569940 \, \text{I}) \, u_{ol+2-21} + (-455328 + 11413936 \, \text{I}) \, u_{ol-31} + (20595840 + 21624680 \, \text{I}) \, u_{ol+1-31} + (-137151 + 132478 \, \text{I}) \, u_{ol-41} \big) \big), \, O(\, \mathcal{A}x_{ol}^6 \, )$$

Formula: , 434, Var.: 1

Variavel : ,  $x_{ol}$ , Derivada de Ordem : , 10

Error order: , 5, Error: ,  $1.1882023753199179953 \times 10^{-10}$ , New Error: ,  $1.1838962806827165554 \times 10^{-15}$

Error order: , 5, Error: ,  $1.1838962806827165554 \times 10^{-15}$ , New Error: ,  $1.1834555988421308131 \times 10^{-20}$

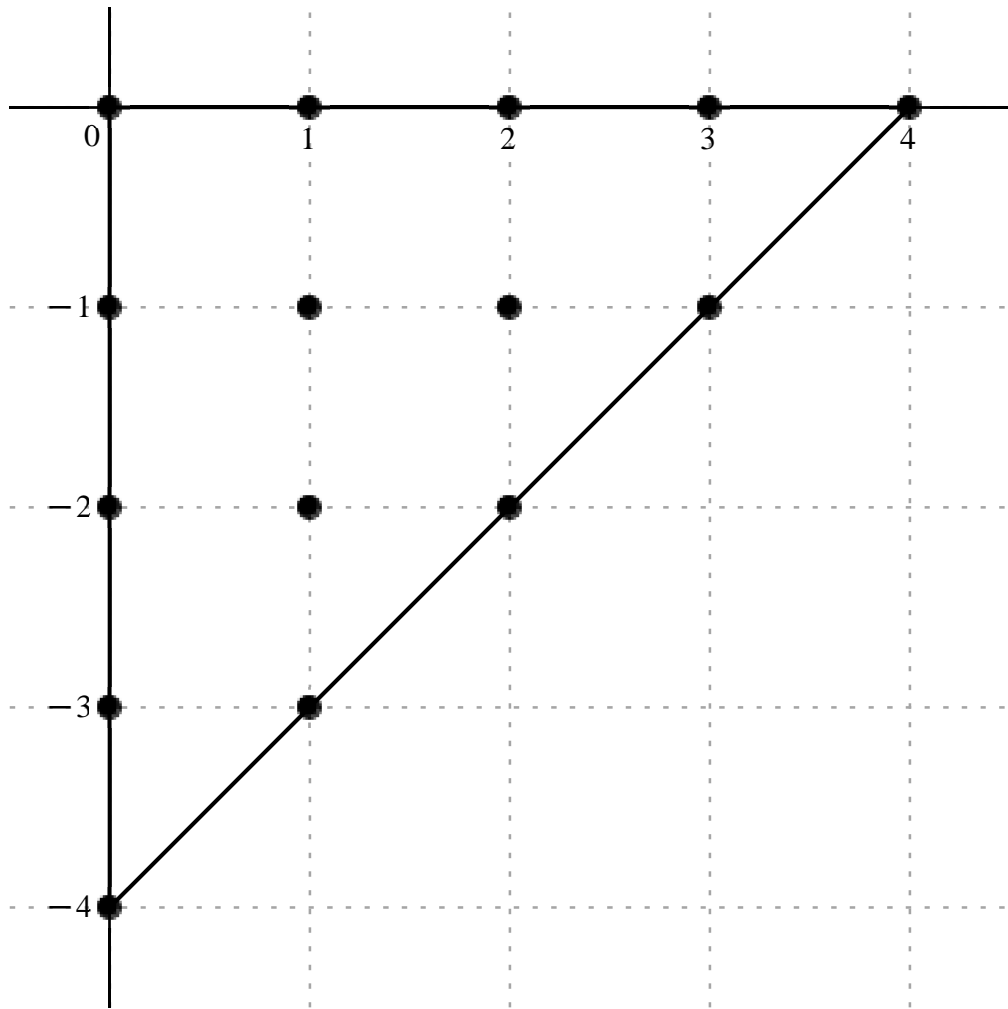
Error order: , 5, Error: ,  $1.1834555988421308131 \times 10^{-20}$ , New Error: ,  $1.1834114309232850593 \times 10^{-25}$

Error order: , 5, Error: ,  $1.1834114309232850593 \times 10^{-25}$ , New Error: ,  $1.1834070131350382167 \times 10^{-30}$

Error order: , 5, Error: ,  $1.1834070131350382167 \times 10^{-30}$ , New Error: ,  $1.1834065713462508951 \times 10^{-35}$

$$c = , \begin{bmatrix} \frac{1265229 \text{ I}}{2} & -\frac{83507760}{17} + \frac{63676368 \text{ I}}{17} & -\frac{60363954}{13} - \frac{23977296 \text{ I}}{13} & -\frac{21900816}{65} - \frac{23087232 \text{ I}}{65} & -\frac{37154943}{4420} - \frac{1846719 \text{ I}}{4420} \\ \frac{83507760}{17} + \frac{63676368 \text{ I}}{17} & -72970632 \text{ I} & -\frac{222735744}{13} + \frac{418191984 \text{ I}}{13} & \frac{215460}{13} - \frac{16762788 \text{ I}}{13} & \\ \frac{60363954}{13} - \frac{23977296 \text{ I}}{13} & \frac{222735744}{13} + \frac{418191984 \text{ I}}{13} & 7488369 \text{ I} & & \\ \frac{21900816}{65} - \frac{23087232 \text{ I}}{65} & -\frac{215460}{13} - \frac{16762788 \text{ I}}{13} & & & \\ \frac{37154943}{4420} - \frac{1846719 \text{ I}}{4420} & & & & \end{bmatrix}$$

$$x_o + h., \begin{bmatrix} 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} & \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & & \\ -3 \text{ I} & 1-3 \text{ I} & & & \\ -4 \text{ I} & & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d} x_{o l}^{10}} u\left(x_{o l}\right)=\frac{1}{4420 \Delta x_{o l}^{10}}\left(63\left(44383430 \text{ I} u_{o l}+\left(-344635200+262791360 \text{ I}\right) u_{o l+1}-\left(325773720+129401280 \text{ I}\right) u_{o l+2}-\left(23638976+24919552 \text{ I}\right) u_{o l+3}-\left(589761+29313 \text{ I}\right) u_{o l+4}+\left(344635200+262791360 \text{ I}\right) u_{o l-1}-5119526880 \text{ I} u_{o l+1-1}+\left(-1202065920+2256909120 \text{ I}\right) u_{o l+2-1}+\left(1162800-90465840 \text{ I}\right) u_{o l+3-1}+\left(325773720-129401280 \text{ I}\right) u_{o l-21}+\left(1202065920+2256909120 \text{ I}\right) u_{o l+1-21}+525374460 \text{ I} u_{o l+2-21}+\left(23638976-24919552 \text{ I}\right) u_{o l-31}-\left(1162800+90465840 \text{ I}\right) u_{o l+1-31}+\left(589761-29313 \text{ I}\right) u_{o l-41}\right), O\left(\Delta x_{o l}^5\right)$$

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 11

Error order:, 4, Error:,  $3.1312764905630757743 \times 10^{-8}$ , New Error:,  $3.0925301144174707901 \times 10^{-12}$

*Error order:*, 4, *Error:*,  $3.0925301144174707901 \times 10^{-12}$ , *New Error:*,  $3.0886630137151938324 \times 10^{-16}$

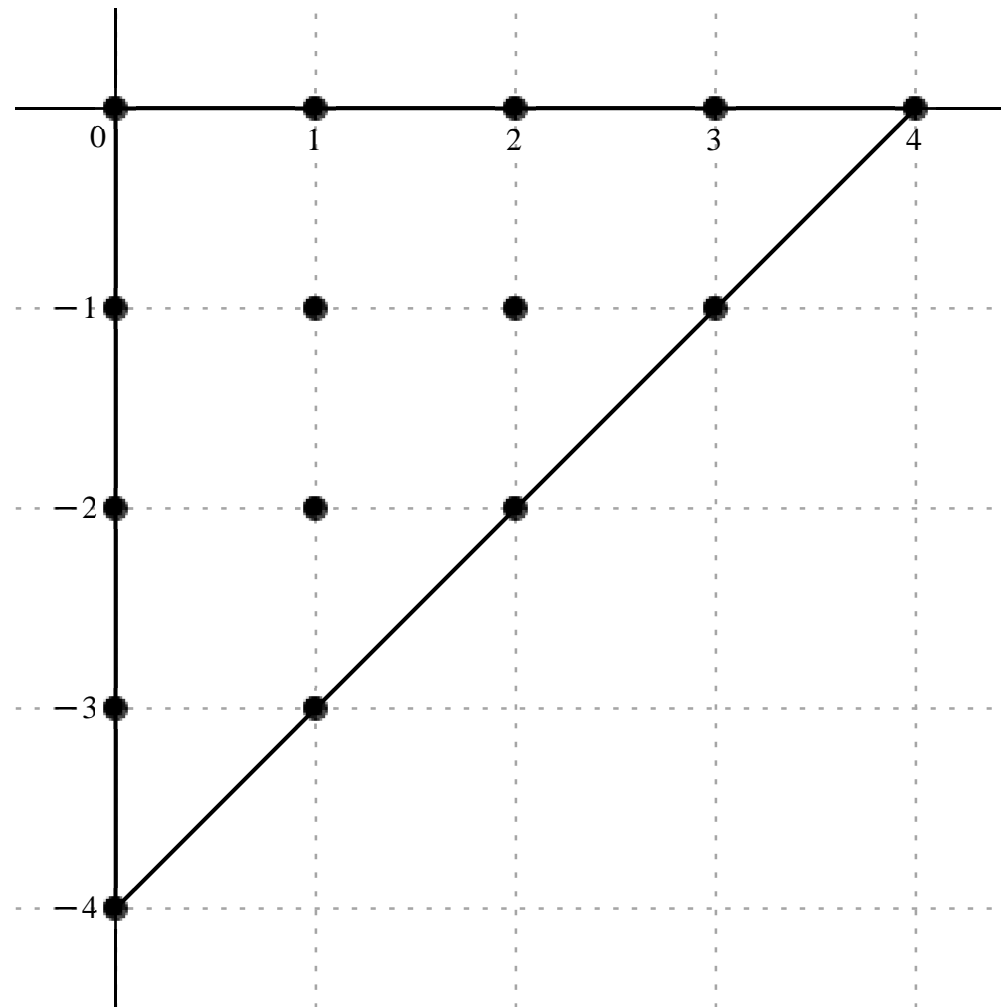
*Error order:*, 4, *Error:*,  $3.0886630137151938324 \times 10^{-16}$ , *New Error:*,  $3.0882763801340123749 \times 10^{-20}$

*Error order:*, 4, *Error:*,  $3.0882763801340123749 \times 10^{-20}$ , *New Error:*,  $3.0882377175418968077 \times 10^{-24}$

*Error order:*, 4, *Error:*,  $3.0882377175418968077 \times 10^{-24}$ , *New Error:*,  $3.0882338512903463881 \times 10^{-28}$

$$x_o + h, \begin{bmatrix} 0 & 1 & 2 & 3 & 4 \\ -I & 1-I & 2-I & 3-I \\ -2I & 1-2I & 2-2I \\ -3I & 1-3I \\ -4I \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{1625085}{2} - \frac{1625085 I}{2} & \frac{194816160}{17} + \frac{32399136 I}{17} & \frac{43771266}{13} + \frac{118640214 I}{13} & -\frac{6076224}{65} + \frac{63800352 I}{65} & \frac{11859309}{1105} + \frac{30514869 I}{2210} \\ -\frac{32399136}{17} - \frac{194816160 I}{17} & -99692208 + 99692208 I & \frac{905712192}{13} - \frac{253272096 I}{13} & -\frac{25385976}{13} + \frac{22857912 I}{13} \\ -\frac{118640214}{13} - \frac{43771266 I}{13} & \frac{253272096}{13} - \frac{905712192 I}{13} & 10721403 - 10721403 I \\ -\frac{63800352}{65} + \frac{6076224 I}{65} & -\frac{22857912}{13} + \frac{25385976 I}{13} \\ -\frac{30514869}{2210} - \frac{11859309 I}{1105} \end{bmatrix}$$



$$\frac{d\mathbf{u}}{dx_{ol}^{11}} u(x_{ol}^{11}) = \frac{1}{2210 \Delta x_{ol}^{11}} \left( 693 \left( (2591225 - 2591225 \text{ I}) u_{ol} + (36545600 + 6077760 \text{ I}) u_{ol+1} + (10737540 + 29103660 \text{ I}) u_{ol+2} + (-298112 + 3130176 \text{ I}) u_{ol+3} + (34226 + 44033 \text{ I}) u_{ol+4} - (6077760 + 36545600 \text{ I}) u_{ol-1} + (-317921760 + 317921760 \text{ I}) u_{ol+1-1} + (222180480 - 62130240 \text{ I}) u_{ol+2-1} + (-6227440 + 5607280 \text{ I}) u_{ol+3-1} \right. \right. \\ \left. \left. - (29103660 + 10737540 \text{ I}) u_{ol-21} + (62130240 - 222180480 \text{ I}) u_{ol+1-21} + (34190910 - 34190910 \text{ I}) u_{ol+2-21} + (-3130176 + 298112 \text{ I}) u_{ol-31} + (-5607280 + 6227440 \text{ I}) u_{ol+1-31} - (44033 + 34226 \text{ I}) u_{ol-41} \right) \right), \quad O(\Delta x_{ol}^4)$$

Formula:, 436, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 12

Error order:, 3, Error:,  $4.7705354796622585888 \times 10^{-6}$ , New Error:,  $4.7550464211671591050 \times 10^{-9}$

Error order:, 3, Error:,  $4.7550464211671591050 \times 10^{-9}$ , New Error:,  $4.7534640660126863322 \times 10^{-12}$

Error order:, 3, Error:,  $4.7534640660126863322 \times 10^{-12}$ , New Error:,  $4.7533054991016697529 \times 10^{-15}$

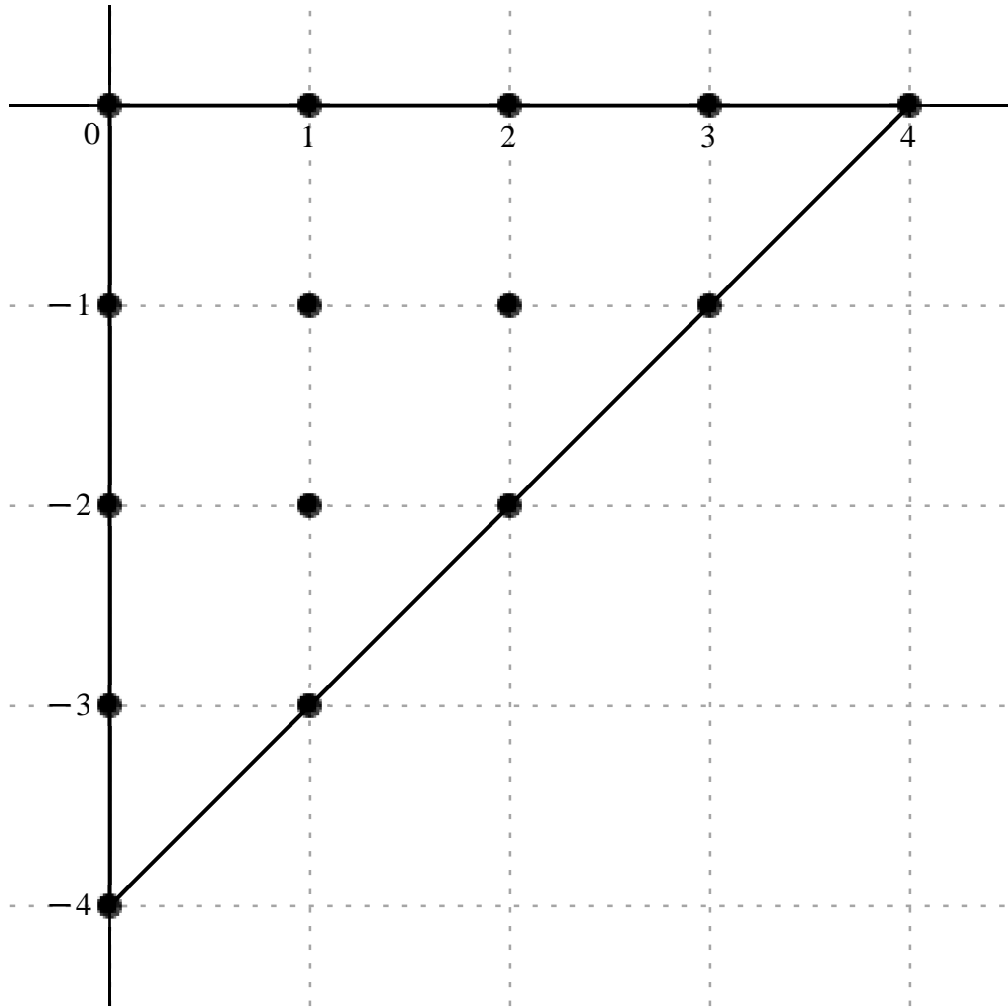
Error order:, 3, Error:,  $4.7533054991016697529 \times 10^{-15}$ , New Error:,  $4.7532896390996998144 \times 10^{-18}$

Error order:, 3, Error:,  $4.7532896390996998144 \times 10^{-18}$ , New Error:,  $4.7532880530663972242 \times 10^{-21}$

$$x_o + h, \left[ \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -I & 1 - I & 2 - I & 3 - I & \\ -2 I & 1 - 2 I & 2 - 2 I & & \\ -3 I & 1 - 3 I & & & \\ -4 I & & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} -1600830 & -9313920 - 13837824 I & \frac{87118416}{13} - \frac{165704616 I}{13} & \frac{79700544}{65} - \frac{56814912 I}{65} & \frac{372141}{65} - \frac{1752597 I}{65} & \\ -9313920 + 13837824 I & 207766944 & -\frac{1222651584}{13} - \frac{726884928 I}{13} & \frac{52789968}{13} + \frac{5022864 I}{13} & & \\ \frac{87118416}{13} + \frac{165704616 I}{13} & -\frac{1222651584}{13} + \frac{726884928 I}{13} & -23426172 & & & \\ \frac{79700544}{65} + \frac{56814912 I}{65} & \frac{52789968}{13} - \frac{5022864 I}{13} & & & & \\ \frac{372141}{65} + \frac{1752597 I}{65} & & & & & \end{array} \right]$$





$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\;u(x_{ol})=\frac{1}{65\,\Delta x_{ol}^{12}}\left(2079\left(-50050\,u_{ol}-(291200+432640\,\mathrm{I})\,u_{ol+1}+(209520-398520\,\mathrm{I})\,u_{ol+2}+(38336-27328\,\mathrm{I})\,u_{ol+3}+(179-843\,\mathrm{I})\,u_{ol+4}+(\,-291200+432640\,\mathrm{I})\,u_{ol-1}+6495840\,u_{ol+1-1}-(2940480+1748160\,\mathrm{I})\,u_{ol+2-1}+(126960+12080\,\mathrm{I})\,u_{ol+3-1}+(209520+398520\,\mathrm{I})\,u_{ol-21}+(\,-2940480+1748160\,\mathrm{I})\,u_{ol+1-21}\right.\\ \left.-732420\,u_{ol+2-21}+(38336+27328\,\mathrm{I})\,u_{ol-31}+(126960-12080\,\mathrm{I})\,u_{ol+1-31}+(179+843\,\mathrm{I})\,u_{ol-41}\right)\Big),\;O(\,\,\Delta x_{ol}^3\,\,)$$

Formula:, 437, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 13

Error order:, 2, Error:, 0.00077206665684231557069, New Error:, 7.6415348965297943461 × 10<sup>−6</sup>

Error order:, 2, Error:, 7.6415348965297943461 × 10<sup>−6</sup>, New Error:, 7.6336354683019869315 × 10<sup>−8</sup>

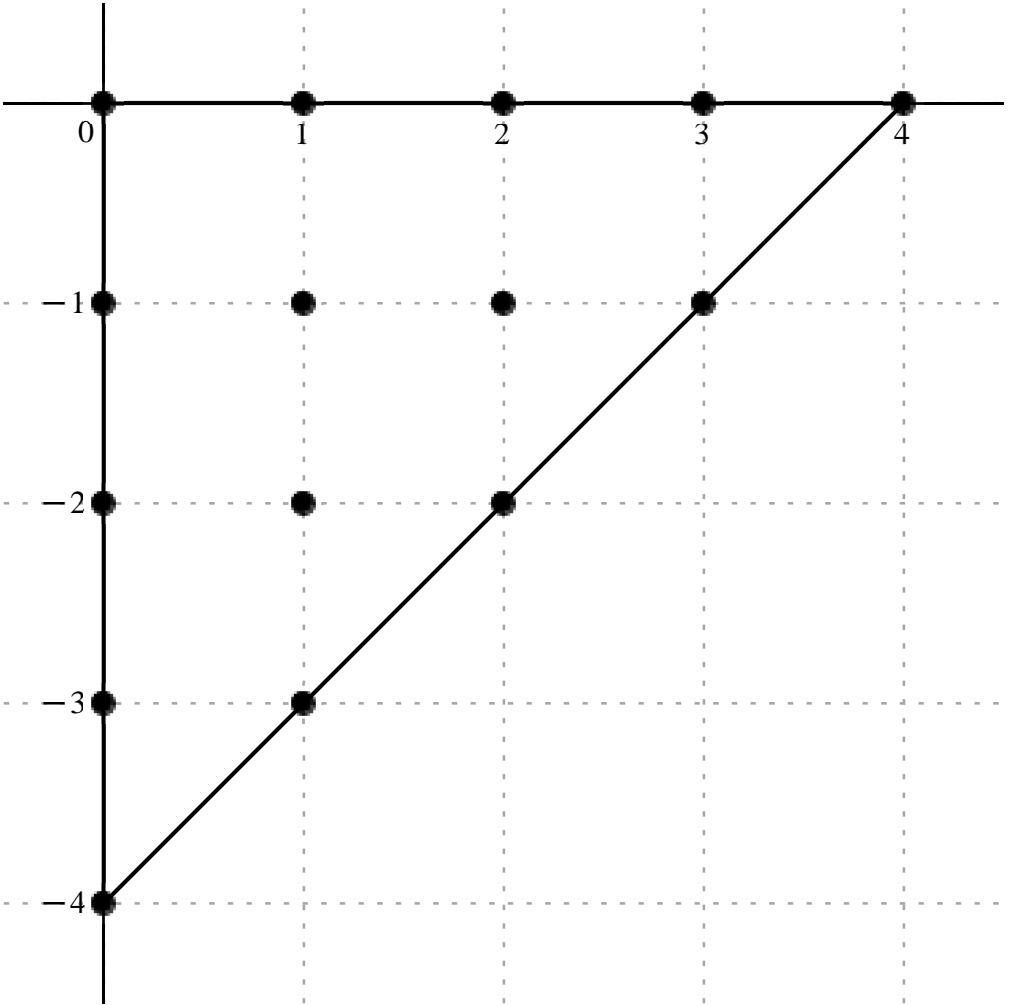
Error order:, 2, Error:, 7.6336354683019869315 × 10<sup>−8</sup>, New Error:, 7.6328456647480939997 × 10<sup>−10</sup>

Error order:, 2, Error:, 7.6328456647480939997 × 10<sup>−10</sup>, New Error:, 7.6327666857872605661 × 10<sup>−12</sup>

Error order:, 2, Error:, 7.6327666857872605661 × 10<sup>−12</sup>, New Error:, 7.6327587879051246471 × 10<sup>−14</sup>

$$x_o\;+h\;, \left[\begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & & \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & & & \\ -4\,\mathrm{I} & & & & \end{array}\right]$$

$$c = , \left[ \begin{array}{ccccc} 1081080 + 1081080 \, \text{I} & -\frac{60540480}{17} + \frac{271567296 \, \text{I}}{17} & -14070672 + 3592512 \, \text{I} & -\frac{7584192}{5} - \frac{1862784 \, \text{I}}{5} & -\frac{2220372}{85} + \frac{1155924 \, \text{I}}{85} \\ \frac{271567296}{17} - \frac{60540480 \, \text{I}}{17} & -147891744 - 147891744 \, \text{I} & 25147584 + 110170368 \, \text{I} & -2594592 - 3459456 \, \text{I} & \\ 3592512 - 14070672 \, \text{I} & 110170368 + 25147584 \, \text{I} & 17513496 + 17513496 \, \text{I} & & \\ -\frac{1862784}{5} - \frac{7584192 \, \text{I}}{5} & -3459456 - 2594592 \, \text{I} & & & \\ \frac{1155924}{85} - \frac{2220372 \, \text{I}}{85} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d} x_{o l}^{13}} \; u(x_{o l}) = \frac{1}{85 \, \Delta x_{o l}^{13}} \Big( 8316 \, \Big( (11050 + 11050 \, \text{I}) \, u_{o l} + (-36400 + 163280 \, \text{I}) \, u_{o l + 1} + (-143820 + 36720 \, \text{I}) \, u_{o l + 2} - (15504 + 3808 \, \text{I}) \, u_{o l + 3} + (-267 + 139 \, \text{I}) \, u_{o l + 4} + (163280 - 36400 \, \text{I}) \, u_{o l - 1} - (1511640 + 1511640 \, \text{I}) \, u_{o l + 1 - 1} + (257040 + 1126080 \, \text{I}) \, u_{o l + 2 - 1} - (26520 + 35360 \, \text{I}) \, u_{o l + 3 - 1} + (36720 - 143820 \, \text{I}) \, u_{o l - 21} + (1126080 + 257040 \, \text{I}) \, u_{o l + 1 - 21} + (179010 + 179010 \, \text{I}) \, u_{o l + 2 - 21} - (3808 + 15504 \, \text{I}) \, u_{o l - 31} - (35360 + 26520 \, \text{I}) \, u_{o l + 1 - 31} + (139 - 267 \, \text{I}) \, u_{o l - 41} \Big) \Big), \; O( \, \Delta x_{o l}^2 \, )$$

Formula: 438, Var: 1

Variavel :, x\_{o l}, Derivada de Ordem :, 14

Error order: 1, Error: 0.061123783658300944593, New Error: 0.0060992069133223845633

Error order: 1, Error: 0.0060992069133223845633, New Error: 0.00060978664689881988466

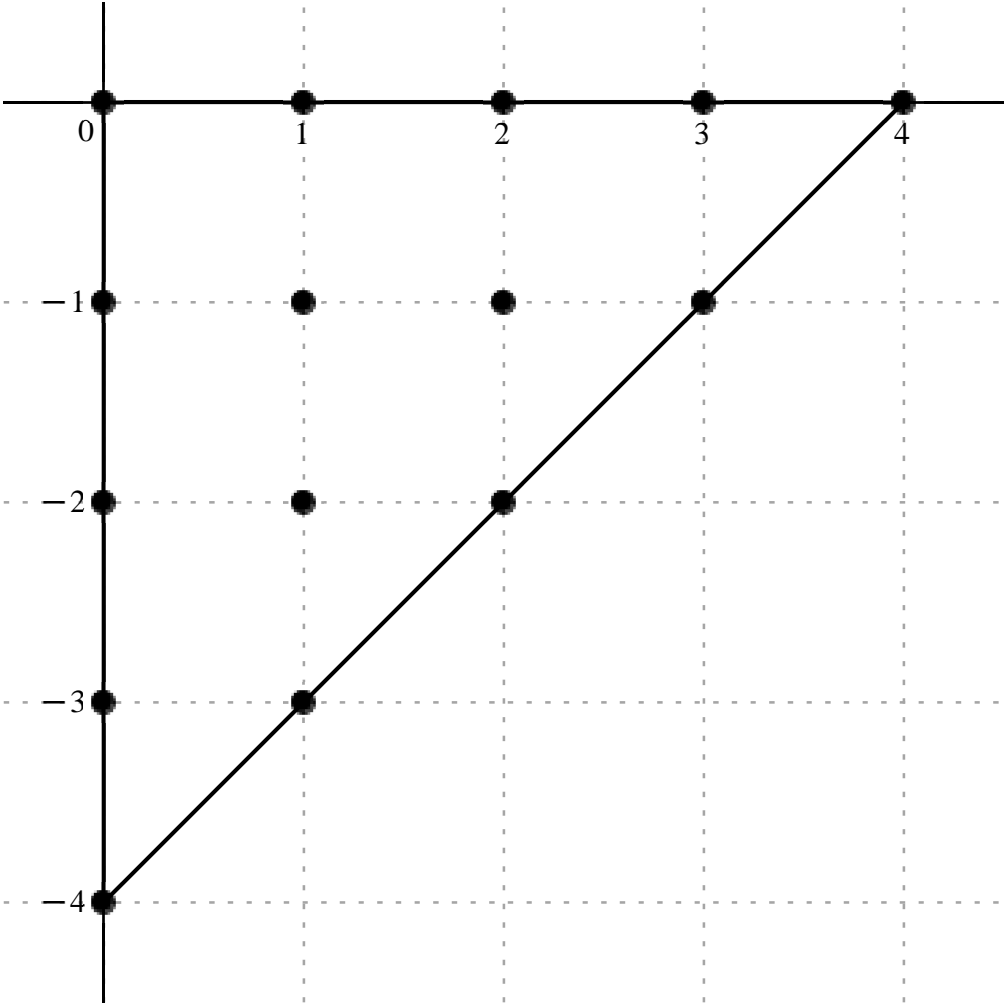
Error order: 1, Error: 0.00060978664689881988466, New Error: 0.000060977321934795774274

Error order: 1, Error: 0.000060977321934795774274, New Error: 6.0977187636198731813 × 10−6

Error order: 1, Error: 6.0977187636198731813 × 10−6, New Error: 6.0977174206108162450 × 10−7

$$x_o + h., \begin{bmatrix} 0 & 1 & 2 & 3 & 4 \\ -I & 1-I & 2-I & 3-I & \\ -2I & 1-2I & 2-2I & & \\ -3I & 1-3I & & & \\ -4I & & & & \end{bmatrix}$$

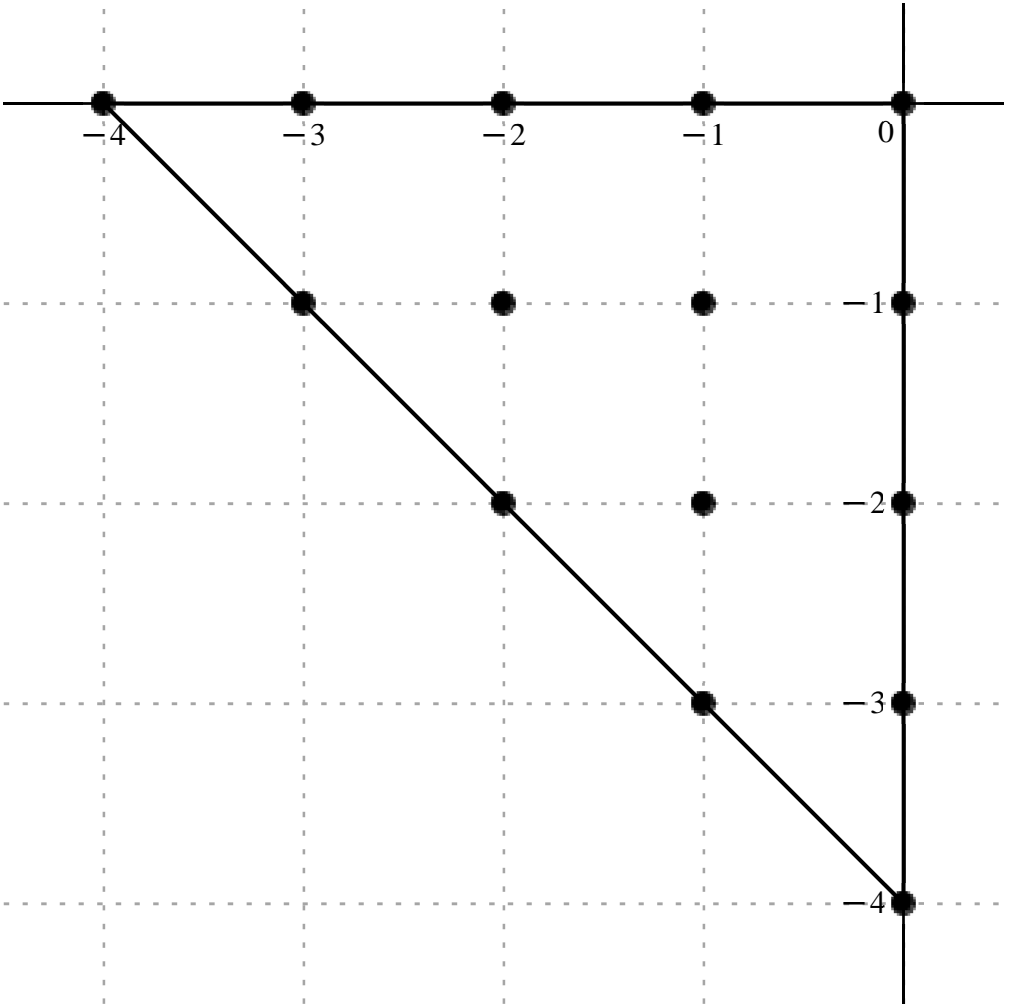
$$c =, \begin{bmatrix} -756756 I & \frac{121080960}{17} - \frac{72648576 I}{17} & 6286896 + 4191264 I & \frac{1862784}{5} + \frac{3725568 I}{5} & \frac{1251558}{85} + \frac{553014 I}{85} \\ -\frac{121080960}{17} - \frac{72648576 I}{17} & 108972864 I & 33530112 - 50295168 I & -465696 + 2328480 I & \\ -6286896 + 4191264 I & -33530112 - 50295168 I & -13621608 I & & \\ -\frac{1862784}{5} + \frac{3725568 I}{5} & 465696 + 2328480 I & & & \\ -\frac{1251558}{85} + \frac{553014 I}{85} & & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d} x_{o l}^{14}} \; u(x_{o l}) = \frac{1}{85 \; \Delta x_{o l}^{14}} \Big( 29106 \Big( -2210 \; I u_{o l} + (20800 - 12480 \; I) \; u_{o l + 1} + (18360 + 12240 \; I) \; u_{o l + 2} + (1088 + 2176 \; I) \; u_{o l + 3} + (43 + 19 \; I) \; u_{o l + 4} - (20800 + 12480 \; I) \; u_{o l - 1} + 318240 \; I u_{o l + 1 - 1} + (97920 - 146880 \; I) \; u_{o l + 2 - 1} + (-1360 + 6800 \; I) \; u_{o l + 3 - 1} + (-18360 + 12240 \; I) \; u_{o l - 21} - (97920 + 146880 \; I) \; u_{o l + 1 - 21} - 39780 \; I u_{o l + 2 - 21} \\ + (-1088 + 2176 \; I) \; u_{o l - 31} + (1360 + 6800 \; I) \; u_{o l + 1 - 31} + (-43 + 19 \; I) \; u_{o l - 41} \Big) \Big), \; O( \; \Delta x_{o l} \; )$$

*Error order:*, 14,    *Error:*,  $1.1385684135570700016 \times 10^{-34}$ ,    *New Error:*,  $1.1498318071858372782 \times 10^{-48}$   
*Error order:*, 14,    *Error:*,  $1.1498318071858372782 \times 10^{-48}$ ,    *New Error:*,  $1.1509543492961376316 \times 10^{-62}$   
*Error order:*, 14,    *Error:*,  $1.1509543492961376316 \times 10^{-62}$ ,    *New Error:*,  $1.1510665645637486118 \times 10^{-76}$   
*Error order:*, 14,    *Error:*,  $1.1510665645637486118 \times 10^{-76}$ ,    *New Error:*,  $1.1510777857000996193 \times 10^{-90}$   
*Error order:*, 14,    *Error:*,  $1.1510777857000996193 \times 10^{-90}$ ,    *New Error:*,  $1.1510789078098296427 \times 10^{-104}$

$$\begin{aligned}
 x_o \neq h. , \quad & \begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \\ & & & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} \\ & & & & -4 \, \mathrm{I} \end{bmatrix} \\
 c =, \quad & \begin{bmatrix} -\frac{19}{8840} - \frac{43 \, \mathrm{I}}{8840} & -\frac{64}{195} - \frac{32 \, \mathrm{I}}{195} & -\frac{36}{13} - \frac{54 \, \mathrm{I}}{13} & \frac{96}{17} - \frac{160 \, \mathrm{I}}{17} & \frac{23}{6} - \frac{23 \, \mathrm{I}}{6} \\ & -\frac{56}{65} + \frac{32 \, \mathrm{I}}{65} & \frac{1152}{65} - \frac{2016 \, \mathrm{I}}{65} & -72 + 72 \, \mathrm{I} & \frac{160}{17} - \frac{96 \, \mathrm{I}}{17} \\ & & \frac{9}{2} - \frac{9 \, \mathrm{I}}{2} & \frac{2016}{65} - \frac{1152 \, \mathrm{I}}{65} & \frac{54}{13} + \frac{36 \, \mathrm{I}}{13} \\ & & & -\frac{32}{65} + \frac{56 \, \mathrm{I}}{65} & \frac{32}{195} + \frac{64 \, \mathrm{I}}{195} \\ & & & & \frac{43}{8840} + \frac{19 \, \mathrm{I}}{8840} \end{bmatrix}
 \end{aligned}$$



$$\begin{aligned}
 \frac{\mathrm{d}}{\mathrm{d} x_{o l}} \, u(x_{o l}) = & \frac{1}{26520 \, \Delta x_{o l}} \, \big( -(57 + 129 \, \mathrm{I}) \, u_{o l - 4} - (8704 + 4352 \, \mathrm{I}) \, u_{o l - 3} - (73440 + 110160 \, \mathrm{I}) \, u_{o l - 2} + (149760 - 249600 \, \mathrm{I}) \, u_{o l - 1} + (101660 - 101660 \, \mathrm{I}) \, u_{o l} + (-22848 + 13056 \, \mathrm{I}) \, u_{o l - 3 - 1} + (470016 - 822528 \, \mathrm{I}) \, u_{o l - 2 - 1} + (-1909440 + 1909440 \, \mathrm{I}) \, u_{o l - 1 - 1} + (249600 - 149760 \, \mathrm{I}) \, u_{o l - 1} + (119340 - 119340 \, \mathrm{I}) \, u_{o l - 2 - 21} + (822528 \\
 & - 470016 \, \mathrm{I}) \, u_{o l - 1 - 21} + (110160 + 73440 \, \mathrm{I}) \, u_{o l - 21} + (-13056 + 22848 \, \mathrm{I}) \, u_{o l - 1 - 31} + (4352 + 8704 \, \mathrm{I}) \, u_{o l - 31} + (129 + 57 \, \mathrm{I}) \, u_{o l - 41} \big), \, O( \, \Delta x_{o l}^{14} \, )
 \end{aligned}$$

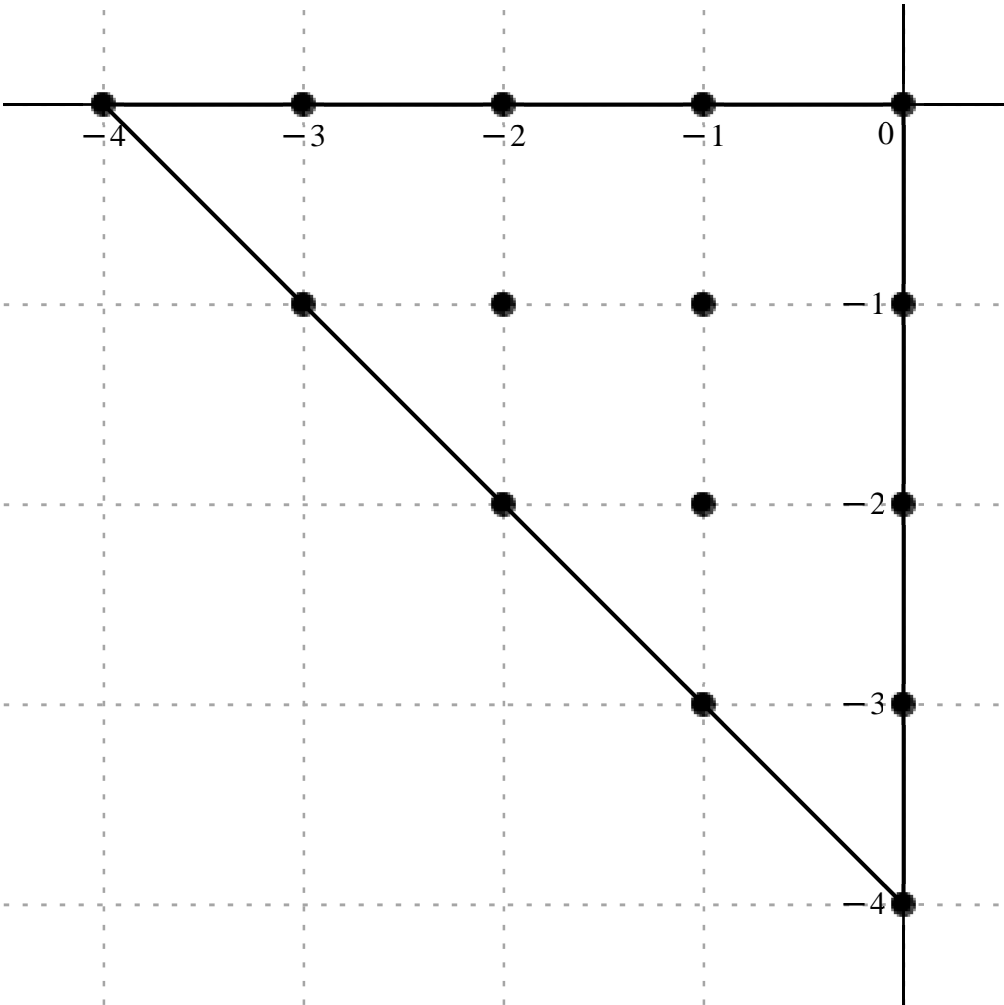
Formula:, 440, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 2

Error order:, 13, Error:,  $9.4769922734708567930 \times 10^{-32}$ , New Error:,  $9.6721396180130225036 \times 10^{-45}$   
Error order:, 13, Error:,  $9.6721396180130225036 \times 10^{-45}$ , New Error:,  $9.6917567413610920558 \times 10^{-58}$   
Error order:, 13, Error:,  $9.6917567413610920558 \times 10^{-58}$ , New Error:,  $9.6937194753269831794 \times 10^{-71}$   
Error order:, 13, Error:,  $9.6937194753269831794 \times 10^{-71}$ , New Error:,  $9.6939157589375842266 \times 10^{-84}$   
Error order:, 13, Error:,  $9.6939157589375842266 \times 10^{-84}$ , New Error:,  $9.6939353874007821476 \times 10^{-97}$

$$x_o + h., \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3 - I & -2 - I & -1 - I & -I \\ & & -2 - 2 I & -1 - 2 I & -2 I \\ & & & -1 - 3 I & -3 I \\ & & & & -4 I \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccc} -\frac{43}{816} - \frac{5 I}{272} & -\frac{32}{9} + \frac{160 I}{117} & -\frac{654}{13} - \frac{84 I}{13} & -\frac{2048}{51} - \frac{4928 I}{51} & -\frac{50983 I}{1800} \\ & -\frac{784}{325} + \frac{9664 I}{975} & -\frac{2592}{25} - \frac{8544 I}{25} & 960 I & \frac{2048}{51} - \frac{4928 I}{51} \\ & & -\frac{129 I}{2} & \frac{2592}{25} - \frac{8544 I}{25} & \frac{654}{13} - \frac{84 I}{13} \\ & & & \frac{784}{325} + \frac{9664 I}{975} & \frac{32}{9} + \frac{160 I}{117} \\ & & & & \frac{43}{816} - \frac{5 I}{272} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{795600 \, \Delta x_{ol}^2} \, \big( -(41925 + 14625 \, \mathrm{I}) \, u_{ol-4} + (-2828800 + 1088000 \, \mathrm{I}) \, u_{ol-3} - (40024800 + 5140800 \, \mathrm{I}) \, u_{ol-2} - (31948800 + 76876800 \, \mathrm{I}) \, u_{ol-1} - 22534486 \, \mathrm{I} \, u_{ol} + (-1919232 + 7885824 \, \mathrm{I}) \, u_{ol-3-1} - (82487808 + 271904256 \, \mathrm{I}) \, u_{ol-2-1} + 763776000 \, \mathrm{I} \, u_{ol-1-1} + (31948800 - 76876800 \, \mathrm{I}) \, u_{ol-1} - 51316200 \, \mathrm{I} \, u_{ol-2-21} \\ + (82487808 - 271904256 \, \mathrm{I}) \, u_{ol-1-21} + (40024800 - 5140800 \, \mathrm{I}) \, u_{ol-21} + (1919232 + 7885824 \, \mathrm{I}) \, u_{ol-1-31} + (2828800 + 1088000 \, \mathrm{I}) \, u_{ol-31} + (41925 - 14625 \, \mathrm{I}) \, u_{ol-41} \big), \, O(\, \Delta x_{ol}^{\, 13} \, )$$

Formula:, 441, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 3

Error order:, 12, Error:, 7.9967344479263560167 × 10−29, New Error:, 8.0747570091768439439 × 10−41

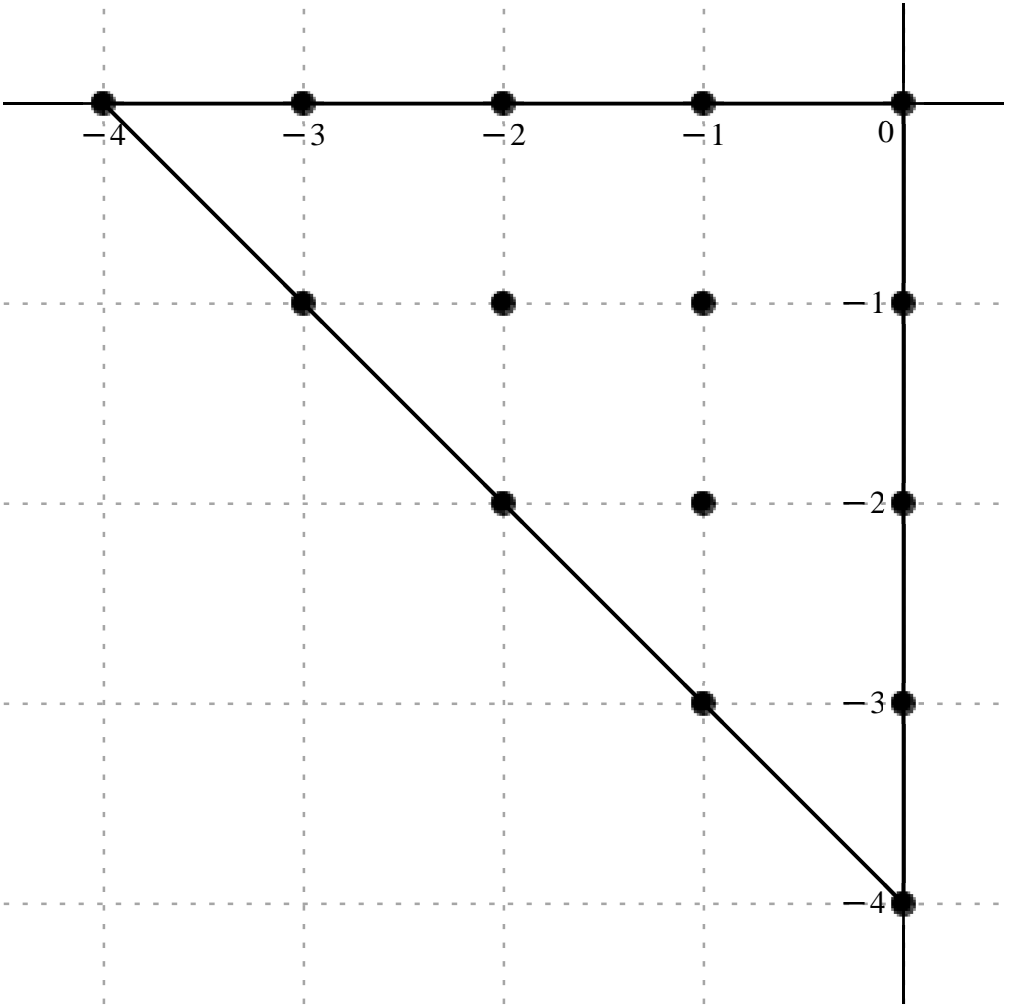
Error order:, 12, Error:, 8.0747570091768439439 × 10−41, New Error:, 8.0825332815887113711 × 10−53

Error order:, 12, Error:, 8.0825332815887113711 × 10−53, New Error:, 8.0833106424310534741 × 10−65

Error order:, 12, Error:, 8.0833106424310534741 × 10−65, New Error:, 8.0833883758447040984 × 10−77

Error order:, 12, Error:, 8.0833883758447040984 × 10−77, New Error:, 8.0833961491593567265 × 10−89

$$x_o \, + h \, . \, , \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \\ & & & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} \\ & & & & -4 \, \mathrm{I} \end{array} \right] \\ c = , \left[ \begin{array}{ccccc} -\frac{495661}{1326000} + \frac{520901 \, \mathrm{I}}{2652000} & -\frac{50644}{4875} + \frac{43096 \, \mathrm{I}}{1625} & -\frac{360747}{1300} + \frac{159249 \, \mathrm{I}}{650} & -\frac{173212}{255} - \frac{80732 \, \mathrm{I}}{425} & -\frac{47413}{480} - \frac{47413 \, \mathrm{I}}{480} \\ & \frac{40004}{975} + \frac{61973 \, \mathrm{I}}{975} & -\frac{749436}{325} - \frac{376368 \, \mathrm{I}}{325} & \frac{116949}{25} + \frac{116949 \, \mathrm{I}}{25} & -\frac{80732}{425} - \frac{173212 \, \mathrm{I}}{255} \\ & & -\frac{133599}{400} - \frac{133599 \, \mathrm{I}}{400} & -\frac{376368}{325} - \frac{749436 \, \mathrm{I}}{325} & \frac{159249}{650} - \frac{360747 \, \mathrm{I}}{1300} \\ & & & \frac{61973}{975} + \frac{40004 \, \mathrm{I}}{975} & \frac{43096}{1625} - \frac{50644 \, \mathrm{I}}{4875} \\ & & & & \frac{520901}{2652000} - \frac{495661 \, \mathrm{I}}{1326000} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{2652000 \, \mathcal{A}x_{ol}^3} \Big( (-991322 + 520901 \, \mathrm{I}) \, u_{ol-4} + (-27550336 + 70332672 \, \mathrm{I}) \, u_{ol-3} + (-735923880 + 649735920 \, \mathrm{I}) \, u_{ol-2} - (1801404800 + 503767680 \, \mathrm{I}) \, u_{ol-1} - (261956825 + 261956825 \, \mathrm{I}) \, u_{ol} + (108810880 + 168566560 \, \mathrm{I}) \, u_{ol-3-1} - (6115397760 + 3071162880 \, \mathrm{I}) \, u_{ol-2-1} + (12405949920 + 12405949920 \, \mathrm{I}) \, u_{ol-1-1} - (503767680 + 1801404800 \, \mathrm{I}) \, u_{ol-1} - (885761370 + 885761370 \, \mathrm{I}) \, u_{ol-2-21} - (3071162880 + 6115397760 \, \mathrm{I}) \, u_{ol-1-21} + (649735920 - 735923880 \, \mathrm{I}) \, u_{ol-21} + (168566560 + 108810880 \, \mathrm{I}) \, u_{ol-1-31} + (70332672 - 27550336 \, \mathrm{I}) \, u_{ol-31} + (520901 - 991322 \, \mathrm{I}) \, u_{ol-41} \Big), \, O(\, \mathcal{A}x_{ol}^{12} \,)$$

Formula:, 442, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:, 11, Error:, 4.0377922355341044513 × 10<sup>−26</sup>, New Error:, 4.1196616619929683973 × 10<sup>−37</sup>

Error order:, 11, Error:, 4.1196616619929683973 × 10<sup>−37</sup>, New Error:, 4.1278909614822739774 × 10<sup>−48</sup>

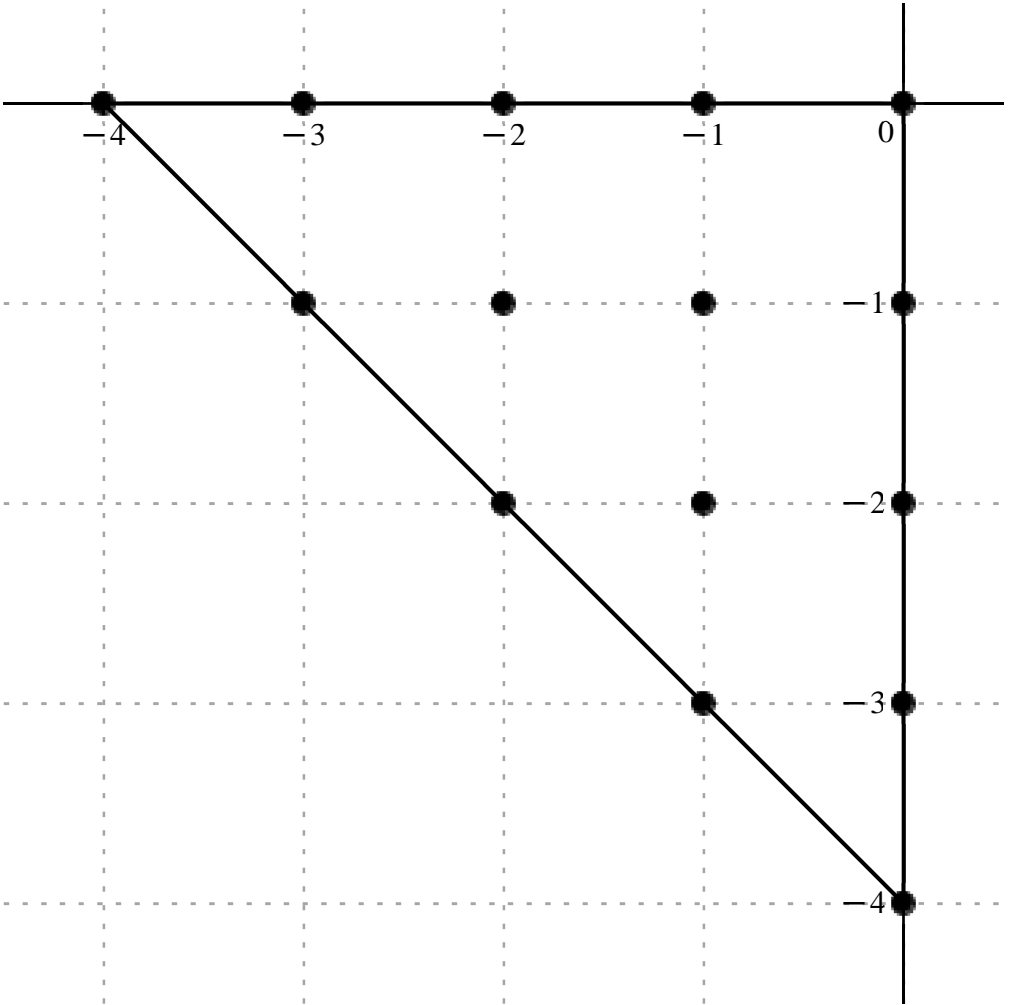
Error order:, 11, Error:, 4.1278909614822739774 × 10<sup>−48</sup>, New Error:, 4.1287143140775726917 × 10<sup>−59</sup>

Error order:, 11, Error:, 4.1287143140775726917 × 10<sup>−59</sup>, New Error:, 4.1287966535626276353 × 10<sup>−70</sup>

Error order:, 11, Error:, 4.1287966535626276353 × 10<sup>−70</sup>, New Error:, 4.1288048875533874402 × 10<sup>−81</sup>

$$x_o \neq h., \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \\ & & & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} \\ & & & & -4 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{926729}{1326000} + \frac{1138019 \text{ I}}{442000} & \frac{383612}{4875} + \frac{775876 \text{ I}}{4875} & \frac{10299}{1300} + \frac{2918979 \text{ I}}{1300} & -\frac{824368}{255} + \frac{2865304 \text{ I}}{1275} & & -\frac{76859}{120} \\ & \frac{149583}{325} + \frac{83873 \text{ I}}{975} & -\frac{4758324}{325} + \frac{1709508 \text{ I}}{325} & \frac{954594}{25} & -\frac{824368}{255} - \frac{2865304 \text{ I}}{1275} & \\ & & -\frac{144399}{50} & -\frac{4758324}{325} - \frac{1709508 \text{ I}}{325} & \frac{10299}{1300} - \frac{2918979 \text{ I}}{1300} & \\ & & & \frac{149583}{325} - \frac{83873 \text{ I}}{975} & \frac{383612}{4875} - \frac{775876 \text{ I}}{4875} & \\ & & & & -\frac{926729}{1326000} - \frac{1138019 \text{ I}}{442000} & \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{1326000 \, \Delta x_{ol}^4} \big( (-926729 + 3414057 \, \text{I}) \, u_{ol-4} + (104342464 + 211038272 \, \text{I}) \, u_{ol-3} + (10504980 + 2977358580 \, \text{I}) \, u_{ol-2} + (-4286713600 + 2979916160 \, \text{I}) \, u_{ol-1} - 849291950 \, u_{ol} + (610298640 + 114067280 \, \text{I}) \, u_{ol-3-1} + (-19413961920 + 6974792640 \, \text{I}) \, u_{ol-2-1} + 50631665760 \, u_{ol-1-1} - (4286713600 + 2979916160 \, \text{I}) \, u_{ol-1} - 3829461480 \, u_{ol-2-21} - (19413961920 + 6974792640 \, \text{I}) \, u_{ol-1-21} + (10504980 - 2977358580 \, \text{I}) \, u_{ol-21} + (610298640 - 114067280 \, \text{I}) \, u_{ol-1-31} + (104342464 - 211038272 \, \text{I}) \, u_{ol-31} - (926729 + 3414057 \, \text{I}) \, u_{ol-41} \big), \, O(\, \Delta x_{ol}^{11} \, )$$

Formula:, 443, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 5

Error order:, 10, Error:, 2.4912624275901701594 × 10<sup>−23</sup>, New Error:, 2.5151367313134882130 × 10<sup>−33</sup>

Error order:, 10, Error:, 2.5151367313134882130 × 10<sup>−33</sup>, New Error:, 2.5175163331843863917 × 10<sup>−43</sup>

Error order:, 10, Error:, 2.5175163331843863917 × 10<sup>−43</sup>, New Error:, 2.5177542131395678281 × 10<sup>−53</sup>

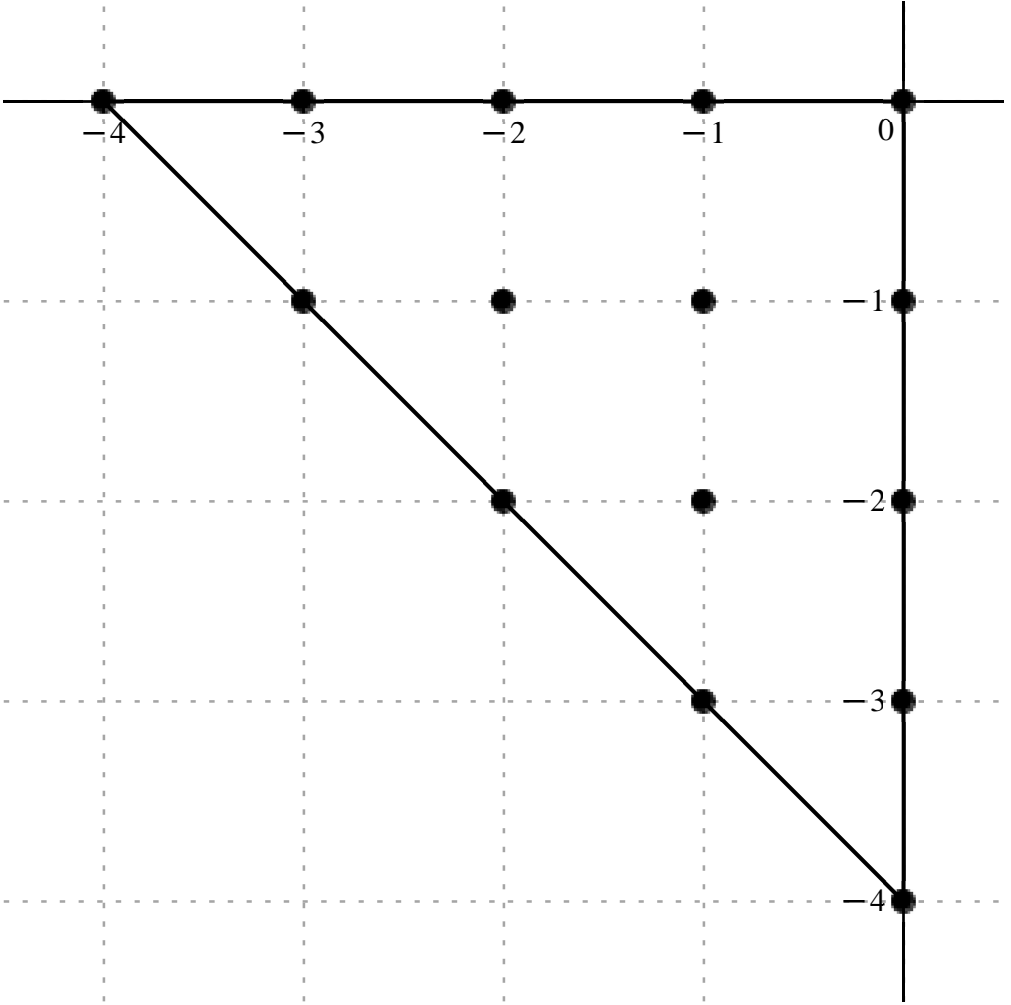
Error order:, 10, Error:, 2.5177542131395678281 × 10<sup>−53</sup>, New Error:, 2.5177780003308102216 × 10<sup>−63</sup>

Error order:, 10, Error:, 2.5177780003308102216 × 10<sup>−63</sup>, New Error:, 2.5177803790418897458 × 10<sup>−73</sup>



$$x_o+h.,\left[\begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3-I & -2-I & -1-I & -I \\ & & -2-2\,I & -1-2\,I & -2\,I \\ & & & -1-3\,I & -3\,I \\ & & & & -4\,I \end{array}\right]$$

$$c=,\left[\begin{array}{cccccc} \frac{1371389}{176800}+\frac{3277657\,I}{265200} & \frac{298972}{325}+\frac{253768\,I}{975} & \frac{4601241}{520}+\frac{3998331\,I}{520} & -\frac{97940}{51}+\frac{4820596\,I}{255} & -\frac{183127}{96}+\frac{183127\,I}{96} \\ & \frac{131667}{65}-\frac{287723\,I}{195} & -\frac{2127804}{65}+\frac{4820688\,I}{65} & \frac{675588}{5}-\frac{675588\,I}{5} & -\frac{4820596}{255}+\frac{97940\,I}{51} \\ & & -\frac{864087}{80}+\frac{864087\,I}{80} & -\frac{4820688}{65}+\frac{2127804\,I}{65} & -\frac{3998331}{520}-\frac{4601241\,I}{520} \\ & & & \frac{287723}{195}-\frac{131667\,I}{65} & -\frac{253768}{975}-\frac{298972\,I}{325} \\ & & & & -\frac{3277657}{265200}-\frac{1371389\,I}{176800} \end{array}\right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_oI^5}\,u(x_oI)=\frac{1}{530400\,\Delta x_oI^5}\big((4114167+6555314\,I)\,u_{oI-4}+(487922304+138049792\,I)\,u_{oI-3}+(4693265820+4078297620\,I)\,u_{oI-2}+(-1018576000+10026839680\,I)\,u_{oI-1}+(-1011776675+1011776675\,I)\,u_{oI}+(1074402720-782606560\,I)\,u_{oI-3-1}+(-17362880640+39336814080\,I)\,u_{oI-2-1}+(71666375040-71666375040\,I)\,u_{oI-1-1}+(-10026839680+1018576000\,I)\,u_{oI-1}+(-5728896810+5728896810\,I)\,u_{oI-2-21}+(-39336814080+17362880640\,I)\,u_{oI-1-21}-(4078297620+4693265820\,I)\,u_{oI-21}+(782606560-1074402720\,I)\,u_{oI-1-31}-(138049792+487922304\,I)\,u_{oI-31}-(6555314+4114167\,I)\,u_{oI-41}\big),\,O(\,\Delta x_oI^{10}\,)$$

*Variavel* :,  $x_{ol}$  , *Derivada de Ordem* :, 6

*Error order*:, 9, *Error*:,  $9.6711598068344179962 \times 10^{-21}$ , *New Error*:,  $9.8630796282553525932 \times 10^{-30}$

*Error order*:, 9, *Error*:,  $9.8630796282553525932 \times 10^{-30}$ , *New Error*:,  $9.8823690438704263318 \times 10^{-39}$

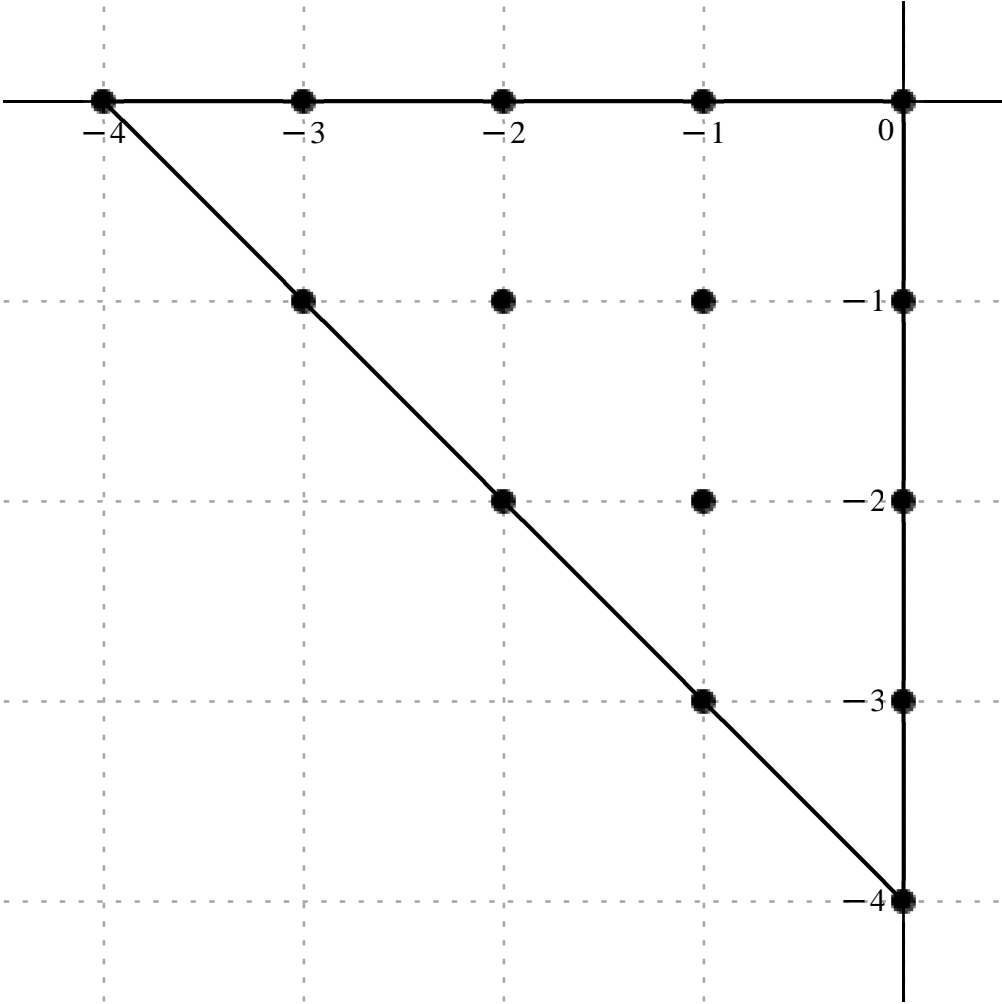
*Error order*:, 9, *Error*:,  $9.8823690438704263318 \times 10^{-39}$ , *New Error*:,  $9.8842989576813561415 \times 10^{-48}$

*Error order*:, 9, *Error*:,  $9.8842989576813561415 \times 10^{-48}$ , *New Error*:,  $9.8844919587828212613 \times 10^{-57}$

*Error order*:, 9, *Error*:,  $9.8844919587828212613 \times 10^{-57}$ , *New Error*:,  $9.8845112589901693689 \times 10^{-66}$

$$x_o + h . , \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -1 - 3 \text{ I} & -3 \text{ I} \\ & & & & -4 \text{ I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} \frac{12135259}{176800} + \frac{2216153 \text{ I}}{176800} & \frac{1233326}{325} - \frac{779602 \text{ I}}{325} & \frac{6849963}{130} - \frac{1877139 \text{ I}}{260} & \frac{928388}{17} + \frac{5008968 \text{ I}}{85} & \frac{825769 \text{ I}}{80} & & & & \\ & \frac{190469}{130} - \frac{1511129 \text{ I}}{130} & \frac{9210762}{65} + \frac{4427226 \text{ I}}{13} & -\frac{4187187 \text{ I}}{5} & -\frac{928388}{17} + \frac{5008968 \text{ I}}{85} & & & & \\ & & \frac{2824227 \text{ I}}{40} & -\frac{9210762}{65} + \frac{4427226 \text{ I}}{13} & -\frac{6849963}{130} - \frac{1877139 \text{ I}}{260} & & & & \\ & & & -\frac{190469}{130} - \frac{1511129 \text{ I}}{130} & -\frac{1233326}{325} - \frac{779602 \text{ I}}{325} & & & & \\ & & & & -\frac{12135259}{176800} + \frac{2216153 \text{ I}}{176800} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{176800 \, \Delta x_{ol}^6} \big( (12135259 + 2216153 \, \text{I}) \, u_{ol-4} + (670929344 - 424103488 \, \text{I}) \, u_{ol-3} + (9315949680 - 1276454520 \, \text{I}) \, u_{ol-2} + (9655235200 + 10418653440 \, \text{I}) \, u_{ol-1} + 1824949490 \, \text{I} u_{ol} + (259037840 - 2055135440 \, \text{I}) \, u_{ol-3-1} + (25053272640 + 60210273600 \, \text{I}) \, u_{ol-2-1} - 148058932320 \, \text{I} u_{ol-1-1} + (-9655235200$$

$$+ 10418653440 \, \text{I}) \, u_{ol-1} + 12483083340 \, \text{I} u_{ol-2-21} + (-25053272640 + 60210273600 \, \text{I}) \, u_{ol-1-21} - (9315949680 + 1276454520 \, \text{I}) \, u_{ol-21} - (259037840 + 2055135440 \, \text{I}) \, u_{ol-1-31} - (670929344 + 424103488 \, \text{I}) \, u_{ol-31} + (-12135259 + 2216153 \, \text{I}) \, u_{ol-41} \big) . \, O( \, \Delta x_{ol}^9 \, )$$

Formula:, 445, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 7

Error order:, 8, Error:,  $4.6465956754355057418 \times 10^{-18}$ , New Error:,  $4.6899796638365746796 \times 10^{-26}$

Error order:, 8, Error:,  $4.6899796638365746796 \times 10^{-26}$ , New Error:,  $4.6943041427444216755 \times 10^{-34}$

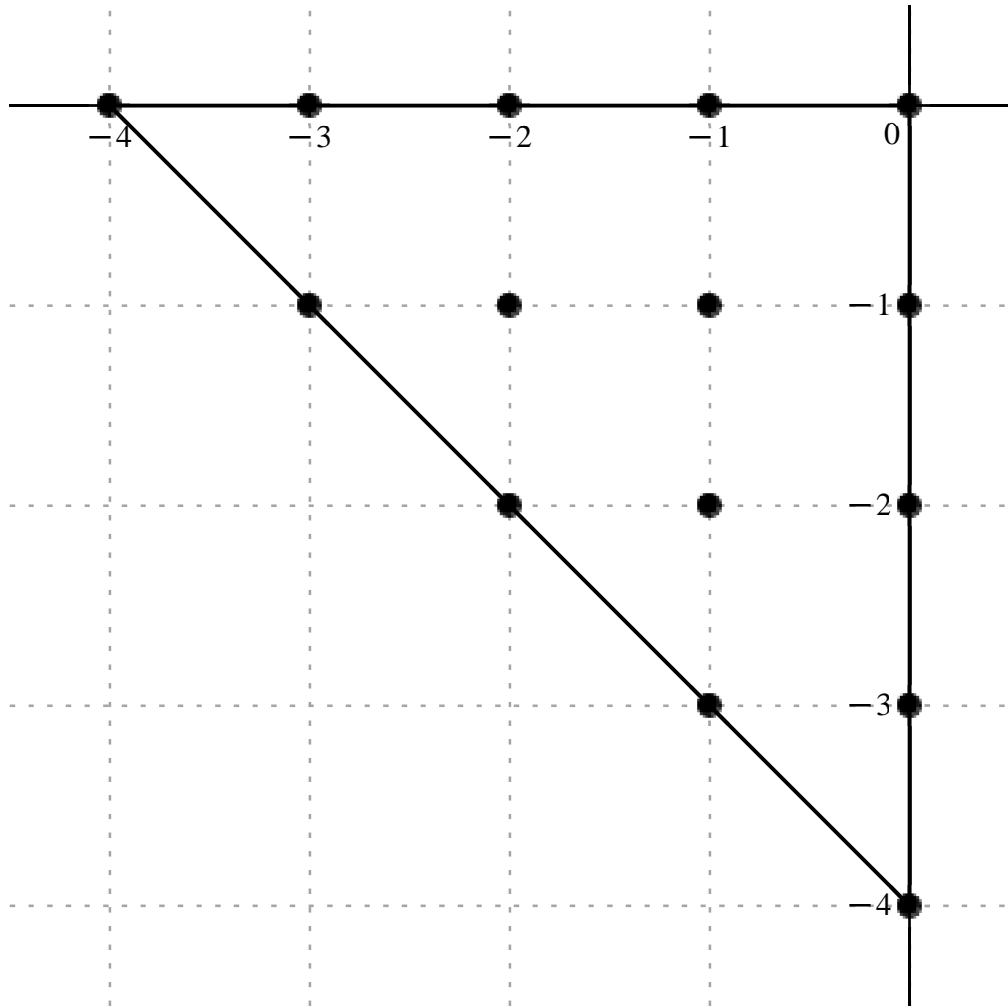
Error order:, 8, Error:,  $4.6943041427444216755 \times 10^{-34}$ , New Error:,  $4.6947364480453487576 \times 10^{-42}$

Error order:, 8, Error:,  $4.6947364480453487576 \times 10^{-42}$ , New Error:,  $4.6947796771461356661 \times 10^{-50}$

Error order:, 8, Error:,  $4.6947796771461356661 \times 10^{-50}$ , New Error:,  $4.6947840000419178901 \times 10^{-58}$

$$x_o + h \cdot , \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3 - I & -2 - I & -1 - I & -I \\ & & -2 - 2 I & -1 - 2 I & -2 I \\ & & & -1 - 3 I & -3 I \\ & & & & -4 I \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} \frac{20451207}{88400} & -\frac{31335087 I}{176800} & \frac{975828}{325} & -\frac{5888106 I}{325} & \frac{60170859}{520} & -\frac{90906921 I}{520} & \frac{5062050}{17} & -\frac{380478 I}{85} & \frac{802011}{32} & +\frac{802011 I}{32} \\ & & -\frac{3966501}{130} & -\frac{4785837 I}{130} & \frac{88884936}{65} & +\frac{34151418 I}{65} & -\frac{11356569}{5} & -\frac{11356569 I}{5} & -\frac{380478}{85} & +\frac{5062050 I}{17} \\ & & & & \frac{16126929}{80} & +\frac{16126929 I}{80} & \frac{34151418}{65} & +\frac{88884936 I}{65} & -\frac{90906921}{520} & +\frac{60170859 I}{520} \\ & & & & & & -\frac{4785837}{130} & -\frac{3966501 I}{130} & -\frac{5888106}{325} & +\frac{975828 I}{325} \\ & & & & & & & & -\frac{31335087}{176800} & +\frac{20451207 I}{88400} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{176800 \, \Delta x_{ol}^7} \Big( 21 \, \Big( (1947734 - 1492147 \, \mathrm{I}) \, u_{ol-4} + (25278592 - 152529984 \, \mathrm{I}) \, u_{ol-3} + (974194860 - 1471826340 \, \mathrm{I}) \, u_{ol-2} + (2506920000 - 37685440 \, \mathrm{I}) \, u_{ol-1} + (211005275 + 211005275 \, \mathrm{I}) \, u_{ol} - (256878160 + 309939920 \, \mathrm{I}) \, u_{ol-3-1} + (11512715520 + 4423421760 \, \mathrm{I}) \, u_{ol-2-1} - (19122299040 + 19122299040 \, \mathrm{I}) \, u_{ol-1-1} \\ + (-37685440 + 2506920000 \, \mathrm{I}) \, u_{ol-1} + (1697167290 + 1697167290 \, \mathrm{I}) \, u_{ol-2-21} + (4423421760 + 11512715520 \, \mathrm{I}) \, u_{ol-1-21} + (-1471826340 + 974194860 \, \mathrm{I}) \, u_{ol-21} - (309939920 + 256878160 \, \mathrm{I}) \, u_{ol-1-31} + (-152529984 + 25278592 \, \mathrm{I}) \, u_{ol-31} + (-1492147 + 1947734 \, \mathrm{I}) \, u_{ol-41} \Big) \Big), \, O( \, \Delta x_{ol}^8 \, )$$

Formula:, 446, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 8

Error order:, 7, Error:, 1.4011376368464039618 × 10<sup>-15</sup>, New Error:, 1.4280543829836308456 × 10<sup>-22</sup>

Error order:, 7, Error:, 1.4280543829836308456 × 10<sup>-22</sup>, New Error:, 1.4307593545448092260 × 10<sup>-29</sup>

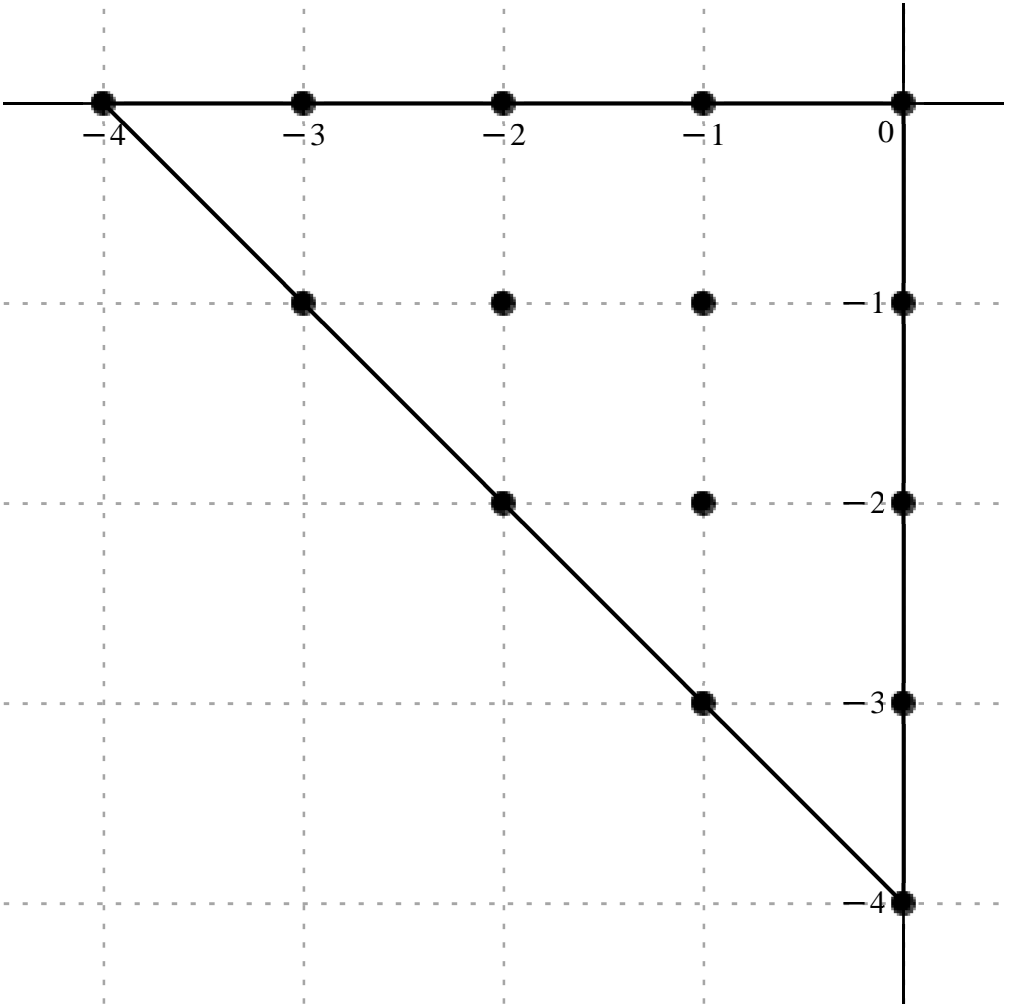
Error order:, 7, Error:, 1.4307593545448092260 × 10<sup>-29</sup>, New Error:, 1.4310299843924700548 × 10<sup>-36</sup>

Error order:, 7, Error:, 1.4310299843924700548 × 10<sup>-36</sup>, New Error:, 1.4310570487038688463 × 10<sup>-43</sup>

Error order:, 7, Error:, 1.4310570487038688463 × 10<sup>-43</sup>, New Error:, 1.4310597551482747693 × 10<sup>-50</sup>

$$x_o \neq h., \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \\ & & & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} \\ & & & & -4 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} \frac{3609123}{44200} & -\frac{46488309 \text{ I}}{44200} & -\frac{13295688}{325} & -\frac{16378824 \text{ I}}{325} & -\frac{12040182}{65} & -\frac{44772777 \text{ I}}{65} & \frac{10832304}{17} & -\frac{61117056 \text{ I}}{85} & \frac{430563}{4} \\ & & -\frac{10970106}{65} & -\frac{655662 \text{ I}}{65} & \frac{296118648}{65} & -\frac{140303016 \text{ I}}{65} & -\frac{53509428}{5} & \frac{10832304}{17} & +\frac{61117056 \text{ I}}{85} \\ & & & & \frac{9981783}{10} & \frac{296118648}{65} & +\frac{140303016 \text{ I}}{65} & -\frac{12040182}{65} & +\frac{44772777 \text{ I}}{65} \\ & & & & & -\frac{10970106}{65} & +\frac{655662 \text{ I}}{65} & -\frac{13295688}{325} & +\frac{16378824 \text{ I}}{325} \\ & & & & & & & \frac{3609123}{44200} & +\frac{46488309 \text{ I}}{44200} \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{44200 \, \Delta x_{ol}^8} \Big( 21 \, \Big( (171863 - 2213729 \, \text{I}) \, u_{ol-4} - (86105408 + 106072384 \, \text{I}) \, u_{ol-3} - (389872560 + 1449785160 \, \text{I}) \, u_{ol-2} + (1341142400 - 1513374720 \, \text{I}) \, u_{ol-1} + 226558150 \, u_{ol} - (355222480 + 21230960 \, \text{I}) \, u_{ol-3-1} + (9588603840 - 4543145280 \, \text{I}) \, u_{ol-2-1} - 22524921120 \, u_{ol-1-1} + (1341142400 + 1513374720 \, \text{I}) \, u_{ol-1} \\ + 2100927660 \, u_{ol-2-21} + (9588603840 + 4543145280 \, \text{I}) \, u_{ol-1-21} + (-389872560 + 1449785160 \, \text{I}) \, u_{ol-21} + (-355222480 + 21230960 \, \text{I}) \, u_{ol-1-31} + (-86105408 + 106072384 \, \text{I}) \, u_{ol-31} + (171863 + 2213729 \, \text{I}) \, u_{ol-41} \Big) \Big) \, O(\, \Delta x_{ol}^7 \, )$$

Formula:, 447, Var:, 1

Variavel :, x\_{ol} , Derivada de Ordem :, 9

Error order:, 6, Error:,, 5.1508898511036204313 × 10−13, New Error:,, 5.1970386353603365949 × 10−19

Error order:, 6, Error:,, 5.1970386353603365949 × 10−19, New Error:,, 5.2016391817846093756 × 10−25

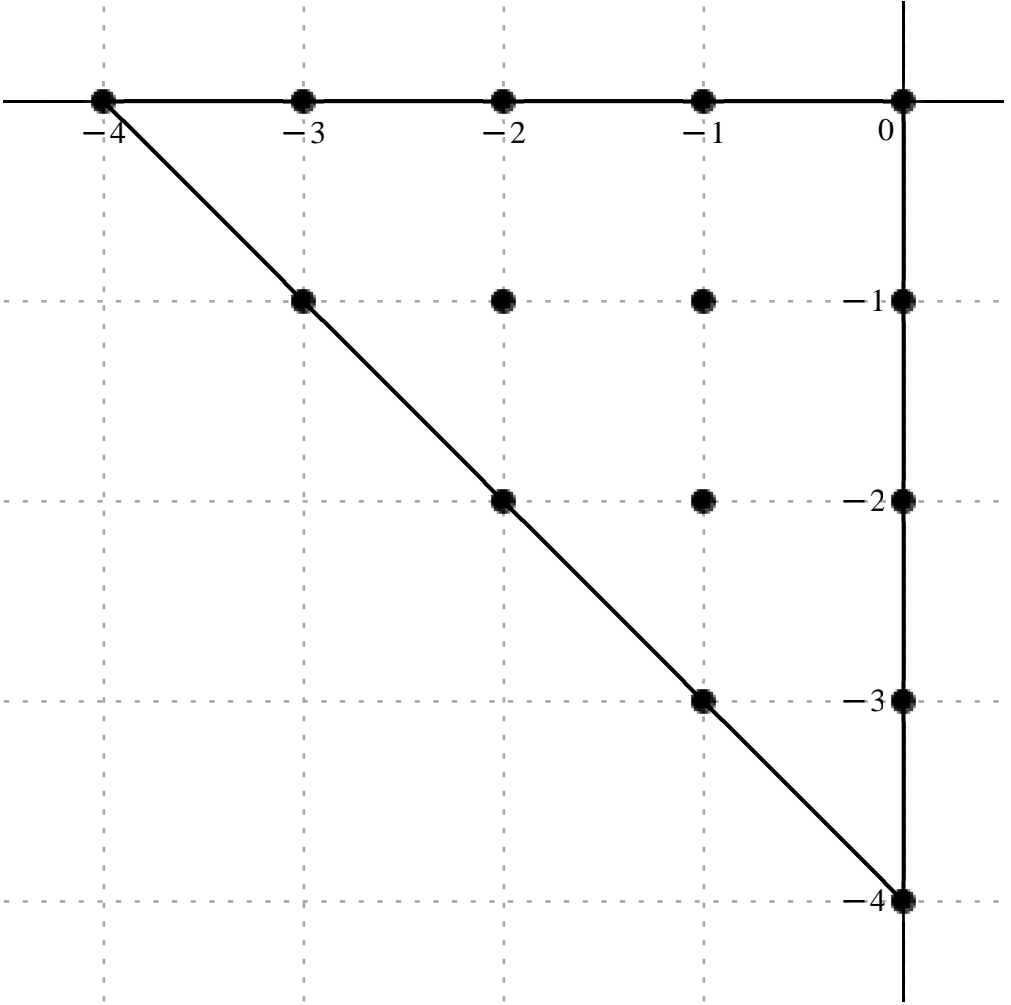
Error order:, 6, Error:,, 5.2016391817846093756 × 10−25, New Error:,, 5.2020990897184232727 × 10−31

Error order:, 6, Error:,, 5.2020990897184232727 × 10−31, New Error:,, 5.2021450790413136945 × 10−37

Error order:, 6, Error:,, 5.2021450790413136945 × 10−37, New Error:,, 5.2021496779588944205 × 10−43

$$c =, \begin{bmatrix} -\frac{12519171}{5525} - \frac{25921539 \, \mathrm{i}}{11050} & -\frac{63448056}{325} - \frac{2531088 \, \mathrm{i}}{325} & -\frac{120197196}{65} - \frac{60089526 \, \mathrm{i}}{65} & -\frac{4489128}{17} - \frac{224959896 \, \mathrm{i}}{85} & \frac{401247}{2} - \frac{401247 \, \mathrm{i}}{2} \\ -\frac{24041556}{65} + \frac{22897728 \, \mathrm{i}}{65} & \frac{302537592}{65} - \frac{914929344 \, \mathrm{i}}{65} & -\frac{107963604}{5} + \frac{107963604 \, \mathrm{i}}{5} & \frac{224959896}{85} + \frac{4489128 \, \mathrm{i}}{17} & \\ \frac{10567746}{5} - \frac{10567746 \, \mathrm{i}}{5} & \frac{914929344}{65} - \frac{302537592 \, \mathrm{i}}{65} & -\frac{22897728}{65} + \frac{24041556 \, \mathrm{i}}{65} & \frac{2531088}{325} + \frac{63448056 \, \mathrm{i}}{325} & \\ \frac{25921539}{11050} + \frac{12519171 \, \mathrm{i}}{5525} & & & & \end{bmatrix}$$

$$x_o + h., \begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ -3 - \mathrm{i} & -2 - \mathrm{i} & -1 - \mathrm{i} & -\mathrm{i} & \\ -2 - 2 \, \mathrm{i} & -1 - 2 \, \mathrm{i} & -2 \, \mathrm{i} & -3 \, \mathrm{i} & \\ -1 - 3 \, \mathrm{i} & -3 \, \mathrm{i} & -4 \, \mathrm{i} & & \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{11050 \, \Delta x_{ol}^9} \big( 189 \, \big( -(132478 + 137151 \, \mathrm{i}) \, u_{ol-4} - (11413936 + 455328 \, \mathrm{i}) \, u_{ol-3} - (108113880 + 54048780 \, \mathrm{i}) \, u_{ol-2} - (15438800 + 154734320 \, \mathrm{i}) \, u_{ol-1} + (11729575 - 11729575 \, \mathrm{i}) \, u_{ol} + (-21624680 + 20595840 \, \mathrm{i}) \, u_{ol-3-1} + (272123760 - 822952320 \, \mathrm{i}) \, u_{ol-2-1} + (-1262431560 + 1262431560 \, \mathrm{i}) \, u_{ol-1-1} + (154734320 + 15438800 \, \mathrm{i}) \, u_{ol-1} + (123569940 - 123569940 \, \mathrm{i}) \, u_{ol-2-21} + (822952320 - 272123760 \, \mathrm{i}) \, u_{ol-1-21} + (54048780 + 108113880 \, \mathrm{i}) \, u_{ol-21} + (-20595840 + 21624680 \, \mathrm{i}) \, u_{ol-1-31} + (455328 + 11413936 \, \mathrm{i}) \, u_{ol-31} + (137151 + 132478 \, \mathrm{i}) \, u_{ol-41} \big) \big), \, O(\, \Delta x_{ol}^6 \, )$$

$$Variavel \, :, x_{ol}, \, Derivada \, de \, Ordem \, :, 10$$

$$Error \, order.: 5, \, Error.: 1.1599546792053908322 \times 10^{-10}, \, New \, Error.: 1.1810512523436682870 \times 10^{-15}$$

$$Error \, order.: 5, \, Error.: 1.1810512523436682870 \times 10^{-15}, \, New \, Error.: 1.1831708946126284625 \times 10^{-20}$$

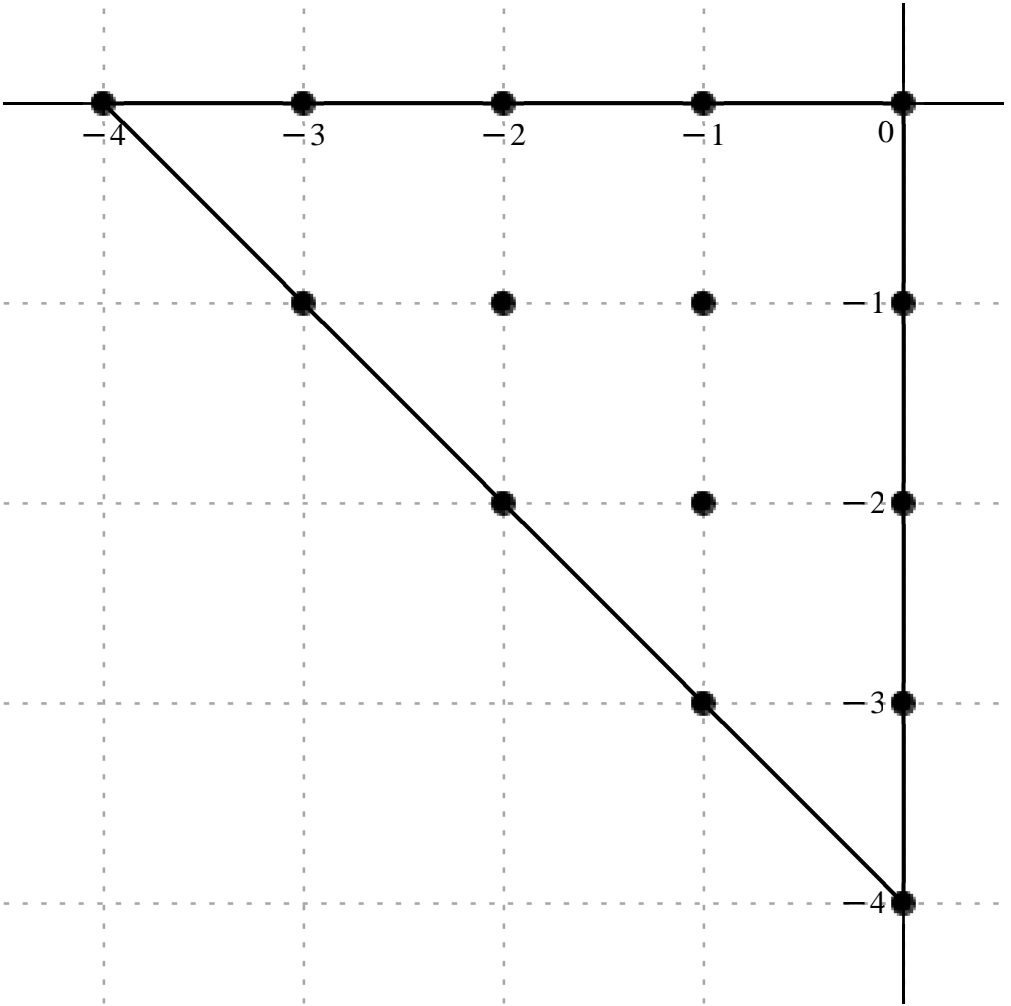
$$Error \, order.: 5, \, Error.: 1.1831708946126284625 \times 10^{-20}, \, New \, Error.: 1.1833829584875705114 \times 10^{-25}$$

$$Error \, order.: 5, \, Error.: 1.1833829584875705114 \times 10^{-25}, \, New \, Error.: 1.1834041658713403105 \times 10^{-30}$$

$$Error \, order.: 5, \, Error.: 1.1834041658713403105 \times 10^{-30}, \, New \, Error.: 1.1834062866196798411 \times 10^{-35}$$

$$x_o + h., \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -1 - 3 \text{ I} & -3 \text{ I} \\ & & & & -4 \text{ I} \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} -\frac{37154943}{4420} + \frac{1846719 \text{ I}}{4420} & -\frac{21900816}{65} + \frac{23087232 \text{ I}}{65} & -\frac{60363954}{13} + \frac{23977296 \text{ I}}{13} & -\frac{83507760}{17} - \frac{63676368 \text{ I}}{17} & -\frac{1265229 \text{ I}}{2} & \\ & \frac{215460}{13} + \frac{16762788 \text{ I}}{13} & -\frac{222735744}{13} - \frac{418191984 \text{ I}}{13} & 72970632 \text{ I} & \frac{83507760}{17} - \frac{63676368 \text{ I}}{17} & \\ & & -7488369 \text{ I} & \frac{222735744}{13} - \frac{418191984 \text{ I}}{13} & \frac{60363954}{13} + \frac{23977296 \text{ I}}{13} & \\ & & & -\frac{215460}{13} + \frac{16762788 \text{ I}}{13} & \frac{21900816}{65} + \frac{23087232 \text{ I}}{65} & \\ & & & & \frac{37154943}{4420} + \frac{1846719 \text{ I}}{4420} & \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}} \, u(x_{ol}) = \frac{1}{4420 \, \Delta x_{ol}^{10}} \, \Big( 63 \, \Big( (-589761 + 29313 \, \text{I}) \, u_{ol-4} + (-23638976 + 24919552 \, \text{I}) \, u_{ol-3} + (-325773720 + 129401280 \, \text{I}) \, u_{ol-2} - (344635200 + 262791360 \, \text{I}) \, u_{ol-1} - 44383430 \, \text{I} \, u_{ol} + (1162800 + 90465840 \, \text{I}) \, u_{ol-3-1} - (1202065920 + 2256909120 \, \text{I}) \, u_{ol-2-1} + 5119526880 \, \text{I} \, u_{ol-1-1} + (344635200 - 262791360 \, \text{I}) \, u_{ol-1} \\ - 525374460 \, \text{I} \, u_{ol-2-21} + (1202065920 - 2256909120 \, \text{I}) \, u_{ol-1-21} + (325773720 + 129401280 \, \text{I}) \, u_{ol-21} + (-1162800 + 90465840 \, \text{I}) \, u_{ol-1-31} + (23638976 + 24919552 \, \text{I}) \, u_{ol-31} + (589761 + 29313 \, \text{I}) \, u_{ol-41} \Big) \Big), \, O(\, \Delta x_{ol}^5 \, )$$

Formula:, 449, Var:, 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 11

Error order:, 4, Error:,  $3.0600033003503379896 \times 10^{-8}$ , New Error:,  $3.0854179604504595857 \times 10^{-12}$

Error order:, 4, Error:,  $3.0854179604504595857 \times 10^{-12}$ , New Error:,  $3.0879519527791978089 \times 10^{-16}$

Error order:, 4, Error:,  $3.0879519527791978089 \times 10^{-16}$ , New Error:,  $3.0882052755878299497 \times 10^{-20}$

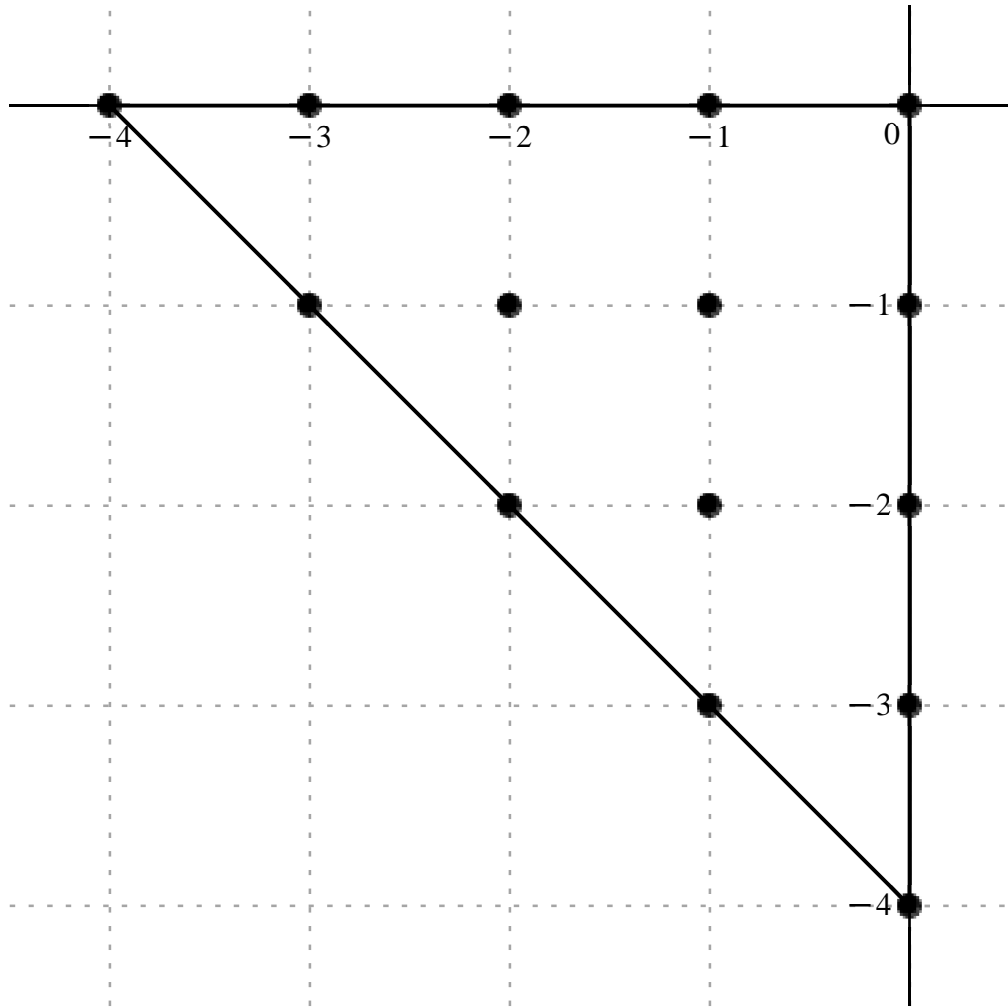
Error order:, 4, Error:,  $3.0882052755878299497 \times 10^{-20}$ , New Error:,  $3.0882306071027555471 \times 10^{-24}$

Error order:, 4, Error:,  $3.0882306071027555471 \times 10^{-24}$ , New Error:,  $3.0882331402465870347 \times 10^{-28}$

$$x_o + h \cdot , \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3 - I & -2 - I & -1 - I & -I \\ & & -2 - 2 I & -1 - 2 I & -2 I \\ & & & -1 - 3 I & -3 I \\ & & & & -4 I \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} -\frac{11859309}{1105} + \frac{30514869 I}{2210} & \frac{6076224}{65} + \frac{63800352 I}{65} & -\frac{43771266}{13} + \frac{118640214 I}{13} & -\frac{194816160}{17} + \frac{32399136 I}{17} & -\frac{1625085}{2} - \frac{1625085 I}{2} \\ & \frac{25385976}{13} + \frac{22857912 I}{13} & -\frac{905712192}{13} - \frac{253272096 I}{13} & 99692208 + 99692208 I & \frac{32399136}{17} - \frac{194816160 I}{17} \\ & & -10721403 - 10721403 I & -\frac{253272096}{13} - \frac{905712192 I}{13} & \frac{118640214}{13} - \frac{43771266 I}{13} \\ & & & \frac{22857912}{13} + \frac{25385976 I}{13} & \frac{63800352}{65} + \frac{6076224 I}{65} \\ & & & & \frac{30514869}{2210} - \frac{11859309 I}{1105} \end{array} \right]$$





$$\frac{\mathrm{d}^{11}}{\mathrm{d}x_{ol}^{11}}\;u(x_{ol})=\frac{1}{2210\,\Delta x_{ol}^{11}}\left(693\left((\,-34226+44033\,\mathrm{I})\,u_{ol-4}+(298112+3130176\,\mathrm{I})\,u_{ol-3}+(\,-10737540+29103660\,\mathrm{I})\,u_{ol-2}+(\,-36545600+6077760\,\mathrm{I})\,u_{ol-1}-(2591225+2591225\,\mathrm{I})\,u_{ol}+(6227440+5607280\,\mathrm{I})\,u_{ol-3-1}-(222180480+62130240\,\mathrm{I})\,u_{ol-2-1}+(317921760+317921760\,\mathrm{I})\,u_{ol-1-1}+(6077760-36545600\,\mathrm{I})\,u_{ol-1}\right.\\ \left.-(34190910+34190910\,\mathrm{I})\,u_{ol-2-21}-(62130240+222180480\,\mathrm{I})\,u_{ol-1-21}+(29103660-10737540\,\mathrm{I})\,u_{ol-21}+(5607280+6227440\,\mathrm{I})\,u_{ol-1-31}+(3130176+298112\,\mathrm{I})\,u_{ol-31}+(44033-34226\,\mathrm{I})\,u_{ol-41}\right)\Big),\;O(\;\Delta x_{ol}^4\;)$$

Formula:, 450, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 12

Error order:., 3, Error:., 4.6690651999087972569 × 10<sup>−6</sup>, New Error:., 4.7448320991141616633 × 10<sup>−9</sup>

Error order:., 3, Error:., 4.7448320991141616633 × 10<sup>−9</sup>, New Error:., 4.7524419645996139420 × 10<sup>−12</sup>

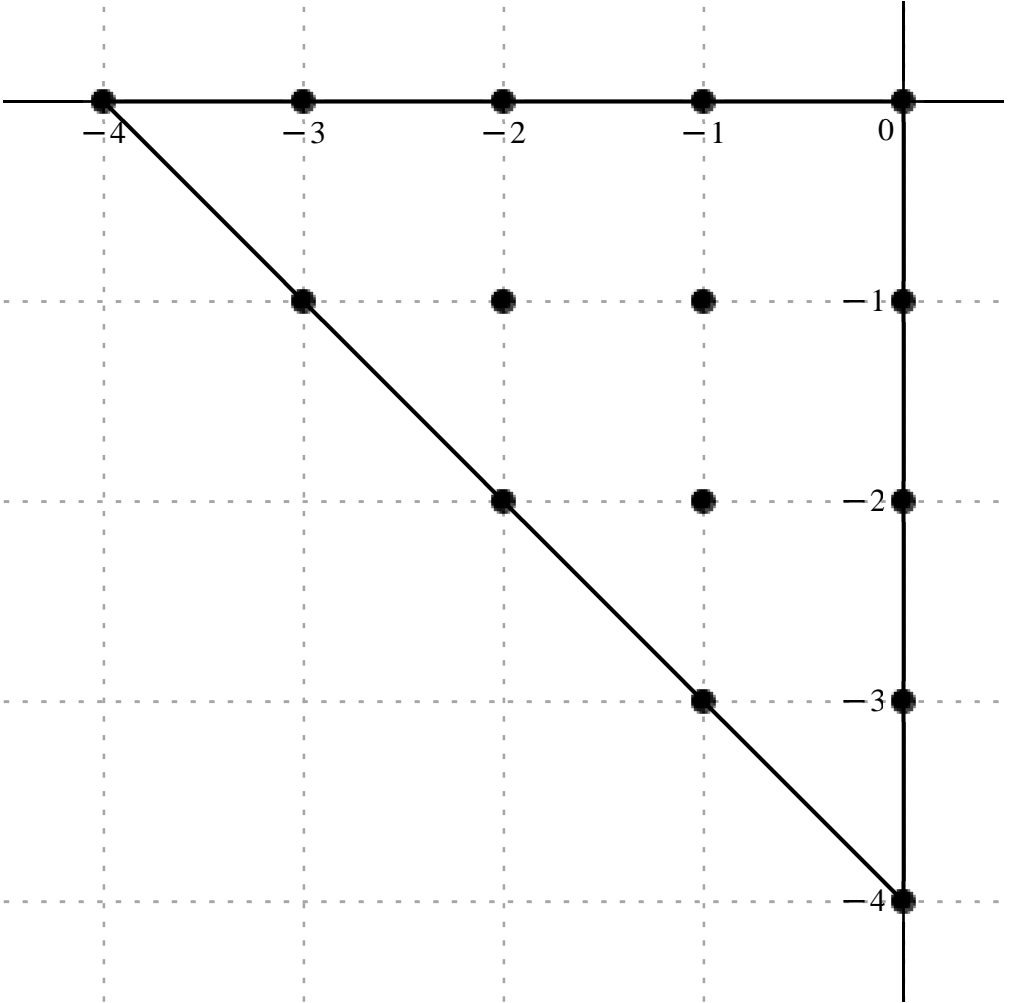
Error order:., 3, Error:., 4.7524419645996139420 × 10<sup>−12</sup>, New Error:., 4.7532032822720177456 × 10<sup>−15</sup>

Error order:., 3, Error:., 4.7532032822720177456 × 10<sup>−15</sup>, New Error:., 4.7532794173498548990 × 10<sup>−18</sup>

Error order:., 3, Error:., 4.7532794173498548990 × 10<sup>−18</sup>, New Error:., 4.7532870308907439392 × 10<sup>−21</sup>

$$x_o \neq h. , \left[ \begin{array}{ccccc} -4 & -3 & -2 & -1 & 0 \\ & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 - 2 \,\mathrm{I} & -1 - 2 \,\mathrm{I} & -2 \,\mathrm{I} \\ & & & -1 - 3 \,\mathrm{I} & -3 \,\mathrm{I} \\ & & & & -4 \,\mathrm{I} \end{array} \right]$$

$$c = \begin{bmatrix} \frac{372141}{65} + \frac{1752597 \text{ I}}{65} & \frac{79700544}{65} + \frac{56814912 \text{ I}}{65} & \frac{87118416}{13} + \frac{165704616 \text{ I}}{13} & -9313920 + 13837824 \text{ I} & -1600830 \\ & \frac{52789968}{13} - \frac{5022864 \text{ I}}{13} & -\frac{1222651584}{13} + \frac{726884928 \text{ I}}{13} & 207766944 & -9313920 - 13837824 \text{ I} \\ & & -23426172 & -\frac{1222651584}{13} - \frac{726884928 \text{ I}}{13} & \frac{87118416}{13} - \frac{165704616 \text{ I}}{13} \\ & & & \frac{52789968}{13} + \frac{5022864 \text{ I}}{13} & \frac{79700544}{65} - \frac{56814912 \text{ I}}{65} \\ & & & & \frac{372141}{65} - \frac{1752597 \text{ I}}{65} \end{bmatrix}$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}} \; u(x_{ol}) = \frac{1}{65 \; \Delta x_{ol}^{12}} \Big( 2079 \; \big( (179 + 843 \; \text{I}) \; u_{ol-4} + (38336 + 27328 \; \text{I}) \; u_{ol-3} + (209520 + 398520 \; \text{I}) \; u_{ol-2} + (-291200 + 432640 \; \text{I}) \; u_{ol-1} - 50050 \; u_{ol} + (126960 - 12080 \; \text{I}) \; u_{ol-3-1} + (-2940480 + 1748160 \; \text{I}) \; u_{ol-2-1} + 6495840 \; u_{ol-1-1} - (291200 + 432640 \; \text{I}) \; u_{ol-1} - 732420 \; u_{ol-2-21} - (2940480 + 1748160 \; \text{I}) \; u_{ol-1-21} + (209520 - 398520 \; \text{I}) \; u_{ol-21} + (126960 + 12080 \; \text{I}) \; u_{ol-1-31} + (38336 - 27328 \; \text{I}) \; u_{ol-31} + (179 - 843 \; \text{I}) \; u_{ol-41} \big) \Big), \; O( \; \Delta x_{ol}^3 \; )$$

Formula:, 451, Var:; 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 13

Error order:; 2, Error:; 0.00075751085414237763857, New Error:; 7.6270067466615346262 × 10<sup>−6</sup>

Error order:; 2, Error:; 7.6270067466615346262 × 10<sup>−6</sup>, New Error:; 7.6321829345613006496 × 10<sup>−8</sup>

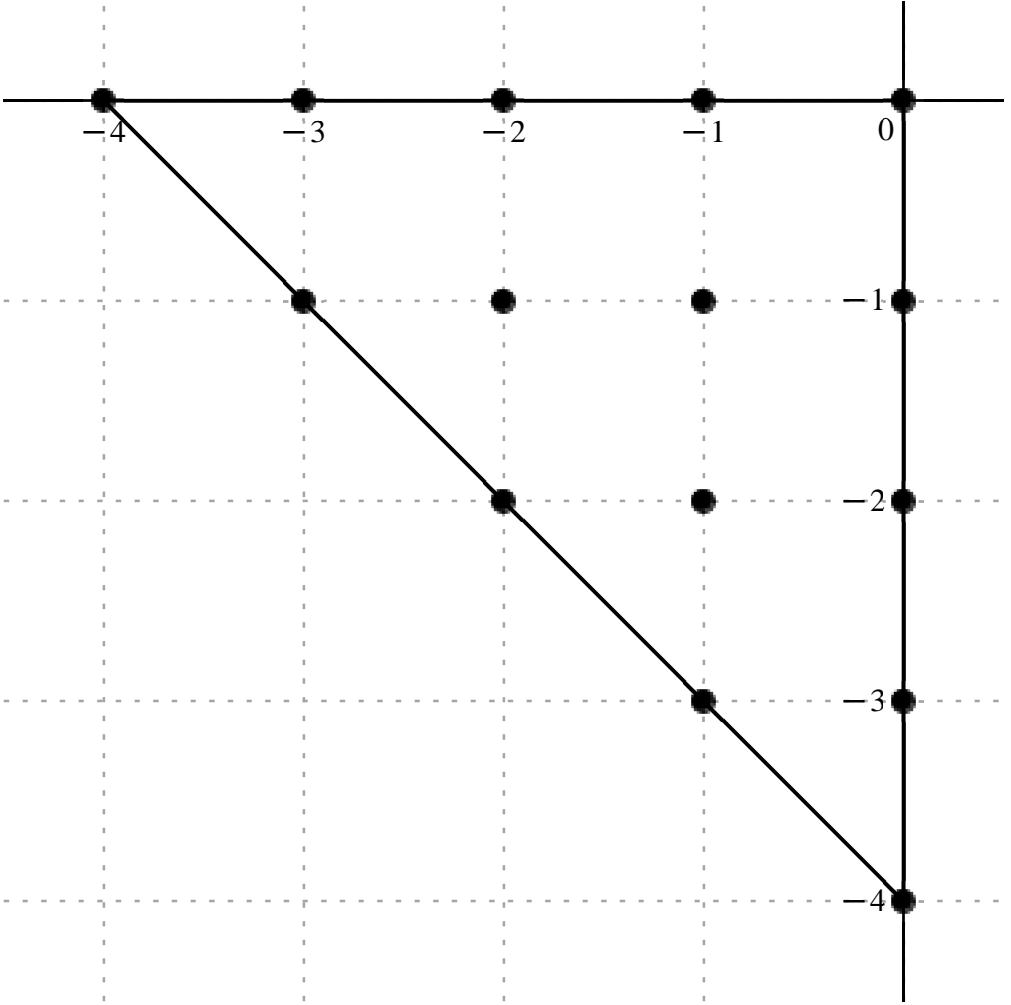
Error order:; 2, Error:; 7.6321829345613006496 × 10<sup>−8</sup>, New Error:; 7.6327004141912045373 × 10<sup>−10</sup>

Error order:; 2, Error:; 7.6327004141912045373 × 10<sup>−10</sup>, New Error:; 7.6327521607597481293 × 10<sup>−12</sup>

Error order:; 2, Error:; 7.6327521607597481293 × 10<sup>−12</sup>, New Error:; 7.6327573354026551732 × 10<sup>−14</sup>

$$x_o + h., \begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -1 - 3 \text{ I} & -3 \text{ I} \\ & & & & -4 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{2220372}{85} + \frac{1155924 \text{ I}}{85} & \frac{7584192}{5} - \frac{1862784 \text{ I}}{5} & 14070672 + 3592512 \text{ I} & \frac{60540480}{17} + \frac{271567296 \text{ I}}{17} & -1081080 + 1081080 \text{ I} \\ & 2594592 - 3459456 \text{ I} & -25147584 + 110170368 \text{ I} & 147891744 - 147891744 \text{ I} & -\frac{271567296}{17} - \frac{60540480 \text{ I}}{17} \\ & & -17513496 + 17513496 \text{ I} & -110170368 + 25147584 \text{ I} & -3592512 - 14070672 \text{ I} \\ & & & 3459456 - 2594592 \text{ I} & \frac{1862784}{5} - \frac{7584192 \text{ I}}{5} \\ & & & & -\frac{1155924}{85} - \frac{2220372 \text{ I}}{85} \end{bmatrix}$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d} x_{o l}^{13}} \; u(x_{o l}) = \frac{1}{85 \, \Delta x_{o l}^{13}} \big( 8316 \, \big( (267 + 139 \, \text{I}) \, u_{o l - 4} + (15504 - 3808 \, \text{I}) \, u_{o l - 3} + (143820 + 36720 \, \text{I}) \, u_{o l - 2} + (36400 + 163280 \, \text{I}) \, u_{o l - 1} + (-11050 + 11050 \, \text{I}) \, u_{o l} + (26520 - 35360 \, \text{I}) \, u_{o l - 3 - 1} + (-257040 + 1126080 \, \text{I}) \, u_{o l - 2 - 1} + (1511640 - 1511640 \, \text{I}) \, u_{o l - 1 - 1} - (163280 + 36400 \, \text{I}) \, u_{o l - 1} + (-179010 + 179010 \, \text{I}) \, u_{o l - 2 - 21} \\ + (-1126080 + 257040 \, \text{I}) \, u_{o l - 1 - 21} - (36720 + 143820 \, \text{I}) \, u_{o l - 21} + (35360 - 26520 \, \text{I}) \, u_{o l - 1 - 31} + (3808 - 15504 \, \text{I}) \, u_{o l - 31} - (139 + 267 \, \text{I}) \, u_{o l - 41} \big) \big), \; O( \, \Delta x_{o l}^2 \, )$$

$$\text{Variavel :}, x_{ol}, \text{ Derivada de Ordem :}, 14$$

$$\text{Error order:}, 1, \text{ Error:}, 0.060263441956098354343, \text{ New Error:}, 0.0060905566007157006826$$

$$\text{Error order:}, 1, \text{ Error:}, 0.0060905566007157006826, \text{ New Error:}, 0.00060970009710810474220$$

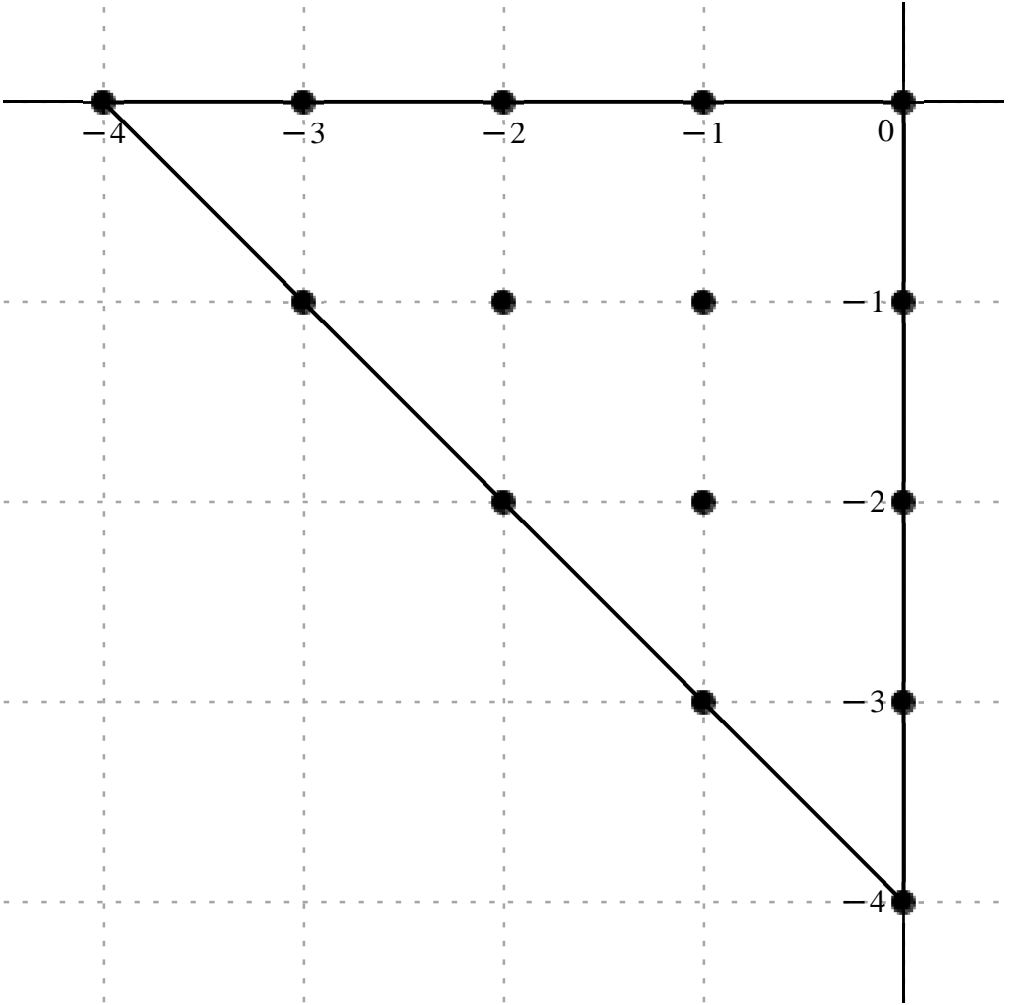
$$\text{Error order:}, 1, \text{ Error:}, 0.00060970009710810474220, \text{ New Error:}, 0.000060976456390247067941$$

$$\text{Error order:}, 1, \text{ Error:}, 0.000060976456390247067941, \text{ New Error:}, 6.0977101081277468724 \times 10^{-6}$$

$$\text{Error order:}, 1, \text{ Error:}, 6.0977101081277468724 \times 10^{-6}, \text{ New Error:}, 6.0977165550611372240 \times 10^{-7}$$

$$x_o+h., \begin{bmatrix} -4 & -3 & -2 & -1 & 0 \\ & -3-I & -2-I & -1-I & -I \\ & & -2-2\,I & -1-2\,I & -2\,I \\ & & & -1-3\,I & -3\,I \\ & & & & -4\,I \end{bmatrix}$$

$$c=, \begin{bmatrix} \frac{1251558}{85}-\frac{553014\,I}{85} & \frac{1862784}{5}-\frac{3725568\,I}{5} & 6286896-4191264\,I & \frac{121080960}{17}+\frac{72648576\,I}{17} & 756756\,I \\ & -465696-2328480\,I & 33530112+50295168\,I & -108972864\,I & -\frac{121080960}{17}+\frac{72648576\,I}{17} \\ & & 13621608\,I & -33530112+50295168\,I & -6286896-4191264\,I \\ & & & 465696-2328480\,I & -\frac{1862784}{5}-\frac{3725568\,I}{5} \\ & & & & -\frac{1251558}{85}-\frac{553014\,I}{85} \end{bmatrix}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d} x_{ol}^{14}}\; u(x_{ol})=\frac{1}{85\,\Delta x_{ol}^{14}}\big(29106\,\big((43-19\,I)\,u_{ol-4}+(1088-2176\,I)\,u_{ol-3}+(18360-12240\,I)\,u_{ol-2}+(20800+12480\,I)\,u_{ol-1}+2210\,I u_{ol}-(1360+6800\,I)\,u_{ol-3-1}+(97920+146880\,I)\,u_{ol-2-1}-318240\,I u_{ol-1-1}+(-20800+12480\,I)\,u_{ol-1}+39780\,I u_{ol-2-21}+(-97920+146880\,I)\,u_{ol-1-21}-(18360+12240\,I)\,u_{ol-21}$$

$$+(1360-6800\,I)\,u_{ol-1-31}-(1088+2176\,I)\,u_{ol-31}-(43+19\,I)\,u_{ol-41}\big)\big),\; O(\;\Delta x_{ol}\;)$$

Formula:, 453, Var.: 1

Variavel :,  $x_o$  , Derivada de Ordem :, 1

Error order:, 8, Error:,  $3.3691818227228143449 \times 10^{-20}$ , New Error:,  $3.3526416838592802062 \times 10^{-28}$

Error order:, 8, Error:,  $3.3526416838592802062 \times 10^{-28}$ , New Error:,  $3.3509909247995581810 \times 10^{-36}$

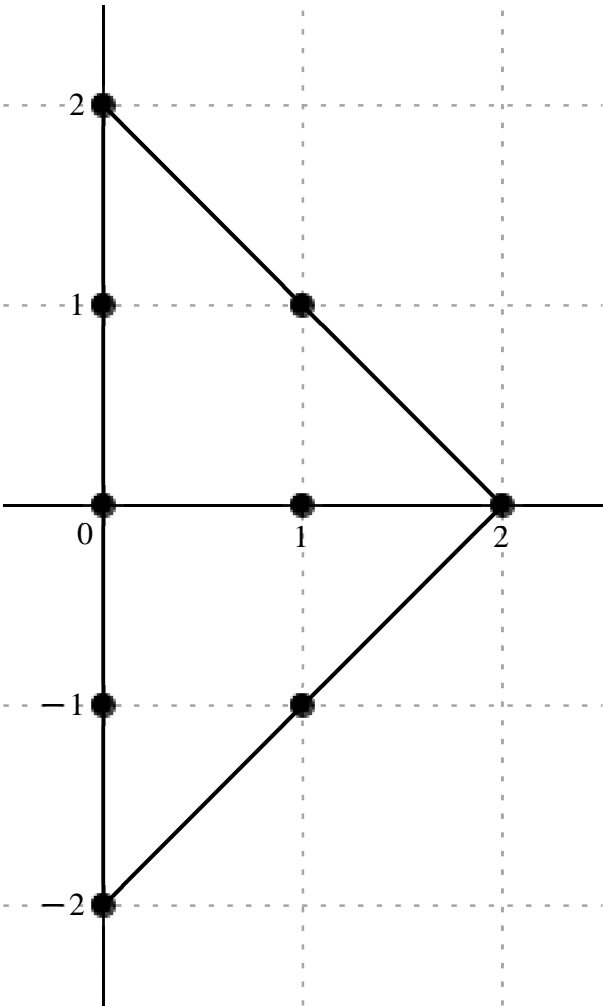
Error order:, 8, Error:,  $3.3509909247995581810 \times 10^{-36}$ , New Error:,  $3.3508258814121772902 \times 10^{-44}$

Error order:, 8, Error:,  $3.3508258814121772902 \times 10^{-44}$ , New Error:,  $3.3508093773985954818 \times 10^{-52}$

Error order:, 8, Error:,  $3.3508093773985954818 \times 10^{-52}$ , New Error:,  $3.3508077270004888341 \times 10^{-60}$

$$x_o+h., \left[ \begin{array}{cc} 2 \text{ I} & \\ \text{I} & 1+\text{I} \\ 0 & 1 & 2 \\ -\text{I} & 1-\text{I} \\ -2 \text{ I} & \end{array} \right]$$

$$c=, \left[ \begin{array}{cc} \frac{1}{120}-\frac{\text{I}}{120} & \\ \frac{4}{15}+\frac{4\text{I}}{15} & \frac{1}{5}+\frac{\text{I}}{5} \\ -\frac{5}{2} & \frac{8}{5} & -\frac{1}{20} \\ \frac{4}{15}-\frac{4\text{I}}{15} & \frac{1}{5}-\frac{\text{I}}{5} \\ \frac{1}{120}+\frac{\text{I}}{120} & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol})=\frac{(1-I)\, u_{ol+2l}+(32+32\, I)\, u_{ol+l}+(24+24\, I)\, u_{ol+l+1}-300\, u_{ol}+192\, u_{ol+1}-6\, u_{ol+2}+(32-32\, I)\, u_{ol-1}+(24-24\, I)\, u_{ol+l-1}+(1+I)\, u_{ol-2l}}{120\, \Delta x_{ol}},\, O(\, \Delta x_{ol}^{\, 8}\, )$$

Formula:, 454, Var:., 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 2

Error order:., 7, Error:., 1.5307761320778297089 × 10<sup>−17</sup>, New Error:., 1.5238613221991245517 × 10<sup>−24</sup>

Error order:., 7, Error:., 1.5238613221991245517 × 10<sup>−24</sup>, New Error:., 1.5231710244852286481 × 10<sup>−31</sup>

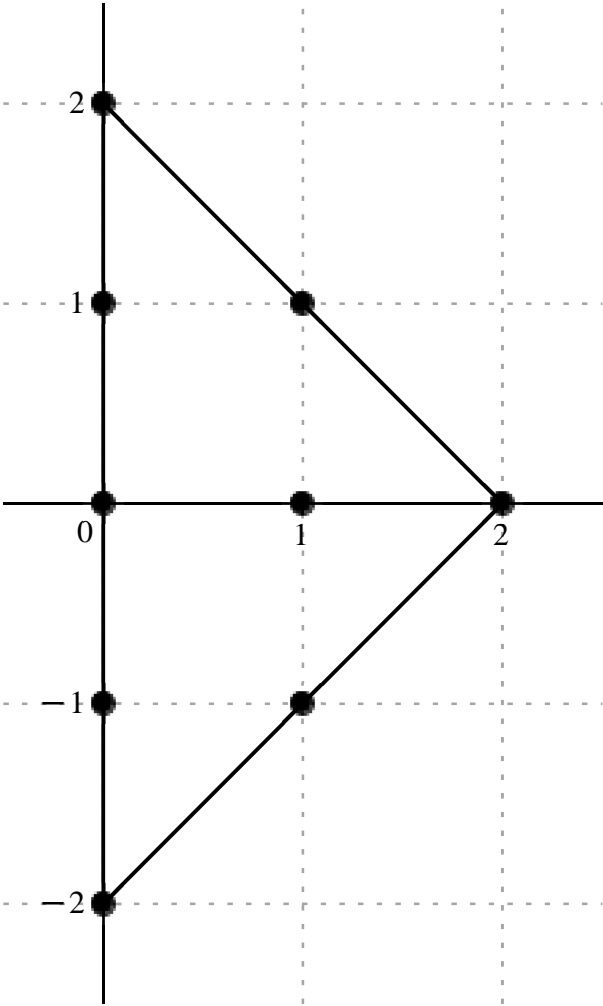
Error order:., 7, Error:., 1.5231710244852286481 × 10<sup>−31</sup>, New Error:., 1.5231020065384820751 × 10<sup>−38</sup>

Error order:., 7, Error:., 1.5231020065384820751 × 10<sup>−38</sup>, New Error:., 1.5230951048620457661 × 10<sup>−45</sup>

Error order:., 7, Error:., 1.5230951048620457661 × 10<sup>−45</sup>, New Error:., 1.5230944146955845106 × 10<sup>−52</sup>

$$x_o\, +h\, .\, ,\left[\begin{array}{ccc}2\, I&&\\I&1+I&\\0&1&2\\-I&1-I&\\-2\, I&&\end{array}\right]$$

$$c=,\left[\begin{array}{ccc}-\frac{1}{20}+\frac{I}{30}&&\\-\frac{4}{5}-\frac{28\, I}{15}&-\frac{3}{5}-I&\\\frac{15}{2}&-\frac{24}{5}&\frac{1}{5}\\-\frac{4}{5}+\frac{28\, I}{15}&-\frac{3}{5}+I&\\-\frac{1}{20}-\frac{I}{30}&&\end{array}\right]$$



$$\frac{d^2}{dx_{ol}^2} u(x_{ol}) = \frac{(-3+2\,I)\,u_{ol+2\,I}-(48+112\,I)\,u_{ol+1\,I}-(36+60\,I)\,u_{ol+1\,I+1}+450\,u_{ol}-288\,u_{ol+1\,I}+12\,u_{ol+2\,I}+(-48+112\,I)\,u_{ol-1\,I}+(-36+60\,I)\,u_{ol+1\,I-1}-(3+2\,I)\,u_{ol-2\,I}}{60\,\Delta x_{ol}^2},\,O(\,\Delta x_{ol}^7\,)$$

Formula:, 455, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 6, Error:,  $6.2604401282171688724 \times 10^{-15}$ , New Error:,  $6.2337962018674948200 \times 10^{-21}$

Error order:, 6, Error:,  $6.2337962018674948200 \times 10^{-21}$ , New Error:,  $6.2311360041510473575 \times 10^{-27}$

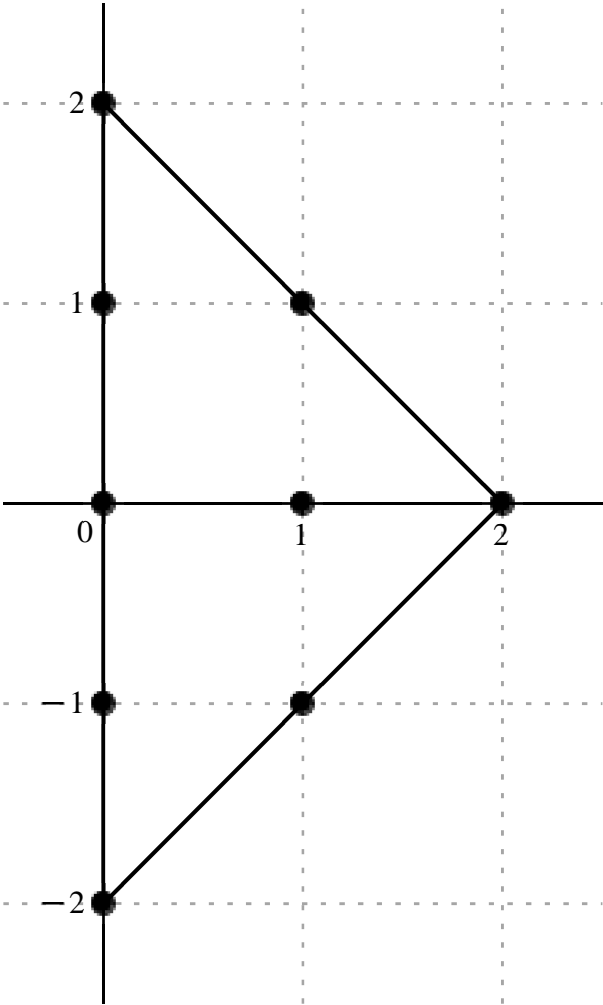
Error order:, 6, Error:,  $6.2311360041510473575 \times 10^{-27}$ , New Error:,  $6.2308700263028105594 \times 10^{-33}$

Error order:, 6, Error:,  $6.2308700263028105594 \times 10^{-33}$ , New Error:,  $6.2308434289371952423 \times 10^{-39}$

Error order:, 6, Error:,  $6.2308434289371952423 \times 10^{-39}$ , New Error:,  $6.2308407692048257685 \times 10^{-45}$

$$x_o + h \cdot , \left[ \begin{array}{ccc} 2\,I & & \\ I & 1+I & \\ 0 & 1 & 2 \\ -I & 1-I & \\ -2\,I & & \end{array} \right]$$

$$c =, \begin{bmatrix} \frac{19}{80} - \frac{9 \text{ I}}{80} \\ \frac{2}{5} + \frac{42 \text{ I}}{5} & \frac{21}{10} + \frac{39 \text{ I}}{10} \\ -\frac{105}{4} & \frac{108}{5} & -\frac{33}{40} \\ \frac{2}{5} - \frac{42 \text{ I}}{5} & \frac{21}{10} - \frac{39 \text{ I}}{10} \\ \frac{19}{80} + \frac{9 \text{ I}}{80} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d} x_{ol}^3} \, u(x_{ol}) = \frac{(19-9 \, \text{I}) \, u_{ol+2\text{I}} + (32+672 \, \text{I}) \, u_{ol+1} + (168+312 \, \text{I}) \, u_{ol+1+1} -2100 \, u_{ol} + 1728 \, u_{ol+1} -66 \, u_{ol+2} + (32-672 \, \text{I}) \, u_{ol-1} + (168-312 \, \text{I}) \, u_{ol+1-1} + (19+9 \, \text{I}) \, u_{ol-2\text{I}}}{80 \, \Delta x_{ol}^3}, \, O(\, \Delta x_{ol}^6 \, )$$

Formula:, 456, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 4

Error order:., 5, Error:., 2.6553913338095866030 × 10−12, New Error:., 2.6445856845676503265 × 10−17

Error order:., 5, Error:., 2.6445856845676503265 × 10−17, New Error:., 2.6435067330288350258 × 10−22

Error order:., 5, Error:., 2.6435067330288350258 × 10−22, New Error:., 2.6433988539992961046 × 10−27

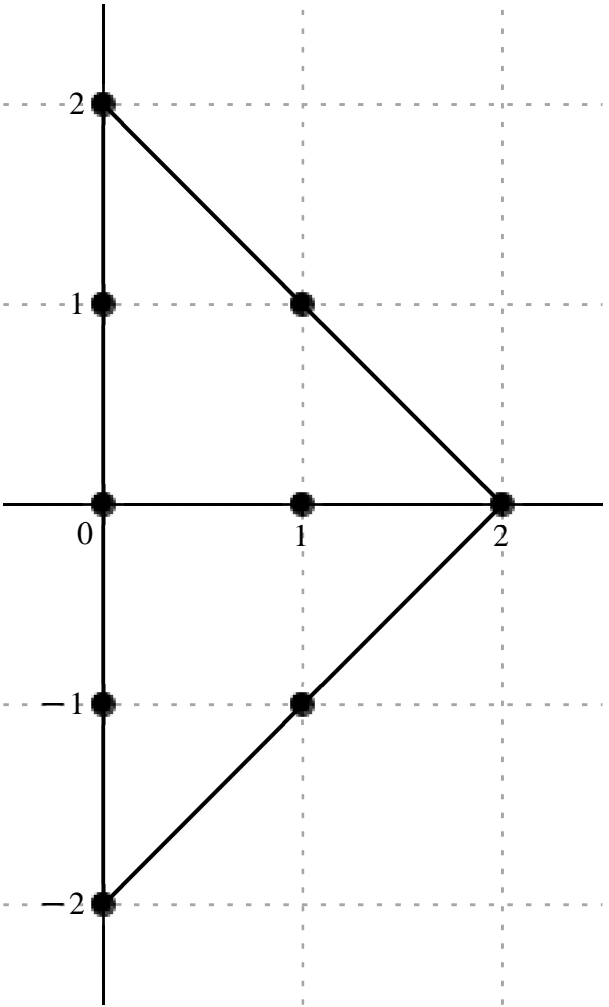
Error order:., 5, Error:., 2.6433988539992961046 × 10−27, New Error:., 2.6433880662575761530 × 10−32

Error order:., 5, Error:., 2.6433880662575761530 × 10−32, New Error:., 2.6433869874850164878 × 10−37



$$x_o \neq h. , \left[ \begin{array}{ccc} 2 \text{ I} & & \\ \text{I} & 1+\text{I} & \\ 0 & 1 & 2 \\ -\text{I} & 1-\text{I} & \\ -2 \text{ I} & & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccc} -\frac{11}{10} + \frac{2 \text{ I}}{5} & & \\ \frac{28}{5} - \frac{148 \text{ I}}{5} & -9 - \frac{87 \text{ I}}{5} & \\ 87 & -\frac{408}{5} & \frac{18}{5} \\ \frac{28}{5} + \frac{148 \text{ I}}{5} & -9 + \frac{87 \text{ I}}{5} & \\ -\frac{11}{10} - \frac{2 \text{ I}}{5} & & \end{array} \right]$$

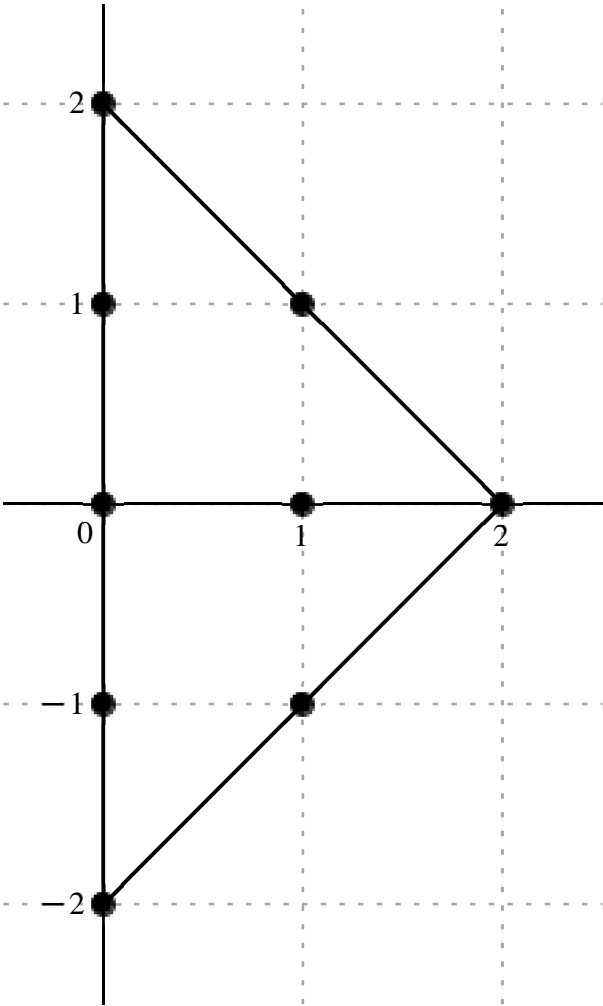


$$\frac{\mathrm{d}^4}{\mathrm{d} x_{oI}^4} \; u(x_{oI}) = \frac{(-11+4 \, \mathrm{I}) \, u_{oI+2 \mathrm{I}} + (56-296 \, \mathrm{I}) \, u_{oI+1} - (90+174 \, \mathrm{I}) \, u_{oI+1+1} + 870 \, u_{oI} - 816 \, u_{oI+1} + 36 \, u_{oI+2} + (56+296 \, \mathrm{I}) \, u_{oI-1} + (-90+174 \, \mathrm{I}) \, u_{oI+1-1} - (11+4 \, \mathrm{I}) \, u_{oI-2 \mathrm{I}}}{10 \, \Delta x_{oI}^4}, \; O( \, \Delta x_{oI}^5 \, )$$

*Error order:*, 4, *Error:*,  $9.9969993895341905266 \times 10^{-10}$ , *New Error:*,  $9.9597466477140456736 \times 10^{-14}$   
*Error order:*, 4, *Error:*,  $9.9597466477140456736 \times 10^{-14}$ , *New Error:*,  $9.9560262062271059998 \times 10^{-18}$   
*Error order:*, 4, *Error:*,  $9.9560262062271059998 \times 10^{-18}$ , *New Error:*,  $9.9556542103840148422 \times 10^{-22}$   
*Error order:*, 4, *Error:*,  $9.9556542103840148422 \times 10^{-22}$ , *New Error:*,  $9.9556170112827404966 \times 10^{-26}$   
*Error order:*, 4, *Error:*,  $9.9556170112827404966 \times 10^{-26}$ , *New Error:*,  $9.9556132913774433885 \times 10^{-30}$

$$x_o+h., \begin{bmatrix} 2 \, \mathrm{I} \\ \mathrm{I} & 1+\mathrm{I} \\ 0 & 1 & 2 \\ -\mathrm{I} & 1-\mathrm{I} \\ -2 \, \mathrm{I} \end{bmatrix}$$

$$c=, \begin{bmatrix} \frac{37}{8}-\frac{7 \, \mathrm{I}}{8} \\ -32+88 \, \mathrm{I} & 21+66 \, \mathrm{I} \\ -\frac{525}{2} & 288 & -\frac{51}{4} \\ -32-88 \, \mathrm{I} & 21-66 \, \mathrm{I} \\ \frac{37}{8}+\frac{7 \, \mathrm{I}}{8} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d} x_{ol}^5} \, u(x_{ol}) = \frac{(37-7 \, \mathrm{I}) \, u_{ol+2 \mathrm{I}} + (-256+704 \, \mathrm{I}) \, u_{ol+1} + (168+528 \, \mathrm{I}) \, u_{ol+1+1} -2100 \, u_{ol} +2304 \, u_{ol+1} -102 \, u_{ol+2} - (256+704 \, \mathrm{I}) \, u_{ol-1} + (168-528 \, \mathrm{I}) \, u_{ol+1-1} + (37+7 \, \mathrm{I}) \, u_{ol-2 \mathrm{I}}}{8 \, \Delta x_{ol}^5}, \, O(\, \Delta x_{ol}^4 \, )$$

Formula:, 458, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 6

Error order:, 3, Error:,  $3.2889289059367043109 \times 10^{-7}$ , New Error:,  $3.2781249790821018626 \times 10^{-10}$

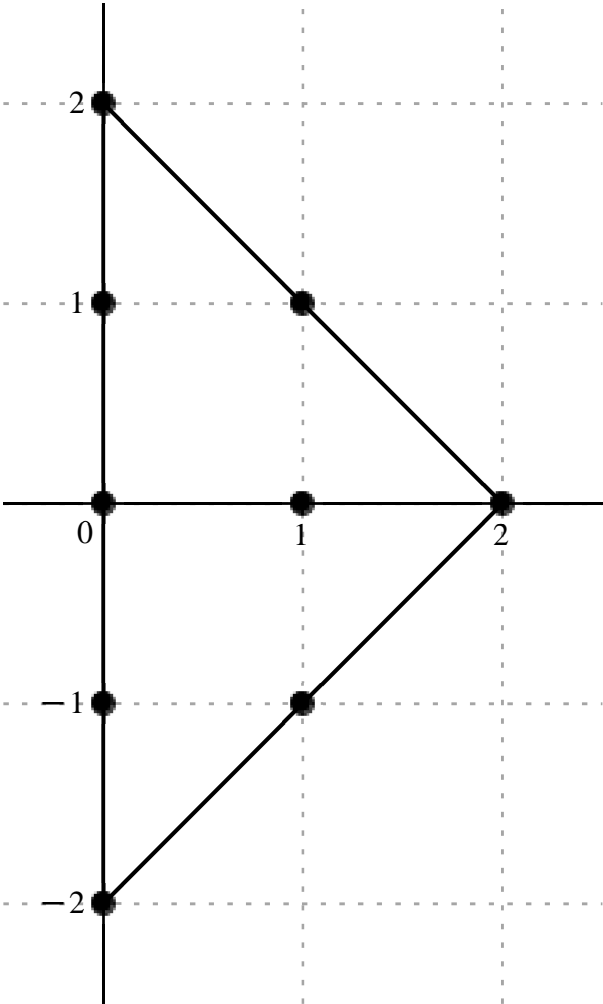
Error order:, 3, Error:,  $3.2781249790821018626 \times 10^{-10}$ , New Error:,  $3.2770457680344850100 \times 10^{-13}$

Error order:, 3, Error:,  $3.2770457680344850100 \times 10^{-13}$ , New Error:,  $3.2769378587410993741 \times 10^{-16}$

Error order:, 3, Error:,  $3.2769378587410993741 \times 10^{-16}$ , New Error:,  $3.2769270679298696004 \times 10^{-19}$

Error order:, 3, Error:,  $3.2769270679298696004 \times 10^{-19}$ , New Error:,  $3.2769259888499277059 \times 10^{-22}$

$$x_o+h., \begin{bmatrix} 2\text{ I} \\ \text{I} & 1+\text{I} \\ 0 & 1 & 2 \\ -\text{I} & 1-\text{I} \\ -2\text{ I} \end{bmatrix}$$
$$c=, \begin{bmatrix} -\frac{63}{4}-\frac{3\text{ I}}{4} \\ 108-228\text{ I} & -54-180\text{ I} \\ 675 & -792 & \frac{81}{2} \\ 108+228\text{ I} & -54+180\text{ I} \\ -\frac{63}{4}+\frac{3\text{ I}}{4} \end{bmatrix}$$

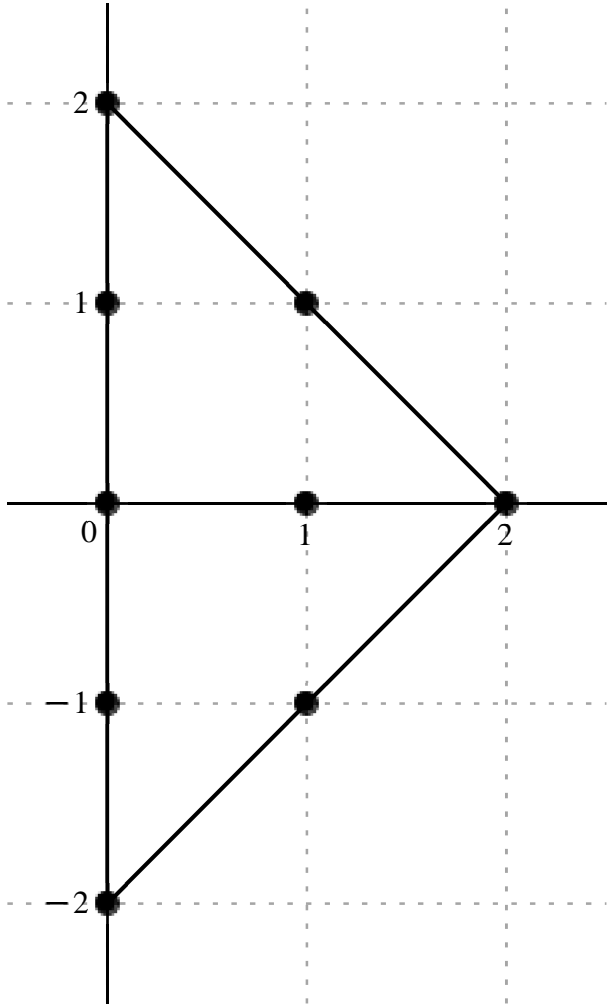


$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6}u(x_{ol})=\frac{3\left(-(21+\mathrm{I})\,u_{ol+21}+(144-304\,\mathrm{I})\,u_{ol+1}-(72+240\,\mathrm{I})\,u_{ol+1+1}+900\,u_{ol}-1056\,u_{ol+1}+54\,u_{ol+2}+(144+304\,\mathrm{I})\,u_{ol-1}+(-72+240\,\mathrm{I})\,u_{ol+1-1}+(-21+\mathrm{I})\,u_{ol-21}\right)}{4\,\Delta x_{ol}^6},\,O(\,\Delta x_{ol}^3\,)$$

Formula:, 459, Var:, 1  
Variavel :,  $x_{oi}$ , Derivada de Ordem :, 7

Error order:, 2, Error:, 0.000089631769587084280760, New Error:,  $8.9396792640341726764 \times 10^{-7}$   
Error order:, 2, Error:,  $8.9396792640341726764 \times 10^{-7}$ , New Error:,  $8.9373314036494658188 \times 10^{-9}$   
Error order:, 2, Error:,  $8.9373314036494658188 \times 10^{-9}$ , New Error:,  $8.9370966366911898490 \times 10^{-11}$   
Error order:, 2, Error:,  $8.9370966366911898490 \times 10^{-11}$ , New Error:,  $8.9370731601861536534 \times 10^{-13}$   
Error order:, 2, Error:,  $8.9370731601861536534 \times 10^{-13}$ , New Error:,  $8.9370708125375579373 \times 10^{-15}$

$$x_o + h. , \begin{bmatrix} 2 \text{ I} \\ \text{I} & 1 + \text{I} \\ 0 & 1 & 2 \\ -\text{I} & 1 - \text{I} \\ -2 \text{ I} \end{bmatrix}$$
$$c = , \begin{bmatrix} \frac{147}{4} + \frac{63 \text{ I}}{4} \\ -336 + 504 \text{ I} & 126 + 504 \text{ I} \\ -1575 & 2016 & -\frac{189}{2} \\ -336 - 504 \text{ I} & 126 - 504 \text{ I} \\ \frac{147}{4} - \frac{63 \text{ I}}{4} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u\big(x_{ol}\big)=\frac{21\left((7+3\,\mathrm{I})\,u_{ol+2\,\mathrm{I}}+(-64+96\,\mathrm{I})\,u_{ol+1}+(24+96\,\mathrm{I})\,u_{ol+1+1}-300\,u_{ol}+384\,u_{ol+1}-18\,u_{ol+2}-(64+96\,\mathrm{I})\,u_{ol-1}+(24-96\,\mathrm{I})\,u_{ol+1-1}+(7-3\,\mathrm{I})\,u_{ol-2\,\mathrm{I}}\right)}{4\,\Delta x_{ol}^7},\,O(\,\Delta x_{ol}^2\,)$$

Formula:, 460, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:., 1, Error:., 0.021713100084617814719, New Error:., 0.0021670368775842618629

Error order:., 1, Error:., 0.0021670368775842618629, New Error:., 0.00021666099856969009928

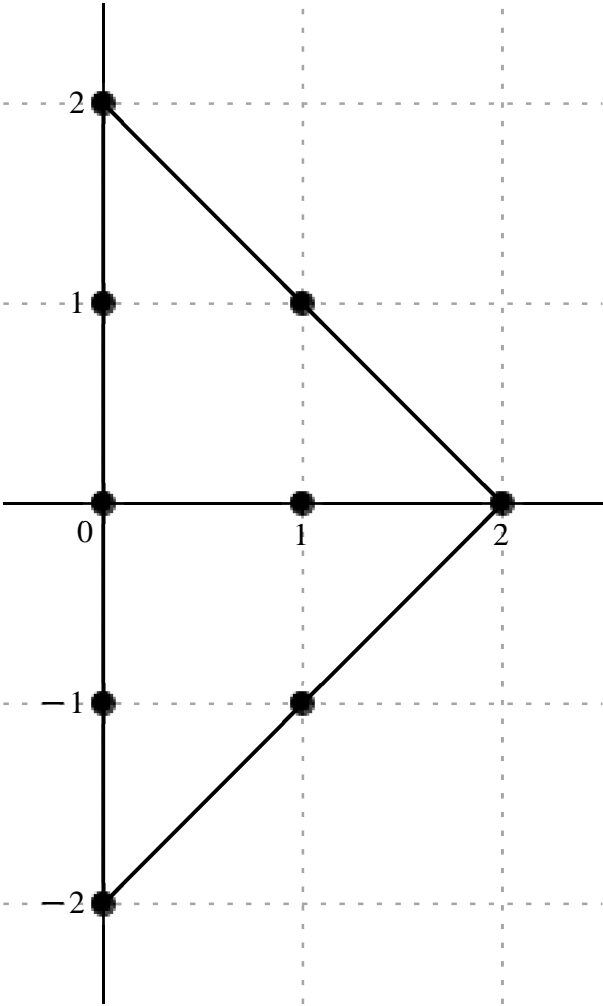
Error order:., 1, Error:., 0.00021666099856969009928, New Error:., 0.000021665673007136322120

Error order:., 1, Error:., 0.000021665673007136322120, New Error:.,  $2.1665630322573534913\times10^{-6}$

Error order:., 1, Error:.,  $2.1665630322573534913\times10^{-6}$ , New Error:.,  $2.1665626054121460943\times10^{-7}$

$$x_o+h.,\left[\begin{array}{ccc}2\,\mathrm{I}&&\\ \mathrm{I}&1+\mathrm{I}&\\ 0&1&2\\ -\mathrm{I}&1-\mathrm{I}&\\ -2\,\mathrm{I}&&\end{array}\right]$$

$$c=,\left[\begin{array}{ccc}-42-42\,\mathrm{I}&&\\ 672-672\,\mathrm{I}&-1008\,\mathrm{I}&\\ 2520&-4032&252\\ 672+672\,\mathrm{I}&1008\,\mathrm{I}&\\ -42+42\,\mathrm{I}&&\end{array}\right]$$



$$\frac{d^8}{dx_{ol}^8} u(x_{ol}) = \frac{42 \left( -(1+I) u_{ol+2I} + (16-16I) u_{ol+I} - 24I u_{ol+I+1} + 60 u_{ol} - 96 u_{ol+1} + 6 u_{ol+2} + (16+16I) u_{ol-1} + 24I u_{ol+1-I} + (-1+I) u_{ol-2I} \right)}{\Delta x_{ol}^8}, O(\Delta x_{ol})$$

Formula:, 461, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 8, Error:,  $3.3325062506988880607 \times 10^{-20}$ , New Error:,  $3.3489741332474501926 \times 10^{-28}$

Error order:, 8, Error:,  $3.3489741332474501926 \times 10^{-28}$ , New Error:,  $3.3506241697449657140 \times 10^{-36}$

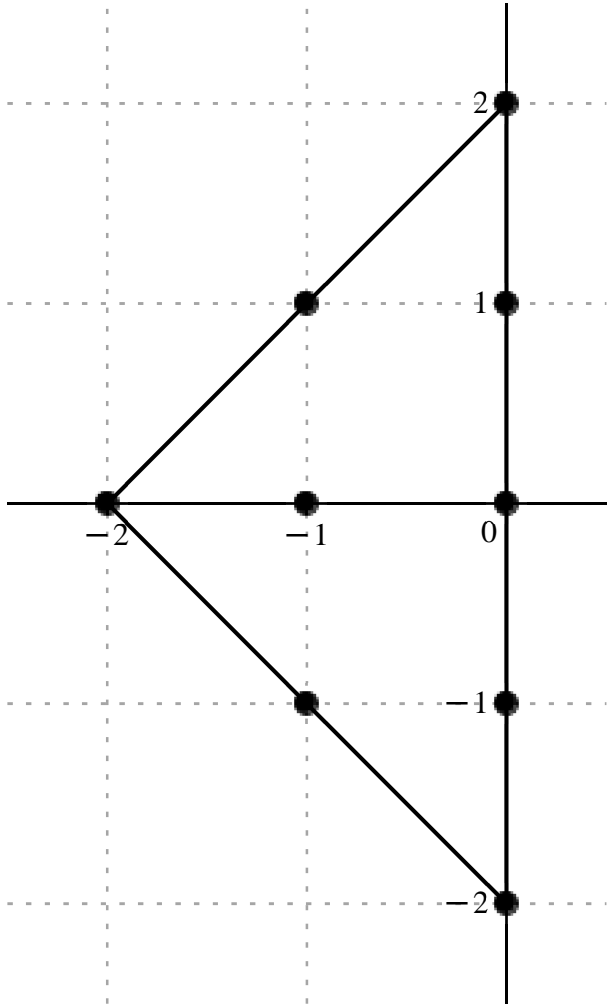
Error order:, 8, Error:,  $3.3506241697449657140 \times 10^{-36}$ , New Error:,  $3.3507892059067246340 \times 10^{-44}$

Error order:, 8, Error:,  $3.3507892059067246340 \times 10^{-44}$ , New Error:,  $3.3508057098480502228 \times 10^{-52}$

Error order:, 8, Error:,  $3.3508057098480502228 \times 10^{-52}$ , New Error:,  $3.3508073602454343082 \times 10^{-60}$

$$x_o + h, \begin{bmatrix} & & 2I \\ & -1+I & I \\ -2 & -1 & 0 \\ & -1-I & -I \\ & & -2I \end{bmatrix}$$

$$c =, \left[ \begin{array}{ccc} & & -\frac{1}{120} - \frac{\text{I}}{120} \\ & -\frac{1}{5} + \frac{\text{I}}{5} & -\frac{4}{15} + \frac{4\text{I}}{15} \\ \frac{1}{20} & -\frac{8}{5} & \frac{5}{2} \\ & -\frac{1}{5} - \frac{\text{I}}{5} & -\frac{4}{15} - \frac{4\text{I}}{15} \\ & & -\frac{1}{120} + \frac{\text{I}}{120} \end{array} \right]$$



$$\frac{\text{d}}{\text{d}x_{ol}}\; u(x_{ol}) = \frac{-(1+\text{I})\, u_{ol+2\text{I}} + (-24+24\,\text{I})\, u_{ol-1+1} + (-32+32\,\text{I})\, u_{ol+1} + 6\, u_{ol-2} - 192\, u_{ol-1} + 300\, u_{ol} - (24+24\,\text{I})\, u_{ol-1-1} - (32+32\,\text{I})\, u_{ol-1} + (-1+\text{I})\, u_{ol-2\text{I}}}{120\, \Delta x_{ol}} , \; O(\, \Delta x_{ol}^8 \,)$$

Formula:, 462, Var.: 1

Variavel :, x\_{ol} , Derivada de Ordem :, 2

Error order:., 7, Error:., 1.5154390843690712669 × 10<sup>−17</sup>, New Error:., 1.5223276192256786990 × 10<sup>−24</sup>

Error order:., 7, Error:., 1.5223276192256786990 × 10<sup>−24</sup>, New Error:., 1.5230176541896814813 × 10<sup>−31</sup>

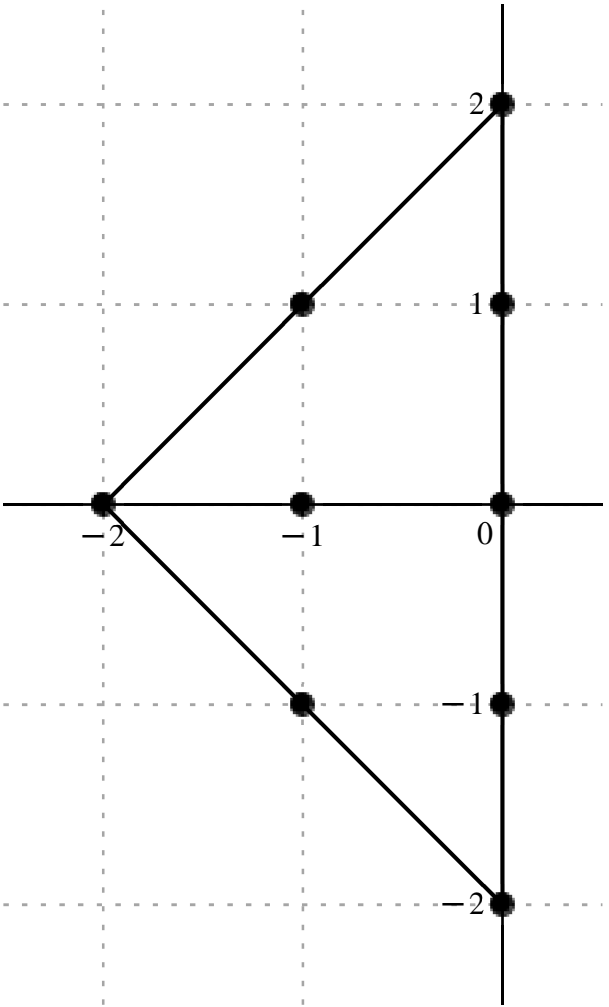
Error order:., 7, Error:., 1.5230176541896814813 × 10<sup>−31</sup>, New Error:., 1.5230866695089291559 × 10<sup>−38</sup>

Error order:., 7, Error:., 1.5230866695089291559 × 10<sup>−38</sup>, New Error:., 1.5230935711590904759 × 10<sup>−45</sup>

Error order:., 7, Error:., 1.5230935711590904759 × 10<sup>−45</sup>, New Error:., 1.5230942613252889815 × 10<sup>−52</sup>

$$x_o + h \cdot , \left[ \begin{array}{ccc} & 2 \, \mathrm{I} & \\ & -1 + \mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{ccc} & -\frac{1}{20} - \frac{\mathrm{I}}{30} & \\ & -\frac{3}{5} + \mathrm{I} & -\frac{4}{5} + \frac{28 \, \mathrm{I}}{15} \\ \frac{1}{5} & -\frac{24}{5} & \frac{15}{2} \\ & -\frac{3}{5} - \mathrm{I} & -\frac{4}{5} - \frac{28 \, \mathrm{I}}{15} \\ & & -\frac{1}{20} + \frac{\mathrm{I}}{30} \end{array} \right]$$



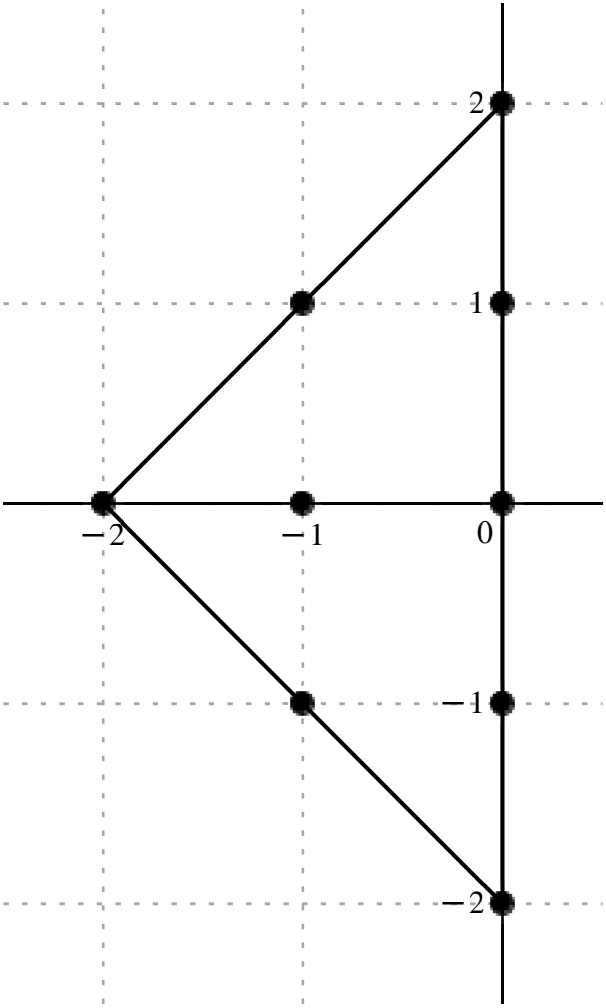
$$\frac{\mathrm{d}^2}{\mathrm{d}x_o{}^2} \, u(x_o) = \frac{-(3+2 \, \mathrm{I}) \, u_{oI+2I} + (-36+60 \, \mathrm{I}) \, u_{oI-1+1} + (-48+112 \, \mathrm{I}) \, u_{oI+1} + 12 \, u_{oI-2} - 288 \, u_{oI-1} + 450 \, u_{oI} - (36+60 \, \mathrm{I}) \, u_{oI-1-1} - (48+112 \, \mathrm{I}) \, u_{oI-1} + (-3+2 \, \mathrm{I}) \, u_{oI-2I}}{60 \, \Delta x_o{}^2}, \, O(\, \Delta x_o{}^7 \, )$$



*Error order:*, 6, *Error:*,  $6.2013349170331113743 \times 10^{-15}$ , *New Error:*,  $6.2278856864681935143 \times 10^{-21}$   
*Error order:*, 6, *Error:*,  $6.2278856864681935143 \times 10^{-21}$ , *New Error:*,  $6.2305449526168362859 \times 10^{-27}$   
*Error order:*, 6, *Error:*,  $6.2305449526168362859 \times 10^{-27}$ , *New Error:*,  $6.2308109211493951713 \times 10^{-33}$   
*Error order:*, 6, *Error:*,  $6.2308109211493951713 \times 10^{-33}$ , *New Error:*,  $6.2308375184218537092 \times 10^{-39}$   
*Error order:*, 6, *Error:*,  $6.2308375184218537092 \times 10^{-39}$ , *New Error:*,  $6.2308401781532916152 \times 10^{-45}$

$$x_o+h\cdot,\left[\begin{array}{ccc} & 2\,\mathrm{I} & \\ & -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ & -1-\mathrm{I} & -\mathrm{I} \\ & & -2\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{ccc} & -\frac{19}{80}-\frac{9\,\mathrm{I}}{80} & \\ & -\frac{21}{10}+\frac{39\,\mathrm{I}}{10} & -\frac{2}{5}+\frac{42\,\mathrm{I}}{5} \\ \frac{33}{40} & -\frac{108}{5} & \frac{105}{4} \\ & -\frac{21}{10}-\frac{39\,\mathrm{I}}{10} & -\frac{2}{5}-\frac{42\,\mathrm{I}}{5} \\ & & -\frac{19}{80}+\frac{9\,\mathrm{I}}{80} \end{array}\right]$$

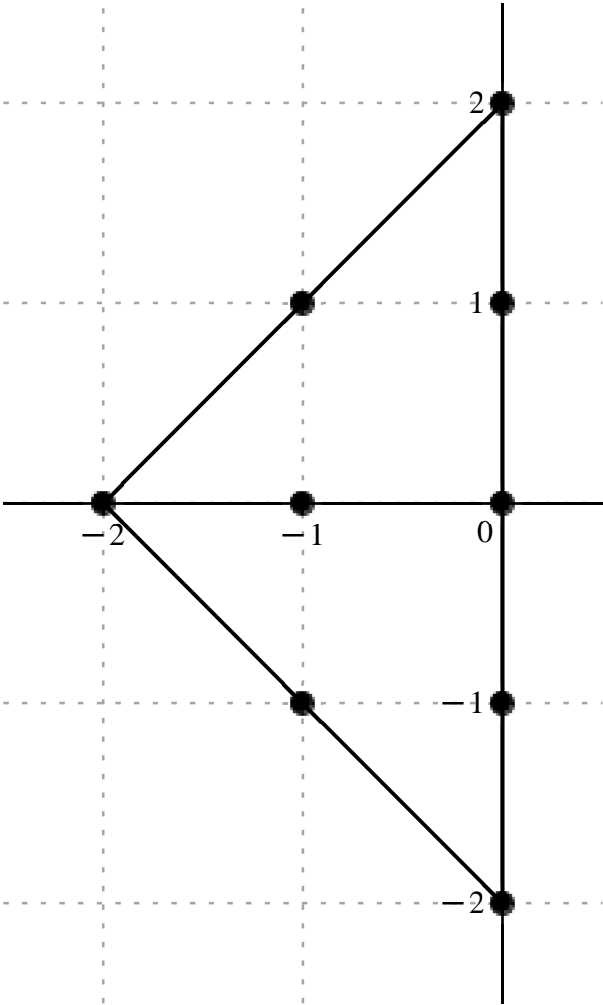


$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3}\,u(x_{ol})=\frac{-(19+9\,\mathrm{I})\,u_{ol+2\,\mathrm{I}}+(-168+312\,\mathrm{I})\,u_{ol-1+1}+(-32+672\,\mathrm{I})\,u_{ol+1}+66\,u_{ol-2}-1728\,u_{ol-1}+2100\,u_{ol}-(168+312\,\mathrm{I})\,u_{ol-1-\mathrm{I}}-(32+672\,\mathrm{I})\,u_{ol-1}+(-19+9\,\mathrm{I})\,u_{ol-2\,\mathrm{I}}}{80\,\Delta x_{ol}^3},\,O(\,\Delta x_{ol}^6\,)$$

Formula:, 464, Var.: 1  
Variavel :,  $x_{oi}$ , Derivada de Ordem :, 4

Error order:, 5, Error:;  $2.6314185929356055078 \times 10^{-12}$ , New Error:;  $2.6421884125896378811 \times 10^{-17}$   
Error order:, 5, Error:;  $2.6421884125896378811 \times 10^{-17}$ , New Error:;  $2.6432670058331431485 \times 10^{-22}$   
Error order:, 5, Error:;  $2.6432670058331431485 \times 10^{-22}$ , New Error:;  $2.6433748812797290262 \times 10^{-27}$   
Error order:, 5, Error:;  $2.6433748812797290262 \times 10^{-27}$ , New Error:;  $2.6433856689856194473 \times 10^{-32}$   
Error order:, 5, Error:;  $2.6433856689856194473 \times 10^{-32}$ , New Error:;  $2.6433867477578208172 \times 10^{-37}$

$$x_o + h., \begin{bmatrix} & & 2\text{ I} \\ & -1 + \text{I} & \text{I} \\ -2 & -1 & 0 \\ & -1 - \text{I} & -\text{I} \\ & & -2\text{ I} \end{bmatrix}$$
$$c =, \frac{18}{5}, \begin{bmatrix} & & -\frac{11}{10} - \frac{2\text{ I}}{5} \\ & -9 + \frac{87\text{ I}}{5} & \frac{28}{5} + \frac{148\text{ I}}{5} \\ \frac{18}{5} & -\frac{408}{5} & 87 \\ & -9 - \frac{87\text{ I}}{5} & \frac{28}{5} - \frac{148\text{ I}}{5} \\ & & -\frac{11}{10} + \frac{2\text{ I}}{5} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{-(11+4 \, \mathrm{I}) \, u_{ol+21} + (-90+174 \, \mathrm{I}) \, u_{ol-1+1} + (56+296 \, \mathrm{I}) \, u_{ol+1} + 36 \, u_{ol-2} - 816 \, u_{ol-1} + 870 \, u_{ol} - (90+174 \, \mathrm{I}) \, u_{ol-1-1} + (56-296 \, \mathrm{I}) \, u_{ol-1} + (-11+4 \, \mathrm{I}) \, u_{ol-21}}{10 \, \Delta x_{ol}^4}, \, O(\, \Delta x_{ol}^5 \, )$$

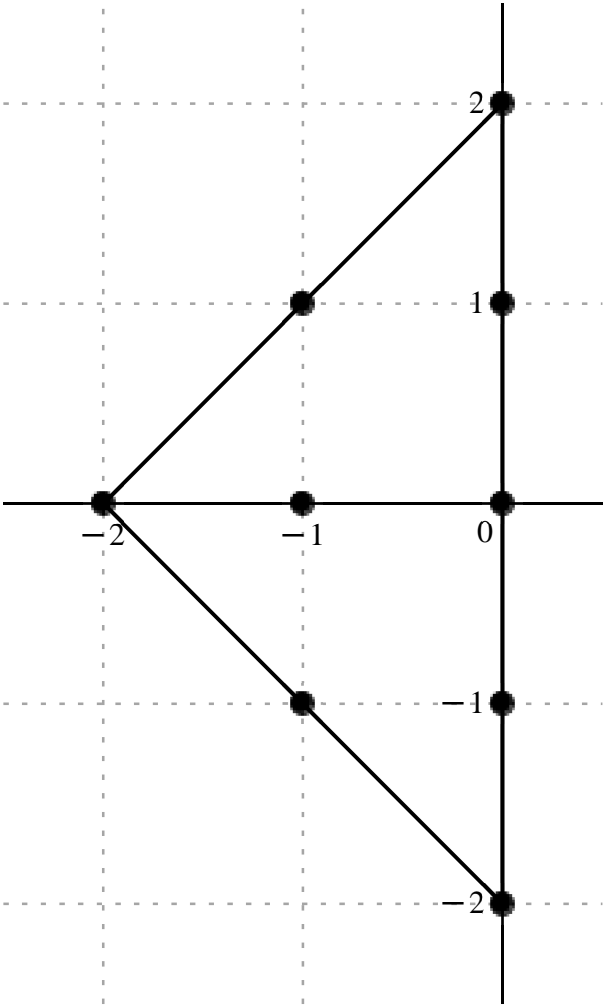
Formula:, 465, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 5

Error order:, 4, Error:,  $9.9143347915599469407 \times 10^{-10}$ , New Error:,  $9.9514801926431801738 \times 10^{-14}$   
 Error order:, 4, Error:,  $9.9514801926431801738 \times 10^{-14}$ , New Error:,  $9.9551995607247459451 \times 10^{-18}$   
 Error order:, 4, Error:,  $9.9551995607247459451 \times 10^{-18}$ , New Error:,  $9.9555715458337835632 \times 10^{-22}$   
 Error order:, 4, Error:,  $9.9555715458337835632 \times 10^{-22}$ , New Error:,  $9.9556087448277173735 \times 10^{-26}$   
 Error order:, 4, Error:,  $9.9556087448277173735 \times 10^{-26}$ , New Error:,  $9.9556124647319410762 \times 10^{-30}$

$$x_o+h\, , \left[ \begin{array}{ccc} & 2 \, \mathrm{I} & \\ & -1+\mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ & -1-\mathrm{I} & -\mathrm{I} \\ & & -2 \, \mathrm{I} \end{array} \right]$$

$$c=, \left[ \begin{array}{ccc} & -\frac{37}{8}-\frac{7 \, \mathrm{I}}{8} & \\ & -21+66 \, \mathrm{I} & 32+88 \, \mathrm{I} \\ \frac{51}{4} & -288 & \frac{525}{2} \\ & -21-66 \, \mathrm{I} & 32-88 \, \mathrm{I} \\ & & -\frac{37}{8}+\frac{7 \, \mathrm{I}}{8} \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} u(x_{ol}) = \frac{-(37 + 7 \mathrm{I}) u_{ol+2\mathrm{I}} + (-168 + 528 \mathrm{I}) u_{ol-1+1} + (256 + 704 \mathrm{I}) u_{ol+1} + 102 u_{ol-2} - 2304 u_{ol-1} + 2100 u_{ol} - (168 + 528 \mathrm{I}) u_{ol-1-1} + (256 - 704 \mathrm{I}) u_{ol-1} + (-37 + 7 \mathrm{I}) u_{ol-2\mathrm{I}}}{8 \Delta x_{ol}^5}, \mathcal{O}(\Delta x_{ol}^4)$$

Formula:, 466, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order:, 3, Error:,  $3.2649493434278897005 \times 10^{-7}$ , New Error:,  $3.2757270239361345163 \times 10^{-10}$

Error order:, 3, Error:,  $3.2757270239361345163 \times 10^{-10}$ , New Error:,  $3.2768059725209931705 \times 10^{-13}$

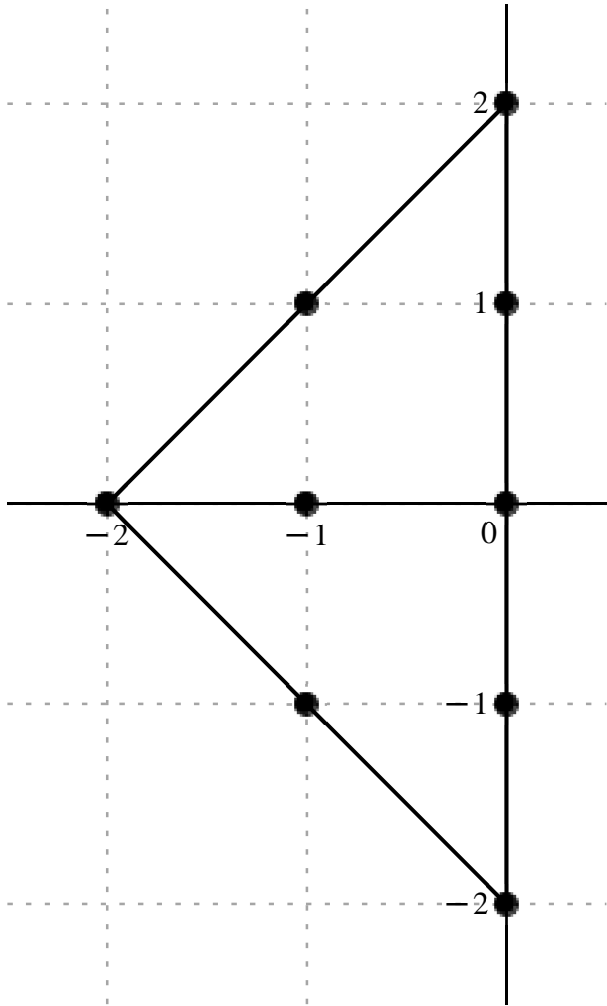
Error order:, 3, Error:,  $3.2768059725209931705 \times 10^{-13}$ , New Error:,  $3.2769138791897512950 \times 10^{-16}$

Error order:, 3, Error:,  $3.2769138791897512950 \times 10^{-16}$ , New Error:,  $3.2769246699747347936 \times 10^{-19}$

Error order:, 3, Error:,  $3.2769246699747347936 \times 10^{-19}$ , New Error:,  $3.2769257490544142253 \times 10^{-22}$

$$x_o + h, \begin{bmatrix} & & 2 \mathrm{I} \\ & -1 + \mathrm{I} & \mathrm{I} \\ -2 & -1 & 0 \\ & -1 - \mathrm{I} & -\mathrm{I} \\ & & -2 \mathrm{I} \end{bmatrix}$$

$$c =, \left[ \begin{array}{cc} & -\frac{63}{4} + \frac{3 \text{ I}}{4} \\ & -54 + 180 \text{ I} \quad 108 + 228 \text{ I} \\ \frac{81}{2} & -792 \quad 675 \\ & -54 - 180 \text{ I} \quad 108 - 228 \text{ I} \\ & -\frac{63}{4} - \frac{3 \text{ I}}{4} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u\big(x_{ol}\big) = \frac{3 \left( (-21 + \text{I}) \, u_{ol+21} + (-72 + 240 \, \text{I}) \, u_{ol-1+1} + (144 + 304 \, \text{I}) \, u_{ol+1} + 54 \, u_{ol-2} - 1056 \, u_{ol-1} + 900 \, u_{ol} - (72 + 240 \, \text{I}) \, u_{ol-1-1} + (144 - 304 \, \text{I}) \, u_{ol-1} - (21 + \text{I}) \, u_{ol-21} \right)}{4 \, \Delta x_{ol}^6}, \, O(\, \Delta x_{ol}^3 \, )$$

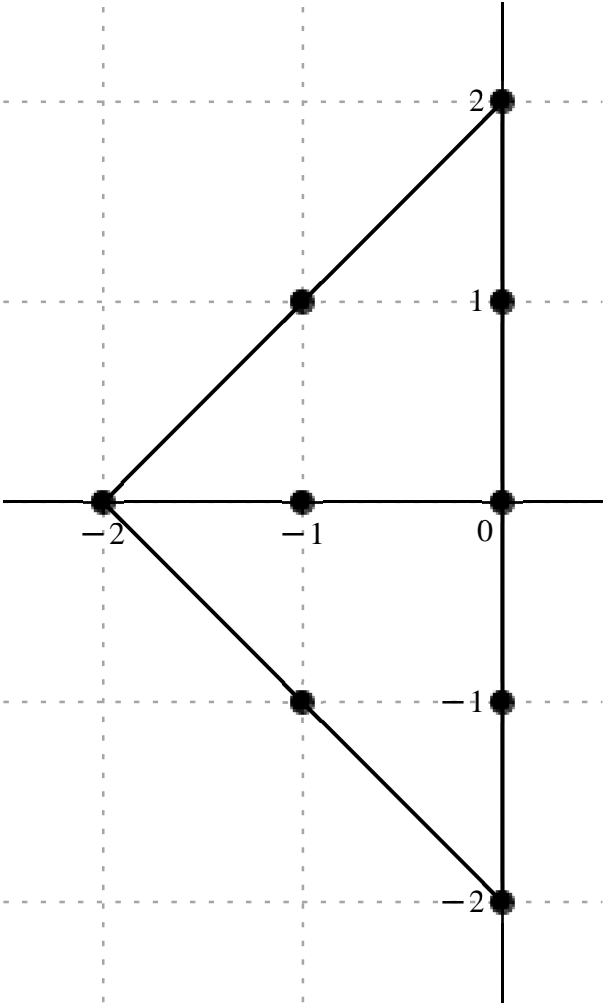
Formula:, 467, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 7

Error order:, 2, Error:, 0.000089110069709512996424, New Error:, 8.9344622676022167085 × 10<sup>−7</sup>  
Error order:, 2, Error:, 8.9344622676022167085 × 10<sup>−7</sup>, New Error:, 8.9368097040086139388 × 10<sup>−9</sup>  
Error order:, 2, Error:, 8.9368097040086139388 × 10<sup>−9</sup>, New Error:, 8.9370444667271070047 × 10<sup>−11</sup>  
Error order:, 2, Error:, 8.9370444667271070047 × 10<sup>−11</sup>, New Error:, 8.9370679431897453713 × 10<sup>−13</sup>  
Error order:, 2, Error:, 8.9370679431897453713 × 10<sup>−13</sup>, New Error:, 8.9370702908379171091 × 10<sup>−15</sup>

$$x_o + h \cdot \begin{bmatrix} 2 \text{ I} \\ -1 + \text{I} & \text{I} \\ -2 & -1 & 0 \\ -1 - \text{I} & -\text{I} \\ -2 \text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{147}{4} + \frac{63 \text{ I}}{4} \\ -126 + 504 \text{ I} & 336 + 504 \text{ I} \\ \frac{189}{2} & -2016 & 1575 \\ -126 - 504 \text{ I} & 336 - 504 \text{ I} \\ -\frac{147}{4} - \frac{63 \text{ I}}{4} \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{21 \left( (-7 + 3 \, \mathrm{I}) \, u_{ol+21} + (-24 + 96 \, \mathrm{I}) \, u_{ol-1+1} + (64 + 96 \, \mathrm{I}) \, u_{ol+1} + 18 \, u_{ol-2} - 384 \, u_{ol-1} + 300 \, u_{ol} - (24 + 96 \, \mathrm{I}) \, u_{ol-1-1} + (64 - 96 \, \mathrm{I}) \, u_{ol-1} - (7 + 3 \, \mathrm{I}) \, u_{ol-21} \right)}{4 \, \Delta x_{ol}^7}, \, O( \, \Delta x_{ol}^2 \, )$$

Formula: 468, Var.: 1

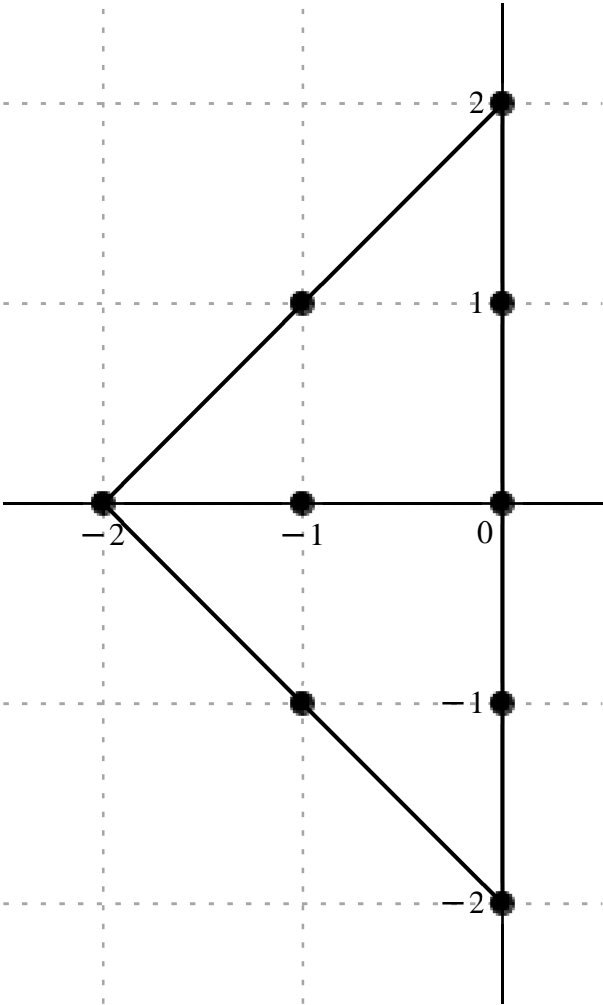
Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 8

Error order:., 1, Error:., 0.021618245458118733215, New Error:., 0.0021660883327681212566

Error order:., 1, Error:., 0.0021660883327681212566, New Error:., 0.00021665151312167357751

Error order:, 1, Error:, 0.00021665151312167357751, New Error:, 0.000021665578152656171390  
Error order:, 1, Error:, 0.000021665578152656171390, New Error:, 2.1665620837125519855 × 10<sup>-6</sup>  
Error order:, 1, Error:, 2.1665620837125519855 × 10<sup>-6</sup>, New Error:, 2.1665625105576659437 × 10<sup>-7</sup>

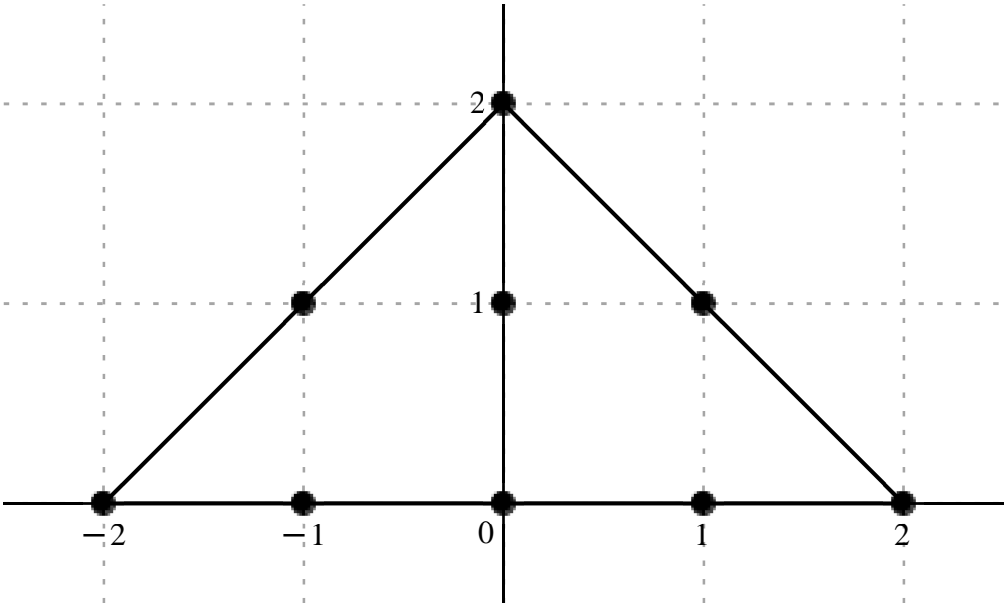
$$x_o + h . , \begin{bmatrix} & & 2 \text{ I} \\ & -1 + \text{I} & \text{I} \\ -2 & -1 & 0 \\ & -1 - \text{I} & -\text{I} \\ & & -2 \text{ I} \end{bmatrix}$$
$$c = , \begin{bmatrix} & & -42 + 42 \text{ I} \\ & 1008 \text{ I} & 672 + 672 \text{ I} \\ 252 & -4032 & 2520 \\ & -1008 \text{ I} & 672 - 672 \text{ I} \\ & & -42 - 42 \text{ I} \end{bmatrix}$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_o l^8} u(x_o l) = \frac{42 \left( (-1 + \text{I}) u_{o l + 2 \text{I}} + 24 \text{I} u_{o l - 1 + 1} + (16 + 16 \text{I}) u_{o l + 1} + 6 u_{o l - 2} - 96 u_{o l - 1} + 60 u_{o l} - 24 \text{I} u_{o l - 1 - 1} + (16 - 16 \text{I}) u_{o l - 1} - (1 + \text{I}) u_{o l - 2 \text{I}} \right)}{\Delta x_o l^8}, O(\Delta x_o l)$$

Error order: 8, Error:  $3.3504251706385439114 \times 10^{-28}$ , New Error:  $3.3507693391675658083 \times 10^{-36}$   
Error order: 8, Error:  $3.3507693391675658083 \times 10^{-36}$ , New Error:  $3.3508037235058553863 \times 10^{-44}$   
Error order: 8, Error:  $3.3508037235058553863 \times 10^{-44}$ , New Error:  $3.3508071616145320413 \times 10^{-52}$   
Error order: 8, Error:  $3.3508071616145320413 \times 10^{-52}$ , New Error:  $3.3508075054221481776 \times 10^{-60}$

$$x_o+h., \left[ \begin{array}{ccccc} & & 2\text{ I} & & \\ & -1+\text{I} & \text{I} & 1+\text{I} & \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$
$$c=, \left[ \begin{array}{ccccccc} & & & & \frac{\text{I}}{20} & & \\ & & \frac{1}{5}-\frac{\text{I}}{5} & -\frac{8\text{ I}}{5} & -\frac{1}{5}-\frac{\text{I}}{5} & & \\ -\frac{1}{120}-\frac{\text{I}}{120} & \frac{4}{15}-\frac{4\text{ I}}{15} & \frac{5\text{ I}}{2} & -\frac{4}{15}-\frac{4\text{ I}}{15} & \frac{1}{120}-\frac{\text{I}}{120} & & \end{array} \right]$$



$$\frac{\text{d}}{\text{d}x_{ol}}u(x_{ol})=\frac{6\text{ I}u_{ol+2\text{ I}}+(24-24\text{ I})u_{ol-1+1}-192\text{ I}u_{ol+1}-(24+24\text{ I})u_{ol+1+1}-(1+\text{I})u_{ol-2}+(32-32\text{ I})u_{ol-1}+300\text{ I}u_{ol}-(32+32\text{ I})u_{ol+1}+(1-\text{I})u_{ol+2}}{120\Delta x_{ol}^8},O(\Delta x_{ol}^8)$$

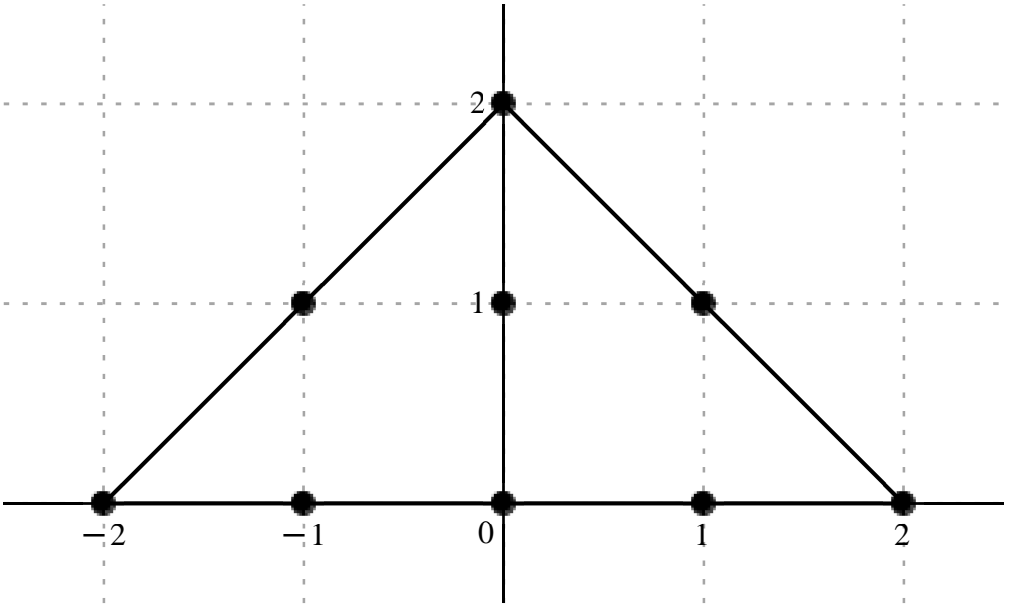
Formula: 470, Var.: 1  
Variavel :, x\_{ol}, Derivada de Ordem :, 2

Error order: 7, Error:  $1.5214835814667276314 \times 10^{-17}$ , New Error:  $1.5229344564848753292 \times 10^{-24}$



Error order.: 7, Error.:  $1.5229344564848753292 \times 10^{-24}$ , New Error.:  $1.5230783618008688370 \times 10^{-31}$   
Error order.: 7, Error.:  $1.5230783618008688370 \times 10^{-31}$ , New Error.:  $1.5230927405089103417 \times 10^{-38}$   
Error order.: 7, Error.:  $1.5230927405089103417 \times 10^{-38}$ , New Error.:  $1.5230941782614772288 \times 10^{-45}$   
Error order.: 7, Error.:  $1.5230941782614772288 \times 10^{-45}$ , New Error.:  $1.5230943220355515432 \times 10^{-52}$

$$x_o + h., \left[ \begin{array}{ccccc} & & 2 \text{ I} & & \\ & -1 + \text{I} & \text{I} & 1 + \text{I} & \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$
$$c =, \left[ \begin{array}{ccccc} & & -\frac{1}{5} & & \\ & \frac{3}{5} + \text{I} & \frac{24}{5} & \frac{3}{5} - \text{I} & \\ \frac{1}{20} - \frac{\text{I}}{30} & \frac{4}{5} + \frac{28 \text{ I}}{15} & -\frac{15}{2} & \frac{4}{5} - \frac{28 \text{ I}}{15} & \frac{1}{20} + \frac{\text{I}}{30} \end{array} \right]$$



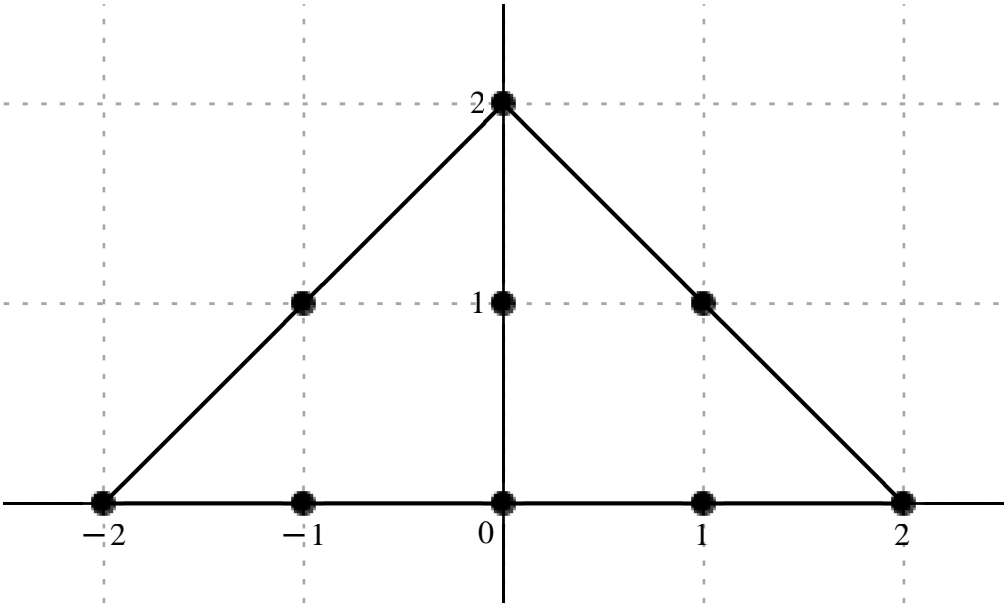
$$\frac{\text{d}^2}{\text{d}x_{ol}^2} u(x_{ol}) = \frac{-12 u_{ol+21} + (36 + 60 \text{ I}) u_{ol-1+1} + 288 u_{ol+1} + (36 - 60 \text{ I}) u_{ol+1+1} + (3 - 2 \text{ I}) u_{ol-2} + (48 + 112 \text{ I}) u_{ol-1} - 450 u_{ol} + (48 - 112 \text{ I}) u_{ol+1} + (3 + 2 \text{ I}) u_{ol+2}}{60 \Delta x_{ol}^2}, O(\Delta x_{ol}^7)$$

Formula.: 471, Var.: 1  
Variavel .:  $x_{ol}$ , Derivada de Ordem .: 3

Error order.: 6, Error.:  $6.2246371026305073613 \times 10^{-15}$ , New Error.:  $6.2302243703707961320 \times 10^{-21}$

Error order:, 6, Error:, 6.2302243703707961320 × 10<sup>-21</sup>, New Error:, 6.2307789056916223404 × 10<sup>-27</sup>  
Error order:, 6, Error:, 6.2307789056916223404 × 10<sup>-27</sup>, New Error:, 6.2308343173037501316 × 10<sup>-33</sup>  
Error order:, 6, Error:, 6.2308343173037501316 × 10<sup>-33</sup>, New Error:, 6.2308398580457579999 × 10<sup>-39</sup>  
Error order:, 6, Error:, 6.2308398580457579999 × 10<sup>-39</sup>, New Error:, 6.2308404121157667322 × 10<sup>-45</sup>

$$x_o + h., \left[ \begin{array}{ccccc} & & 2 \text{ I} & & \\ & -1 + \text{I} & \text{I} & 1 + \text{I} & \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$
$$c =, \left[ \begin{array}{ccccc} & & -\frac{33 \text{ I}}{40} & & \\ & -\frac{39}{10} + \frac{21 \text{ I}}{10} & \frac{108 \text{ I}}{5} & \frac{39}{10} + \frac{21 \text{ I}}{10} & \\ \frac{9}{80} + \frac{19 \text{ I}}{80} & -\frac{42}{5} + \frac{2 \text{ I}}{5} & -\frac{105 \text{ I}}{4} & \frac{42}{5} + \frac{2 \text{ I}}{5} & -\frac{9}{80} + \frac{19 \text{ I}}{80} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{-66 \text{ I} u_{ol+21} + (-312 + 168 \text{ I}) u_{ol-1+1} + 1728 \text{ I} u_{ol+1} + (312 + 168 \text{ I}) u_{ol+1+1} + (9 + 19 \text{ I}) u_{ol-2} + (-672 + 32 \text{ I}) u_{ol-1} - 2100 \text{ I} u_{ol} + (672 + 32 \text{ I}) u_{ol+1} + (-9 + 19 \text{ I}) u_{ol+2}}{80 \Delta x_{ol}^3}, O(\Delta x_{ol}^6)$$

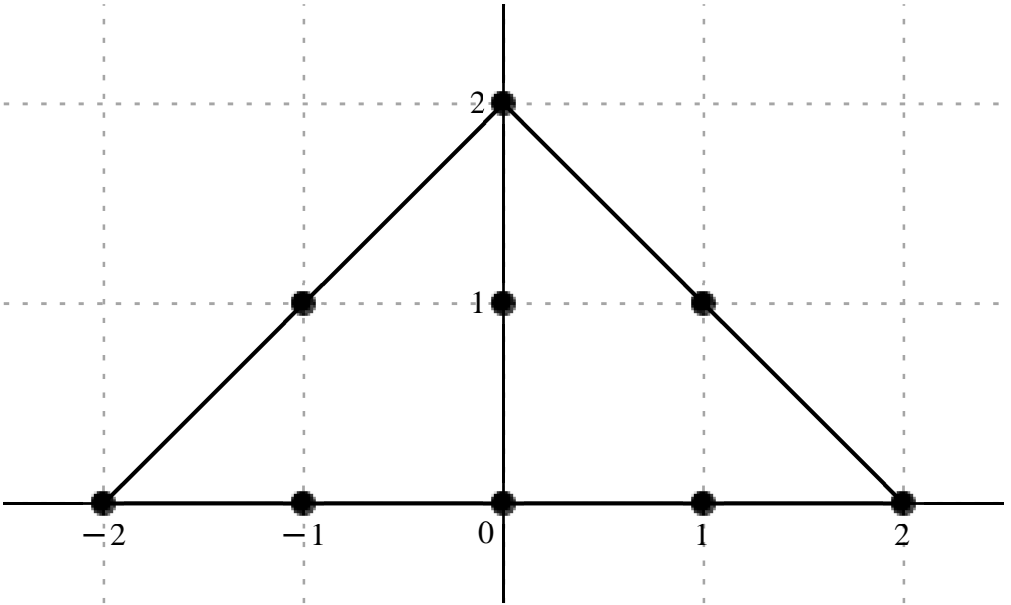
Formula:, 472, Var:, 1  
Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 4

Error order:, 5, Error:, 2.6408718018477617711 × 10<sup>-12</sup>, New Error:, 2.6431369894364922279 × 10<sup>-17</sup>

*Error order:*, 5, *Error:*,  $2.6431369894364922279 \times 10^{-17}$ , *New Error:*,  $2.6433618960888545798 \times 10^{-22}$   
*Error order:*, 5, *Error:*,  $2.6433618960888545798 \times 10^{-22}$ , *New Error:*,  $2.6433843706310218988 \times 10^{-27}$   
*Error order:*, 5, *Error:*,  $2.6433843706310218988 \times 10^{-27}$ , *New Error:*,  $2.6433866179240059633 \times 10^{-32}$   
*Error order:*, 5, *Error:*,  $2.6433866179240059633 \times 10^{-32}$ , *New Error:*,  $2.6433868426516920411 \times 10^{-37}$

$$x_o+h., \left[ \begin{array}{ccccc} & & 2 \text{ I} & & \\ & -1+\text{I} & \text{I} & 1+\text{I} & \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

$$c=, \left[ \begin{array}{ccccc} & & \frac{18}{5} & & \\ & -9-\frac{87 \text{ I}}{5} & -\frac{408}{5} & -9+\frac{87 \text{ I}}{5} & \\ -\frac{11}{10}+\frac{2 \text{ I}}{5} & \frac{28}{5}-\frac{148 \text{ I}}{5} & 87 & \frac{28}{5}+\frac{148 \text{ I}}{5} & -\frac{11}{10}-\frac{2 \text{ I}}{5} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d} x_{o l}^4} \, u(x_{o l}) = \frac{36 \, u_{o l+2 l} - (90+174 \, \mathrm{I}) \, u_{o l-1+1} - 816 \, u_{o l+1} + (-90+174 \, \mathrm{I}) \, u_{o l+1+1} + (-11+4 \, \mathrm{I}) \, u_{o l-2} + (56-296 \, \mathrm{I}) \, u_{o l-1} + 870 \, u_{o l} + (56+296 \, \mathrm{I}) \, u_{o l+1} - (11+4 \, \mathrm{I}) \, u_{o l+2}}{10 \, \Delta x_{o l}^4}, \, O( \, \Delta x_{o l}^5 \, )$$

Formula:, 473, Var.:, 1

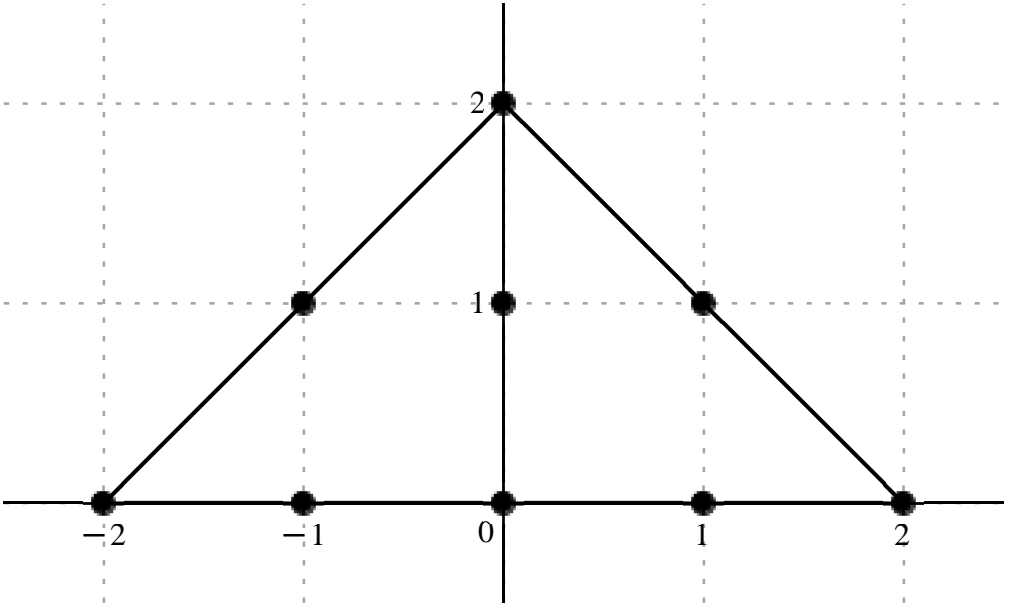
Variavel :,  $x_{o l}$ , Derivada de Ordem :, 5

*Error order:*, 4, *Error:*,  $9.9469484214289188987 \times 10^{-10}$ , *New Error:*,  $9.9547513110049867892 \times 10^{-14}$

*Error order:*, 4, *Error:*,  $9.9547513110049867892 \times 10^{-14}$ , *New Error:*,  $9.9555267701403759388 \times 10^{-18}$   
*Error order:*, 4, *Error:*,  $9.9555267701403759388 \times 10^{-18}$ , *New Error:*,  $9.9556042677511667559 \times 10^{-22}$   
*Error order:*, 4, *Error:*,  $9.9556042677511667559 \times 10^{-22}$ , *New Error:*,  $9.9556120170292139204 \times 10^{-26}$   
*Error order:*, 4, *Error:*,  $9.9556120170292139204 \times 10^{-26}$ , *New Error:*,  $9.9556127919521883132 \times 10^{-30}$

$$x_o \neq h \text{ , } \left[ \begin{array}{ccccc} & & 2 \text{ I} & & \\ & -1 + \text{I} & \text{I} & 1 + \text{I} & \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} & & \frac{51 \text{ I}}{4} & & \\ & 66 - 21 \text{ I} & -288 \text{ I} & -66 - 21 \text{ I} & \\ -\frac{7}{8} - \frac{37 \text{ I}}{8} & 88 + 32 \text{ I} & \frac{525 \text{ I}}{2} & -88 + 32 \text{ I} & \frac{7}{8} - \frac{37 \text{ I}}{8} \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{102 \, \mathrm{I} \, u_{ol+2\mathrm{I}} + (528 - 168 \, \mathrm{I}) \, u_{ol-1+1} - 2304 \, \mathrm{I} \, u_{ol+1} - (528 + 168 \, \mathrm{I}) \, u_{ol+1+1} - (7 + 37 \, \mathrm{I}) \, u_{ol-2} + (704 + 256 \, \mathrm{I}) \, u_{ol-1} + 2100 \, \mathrm{I} \, u_{ol} + (-704 + 256 \, \mathrm{I}) \, u_{ol+1} + (7 - 37 \, \mathrm{I}) \, u_{ol+2}}{8 \, \Delta x_{ol}^5} \, , \, O( \, \Delta x_{ol}^4 \, )$$

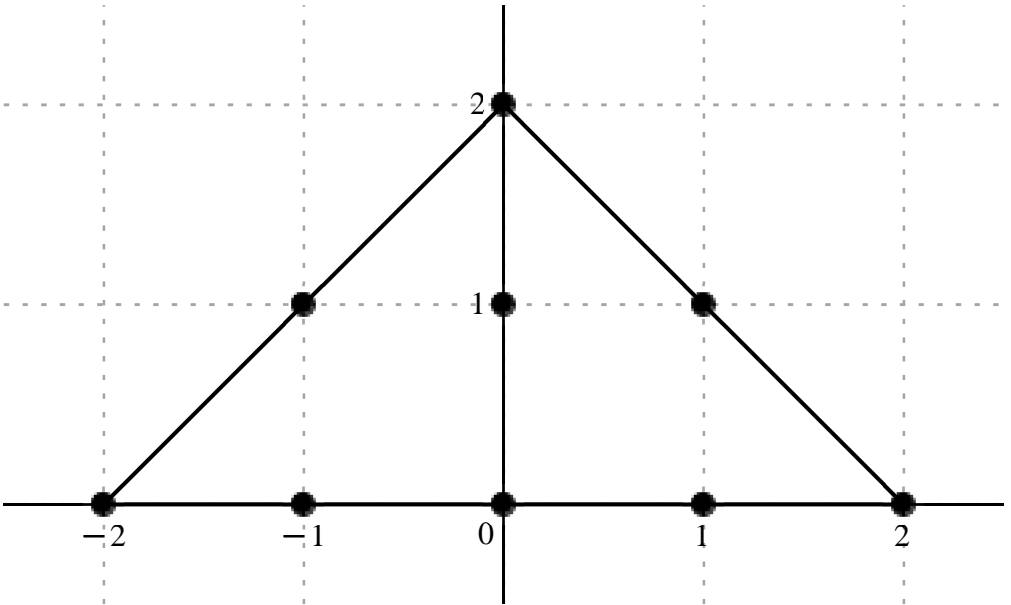
Formula:, 474, Var.:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 6

*Error order:*, 3, *Error:*,  $3.2744149305656748553 \times 10^{-7}$ , *New Error:*,  $3.2766759680073831112 \times 10^{-10}$   
*Error order:*, 3, *Error:*,  $3.2766759680073831112 \times 10^{-10}$ , *New Error:*,  $3.2769008907877005954 \times 10^{-13}$

Error order: 3, Error:  $3.2769008907877005954 \times 10^{-13}$ , New Error:  $3.2769233712550238709 \times 10^{-16}$   
Error order: 3, Error:  $3.2769233712550238709 \times 10^{-16}$ , New Error:  $3.2769256191836480755 \times 10^{-19}$   
Error order: 3, Error:  $3.2769256191836480755 \times 10^{-19}$ , New Error:  $3.2769258439753294137 \times 10^{-22}$

$$x_o+h., \left[ \begin{array}{cccc} & & 2 \text{ I} & \\ & -1+\text{I} & \text{I} & 1+\text{I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$
$$c=, \left[ \begin{array}{cccccc} & & & & -\frac{81}{2} & \\ & & 54+180 \text{ I} & 792 & 54-180 \text{ I} & \\ \frac{63}{4}+\frac{3 \text{ I}}{4} & -108+228 \text{ I} & -675 & -108-228 \text{ I} & \frac{63}{4}-\frac{3 \text{ I}}{4} & \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6}u(x_{ol})=\frac{3\left(-54\,u_{ol+21}+(72+240\,\mathrm{I})\,u_{ol-1+1}+1056\,u_{ol+1}+(72-240\,\mathrm{I})\,u_{ol+1+1}+(21+\mathrm{I})\,u_{ol-2}+(-144+304\,\mathrm{I})\,u_{ol-1}-900\,u_{ol}-(144+304\,\mathrm{I})\,u_{ol+1}+(21-\mathrm{I})\,u_{ol+2}\right)}{4\,\Delta x_{ol}^6},\,O(\,\Delta x_{ol}^3\,)$$

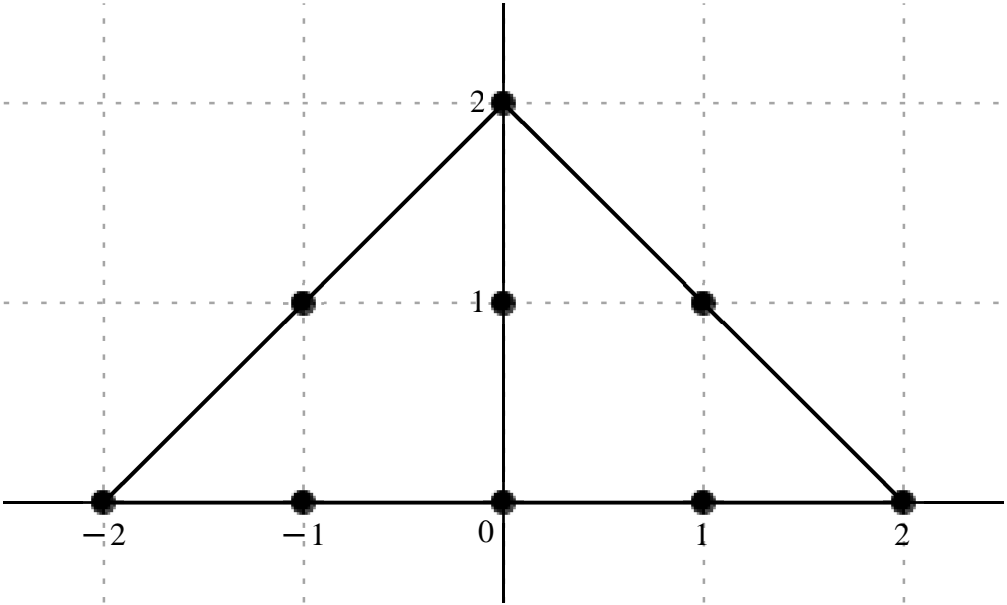
Formula: 475, Var.: 1  
Variavel :  $x_{ol}$ , Derivada de Ordem : 7

Error order: 2, Error: 0.000089316151747005352382, New Error:  $8.9365269409092398196 \times 10^{-7}$   
Error order: 2, Error:  $8.9365269409092398196 \times 10^{-7}$ , New Error:  $8.9370162098813811995 \times 10^{-9}$   
Error order: 2, Error:  $8.9370162098813811995 \times 10^{-9}$ , New Error:  $8.9370651176998171241 \times 10^{-11}$

*Error order:*, 2, *Error:*,  $8.9370651176998171241 \times 10^{-11}$ , *New Error:*,  $8.9370700082908707299 \times 10^{-13}$   
*Error order:*, 2, *Error:*,  $8.9370700082908707299 \times 10^{-13}$ , *New Error:*,  $8.9370704973480681884 \times 10^{-15}$

$$x_o \neq h. , \left[ \begin{array}{cccc} & & 2 \text{ I} & \\ & -1 + \text{I} & \text{I} & 1 + \text{I} \\ -2 & -1 & 0 & 1 & 2 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} & & & & -\frac{189 \text{ I}}{2} & \\ & & -504 + 126 \text{ I} & 2016 \text{ I} & 504 + 126 \text{ I} & \\ -\frac{63}{4} + \frac{147 \text{ I}}{4} & -504 - 336 \text{ I} & -1575 \text{ I} & 504 - 336 \text{ I} & \frac{63}{4} + \frac{147 \text{ I}}{4} & \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d} x_{oI}^7} \, u(x_{oI}) = \frac{21 \left( -18 \text{ I} u_{oI+21} + (-96+24 \text{ I}) \, u_{oI-1+1} + 384 \text{ I} u_{oI+1} + (96+24 \text{ I}) \, u_{oI+1+1} + (-3+7 \text{ I}) \, u_{oI-2} - (96+64 \text{ I}) \, u_{oI-1} - 300 \text{ I} u_{oI} + (96-64 \text{ I}) \, u_{oI+1} + (3+7 \text{ I}) \, u_{oI+2} \right)}{4 \, \Delta x_{oI}^7}, \, O( \, \Delta x_{oI}^2 \, )$$

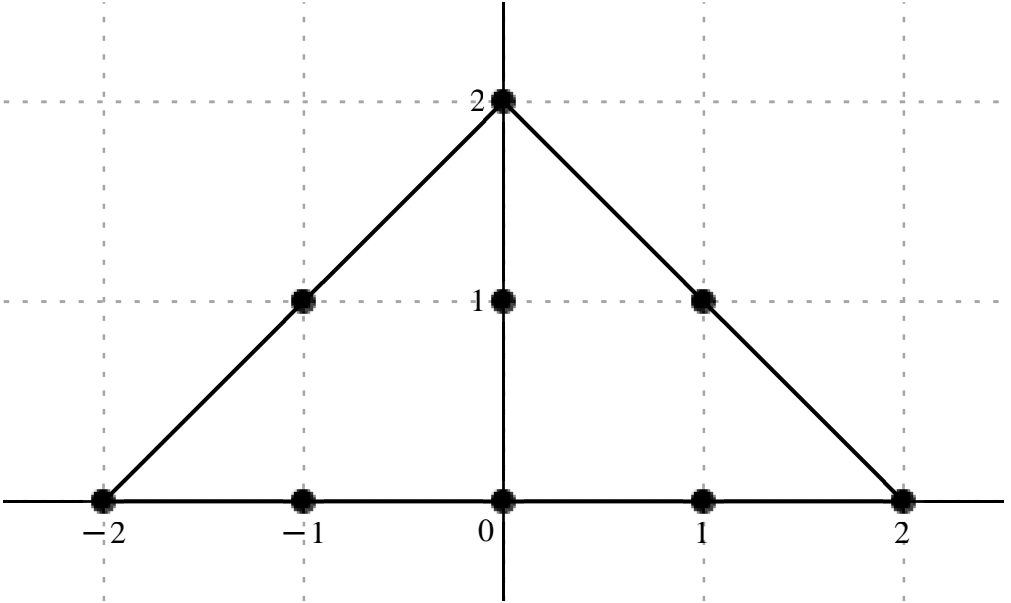
*Formula:*, 476, *Var.:*, 1

*Variavel .:*,  $x_{oI}$ , *Derivada de Ordem .:*, 8

*Error order:*, 1, *Error:*, 0.021655698464943914295, *New Error:*, 0.0021664637114041446729  
*Error order:*, 1, *Error:*, 0.0021664637114041446729, *New Error:*, 0.00021665526775738938436  
*Error order:*, 1, *Error:*, 0.00021665526775738938436, *New Error:*, 0.000021665615699862763811  
*Error order:*, 1, *Error:*, 0.000021665615699862763811, *New Error:*,  $2.1665624591854673519 \times 10^{-6}$

Error order.: 1, Error.: 2.1665624591854673519 × 10<sup>-6</sup>, New Error.: 2.1665625481049659748 × 10<sup>-7</sup>

$$x_o \neq h. , \left[ \begin{array}{cccccc} & & 2 \text{ I} & & & \\ & -1 + \text{I} & \text{I} & 1 + \text{I} & & \\ -2 & -1 & 0 & 1 & 2 & \end{array} \right]$$
$$c = , \left[ \begin{array}{cccccc} & & 252 & & & \\ & -1008 \text{ I} & -4032 & 1008 \text{ I} & & \\ -42 - 42 \text{ I} & 672 - 672 \text{ I} & 2520 & 672 + 672 \text{ I} & -42 + 42 \text{ I} & \end{array} \right]$$



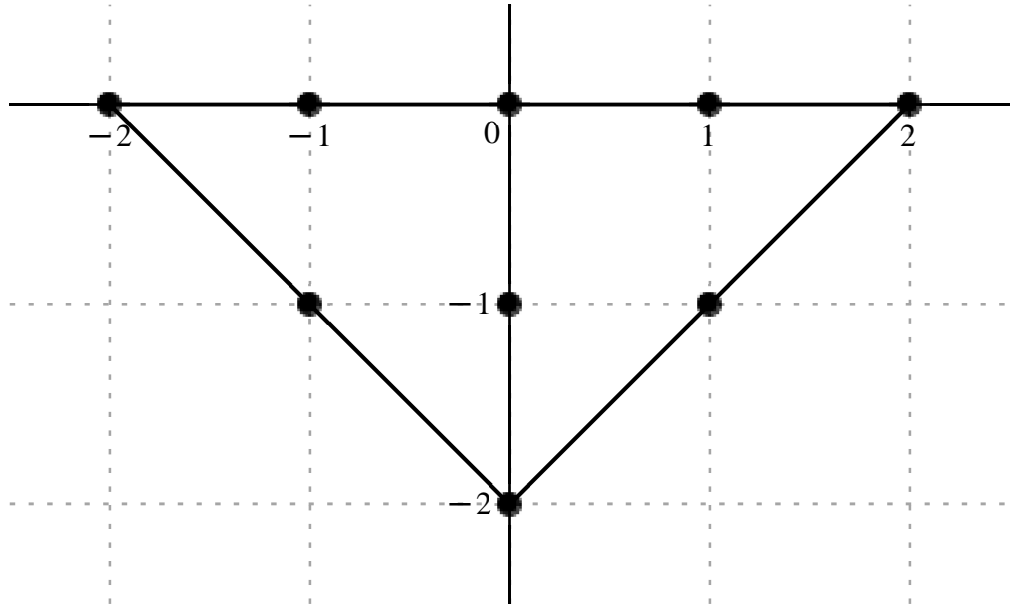
$$\frac{d^8}{dx_{ol}^8} u(x_{ol}) = \frac{42 \left( 6 u_{ol+2I} - 24 I u_{ol-1+1} - 96 u_{ol+1} + 24 I u_{ol+1+1} - (1 + I) u_{ol-2} + (16 - 16 I) u_{ol-1} + 60 u_{ol} + (16 + 16 I) u_{ol+1} + (-1 + I) u_{ol+2} \right)}{\Delta x_{ol}^8}, O(\Delta x_{ol})$$

Formula.: 477, Var.: 1  
Variavel.: x<sub>ol</sub>, Derivada de Ordem.: 1

Error order.: 8, Error.: 3.3545911243059119923 × 10<sup>-20</sup>, New Error.: 3.3511891867465764341 × 10<sup>-28</sup>  
Error order.: 8, Error.: 3.3511891867465764341 × 10<sup>-28</sup>, New Error.: 3.3508457407797419862 × 10<sup>-36</sup>  
Error order.: 8, Error.: 3.3508457407797419862 × 10<sup>-36</sup>, New Error.: 3.3508113636670743770 × 10<sup>-44</sup>  
Error order.: 8, Error.: 3.3508113636670743770 × 10<sup>-44</sup>, New Error.: 3.3508079256306539417 × 10<sup>-52</sup>  
Error order.: 8, Error.: 3.3508079256306539417 × 10<sup>-52</sup>, New Error.: 3.3508075818237603676 × 10<sup>-60</sup>

$$x_o \neq h., \begin{bmatrix} -2 & -1 & 0 & 1 & 2 \\ -1 - I & -I & 1 - I & & \\ & -2 I & & & \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{1}{120} + \frac{I}{120} & \frac{4}{15} + \frac{4I}{15} & -\frac{5I}{2} & -\frac{4}{15} + \frac{4I}{15} & \frac{1}{120} + \frac{I}{120} \\ & \frac{1}{5} + \frac{I}{5} & \frac{8I}{5} & -\frac{1}{5} + \frac{I}{5} & \\ & & -\frac{I}{20} & & \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\; u(x_{ol}) = \frac{(-1 + I)\; u_{ol-2} + (32 + 32\; I)\; u_{ol-1} - 300\; I u_{ol} + (-32 + 32\; I)\; u_{ol+1} + (1 + I)\; u_{ol+2} + (24 + 24\; I)\; u_{ol-1-1} + 192\; I u_{ol-1} + (-24 + 24\; I)\; u_{ol+1-1} - 6\; I u_{ol-21}}{120\; \Delta x_{ol}},\; O(\; \Delta x_{ol}^8\; )$$

Formula.: 478, Var.: 1

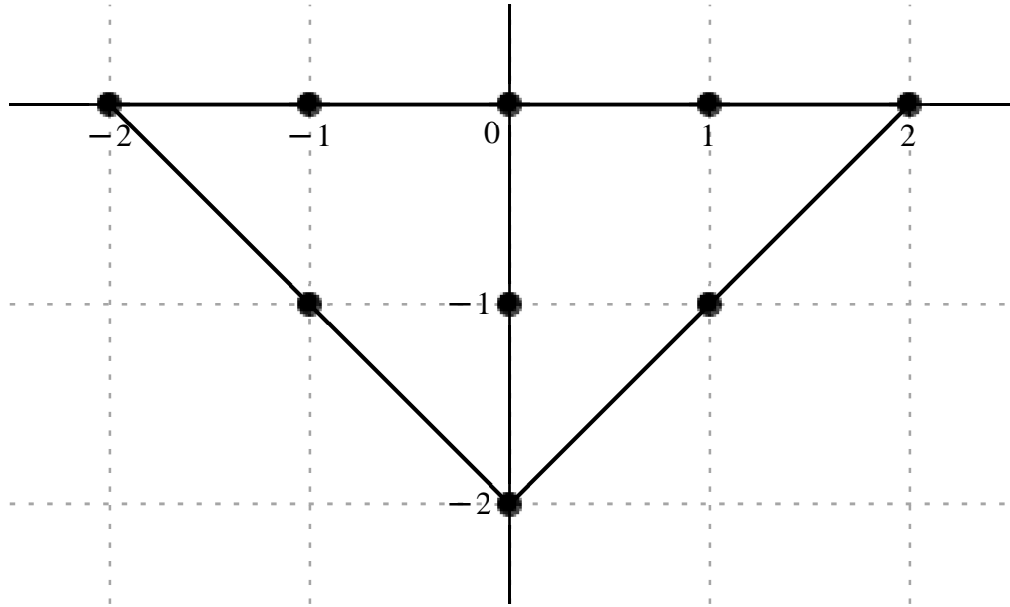
Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 2

Error order.: 7, Error.: 1.5246785541943529215 × 10<sup>−17</sup>, New Error.: 1.5232539541320697203 × 10<sup>−24</sup>  
Error order.: 7, Error.: 1.5232539541320697203 × 10<sup>−24</sup>, New Error.: 1.5231103115659627104 × 10<sup>−31</sup>  
Error order.: 7, Error.: 1.5231103115659627104 × 10<sup>−31</sup>, New Error.: 1.5230959354854201035 × 10<sup>−38</sup>  
Error order.: 7, Error.: 1.5230959354854201035 × 10<sup>−38</sup>, New Error.: 1.5230944977591282053 × 10<sup>−45</sup>  
Error order.: 7, Error.: 1.5230944977591282053 × 10<sup>−45</sup>, New Error.: 1.5230943539853166408 × 10<sup>−52</sup>



$$x_o + h., \begin{bmatrix} -2 & -1 & 0 & 1 & 2 \\ -1 - I & -I & 1 - I & & \\ & -2 I & & & \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{1}{20} + \frac{I}{30} & \frac{4}{5} - \frac{28 I}{15} & -\frac{15}{2} & \frac{4}{5} + \frac{28 I}{15} & \frac{1}{20} - \frac{I}{30} \\ & \frac{3}{5} - I & \frac{24}{5} & \frac{3}{5} + I & \\ & & -\frac{1}{5} & & \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{(3 + 2 \, I) \, u_{ol - 2} + (48 - 112 \, I) \, u_{ol - 1} - 450 \, u_{ol} + (48 + 112 \, I) \, u_{ol + 1} + (3 - 2 \, I) \, u_{ol + 2} + (36 - 60 \, I) \, u_{ol - 1 - 1} + 288 \, u_{ol - 1} + (36 + 60 \, I) \, u_{ol + 1 - 1} - 12 \, u_{ol - 21}}{60 \, \Delta x_{ol}^2}, \, O( \, \Delta x_{ol}^7 \, )$$

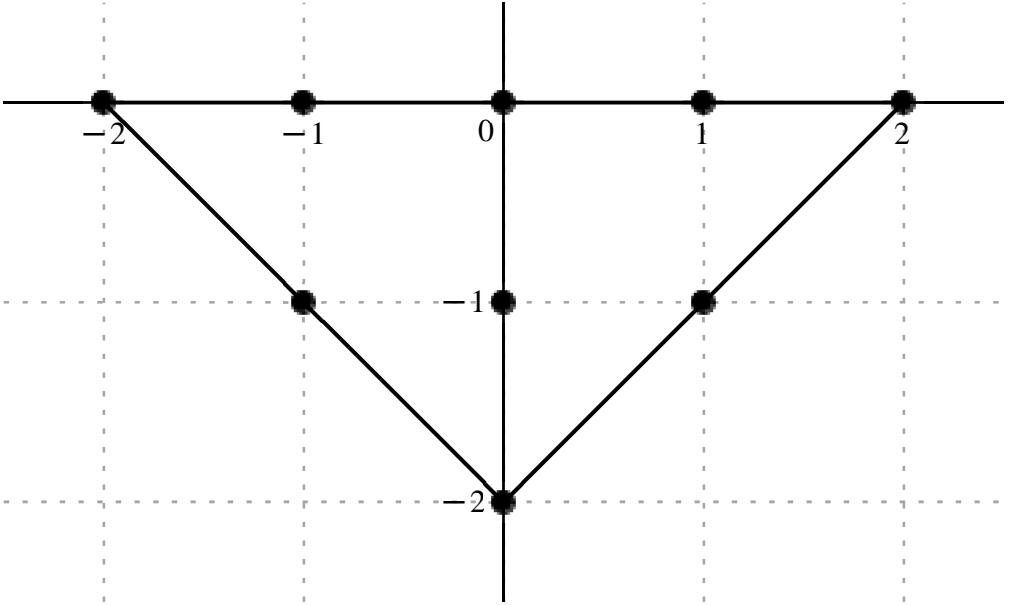
Formula.: 479, Var.: 1

Variavel .:, x\_{ol}, Derivada de Ordem .:, 3

Error order.: 6, Error.: 6.2369497471064095550 × 10<sup>−15</sup>, New Error.: 6.2314556360097585797 × 10<sup>−21</sup>  
Error order.: 6, Error.: 6.2314556360097585797 × 10<sup>−21</sup>, New Error.: 6.2309020322567099668 × 10<sup>−27</sup>  
Error order.: 6, Error.: 6.2309020322567099668 × 10<sup>−27</sup>, New Error.: 6.2308466299602600856 × 10<sup>−33</sup>  
Error order.: 6, Error.: 6.2308466299602600856 × 10<sup>−33</sup>, New Error.: 6.2308410893114089965 × 10<sup>−39</sup>  
Error order.: 6, Error.: 6.2308410893114089965 × 10<sup>−39</sup>, New Error.: 6.2308405352423318319 × 10<sup>−45</sup>

$$x_o \neq h., \begin{bmatrix} -2 & -1 & 0 & 1 & 2 \\ -1 - I & -I & 1 - I & & \\ & -2 I & & & \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{9}{80} - \frac{19 I}{80} & -\frac{42}{5} - \frac{2 I}{5} & \frac{105 I}{4} & \frac{42}{5} - \frac{2 I}{5} & -\frac{9}{80} - \frac{19 I}{80} \\ & -\frac{39}{10} - \frac{21 I}{10} & -\frac{108 I}{5} & \frac{39}{10} - \frac{21 I}{10} & \\ & & \frac{33 I}{40} & & \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d} x_{o l}^3} u\left(x_{o l}\right)=\frac{\left(9-19 I\right) u_{o l-2}-\left(672+32 I\right) u_{o l-1}+2100 I u_{o l}+\left(672-32 I\right) u_{o l+1}-\left(9+19 I\right) u_{o l+2}-\left(312+168 I\right) u_{o l-1-1}-1728 I u_{o l-1}+\left(312-168 I\right) u_{o l+1-1}+66 I u_{o l-21}}{80 \Delta x_{o l}^3}, O\left(\Delta x_{o l}^6\right)$$

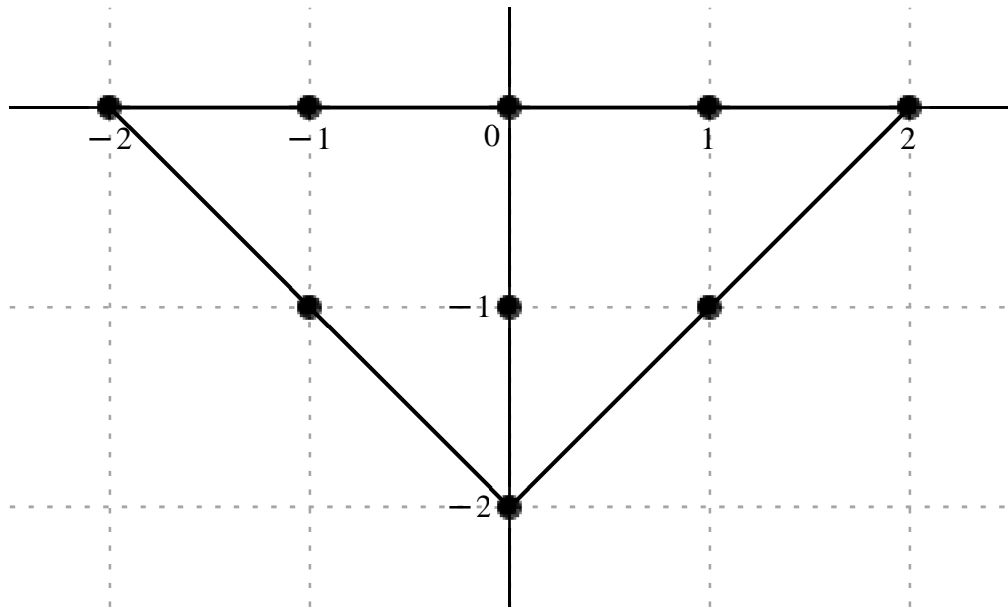
Formula.: 480, Var.: 1

Variavel :, x\_o l, Derivada de Ordem :, 4

Error order.: 5, Error:; 2.6458657420076752176 × 10<sup>−12</sup>, New Error:; 2.6436363838918984325 × 10<sup>−17</sup>  
Error order.: 5, Error:; 2.6436363838918984325 × 10<sup>−17</sup>, New Error:; 2.6434118355348346190 × 10<sup>−22</sup>  
Error order.: 5, Error:; 2.6434118355348346190 × 10<sup>−22</sup>, New Error:; 2.6433893645756203422 × 10<sup>−27</sup>  
Error order.: 5, Error:; 2.6433893645756203422 × 10<sup>−27</sup>, New Error:; 2.6433871173184658081 × 10<sup>−32</sup>  
Error order.: 5, Error:; 2.6433871173184658081 × 10<sup>−32</sup>, New Error:; 2.6433868925911380256 × 10<sup>−37</sup>

$$x_o \neq h., \begin{bmatrix} -2 & -1 & 0 & 1 & 2 \\ -1 - I & -I & 1 - I & & \\ & -2 I & & & \end{bmatrix}$$

$$c =, \begin{bmatrix} -\frac{11}{10} - \frac{2 I}{5} & \frac{28}{5} + \frac{148 I}{5} & 87 & \frac{28}{5} - \frac{148 I}{5} & -\frac{11}{10} + \frac{2 I}{5} \\ & -9 + \frac{87 I}{5} & -\frac{408}{5} & -9 - \frac{87 I}{5} & \\ & & \frac{18}{5} & & \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d} x_{o l}^4} u\left(x_{o l}\right)=\frac{-(11+4 I) u_{o l-2}+(56+296 I) u_{o l-1}+870 u_{o l}+(56-296 I) u_{o l+1}+(-11+4 I) u_{o l+2}+(-90+174 I) u_{o l-1-1}-816 u_{o l-1}-(90+174 I) u_{o l+1-1}+36 u_{o l-21}}{10 \Delta x_{o l}^4}, O\left(\Delta x_{o l}^5\right)$$

Formula.: 481, Var.: 1

Variavel .:  $x_{o l}$ , Derivada de Ordem .: 5

Error order.: 4, Error.: 9.9641689100988034299 × 10<sup>−10</sup>, New Error.: 9.9564733608565749192 × 10<sup>−14</sup>

Error order.: 4, Error.: 9.9564733608565749192 × 10<sup>−14</sup>, New Error.: 9.9556989751265193647 × 10<sup>−18</sup>

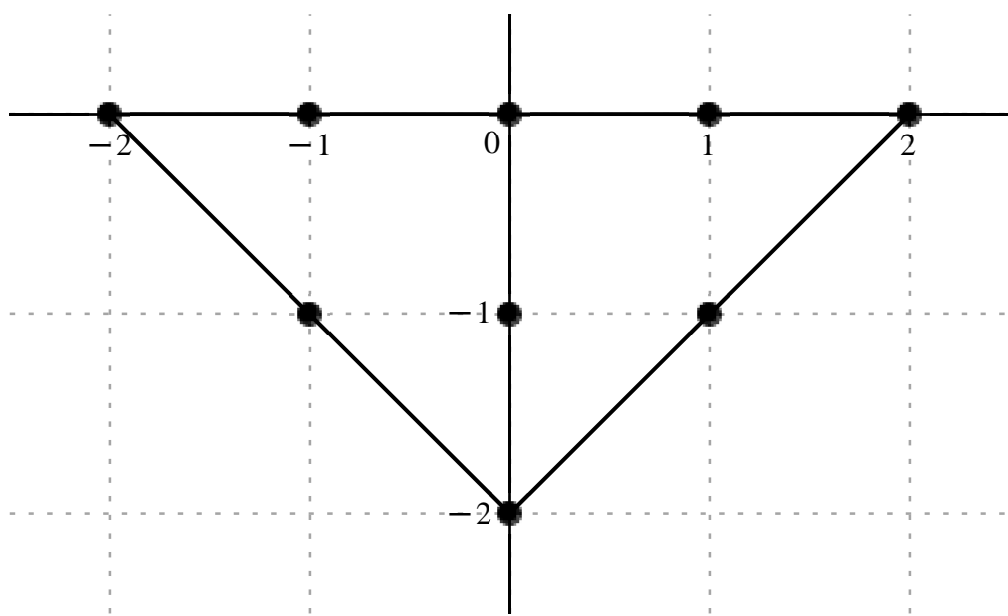
Error order.: 4, Error.: 9.9556989751265193647 × 10<sup>−18</sup>, New Error.: 9.9556214882497820831 × 10<sup>−22</sup>

Error order.: 4, Error.: 9.9556214882497820831 × 10<sup>−22</sup>, New Error.: 9.9556137390790754541 × 10<sup>−26</sup>

Error order.: 4, Error.: 9.9556137390790754541 × 10<sup>−26</sup>, New Error.: 9.9556129641571744666 × 10<sup>−30</sup>

$$x_o \neq h., \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -1 - \text{I} & -\text{I} & 1 - \text{I} & & \\ & -2 \text{ I} & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccc} -\frac{7}{8} + \frac{37 \text{ I}}{8} & 88 - 32 \text{ I} & -\frac{525 \text{ I}}{2} & -88 - 32 \text{ I} & \frac{7}{8} + \frac{37 \text{ I}}{8} \\ & 66 + 21 \text{ I} & 288 \text{ I} & -66 + 21 \text{ I} & \\ & & -\frac{51 \text{ I}}{4} & & \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{(-7 + 37 \, \mathrm{I}) \, u_{ol-2} + (704 - 256 \, \mathrm{I}) \, u_{ol-1} - 2100 \, \mathrm{I} u_{ol} - (704 + 256 \, \mathrm{I}) \, u_{ol+1} + (7 + 37 \, \mathrm{I}) \, u_{ol+2} + (528 + 168 \, \mathrm{I}) \, u_{ol-1-1} + 2304 \, \mathrm{I} u_{ol-1} + (-528 + 168 \, \mathrm{I}) \, u_{ol+1-1} - 102 \, \mathrm{I} u_{ol-2 \text{I}}}{8 \, \Delta x_{ol}^5}, \, O( \, \Delta x_{ol}^4 \, )$$

Formula:, 482, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 6

Error order:., 3, Error:., 3.2794102960209242318 × 10−7, New Error:., 3.2771755047830733214 × 10−10

Error order:., 3, Error:., 3.2771755047830733214 × 10−10, New Error:., 3.2769508444654997856 × 10−13

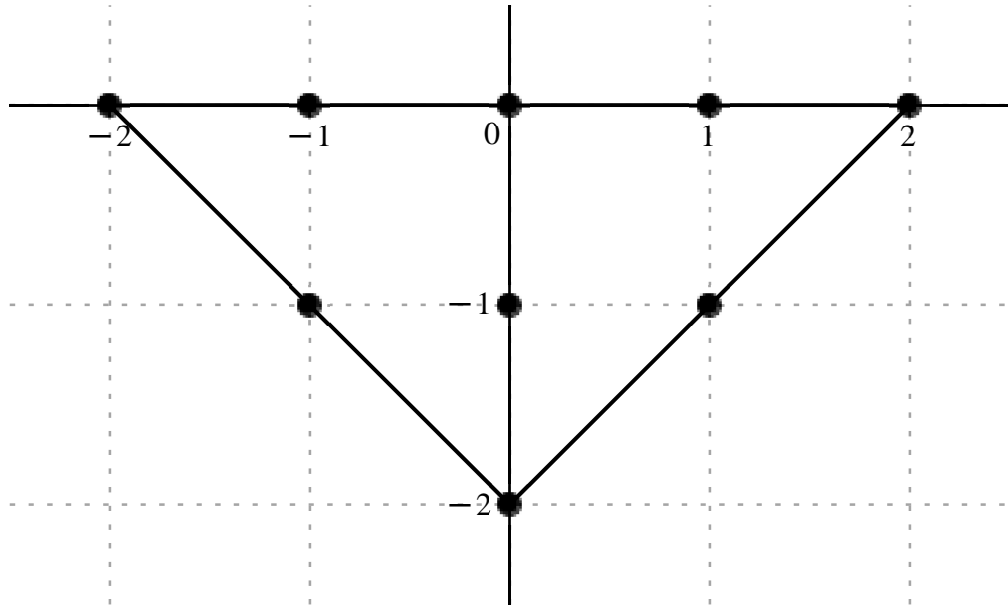
Error order:., 3, Error:., 3.2769508444654997856 × 10−13, New Error:., 3.2769283666228040201 × 10−16

Error order:., 3, Error:., 3.2769283666228040201 × 10−16, New Error:., 3.2769261187204260907 × 10−19

Error order:., 3, Error:., 3.2769261187204260907 × 10−19, New Error:., 3.2769258939290072152 × 10−22

$$x_o \neq h., \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ -1 - \text{I} & -\text{I} & 1 - \text{I} & & \\ & -2 \text{I} & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccc} \frac{63}{4} - \frac{3 \text{I}}{4} & -108 - 228 \text{I} & -675 & -108 + 228 \text{I} & \frac{63}{4} + \frac{3 \text{I}}{4} \\ & 54 - 180 \text{I} & 792 & 54 + 180 \text{I} & \\ & & -\frac{81}{2} & & \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{3 \left( (21 - \text{I}) \, u_{ol-2} - (144 + 304 \, \text{I}) \, u_{ol-1} - 900 \, u_{ol} + (-144 + 304 \, \text{I}) \, u_{ol+1} + (21 + \text{I}) \, u_{ol+2} + (72 - 240 \, \text{I}) \, u_{ol-1-1} + 1056 \, u_{ol-1} + (72 + 240 \, \text{I}) \, u_{ol+1-1} - 54 \, u_{ol-21} \right)}{4 \, \Delta x_{ol}^6}, \, O(\, \Delta x_{ol}^3 \, )$$

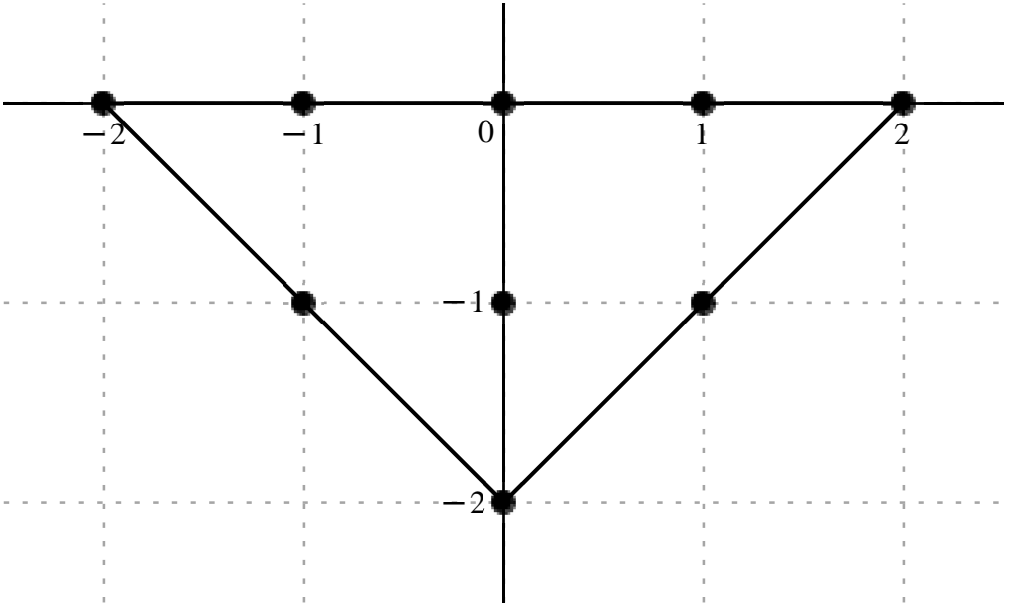
Formula:, 483, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 7

Error order:., 2, Error:., 0.000089424831027793545848, New Error:., 8.9376137342053511906 × 10<sup>−7</sup>  
Error order:., 2, Error:., 8.9376137342053511906 × 10<sup>−7</sup>, New Error:., 8.9371248892114805744 × 10<sup>−9</sup>  
Error order:., 2, Error:., 8.9371248892114805744 × 10<sup>−9</sup>, New Error:., 8.9370759856328275498 × 10<sup>−11</sup>  
Error order:., 2, Error:., 8.9370759856328275498 × 10<sup>−11</sup>, New Error:., 8.9370710950841717730 × 10<sup>−13</sup>  
Error order:., 2, Error:., 8.9370710950841717730 × 10<sup>−13</sup>, New Error:., 8.9370706060273982927 × 10<sup>−15</sup>

$$x_o + h \cdot , \left[ \begin{array}{ccccc} -2 & -1 & 0 & 1 & 2 \\ & -1 - I & -I & 1 - I & \\ & & -2 I & & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} -\frac{63}{4} - \frac{147 I}{4} & -504 + 336 I & 1575 I & 504 + 336 I & \frac{63}{4} - \frac{147 I}{4} \\ & -504 - 126 I & -2016 I & 504 - 126 I & \\ & & \frac{189 I}{2} & & \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} u(x_{ol}) = \frac{21 \left( -(3 + 7 I) u_{ol-2} + (-96 + 64 I) u_{ol-1} + 300 I u_{ol} + (96 + 64 I) u_{ol+1} + (3 - 7 I) u_{ol+2} - (96 + 24 I) u_{ol-1-1} - 384 I u_{ol-1} + (96 - 24 I) u_{ol+1-1} + 18 I u_{ol-21} \right)}{4 \Delta x_{ol}^7}, O(\Delta x_{ol}^2)$$

Formula:, 484, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 8

Error order:., 1, Error:., 0.021675458312658004538, New Error:., 0.0021666613101831038186

Error order:., 1, Error:., 0.0021666613101831038186, New Error:., 0.00021665724374520915780

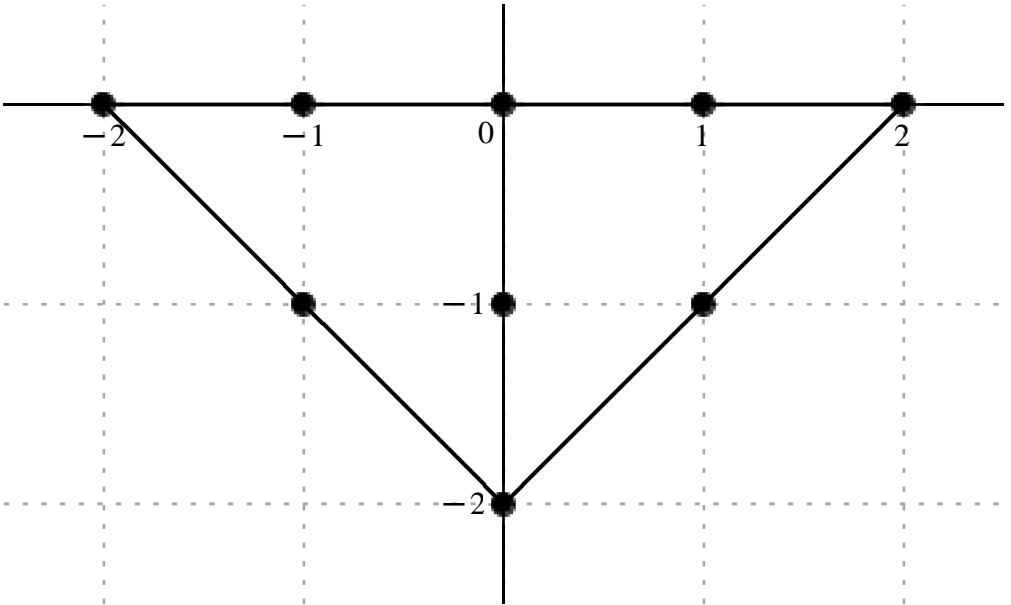
Error order:., 1, Error:., 0.00021665724374520915780, New Error:., 0.000021665635459740964564

Error order:., 1, Error:., 0.000021665635459740964564, New Error:., 2.1665626567842493598 × 10<sup>-6</sup>

Error order:., 1, Error:., 2.1665626567842493598 × 10<sup>-6</sup>, New Error:., 2.1665625678648441756 × 10<sup>-7</sup>

$$x_o \neq h., \begin{bmatrix} -2 & -1 & 0 & 1 & 2 \\ -1 - I & -I & 1 - I & & \\ & -2 I & & & \end{bmatrix}$$

$$c =, \begin{bmatrix} -42 + 42 I & 672 + 672 I & 2520 & 672 - 672 I & -42 - 42 I \\ & 1008 I & -4032 & -1008 I & \\ & & 252 & & \end{bmatrix}$$



$$\frac{d^8}{dx_o^8} u(x_o) = \frac{42 \left( (-1 + I) u_{oI-2} + (16 + 16 I) u_{oI-1} + 60 u_{oI} + (16 - 16 I) u_{oI+1} - (1 + I) u_{oI+2} + 24 I u_{oI-1-1} - 96 u_{oI-1} - 24 I u_{oI+1-1} + 6 u_{oI-2I} \right)}{\Delta x_o^8}, \quad O(\Delta x_o)$$

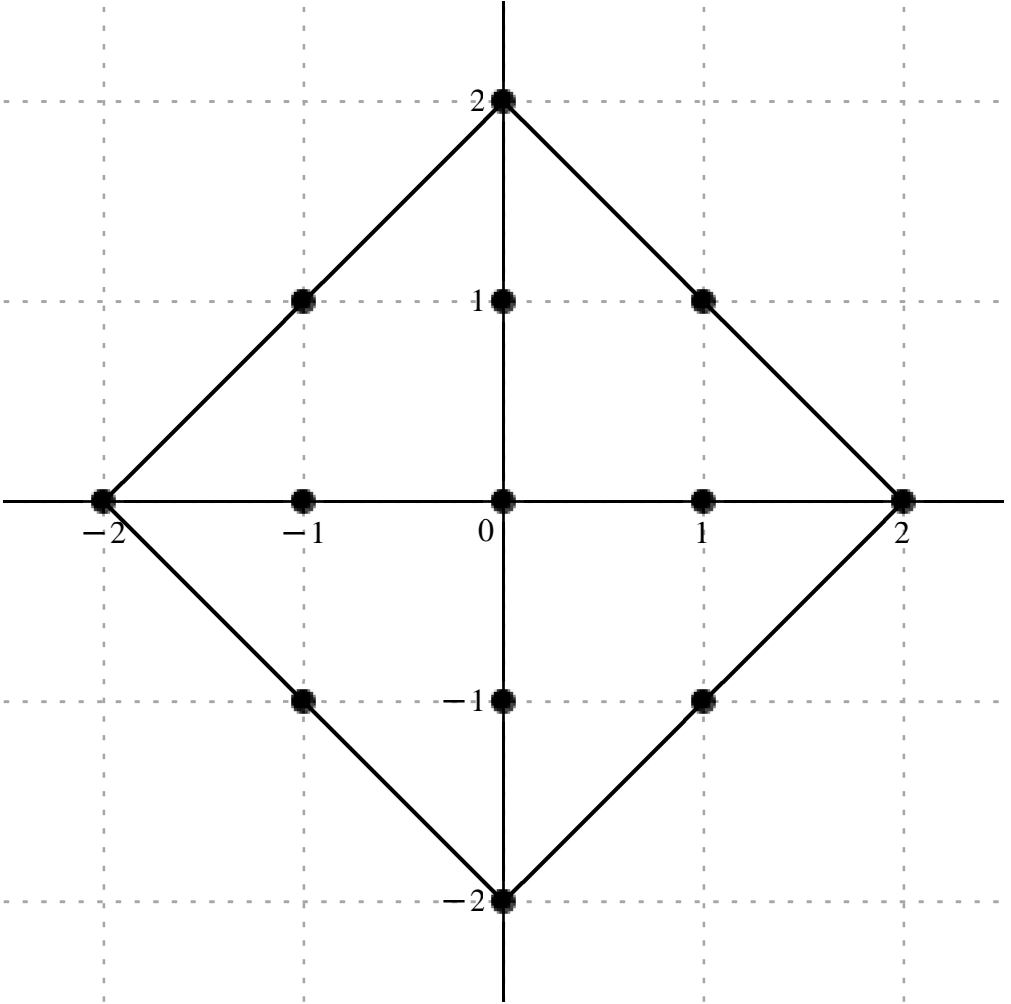
Formula:, 485, Var:, 1

Variavel :, x\_oI, Derivada de Ordem :, 1

Error order:, 12, Error:, 1.1209821210126702682 × 10<sup>-31</sup>, New Error:, 1.1209821210090091234 × 10<sup>-43</sup>  
 Error order:, 12, Error:, 1.1209821210090091234 × 10<sup>-43</sup>, New Error:, 1.1209821210090087573 × 10<sup>-55</sup>  
 Error order:, 12, Error:, 1.1209821210090087573 × 10<sup>-55</sup>, New Error:, 1.1209821210090087573 × 10<sup>-67</sup>  
 Error order:, 12, Error:, 1.1209821210090087573 × 10<sup>-67</sup>, New Error:, 1.1209821210090087573 × 10<sup>-79</sup>  
 Error order:, 12, Error:, 1.1209821210090087573 × 10<sup>-79</sup>, New Error:, 1.1209821210090087573 × 10<sup>-91</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccc} & & 2 \, \mathrm{I} & \\ & -1 + \mathrm{I} & 1 & 1 + \mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ & -1 - \mathrm{I} & -1 & 1 - \mathrm{I} \\ & & -2 \, \mathrm{I} & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} & & \frac{1}{600} & & \\ & -\frac{1}{50} - \frac{\mathrm{I}}{50} & -\frac{16 \, \mathrm{I}}{75} & \frac{1}{50} - \frac{\mathrm{I}}{50} & \\ \frac{1}{600} & -\frac{16}{75} & 0 & \frac{16}{75} & -\frac{1}{600} \\ & -\frac{1}{50} + \frac{\mathrm{I}}{50} & \frac{16 \, \mathrm{I}}{75} & \frac{1}{50} + \frac{\mathrm{I}}{50} & \\ & & -\frac{\mathrm{I}}{600} & & \end{array} \right]$$



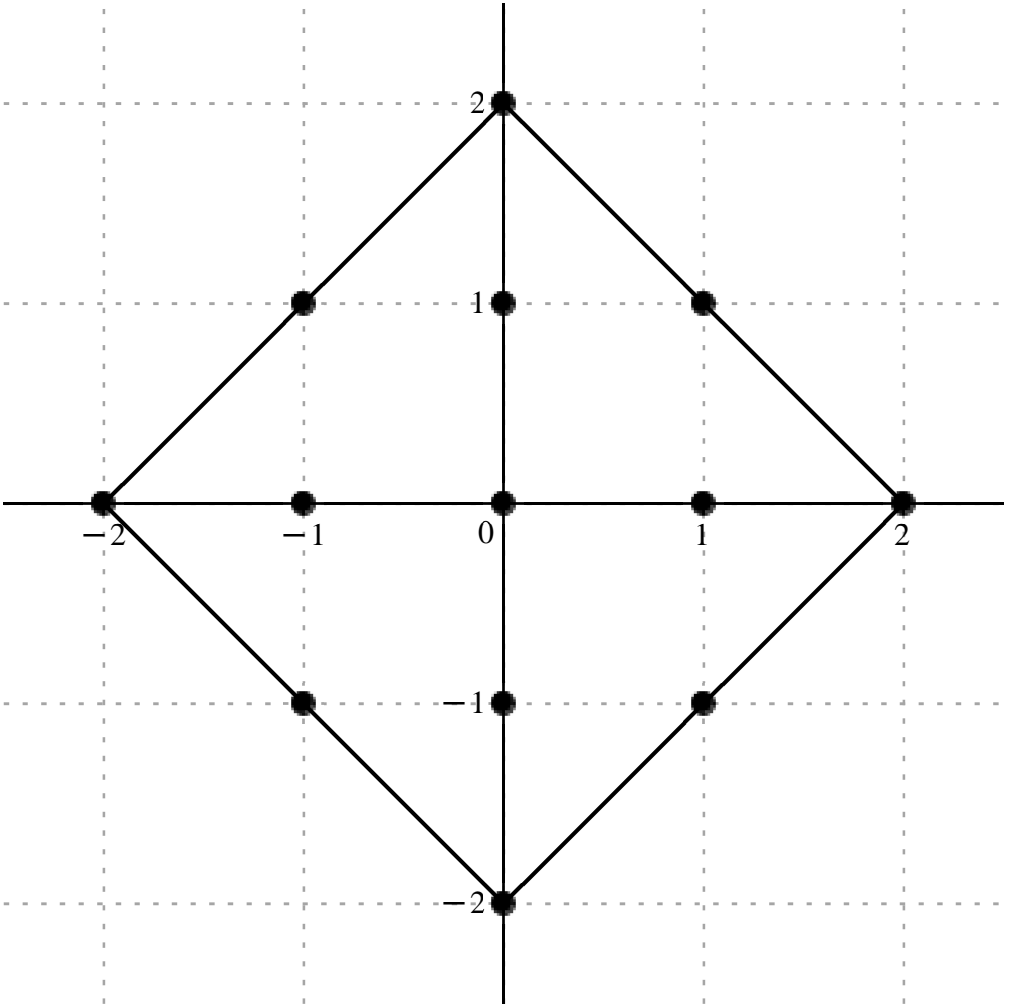
$$\frac{\mathrm{d}}{\mathrm{d} x_{o l}} \; u(x_{o l}) = \frac{\mathrm{I} u_{o l+2 \, \mathrm{I}} - (12+12 \, \mathrm{I}) \, u_{o l-1+1} - 128 \, \mathrm{I} u_{o l+1} + (12-12 \, \mathrm{I}) \, u_{o l+1+1} + u_{o l-2} - 128 \, u_{o l-1} + 128 \, u_{o l+1} - u_{o l+2} + (-12+12 \, \mathrm{I}) \, u_{o l-1-1} + 128 \, \mathrm{I} u_{o l-1} + (12+12 \, \mathrm{I}) \, u_{o l+1-1} - \mathrm{I} u_{o l-2 \, \mathrm{I}}}{600 \, \Delta x_{o l}} , \; O( \; \Delta x_{o l}^{\; 12} \; )$$



*Error order:*, 12,   *Error:*,  $1.5934358507631223868 \times 10^{-32}$ ,   *New Error:*,  $1.5934358507590746866 \times 10^{-44}$   
*Error order:*, 12,   *Error:*,  $1.5934358507590746866 \times 10^{-44}$ ,   *New Error:*,  $1.5934358507590742819 \times 10^{-56}$   
*Error order:*, 12,   *Error:*,  $1.5934358507590742819 \times 10^{-56}$ ,   *New Error:*,  $1.5934358507590742818 \times 10^{-68}$   
*Error order:*, 12,   *Error:*,  $1.5934358507590742818 \times 10^{-68}$ ,   *New Error:*,  $1.5934358507590742818 \times 10^{-80}$   
*Error order:*, 12,   *Error:*,  $1.5934358507590742818 \times 10^{-80}$ ,   *New Error:*,  $1.5934358507590742818 \times 10^{-92}$

$$x_o \neq h \text{ , } \left[ \begin{array}{cccc} & & 2 \text{ I} & \\ & -1 + \text{I} & \text{I} & 1 + \text{I} \\ -2 & -1 & 0 & 1 & 2 \\ & -1 - \text{I} & -\text{I} & 1 - \text{I} \\ & & -2 \text{ I} & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} & & \frac{1}{600} & & \\ & \frac{\text{I}}{25} & -\frac{32}{75} & -\frac{\text{I}}{25} & \\ -\frac{1}{600} & \frac{32}{75} & 0 & \frac{32}{75} & -\frac{1}{600} \\ & -\frac{\text{I}}{25} & -\frac{32}{75} & \frac{\text{I}}{25} & \\ & & \frac{1}{600} & & \end{array} \right]$$



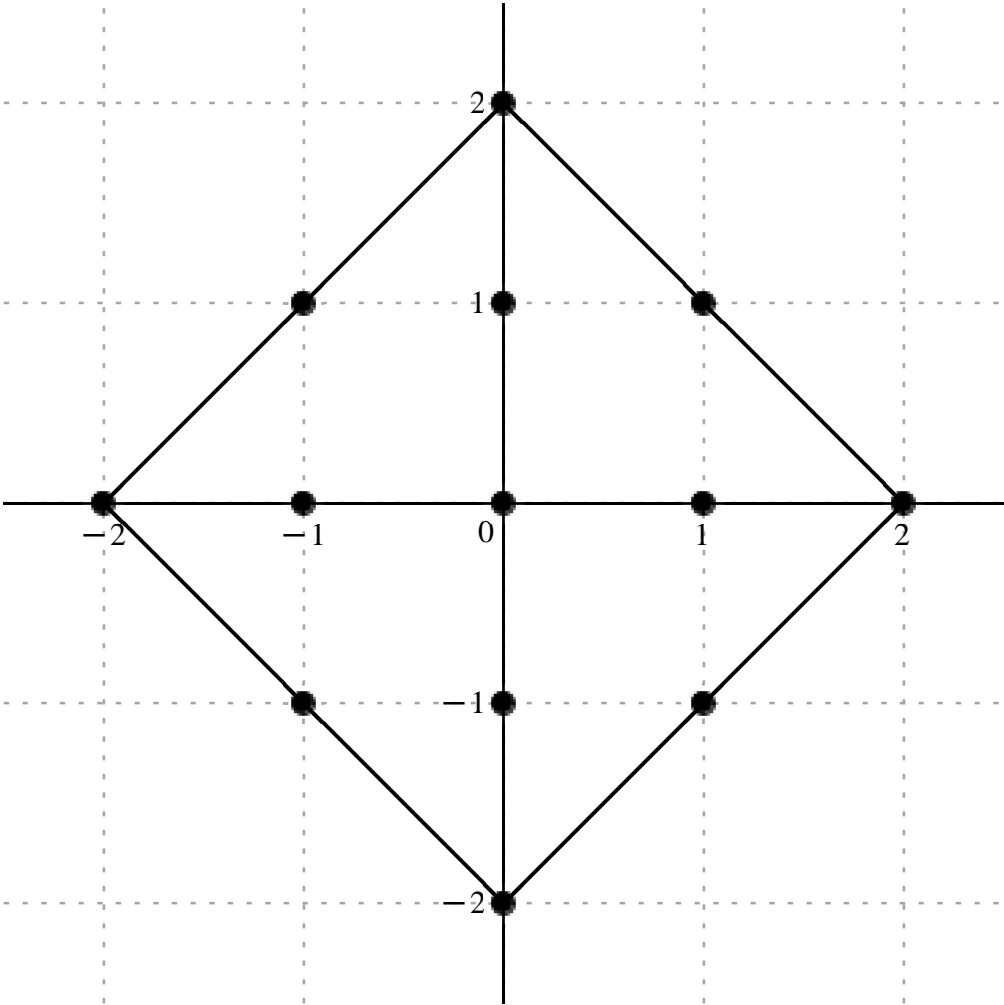
$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{u_{ol+2l} + 24 \, \mathrm{I} \, u_{ol-1+l} - 256 \, u_{ol+l} - 24 \, \mathrm{I} \, u_{ol+1+l} - u_{ol-2} + 256 \, u_{ol-1} + 256 \, u_{ol+1} - u_{ol+2} - 24 \, \mathrm{I} \, u_{ol-1-l} - 256 \, u_{ol-l} + 24 \, \mathrm{I} \, u_{ol+1-l} + u_{ol-2l}}{600 \, \Delta x_{ol}^2} , \, O( \, \Delta x_{ol}^{12} \, )$$

Formula:, 487, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 3

Error order:, 12, Error:,  $3.1710166184323784162 \times 10^{-33}$ , New Error:,  $3.1710166184260191073 \times 10^{-45}$   
Error order:, 12, Error:,  $3.1710166184260191073 \times 10^{-45}$ , New Error:,  $3.1710166184260184713 \times 10^{-57}$   
Error order:, 12, Error:,  $3.1710166184260184713 \times 10^{-57}$ , New Error:,  $3.1710166184260184713 \times 10^{-69}$   
Error order:, 12, Error:,  $3.1710166184260184713 \times 10^{-69}$ , New Error:,  $3.1710166184260184713 \times 10^{-81}$   
Error order:, 12, Error:,  $3.1710166184260184713 \times 10^{-81}$ , New Error:,  $3.1710166184260184713 \times 10^{-93}$

$$x_o + h., \left[ \begin{array}{cccc} & & 2 \text{ I} & \\ & -1 + \text{I} & \text{I} & 1 + \text{I} \\ -2 & -1 & 0 & 1 & 2 \\ & -1 - \text{I} & -\text{I} & 1 - \text{I} \\ & & -2 \text{ I} & \end{array} \right]$$
$$c =, \left[ \begin{array}{ccccc} & & -\frac{\text{I}}{400} & & \\ & \frac{3}{50} - \frac{3 \text{ I}}{50} & \frac{32 \text{ I}}{25} & -\frac{3}{50} - \frac{3 \text{ I}}{50} & \\ \frac{1}{400} & -\frac{32}{25} & 0 & \frac{32}{25} & -\frac{1}{400} \\ & \frac{3}{50} + \frac{3 \text{ I}}{50} & -\frac{32 \text{ I}}{25} & -\frac{3}{50} + \frac{3 \text{ I}}{50} & \\ & & \frac{\text{I}}{400} & & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u\big(x_{ol}\big) = \frac{-\mathrm{I} u_{ol+2\mathrm{I}} + (24-24\,\mathrm{I})\, u_{ol-1+1} + 512\,\mathrm{I} u_{ol+1} - (24+24\,\mathrm{I})\, u_{ol+1+1} + u_{ol-2} - 512\, u_{ol-1} + 512\, u_{ol+1} - u_{ol+2} + (24+24\,\mathrm{I})\, u_{ol-1-1} - 512\,\mathrm{I} u_{ol-1} + (-24+24\,\mathrm{I})\, u_{ol+1-1} + \mathrm{I} u_{ol-2\mathrm{I}}}{400\,\Delta x_{ol}^3}, \, O(\,\Delta x_{ol}^{12}\,)$$

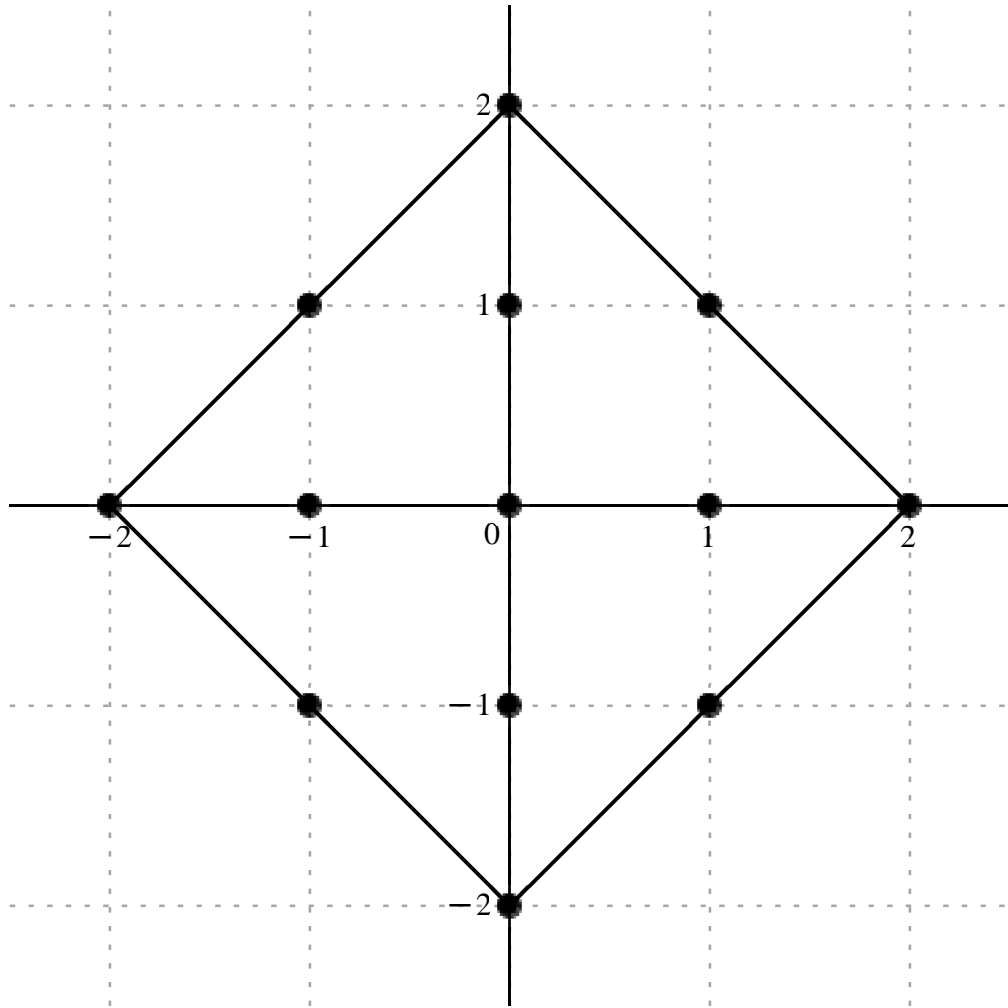
Formula:, 488, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 4

Error order:, 12, Error:, 7.8881010408733990726 × 10<sup>−34</sup>, New Error:, 7.8881010408607437315 × 10<sup>−46</sup>  
 Error order:, 12, Error:, 7.8881010408607437315 × 10<sup>−46</sup>, New Error:, 7.8881010408607424660 × 10<sup>−58</sup>  
 Error order:, 12, Error:, 7.8881010408607424660 × 10<sup>−58</sup>, New Error:, 7.8881010408607424659 × 10<sup>−70</sup>  
 Error order:, 12, Error:, 7.8881010408607424659 × 10<sup>−70</sup>, New Error:, 7.8881010408607424659 × 10<sup>−82</sup>  
 Error order:, 12, Error:, 7.8881010408607424659 × 10<sup>−82</sup>, New Error:, 7.8881010408607424659 × 10<sup>−94</sup>

$$x_o \neq h. , \left[ \begin{array}{cccc} & & 2\,\mathrm{I} & \\ & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} \\ & & -2\,\mathrm{I} & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} & & -\frac{1}{200} & & \\ & -\frac{6}{25} & \frac{128}{25} & -\frac{6}{25} & \\ -\frac{1}{200} & \frac{128}{25} & -\frac{39}{2} & \frac{128}{25} & -\frac{1}{200} \\ & -\frac{6}{25} & \frac{128}{25} & -\frac{6}{25} & \\ & & -\frac{1}{200} & & \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{-u_{ol+2l} - 48 \, u_{ol-1+l} + 1024 \, u_{ol+l} - 48 \, u_{ol+1+l} - u_{ol-2} + 1024 \, u_{ol-1} - 3900 \, u_{ol} + 1024 \, u_{ol+1} - u_{ol+2} - 48 \, u_{ol-1-l} + 1024 \, u_{ol-l} - 48 \, u_{ol+1-l} - u_{ol-2l}}{200 \, \Delta x_{ol}^4}, \, O( \, \Delta x_{ol}^{12} \, )$$

Formula:, 489, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 5

Error order:, 8, Error:, 7.4650472507821564500 × 10−22, New Error:, 7.4650472507600837479 × 10−30

Error order:, 8, Error:, 7.4650472507600837479 × 10−30, New Error:, 7.4650472507600815406 × 10−38

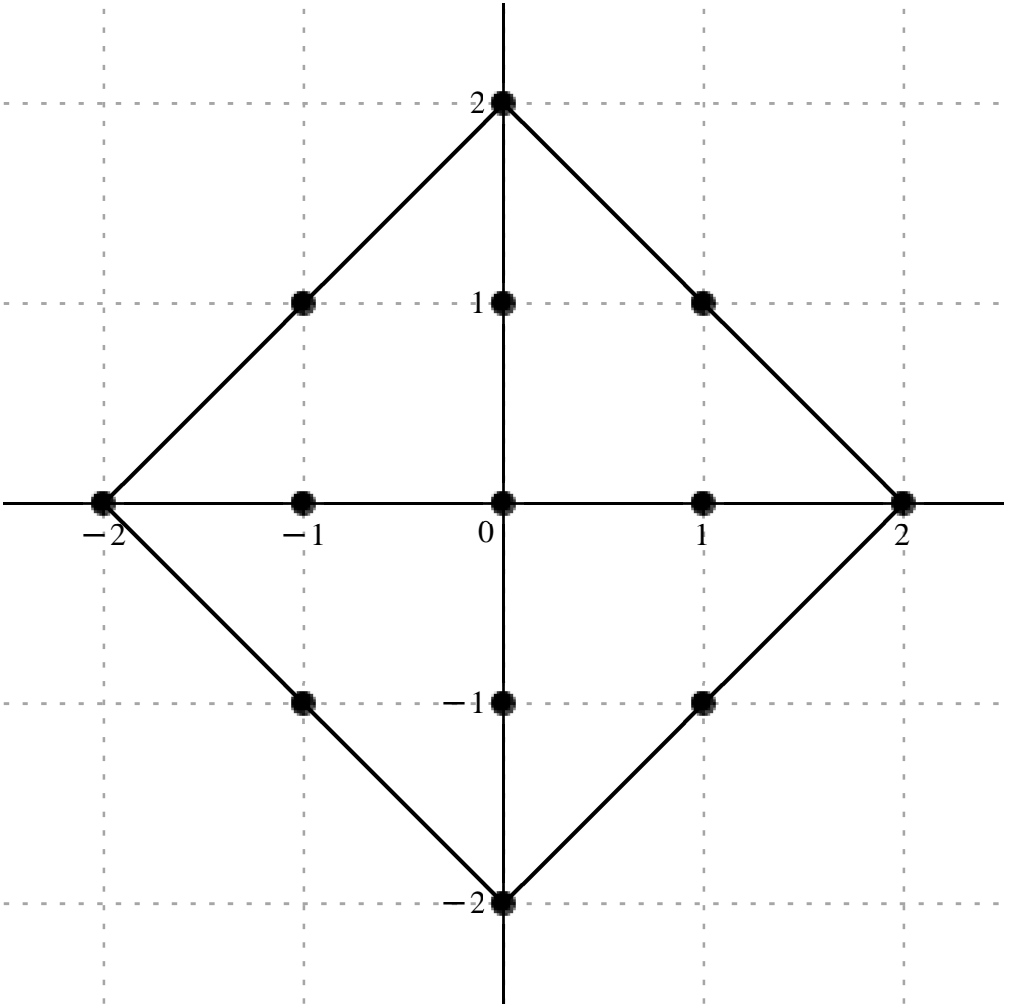
Error order:, 8, Error:, 7.4650472507600815406 × 10−38, New Error:, 7.4650472507600815404 × 10−46

Error order:, 8, Error:, 7.4650472507600815404 × 10−46, New Error:, 7.4650472507600815404 × 10−54

Error order:, 8, Error:, 7.4650472507600815404 × 10−54, New Error:, 7.4650472507600815404 × 10−62

$$x_o \neq h. , \left[ \begin{array}{cccc} & & 2 \, \mathrm{I} & \\ & -1 + \mathrm{I} & \mathrm{I} & 1 + \mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} \\ & & -2 \, \mathrm{I} & \end{array} \right]$$

$$c = \begin{bmatrix} -\frac{3}{20} & -\frac{24}{5} & 0 & \frac{24}{5} & \frac{3}{20} \\ \frac{51}{20} - \frac{51 \text{ I}}{20} & \frac{24 \text{ I}}{5} & -\frac{51}{20} - \frac{51 \text{ I}}{20} & \frac{3 \text{ I}}{20} & \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{-3 \, \mathrm{I} u_{ol+2\mathrm{I}} + (51+51 \, \mathrm{I}) \, u_{ol-1+1} -96 \, \mathrm{I} u_{ol+1} + (-51+51 \, \mathrm{I}) \, u_{ol+1+1} -3 \, u_{ol-2} -96 \, u_{ol-1} +96 \, u_{ol+1} +3 \, u_{ol+2} + (51-51 \, \mathrm{I}) \, u_{ol-1-1} +96 \, \mathrm{I} u_{ol-1} - (51+51 \, \mathrm{I}) \, u_{ol+1-1} +3 \, \mathrm{I} u_{ol-2\mathrm{I}}}{20 \, \Delta x_{ol}^5}, \, O(\, \Delta x_{ol}^8 \, )$$

Formula: 490, Var.: 1

Variavel :  $x_{ol}$  , Derivada de Ordem : 6

Error order.: 8, Error: 3.1833890195212157418 × 10<sup>-22</sup>, New Error: 3.1833890195138947792 × 10<sup>-30</sup>

Error order.: 8, Error: 3.1833890195138947792 × 10<sup>-30</sup>, New Error: 3.1833890195138940471 × 10<sup>-38</sup>

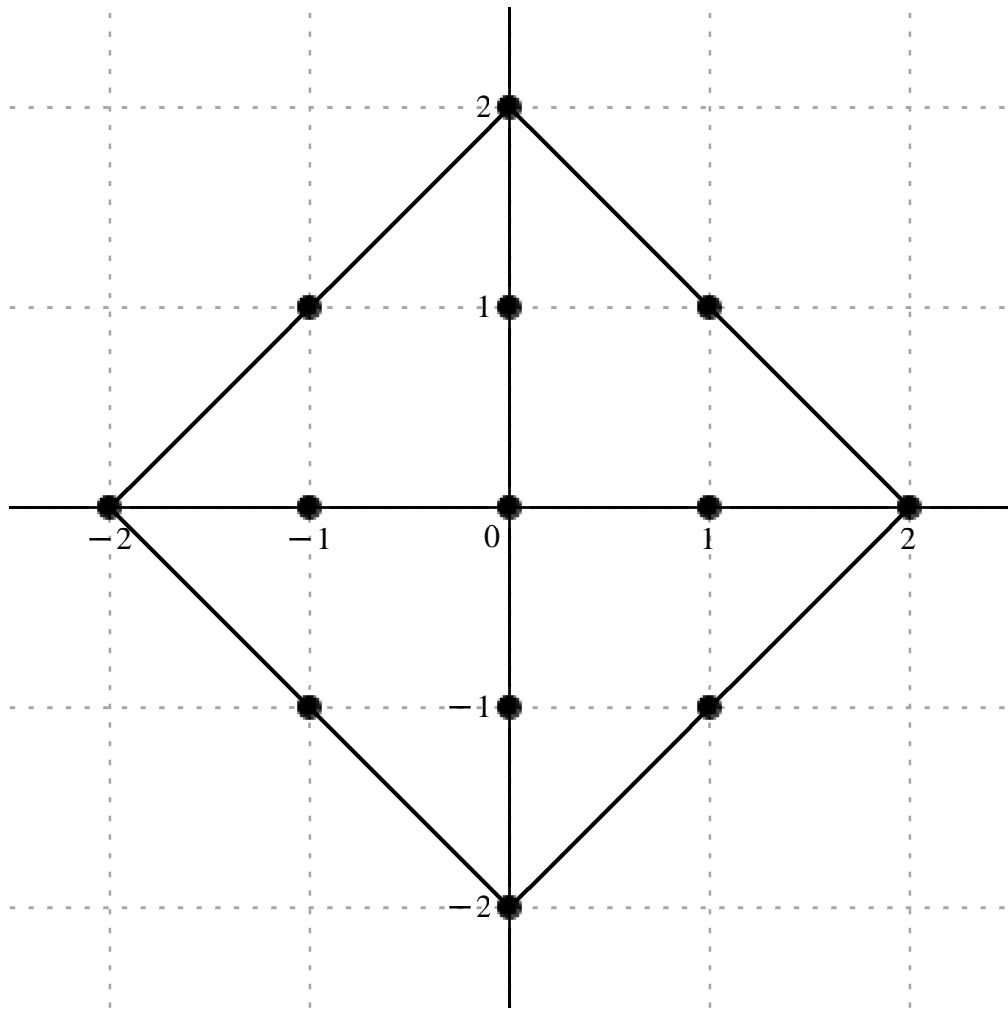
Error order.: 8, Error: 3.1833890195138940471 × 10<sup>-38</sup>, New Error: 3.1833890195138940471 × 10<sup>-46</sup>

Error order.: 8, Error: 3.1833890195138940471 × 10<sup>-46</sup>, New Error: 3.1833890195138940471 × 10<sup>-54</sup>

Error order.: 8, Error: 3.1833890195138940471 × 10<sup>-54</sup>, New Error: 3.1833890195138940471 × 10<sup>-62</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccc} & & 2 \, \mathrm{I} & \\ & -1 + \mathrm{I} & 1 & 1 + \mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ & -1 - \mathrm{I} & -1 & 1 - \mathrm{I} \\ & & -2 \, \mathrm{I} & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} & & -\frac{9}{20} & & \\ & -\frac{153 \, \mathrm{I}}{10} & -\frac{144}{5} & \frac{153 \, \mathrm{I}}{10} & \\ \frac{9}{20} & \frac{144}{5} & 0 & \frac{144}{5} & \frac{9}{20} \\ & \frac{153 \, \mathrm{I}}{10} & -\frac{144}{5} & -\frac{153 \, \mathrm{I}}{10} & \\ & & -\frac{9}{20} & & \end{array} \right]$$

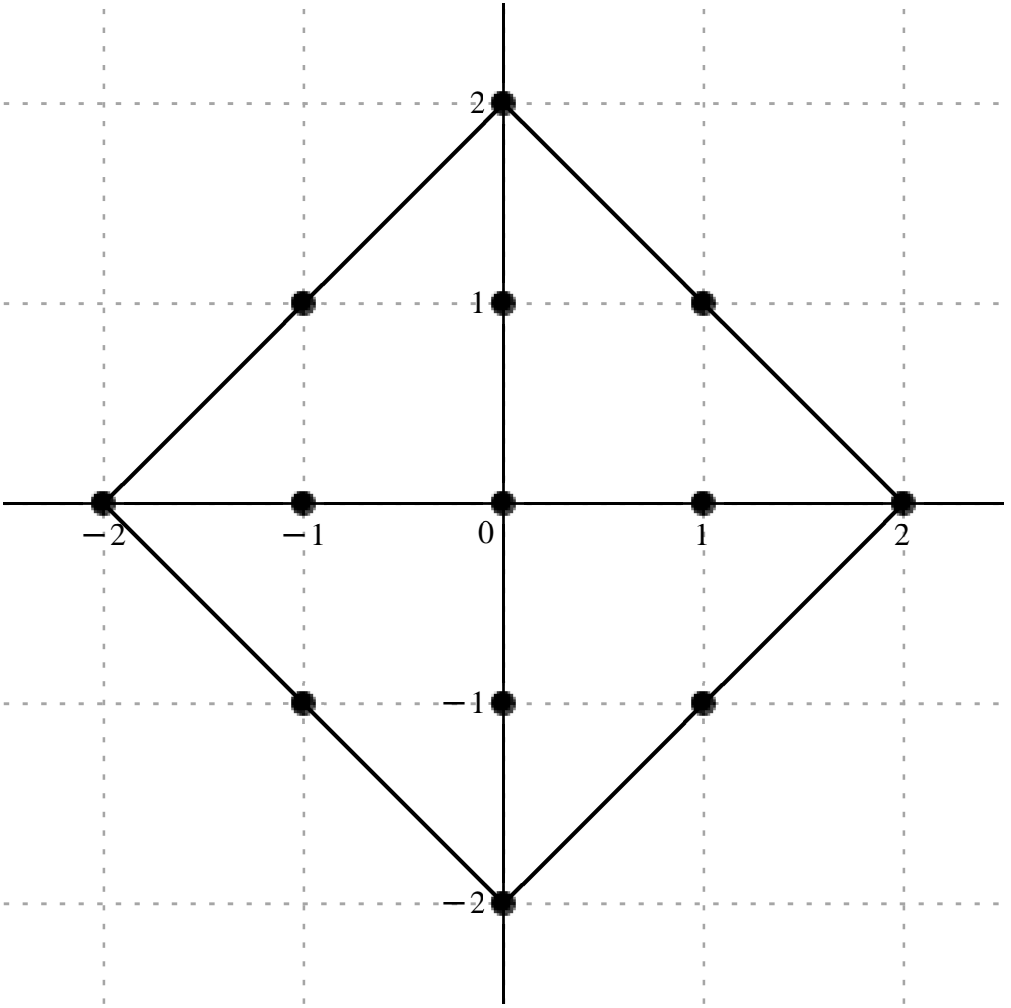


$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{9 \left( -u_{ol+2 \, \mathrm{i}} -34 \, \mathrm{I} \, u_{ol-1+ \, \mathrm{i}} -64 \, u_{ol+ \, \mathrm{i}} +34 \, \mathrm{I} \, u_{ol+1+ \, \mathrm{i}} +u_{ol-2} +64 \, u_{ol-1} +64 \, u_{ol+1} +u_{ol+2} +34 \, \mathrm{I} \, u_{ol-1- \, \mathrm{i}} -64 \, u_{ol-1} -34 \, \mathrm{I} \, u_{ol+1- \, \mathrm{i}} -u_{ol-2 \, \mathrm{i}} \right)}{20 \, \Delta x_{ol}^6} , \, O( \, \Delta x_{ol}^8 \, )$$

*Error order:*, 8, *Error:*,  $1.4781905894950394910 \times 10^{-22}$ , *New Error:*,  $1.4781905894923557131 \times 10^{-30}$   
*Error order:*, 8, *Error:*,  $1.4781905894923557131 \times 10^{-30}$ , *New Error:*,  $1.4781905894923554448 \times 10^{-38}$   
*Error order:*, 8, *Error:*,  $1.4781905894923554448 \times 10^{-38}$ , *New Error:*,  $1.4781905894923554447 \times 10^{-46}$   
*Error order:*, 8, *Error:*,  $1.4781905894923554447 \times 10^{-46}$ , *New Error:*,  $1.4781905894923554447 \times 10^{-54}$   
*Error order:*, 8, *Error:*,  $1.4781905894923554447 \times 10^{-54}$ , *New Error:*,  $1.4781905894923554447 \times 10^{-62}$

$$x_o \neq h., \left[ \begin{array}{cccc} & & 2 \, \mathrm{I} & \\ & -1 + \mathrm{I} & \mathrm{I} & 1 + \mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} \\ & & -2 \, \mathrm{I} & \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccc} & & \frac{63 \, \mathrm{I}}{40} & & \\ & -\frac{1071}{20} + \frac{1071 \, \mathrm{I}}{20} & \frac{1008 \, \mathrm{I}}{5} & \frac{1071}{20} + \frac{1071 \, \mathrm{I}}{20} & \\ -\frac{63}{40} & -\frac{1008}{5} & 0 & \frac{1008}{5} & \frac{63}{40} \\ & -\frac{1071}{20} - \frac{1071 \, \mathrm{I}}{20} & -\frac{1008 \, \mathrm{I}}{5} & \frac{1071}{20} - \frac{1071 \, \mathrm{I}}{20} & \\ & & -\frac{63 \, \mathrm{I}}{40} & & \end{array} \right]$$

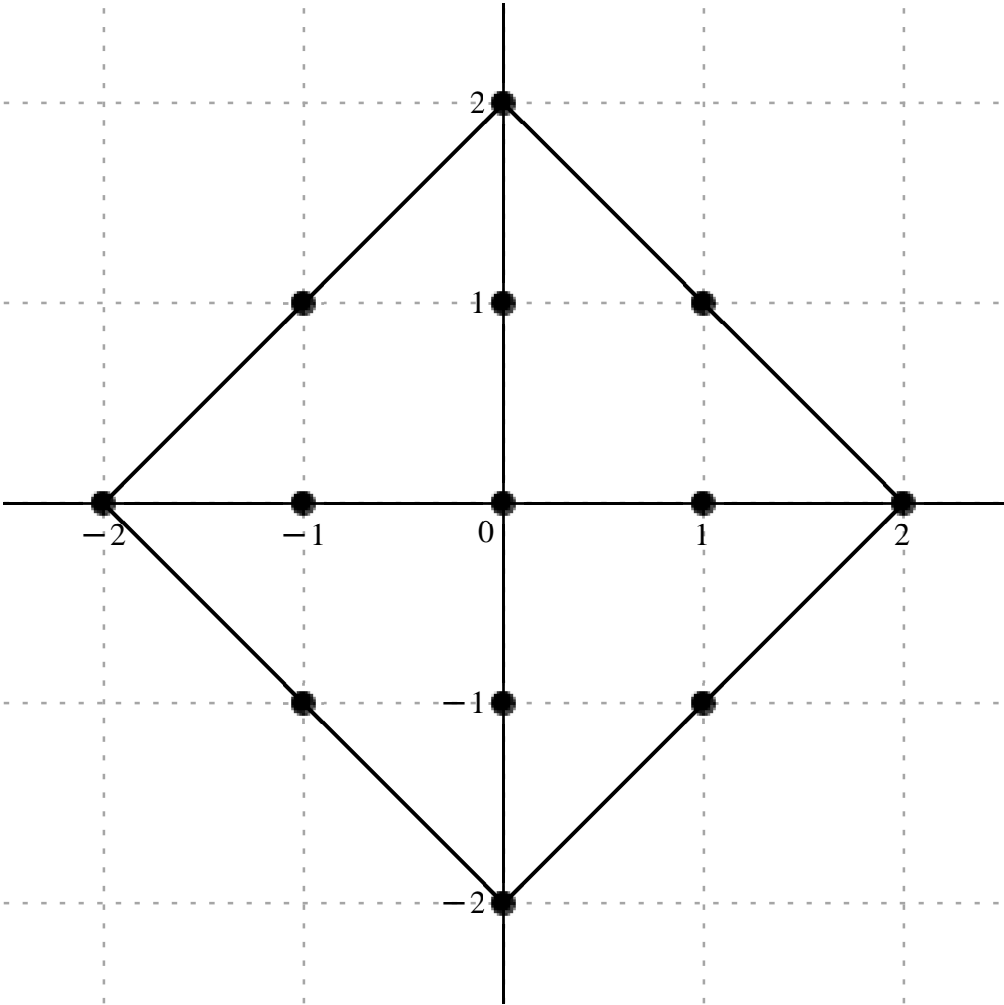


$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{63 \, (1 u_{ol+21} + (-34 + 34 \, \mathrm{I}) \, u_{ol-1+1} + 128 \, \mathrm{I} u_{ol+1} + (34 + 34 \, \mathrm{I}) \, u_{ol+1+1} - u_{ol-2} - 128 \, u_{ol-1} + 128 \, u_{ol+1} + u_{ol+2} - (34 + 34 \, \mathrm{I}) \, u_{ol-1-1} - 128 \, \mathrm{I} u_{ol-1} + (34 - 34 \, \mathrm{I}) \, u_{ol+1-1} - \mathrm{I} u_{ol-21})}{40 \, \Delta x_{ol}^7}, \, O( \, \Delta x_{ol}^8 \, )$$

Formula:, 492, Var.: 1  
Variavel :,  $x_{oi}$ , Derivada de Ordem :, 8

Error order:, 8, Error:,  $7.3541820372860829937 \times 10^{-23}$ , New Error:,  $7.3541820372754012909 \times 10^{-31}$   
Error order:, 8, Error:,  $7.3541820372754012909 \times 10^{-31}$ , New Error:,  $7.3541820372754002227 \times 10^{-39}$   
Error order:, 8, Error:,  $7.3541820372754002227 \times 10^{-39}$ , New Error:,  $7.3541820372754002226 \times 10^{-47}$   
Error order:, 8, Error:,  $7.3541820372754002226 \times 10^{-47}$ , New Error:,  $7.3541820372754002226 \times 10^{-55}$   
Error order:, 8, Error:,  $7.3541820372754002226 \times 10^{-55}$ , New Error:,  $7.3541820372754002226 \times 10^{-63}$

$$x_o + h., \begin{bmatrix} & & 2\text{ I} & & \\ & -1 + \text{I} & 1 & 1 + \text{I} & \\ -2 & -1 & 0 & 1 & 2 \\ & -1 - \text{I} & -1 & 1 - \text{I} & \\ & & -2\text{ I} & & \end{bmatrix}$$
$$c =, \begin{bmatrix} & & \frac{63}{10} & & \\ & \frac{2142}{5} & \frac{8064}{5} & \frac{2142}{5} & \\ \frac{63}{10} & \frac{8064}{5} & -8190 & \frac{8064}{5} & \frac{63}{10} \\ & \frac{2142}{5} & \frac{8064}{5} & \frac{2142}{5} & \\ & & \frac{63}{10} & & \end{bmatrix}$$





$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^s}u(x_{ol})=\frac{63\left(u_{ol+2l}+68\,u_{ol-1+1}+256\,u_{ol+1}+68\,u_{ol+1+1}+u_{ol-2}+256\,u_{ol-1}-1300\,u_{ol}+256\,u_{ol+1}+u_{ol+2}+68\,u_{ol-1-1}+256\,u_{ol-1}+68\,u_{ol+1-1}+u_{ol-2l}\right)}{10\,\Delta x_{ol}^8},\,O(\,\Delta x_{ol}^8\,)$$

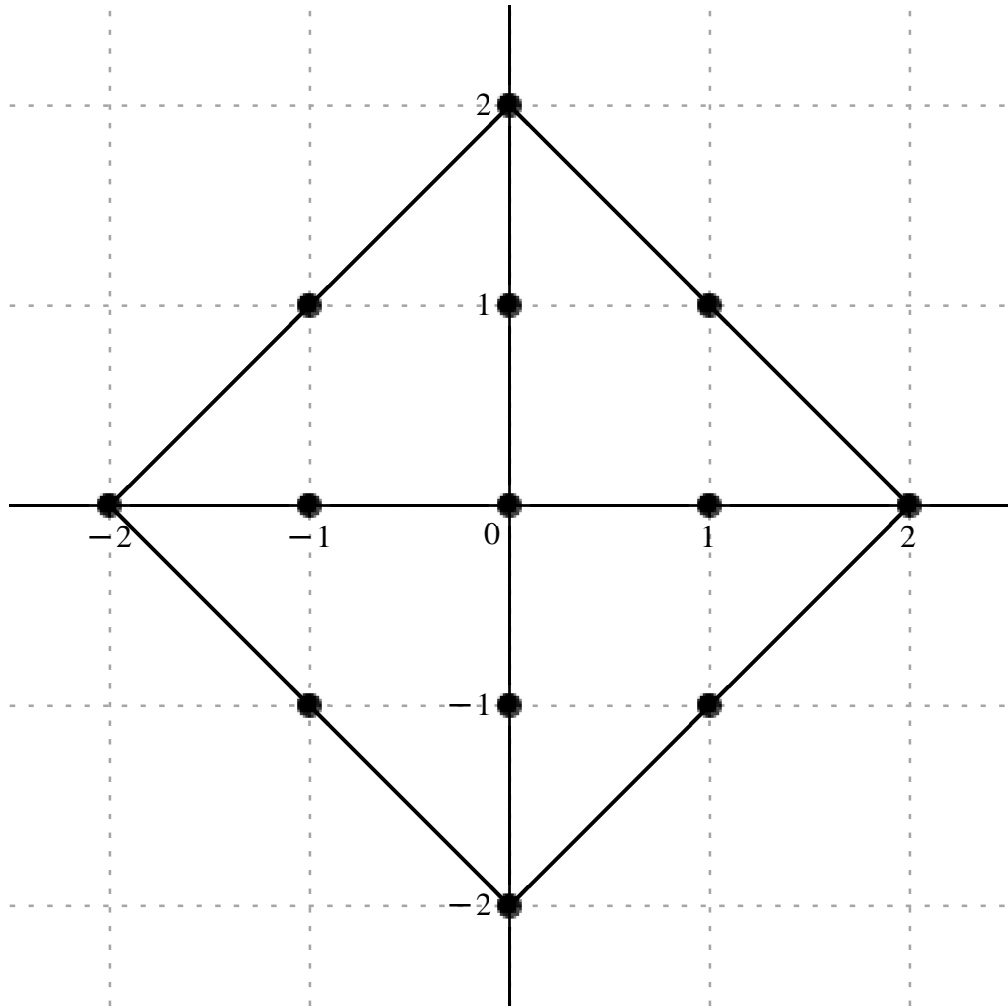
Formula:, 493, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 9

Error order:, 4, Error:, 3.8546381542235690498 × 10<sup>−11</sup>, New Error:, 3.8546381542071061096 × 10<sup>−15</sup>  
 Error order:, 4, Error:, 3.8546381542071061096 × 10<sup>−15</sup>, New Error:, 3.8546381542071044633 × 10<sup>−19</sup>  
 Error order:, 4, Error:, 3.8546381542071044633 × 10<sup>−19</sup>, New Error:, 3.8546381542071044632 × 10<sup>−23</sup>  
 Error order:, 4, Error:, 3.8546381542071044632 × 10<sup>−23</sup>, New Error:, 3.8546381542071044632 × 10<sup>−27</sup>  
 Error order:, 4, Error:, 3.8546381542071044632 × 10<sup>−27</sup>, New Error:, 3.8546381542071044632 × 10<sup>−31</sup>

$$x_o+h.,\left[\begin{array}{cccc} & & 2\,\mathrm{I} & \\ & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} \\ -2 & -1 & 0 & 1 & 2 \\ & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} \\ & & -2\,\mathrm{I} & \end{array}\right]$$

$$c=,\left[\begin{array}{ccccc} & & & -\frac{756\,\mathrm{I}}{5} & \\ & -\frac{2268}{5}-\frac{2268\,\mathrm{I}}{5} & \frac{6048\,\mathrm{I}}{5} & \frac{2268}{5}-\frac{2268\,\mathrm{I}}{5} & \\ -\frac{756}{5} & \frac{6048}{5} & 0 & -\frac{6048}{5} & \frac{756}{5} \\ & -\frac{2268}{5}+\frac{2268\,\mathrm{I}}{5} & -\frac{6048\,\mathrm{I}}{5} & \frac{2268}{5}+\frac{2268\,\mathrm{I}}{5} & \\ & & \frac{756\,\mathrm{I}}{5} & & \end{array}\right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} u(x_{ol}) = \frac{756 \left( -\mathrm{I} u_{ol+2\mathrm{I}} - (3+3\mathrm{I}) u_{ol-1+1} + 8\mathrm{I} u_{ol+1} + (3-3\mathrm{I}) u_{ol+1+1} - u_{ol-2} + 8 u_{ol-1} - 8 u_{ol+1} + u_{ol+2} + (-3+3\mathrm{I}) u_{ol-1-1} - 8\mathrm{I} u_{ol-1} + (3+3\mathrm{I}) u_{ol+1-1} + \mathrm{I} u_{ol-2\mathrm{I}} \right)}{5 \Delta x_{ol}^9}, \quad O(\Delta x_{ol}^4)$$

Formula:, 494, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

Error order:, 4, Error:,  $2.7396148928357571093 \times 10^{-11}$ , New Error:,  $2.73961489282665565343 \times 10^{-15}$

Error order:, 4, Error:,  $2.73961489282665565343 \times 10^{-15}$ , New Error:,  $2.7396148928266556242 \times 10^{-19}$

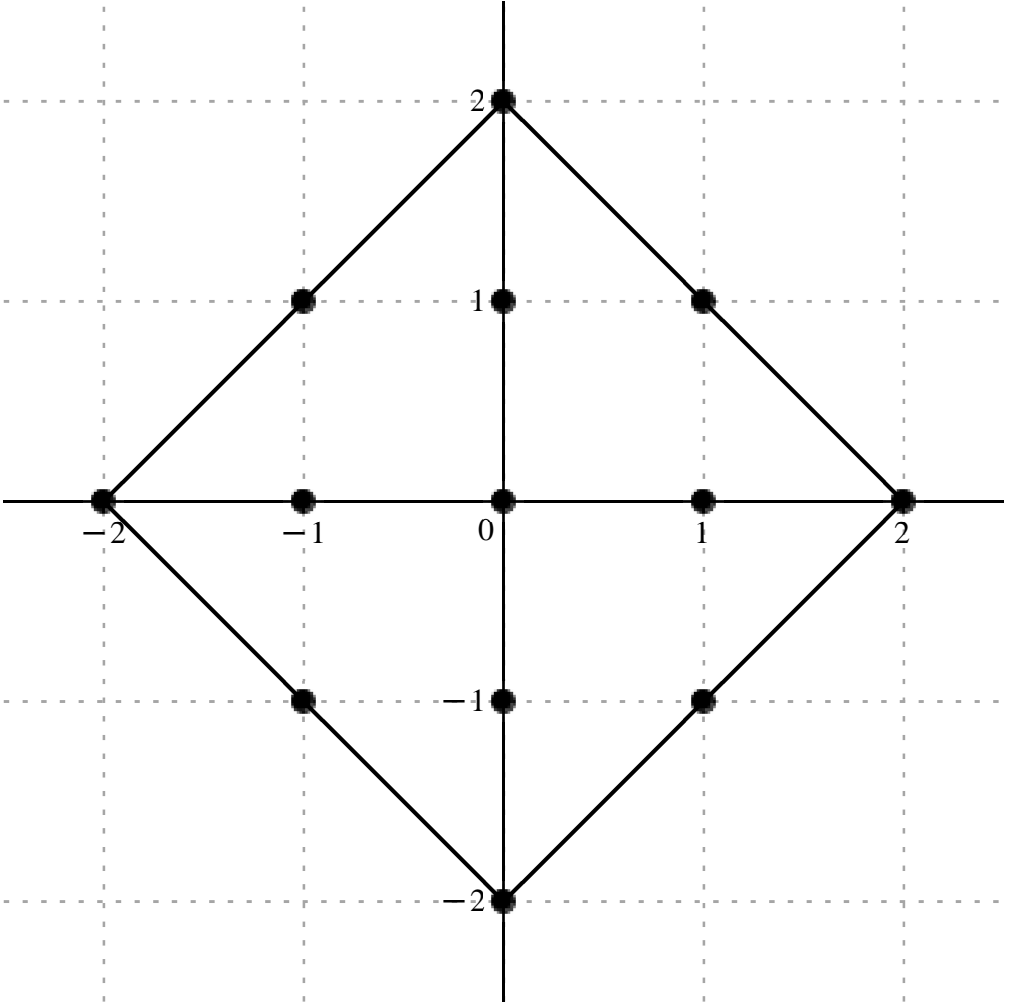
Error order:, 4, Error:,  $2.7396148928266556242 \times 10^{-19}$ , New Error:,  $2.7396148928266556241 \times 10^{-23}$

Error order:, 4, Error:,  $2.7396148928266556241 \times 10^{-23}$ , New Error:,  $2.7396148928266556241 \times 10^{-27}$

Error order:, 4, Error:,  $2.7396148928266556241 \times 10^{-27}$ , New Error:,  $2.7396148928266556241 \times 10^{-31}$

$$x_o + h., \begin{bmatrix} & & 2\mathrm{I} & & \\ & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & \\ -2 & -1 & 0 & 1 & 2 \\ & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & \\ & & -2\mathrm{I} & & \end{bmatrix}$$

$$c =, \begin{bmatrix} & -756 & & & \\ & 4536\mathrm{I} & 12096 & -4536\mathrm{I} & \\ 756 & -12096 & 0 & -12096 & 756 \\ & -4536\mathrm{I} & 12096 & 4536\mathrm{I} & \\ & & -756 & & \end{bmatrix}$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\,u(x_{ol})=\frac{756\left(-u_{ol+2\mathrm{i}}+6\mathrm{I}u_{ol-1+\mathrm{i}}+16u_{ol+\mathrm{i}}-6\mathrm{I}u_{ol+1+\mathrm{i}}+u_{ol-2}-16u_{ol-1}-16u_{ol+1}+u_{ol+2}-6\mathrm{I}u_{ol-1-\mathrm{i}}+16u_{ol-1}+6\mathrm{I}u_{ol+1-\mathrm{i}}-u_{ol-2\mathrm{i}}\right)}{\Delta x_{ol}^{10}},\,O(\,\Delta x_{ol}^4\,)$$

Formula: 495, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 11

Error order.: 4, Error.:  $1.9990556431955058759 \times 10^{-11}$ , New Error.:  $1.9990556431902633346 \times 10^{-15}$

Error order.: 4, Error.:  $1.9990556431902633346 \times 10^{-15}$ , New Error.:  $1.9990556431902628104 \times 10^{-19}$

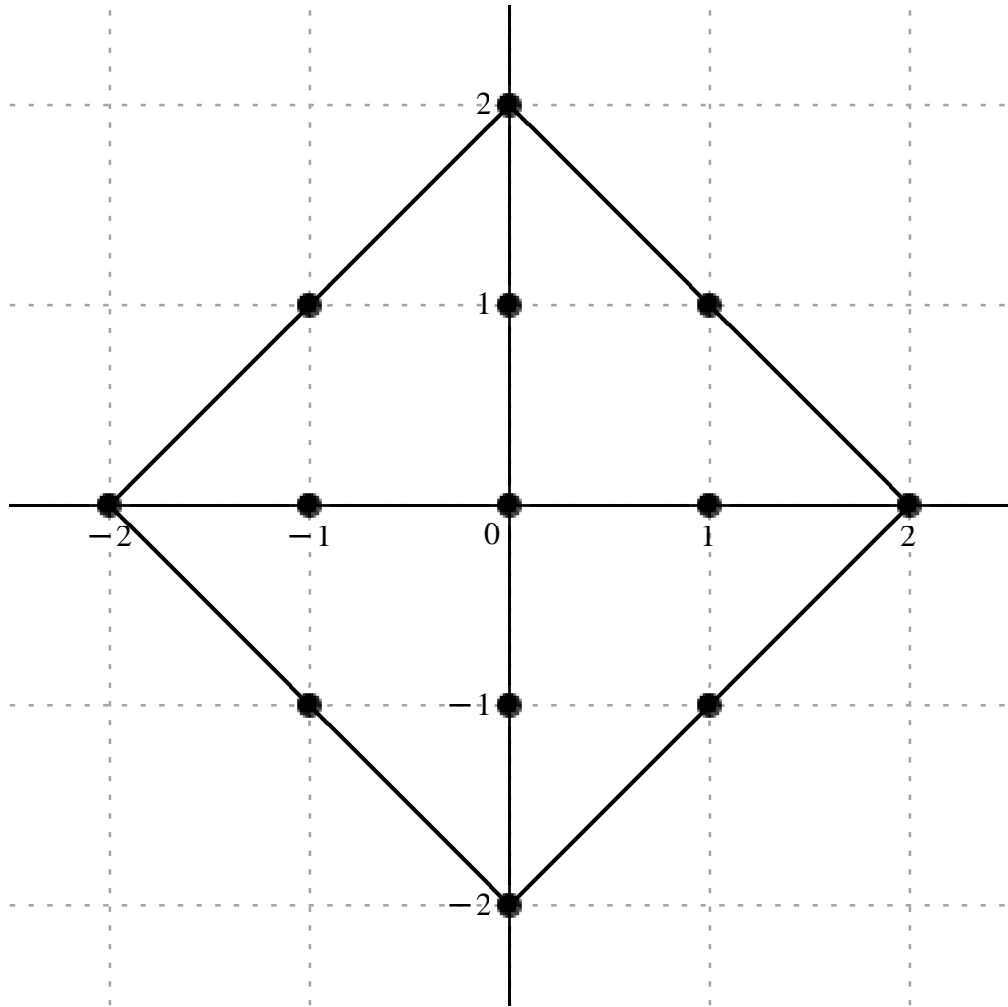
Error order.: 4, Error.:  $1.9990556431902628104 \times 10^{-19}$ , New Error.:  $1.9990556431902628103 \times 10^{-23}$

Error order.: 4, Error.:  $1.9990556431902628103 \times 10^{-23}$ , New Error.:  $1.9990556431902628103 \times 10^{-27}$

Error order.: 4, Error.:  $1.9990556431902628103 \times 10^{-27}$ , New Error.:  $1.9990556431902628103 \times 10^{-31}$

$$x_o+h.,\left[\begin{array}{ccccc} & & 2\,\mathrm{I} & & \\ & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & \\ -2 & -1 & 0 & 1 & 2 \\ & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & \\ & & -2\,\mathrm{I} & & \end{array}\right]$$

$$c=,\left[\begin{array}{ccccc} & & 4158\,\mathrm{I} & & \\ & 24948-24948\,\mathrm{I} & -133056\,\mathrm{I} & -24948-24948\,\mathrm{I} & \\ -4158 & 133056 & 0 & -133056 & 4158 \\ & 24948+24948\,\mathrm{I} & 133056\,\mathrm{I} & -24948+24948\,\mathrm{I} & \\ & & -4158\,\mathrm{I} & & \end{array}\right]$$



$$\frac{d^{11}}{dx^{11}} u(x_{ol}) = \frac{4158 \left( 1 u_{ol+21} + (6-6 I) u_{ol-1+1} - 32 I u_{ol+1} - (6+6 I) u_{ol+1+1} - u_{ol-2} + 32 u_{ol-1} - 32 u_{ol+1} + u_{ol+2} + (6+6 I) u_{ol-1-1} + 32 I u_{ol-1} + (-6+6 I) u_{ol+1-1} - I u_{ol-21} \right)}{\Delta x_{ol}^{11}}, O(\Delta x_{ol}^4)$$

Formula:, 496, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

Error order:, 4, Error:,  $1.4918325695481024349 \times 10^{-11}$ , New Error:,  $1.4918325695449725595 \times 10^{-15}$

Error order:, 4, Error:,  $1.4918325695449725595 \times 10^{-15}$ , New Error:,  $1.4918325695449722465 \times 10^{-19}$

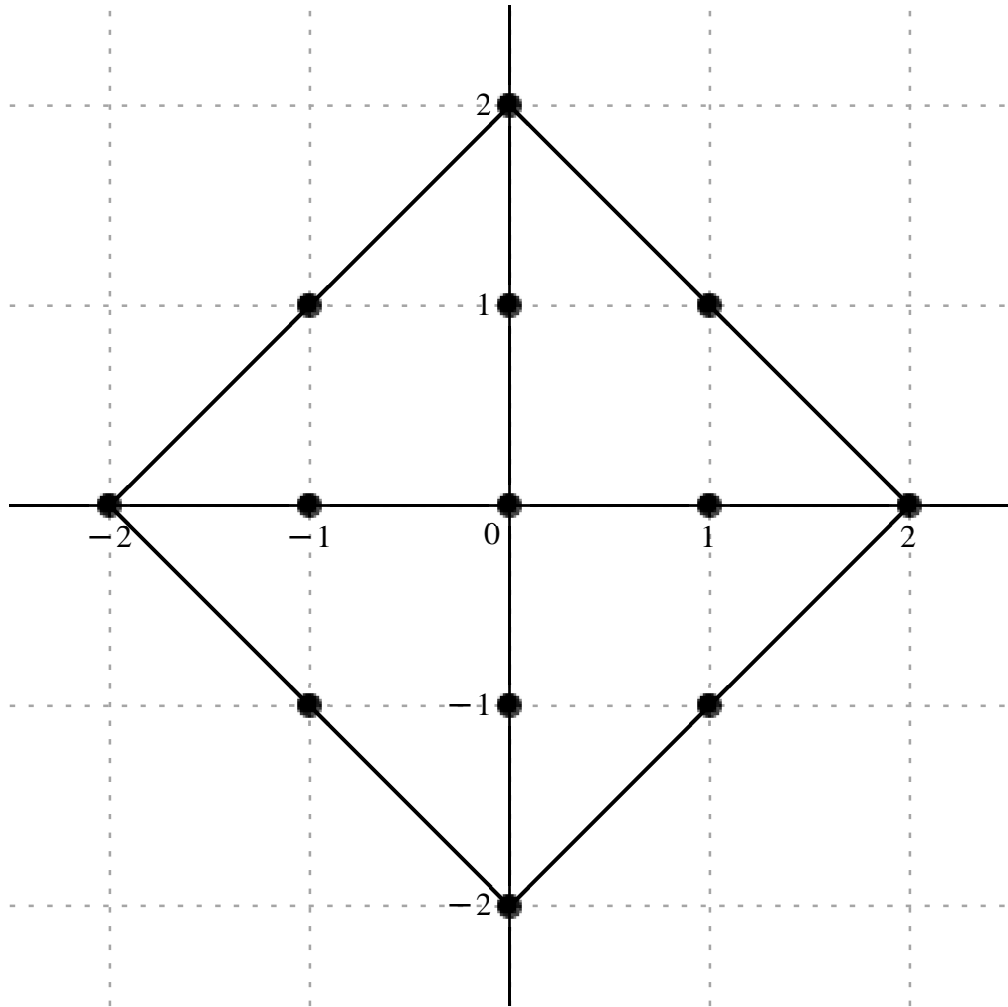
Error order:, 4, Error:,  $1.4918325695449722465 \times 10^{-19}$ , New Error:,  $1.4918325695449722465 \times 10^{-23}$

Error order:, 4, Error:,  $1.4918325695449722465 \times 10^{-23}$ , New Error:,  $1.4918325695449722465 \times 10^{-27}$

Error order:, 4, Error:,  $1.4918325695449722465 \times 10^{-27}$ , New Error:,  $1.4918325695449722465 \times 10^{-31}$

$$x_o + h., \begin{bmatrix} & & 2 I & & \\ & -1 + I & I & 1 + I & \\ -2 & -1 & 0 & 1 & 2 \\ & -1 - I & -I & 1 - I & \\ & & -2 I & & \end{bmatrix}$$

$$c =, \begin{bmatrix} & & 24948 & & \\ & -299376 & -1596672 & -299376 & \\ 24948 & -1596672 & 7484400 & -1596672 & 24948 \\ & -299376 & -1596672 & -299376 & \\ & & 24948 & & \end{bmatrix}$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\,u(x_{ol})=\frac{24948\left(u_{ol+2l}-12\,u_{ol+1+l}-64\,u_{ol+l}-12\,u_{ol+1+l}+u_{ol-2}-64\,u_{ol-1}+300\,u_{ol}-64\,u_{ol+1}+u_{ol+2}-12\,u_{ol-1+l}-64\,u_{ol-1}-12\,u_{ol+1+l}+u_{ol-2l}\right)}{\Delta x_{ol}^{12}},\,O(\,\Delta x_{ol}^4\,)$$

Not square - Triangle: Interval , 5

Formula:, 497, Var.: 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 1

Error order:., 20, Error:.,  $2.8370791494946366592 \times 10^{-50}$ , New Error:.,  $2.8025339335296973699 \times 10^{-70}$

Error order:., 20, Error:.,  $2.8025339335296973699 \times 10^{-70}$ , New Error:.,  $2.7990633530590660650 \times 10^{-90}$

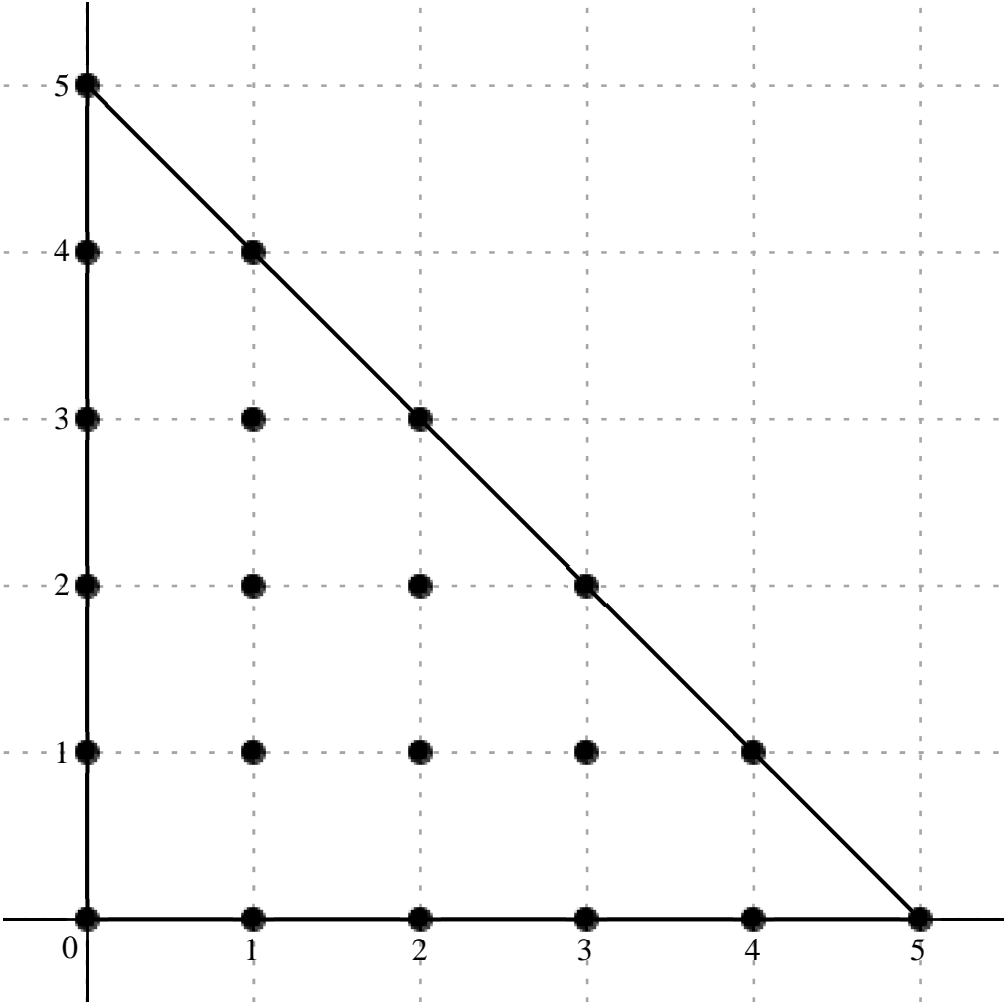
Error order:., 20, Error:.,  $2.7990633530590660650 \times 10^{-90}$ , New Error:.,  $2.7987161394891648103 \times 10^{-110}$

Error order:., 20, Error:.,  $2.7987161394891648103 \times 10^{-110}$ , New Error:.,  $2.7986814165819779851 \times 10^{-130}$

Error order:., 20, Error:.,  $2.7986814165819779851 \times 10^{-130}$ , New Error:.,  $2.7986779442757623638 \times 10^{-150}$

$$x_o \neq h., \left[ \begin{array}{c} 5\,\mathrm{I} \\ 4\,\mathrm{I} \; 1+4\,\mathrm{I} \\ 3\,\mathrm{I} \; 1+3\,\mathrm{I} \; 2+3\,\mathrm{I} \\ 2\,\mathrm{I} \; 1+2\,\mathrm{I} \; 2+2\,\mathrm{I} \; 3+2\,\mathrm{I} \\ \mathrm{I} \; 1+\mathrm{I} \; 2+\mathrm{I} \; 3+\mathrm{I} \; 4+\mathrm{I} \\ 0 \; 1 \; 2 \; 3 \; 4 \; 5 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} -\frac{16}{29725} + \frac{43 \text{ I}}{118900} & & & & & \\ -\frac{35}{328} + \frac{13 \text{ I}}{328} & \frac{1}{17} - \frac{33 \text{ I}}{68} & & & & \\ -\frac{1}{3} + \frac{13 \text{ I}}{3} & -\frac{272}{25} + \frac{1496 \text{ I}}{25} & -\frac{425}{26} + \frac{85 \text{ I}}{26} & & & \\ \frac{750}{29} - \frac{280 \text{ I}}{29} & -\frac{2907}{5} - \frac{2601 \text{ I}}{5} & -\frac{765}{2} + \frac{765 \text{ I}}{2} & -\frac{85}{26} + \frac{425 \text{ I}}{26} & & \\ -\frac{95}{4} - \frac{45 \text{ I}}{4} & 520 - 520 \text{ I} & \frac{2601}{5} + \frac{2907 \text{ I}}{5} & -\frac{1496}{25} + \frac{272 \text{ I}}{25} & \frac{33}{68} - \frac{\text{I}}{17} & \\ -\frac{31241}{6630} + \frac{31241 \text{ I}}{6630} & \frac{45}{4} + \frac{95 \text{ I}}{4} & \frac{280}{29} - \frac{750 \text{ I}}{29} & -\frac{13}{3} + \frac{\text{I}}{3} & -\frac{13}{328} + \frac{35 \text{ I}}{328} & -\frac{43}{118900} + \frac{16 \text{ I}}{29725} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\; u(x_{ol}) = \frac{1}{157661400\; \Delta x_{ol}}\; \big( (-84864 + 57018 \text{ I})\; u_{_{ol+51}} + (-16823625 + 6248775 \text{ I})\; u_{_{ol+41}} + (9274200 - 76512150 \text{ I})\; u_{_{ol+1+41}} + (-52553800 + 683199400 \text{ I})\; u_{_{ol+31}} + (-1715356032 + 9434458176 \text{ I})\; u_{_{ol+1+31}} + (-2577157500 + 515431500 \text{ I})\; u_{_{ol+2+31}} + (4077450000 - 1522248000 \text{ I})\; u_{_{ol+21}} - (91664337960 \\ + 82015460280 \text{ I})\; u_{_{ol+1+21}} + (-60305485500 + 60305485500 \text{ I})\; u_{_{ol+2+21}} + (-515431500 + 2577157500 \text{ I})\; u_{_{ol+3+21}} - (3744458250 + 1773690750 \text{ I})\; u_{_{ol+1}} + (81983928000 - 81983928000 \text{ I})\; u_{_{ol+1+1}} + (82015460280 + 91664337960 \text{ I})\; u_{_{ol+2+1}} + (-9434458176 + 1715356032 \text{ I})\; u_{_{ol+3+1}} + (76512150 - 9274200 \text{ I})\; u_{_{ol+4+1}} \\ + (-742910980 + 742910980 \text{ I})\; u_{_{ol}} + (1773690750 + 3744458250 \text{ I})\; u_{_{ol+1}} + (1522248000 - 4077450000 \text{ I})\; u_{_{ol+2}} + (-683199400 + 52553800 \text{ I})\; u_{_{ol+3}} + (-6248775 + 16823625 \text{ I})\; u_{_{ol+4}} + (-57018 + 84864 \text{ I})\; u_{_{ol+5}} \big),\; O(\;\Delta x_{ol}^{\;20}\;)$$

Formula: 498, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 2

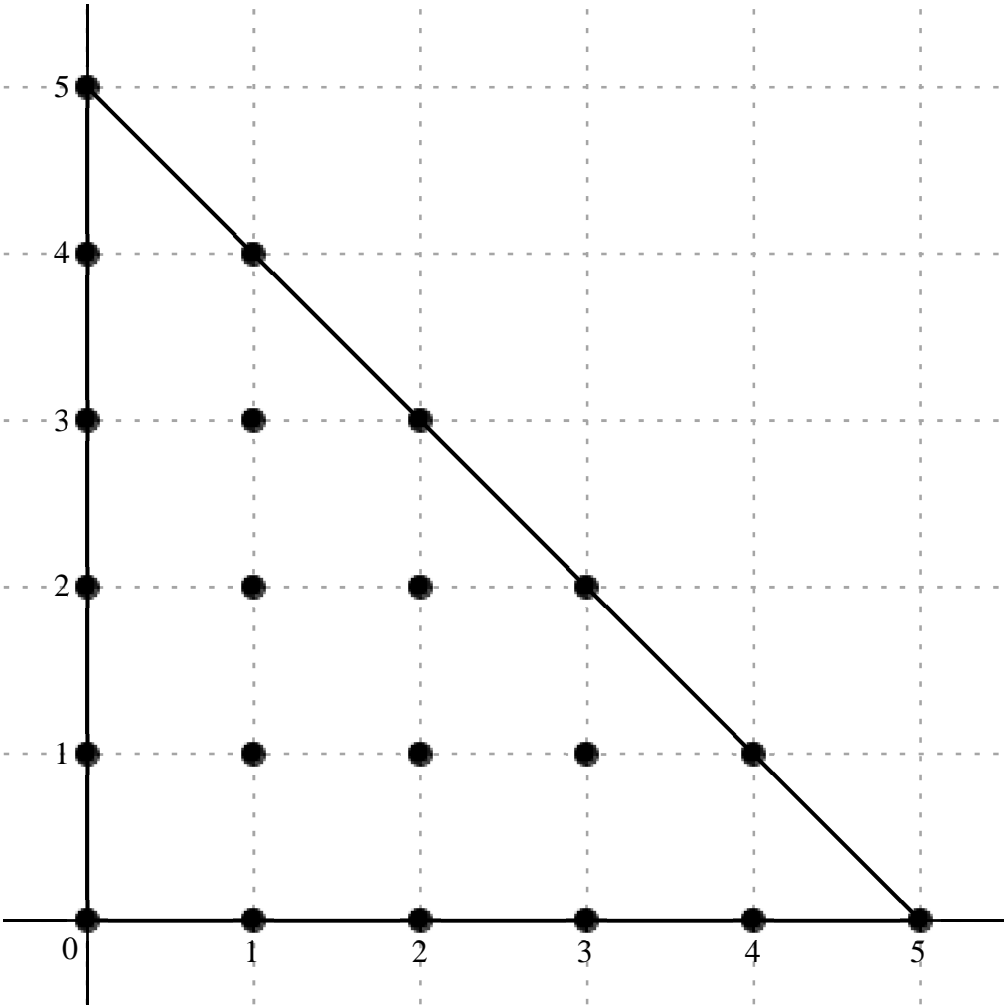
Error order: 19, Error: 2.9810398978696899710 × 10<sup>−47</sup>, New Error: 2.9055591722875150935 × 10<sup>−66</sup>

Error order: 19, Error: 2.9055591722875150935 × 10<sup>−66</sup>, New Error: 2.8980610896587085579 × 10<sup>−85</sup>

*Error order:*, 19, *Error:*,  $2.8980610896587085579 \times 10^{-85}$ , *New Error:*,  $2.8973117828065850089 \times 10^{-104}$   
*Error order:*, 19, *Error:*,  $2.8973117828065850089 \times 10^{-104}$ , *New Error:*,  $2.8972368571369565557 \times 10^{-123}$   
*Error order:*, 19, *Error:*,  $2.8972368571369565557 \times 10^{-123}$ , *New Error:*,  $2.8972293646201510223 \times 10^{-142}$

$$x_o + h \cdot \begin{bmatrix} 5 \text{ I} \\ 4 \text{ I} \ 1 + 4 \text{ I} \\ 3 \text{ I} \ 1 + 3 \text{ I} \ 2 + 3 \text{ I} \\ 2 \text{ I} \ 1 + 2 \text{ I} \ 2 + 2 \text{ I} \ 3 + 2 \text{ I} \\ \text{I} \ 1 + \text{I} \ 2 + \text{I} \ 3 + \text{I} \ 4 + \text{I} \\ 0 \ 1 \ 2 \ 3 \ 4 \ 5 \end{bmatrix}$$

$$c = \begin{bmatrix} \frac{237693}{131384500} - \frac{3257923 \text{ I}}{394153500} \\ \frac{1417699}{2174640} - \frac{961037 \text{ I}}{724880} & \frac{50357}{13260} + \frac{66871 \text{ I}}{13260} \\ -\frac{346162}{9945} - \frac{435164 \text{ I}}{9945} & -\frac{694976}{1625} - \frac{242992 \text{ I}}{375} & \frac{4669}{39} - \frac{2292 \text{ I}}{13} \\ -\frac{3122294}{19227} + \frac{5938396 \text{ I}}{19227} & \frac{3163194}{325} - \frac{103908 \text{ I}}{325} & -\frac{177501 \text{ I}}{26} & -\frac{4669}{39} - \frac{2292 \text{ I}}{13} \\ \frac{407539}{1326} - \frac{46610 \text{ I}}{663} & \frac{446816 \text{ I}}{51} & -\frac{3163194}{325} - \frac{103908 \text{ I}}{325} & \frac{694976}{1625} - \frac{242992 \text{ I}}{375} & -\frac{50357}{13260} + \frac{66871 \text{ I}}{13260} \\ -\frac{17162987 \text{ I}}{397800} & -\frac{407539}{1326} - \frac{46610 \text{ I}}{663} & \frac{3122294}{19227} + \frac{5938396 \text{ I}}{19227} & \frac{346162}{9945} - \frac{435164 \text{ I}}{9945} & -\frac{1417699}{2174640} - \frac{961037 \text{ I}}{724880} & -\frac{237693}{131384500} - \frac{3257923 \text{ I}}{394153500} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{1}{4729842000 \mathcal{A} x_{ol}^2} \Big( (8556948 - 39095076 \text{ I}) u_{ol+51} + (3083495325 - 6270766425 \text{ I}) u_{ol+41} + (17962341900 + 23852885700 \text{ I}) u_{ol+1+41} - (164634647200 + 206963998400 \text{ I}) u_{ol+31} - (2022847183872 + 3064836712704 \text{ I}) u_{ol+1+31} + (566246982000 - 833907528000 \text{ I}) u_{ol+2+31} + (-768084324000$$

$$+ 1460845416000 \text{ I}) u_{ol+21} + (46035101031840 - 1512210530880 \text{ I}) u_{ol+1+21} - 32290449417000 \text{ I} u_{ol+2+21} - (566246982000 + 833907528000 \text{ I}) u_{ol+3+21} + (1453691613000 - 332515740000 \text{ I}) u_{ol+1} + 41438609472000 \text{ I} u_{ol+1+1} - (46035101031840 + 1512210530880 \text{ I}) u_{ol+2+1} + (2022847183872 - 3064836712704 \text{ I}) u_{ol+3+1}$$

$$+ (-17962341900 + 23852885700 \text{ I}) u_{ol+4+1} - 204067915430 \text{ I} u_{ol} - (1453691613000 + 332515740000 \text{ I}) u_{ol+1} + (768084324000 + 1460845416000 \text{ I}) u_{ol+2} + (164634647200 - 206963998400 \text{ I}) u_{ol+3} - (3083495325 + 6270766425 \text{ I}) u_{ol+4} - (8556948 + 39095076 \text{ I}) u_{ol+5} \Big), \mathcal{O}(\mathcal{A} x_{ol}^{19})$$

Formula:, 499, Var:, 1

Variavel :,  $x_{oi}$  , Derivada de Ordem :, 3

Error order:, 18, Error:,  $3.0345822204675115844 \times 10^{-44}$ , New Error:,  $2.9978585056739650144 \times 10^{-62}$

Error order:, 18, Error:,  $2.9978585056739650144 \times 10^{-62}$ , New Error:,  $2.9941691671495711647 \times 10^{-80}$

Error order:, 18, Error:,  $2.9941691671495711647 \times 10^{-80}$ , New Error:,  $2.9938000689496414602 \times 10^{-98}$

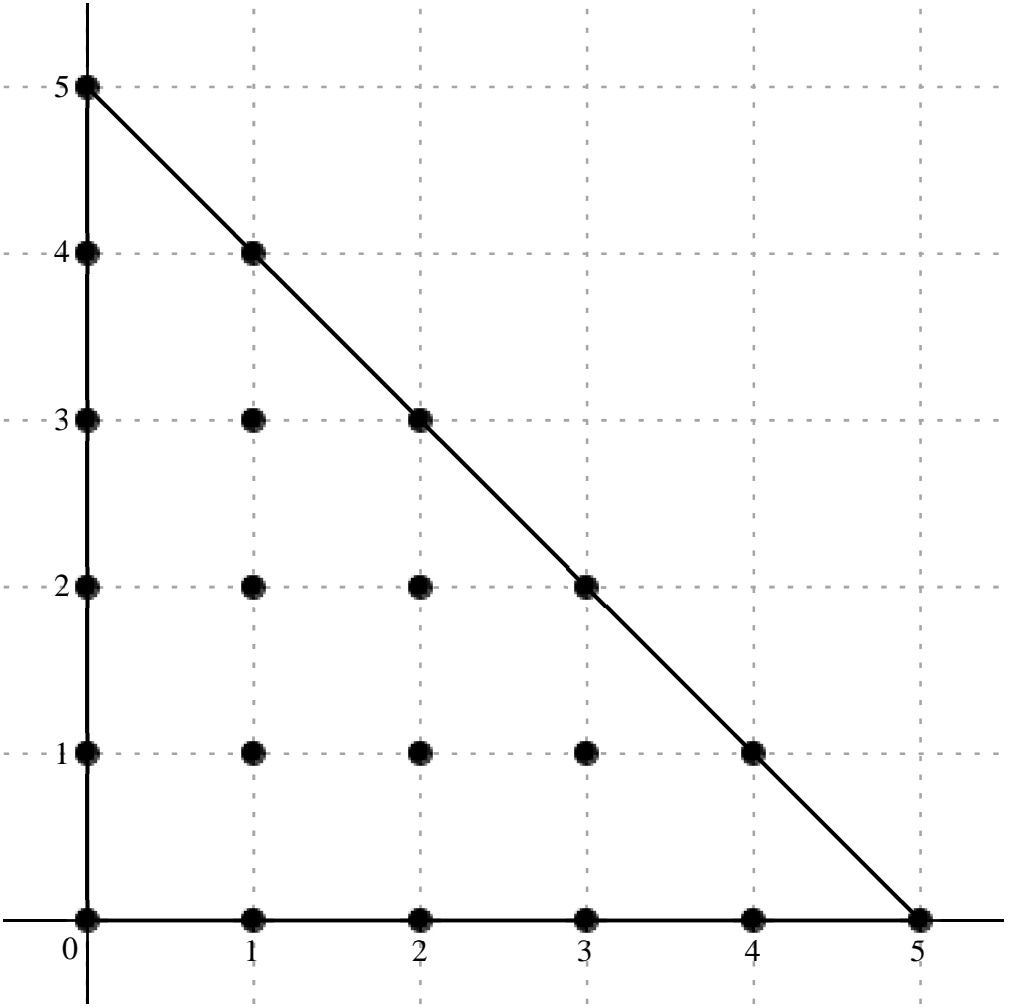
Error order:, 18, Error:,  $2.9938000689496414602 \times 10^{-98}$ , New Error:,  $2.9937631574914607863 \times 10^{-116}$

Error order:, 18, Error:,  $2.9937631574914607863 \times 10^{-116}$ , New Error:,  $2.9937594663292661255 \times 10^{-134}$

$$x_o + h \cdot \begin{bmatrix} 5 \text{ I} \\ 4 \text{ I} \quad 1 + 4 \text{ I} \\ 3 \text{ I} \quad 1 + 3 \text{ I} \quad 2 + 3 \text{ I} \\ 2 \text{ I} \quad 1 + 2 \text{ I} \quad 2 + 2 \text{ I} \quad 3 + 2 \text{ I} \\ \text{I} \quad 1 + \text{I} \quad 2 + \text{I} \quad 3 + \text{I} \quad 4 + \text{I} \\ 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{1237933}{29580000} + \frac{3296699 \text{ I}}{48067500} \\ \frac{2193563}{530400} + \frac{706633 \text{ I}}{53040} - \frac{10357601}{176800} - \frac{1247041 \text{ I}}{132600} \\ \frac{22856919}{44200} + \frac{10336489 \text{ I}}{132600} - \frac{171450433}{24375} + \frac{38969806 \text{ I}}{24375} - \frac{85523}{240} + \frac{1217735 \text{ I}}{624} \\ - \frac{75602939}{96135} - \frac{79570347 \text{ I}}{25636} - \frac{160876653}{2600} + \frac{164792631 \text{ I}}{2600} - \frac{46163931}{1040} + \frac{46163931 \text{ I}}{1040} - \frac{1217735}{624} + \frac{85523 \text{ I}}{240} \\ - \frac{58946561}{35360} + \frac{228287393 \text{ I}}{106080} - \frac{13811867}{255} - \frac{13811867 \text{ I}}{255} - \frac{164792631}{2600} - \frac{160876653 \text{ I}}{2600} - \frac{38969806}{24375} + \frac{171450433 \text{ I}}{24375} - \frac{1247041}{132600} - \frac{10357601 \text{ I}}{176800} \\ \frac{503358637}{2652000} + \frac{503358637 \text{ I}}{2652000} - \frac{228287393}{106080} - \frac{58946561 \text{ I}}{35360} - \frac{79570347}{25636} - \frac{75602939 \text{ I}}{96135} - \frac{10336489}{132600} + \frac{22856919 \text{ I}}{44200} - \frac{706633}{53040} + \frac{2193563 \text{ I}}{530400} - \frac{3296699}{48067500} + \frac{1237933 \text{ I}}{29580000} \end{bmatrix}$$





$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{1}{384540000 \Delta x_{ol}^3} \big( (16093129 + 26373592 \, \mathrm{I}) \, u_{ol+5\mathrm{I}} + (1590333175 + 5123089250 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} - (22527782175 + 3616418900 \, \mathrm{I}) \, u_{ol+1+4\mathrm{I}} + (198855195300 + 29975818100 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (2704802031008 + 614787659456 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (137029226750 + 750429193750 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} - (302411756000 + 1193555205000 \, \mathrm{I}) \, u_{ol+2\mathrm{I}}$$
  
$$+ (-23793656978700 + 24372830124900 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (17069113487250 + 17069113487250 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (750429193750 + 137029226750 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (-641043850875 + 827541799625 \, \mathrm{I}) \, u_{ol+1} - (20828295436000 + 20828295436000 \, \mathrm{I}) \, u_{ol+1+1} + (24372830124900 - 23793656978700 \, \mathrm{I}) \, u_{ol+2+1} + (614787659456$$
  
$$+ 2704802031008 \, \mathrm{I}) \, u_{ol+3+1} - (3616418900 + 22527782175 \, \mathrm{I}) \, u_{ol+4+1} + (72987002365 + 72987002365 \, \mathrm{I}) \, u_{ol} + (827541799625 - 641043850875 \, \mathrm{I}) \, u_{ol+1} - (1193555205000 + 302411756000 \, \mathrm{I}) \, u_{ol+2} + (29975818100 + 198855195300 \, \mathrm{I}) \, u_{ol+3} + (5123089250 + 1590333175 \, \mathrm{I}) \, u_{ol+4} + (26373592 + 16093129 \, \mathrm{I}) \, u_{ol+5} \big), \, O(\Delta x_{ol}^{18})$$

Formula:, 500, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 4

Error order:, 17, Error:, 1.9843684763166750608 × 10<sup>-41</sup>, New Error:, 1.9344547272621284975 × 10<sup>-58</sup>

Error order:, 17, Error:, 1.9344547272621284975 × 10<sup>-58</sup>, New Error:, 1.9294962029465474949 × 10<sup>-75</sup>

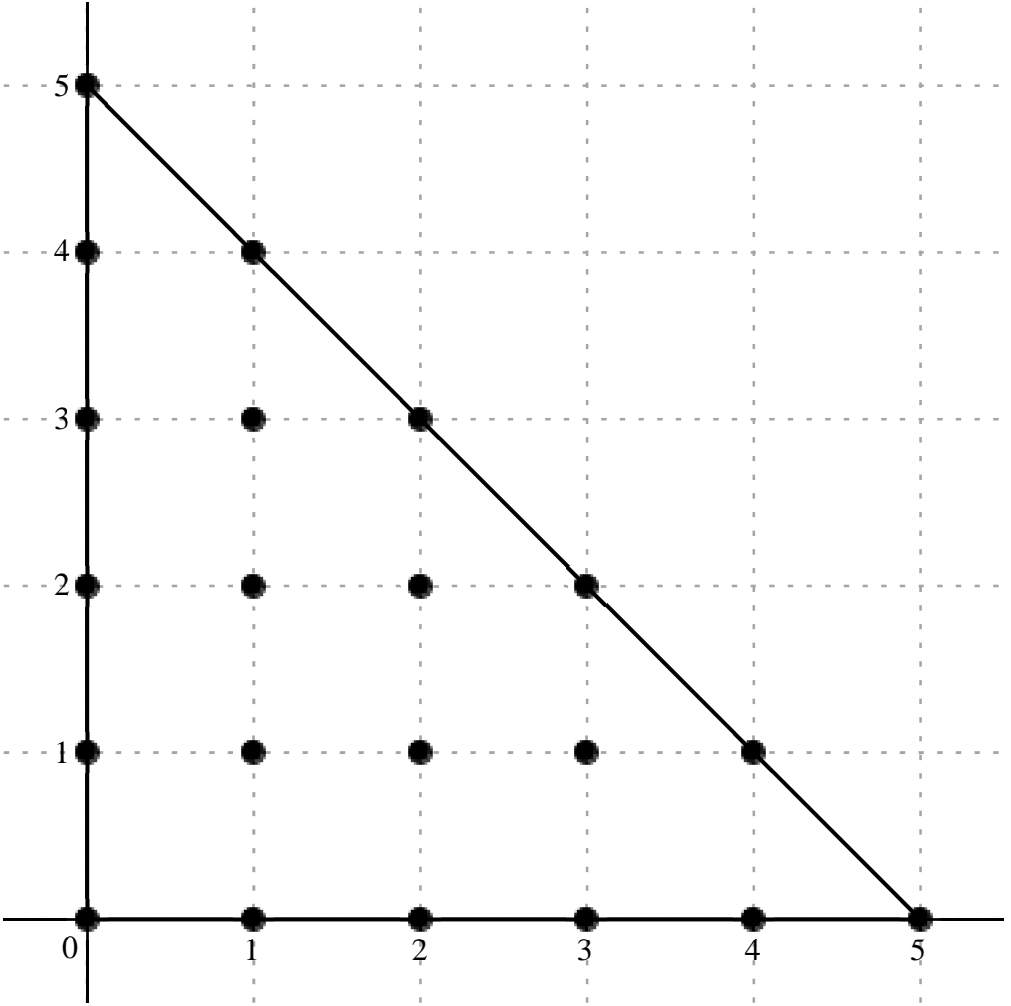
Error order:, 17, Error:, 1.9294962029465474949 × 10<sup>-75</sup>, New Error:, 1.9290006800079784319 × 10<sup>-92</sup>

Error order:, 17, Error:, 1.9290006800079784319 × 10<sup>-92</sup>, New Error:, 1.9289511310100156943 × 10<sup>-109</sup>

Error order:, 17, Error:, 1.9289511310100156943 × 10<sup>-109</sup>, New Error:, 1.9289461761431793242 × 10<sup>-126</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccccc} 5\mathrm{I} & & & & & \\ 4\mathrm{I} & 1+4\mathrm{I} & & & & \\ 3\mathrm{I} & 1+3\mathrm{I} & 2+3\mathrm{I} & & & \\ 2\mathrm{I} & 1+2\mathrm{I} & 2+2\mathrm{I} & 3+2\mathrm{I} & & \\ 1 & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & 4+\mathrm{I} & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccc} -\frac{16511368357}{26276900000} & -\frac{13209804533 \text{ I}}{78830700000} & & & & & & \\ & -\frac{5316004819}{54366000} & -\frac{2993312711 \text{ I}}{54366000} & \frac{1035515317}{2652000} & -\frac{718314089 \text{ I}}{2652000} & & & \\ & -\frac{1140048523}{331500} & +\frac{194537021 \text{ I}}{82875} & -\frac{458995583}{9375} & +\frac{3579464747 \text{ I}}{121875} & -\frac{100398437}{7800} & -\frac{2943262 \text{ I}}{325} & \\ \frac{39910387561}{1922700} & +\frac{26681973499 \text{ I}}{1922700} & \frac{177010179}{32500} & -\frac{5578976757 \text{ I}}{8125} & & -\frac{159907032}{325} & & -\frac{100398437}{7800} & +\frac{2943262 \text{ I}}{325} \\ & -\frac{15594617}{17680} & -\frac{659828011 \text{ I}}{33150} & \frac{730479934}{1275} & & \frac{177010179}{32500} & +\frac{5578976757 \text{ I}}{8125} & -\frac{458995583}{9375} & -\frac{3579464747 \text{ I}}{121875} & \frac{1035515317}{2652000} & +\frac{718314089 \text{ I}}{2652000} \\ & & -\frac{5275233997}{3315000} & & -\frac{15594617}{17680} & +\frac{659828011 \text{ I}}{33150} & \frac{39910387561}{1922700} & -\frac{26681973499 \text{ I}}{1922700} & -\frac{1140048523}{331500} & -\frac{194537021 \text{ I}}{82875} & -\frac{5316004819}{54366000} & +\frac{2993312711 \text{ I}}{54366000} & -\frac{16511368357}{26276900000} & +\frac{13209804533 \text{ I}}{78830700000} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{78830700000 \, \Delta x_{ol}^4} \, \big( -(49534105071 + 13209804533 \, \text{I}) \, u_{ol+51} - (7708206987550 + 4340303430950 \, \text{I}) \, u_{ol+41} + (30780692797825 - 21351886295525 \, \text{I}) \, u_{ol+1+41} + ( -271103538769400 + 185043614375200 \, \text{I}) \, u_{ol+31} + ( -3859513931178464 + 2315255069795552 \, \text{I}) \, u_{ol+1+31} - (1014676803540500$$

$$+ 713905857672000 \, \text{I}) \, u_{ol+2+31} + (1636325890001000 + 1093960913459000 \, \text{I}) \, u_{ol+21} + (429348809775240 - 54128571450835680 \, \text{I}) \, u_{ol+1+21} - 38786410053792000 \, u_{ol+2+21} + ( -1014676803540500 + 713905857672000 \, \text{I}) \, u_{ol+3+21} - (69532498548750 + 1569071010158000 \, \text{I}) \, u_{ol+1} + 45164113359352000 \, u_{ol+1+1}$$

$$+ (429348809775240 + 54128571450835680 \, \text{I}) \, u_{ol+2+1} - (3859513931178464 + 2315255069795552 \, \text{I}) \, u_{ol+3+1} + (30780692797825 + 21351886295525 \, \text{I}) \, u_{ol+4+1} - 125445064448660 \, u_{ol} + ( -69532498548750 + 1569071010158000 \, \text{I}) \, u_{ol+1} + (1636325890001000 - 1093960913459000 \, \text{I}) \, u_{ol+2} - (271103538769400$$

$$+ 185043614375200 \, \text{I}) \, u_{ol+3} + ( -7708206987550 + 4340303430950 \, \text{I}) \, u_{ol+4} + ( -49534105071 + 13209804533 \, \text{I}) \, u_{ol+5} \big), \, O( \, \Delta x_{ol}^{17} \, )$$

Formula:, 501, Var:, 1

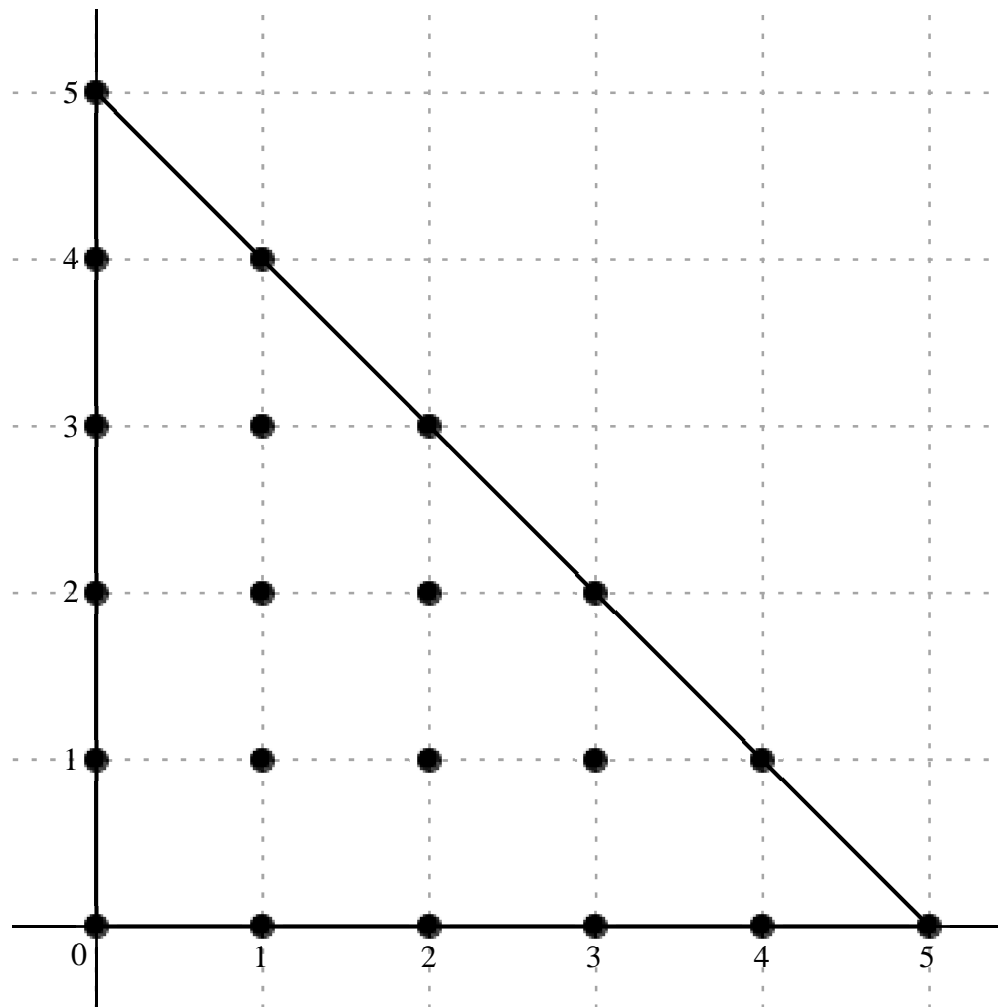
Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 5

Error order:, 16, Error:, 1.5415198828936716076 × 10<sup>−38</sup>, New Error:, 1.5230010287139189044 × 10<sup>−54</sup>

*Error order:*, 16, *Error:*,  $1.5230010287139189044 \times 10^{-54}$ , *New Error:*,  $1.5211406488616603408 \times 10^{-70}$   
*Error order:*, 16, *Error:*,  $1.5211406488616603408 \times 10^{-70}$ , *New Error:*,  $1.5209545285799413603 \times 10^{-86}$   
*Error order:*, 16, *Error:*,  $1.5209545285799413603 \times 10^{-86}$ , *New Error:*,  $1.5209359157314347048 \times 10^{-102}$   
*Error order:*, 16, *Error:*,  $1.5209359157314347048 \times 10^{-102}$ , *New Error:*,  $1.5209340544383833201 \times 10^{-118}$

$$x_o \neq h., \left[ \begin{array}{cccccc} 5 \text{ I} & & & & & \\ 4 \text{ I} & 1+4 \text{ I} & & & & \\ 3 \text{ I} & 1+3 \text{ I} & 2+3 \text{ I} & & & \\ 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} & 3+2 \text{ I} & & \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

[illegible]



$$\frac{d^5}{dx_{oI}^5} u(x_{oI}) = \frac{1}{3153228000 \Delta_{\mathbf{c}_{oI}}^5} \left( (12976206851 - 7092038272 \text{ I}) u_{oI+51} + (2460166081930 - 608971259057 \text{ I}) u_{oI+41} + (-2118493139211 + 10475848520172 \text{ I}) u_{oI+1+41} + (20699245254924 - 90645486604212 \text{ I}) u_{oI+31} + (334693485804448 - 1223450594054944 \text{ I}) u_{oI+1+31} + (345938538696050 - 57156869904470 \text{ I}) u_{oI+2+31} \right. \\ \left. + (-539457690285100 + 78606156142140 \text{ I}) u_{oI+21} + (10273640330414340 + 10851813742423140 \text{ I}) u_{oI+1+21} + (7657226927632890 - 7657226927632890 \text{ I}) u_{oI+2+21} + (57156869904470 - 345938538696050 \text{ I}) u_{oI+3+21} + (282049854099535 + 296157894719235 \text{ I}) u_{oI+1} + (-8529875366725440 + 8529875366725440 \text{ I}) u_{oI+1+1} \right. \\ \left. - (10851813742423140 + 10273640330414340 \text{ I}) u_{oI+2+1} + (1223450594054944 - 334693485804448 \text{ I}) u_{oI+3+1} + (-10475848520172 + 2118493139211 \text{ I}) u_{oI+4+1} + (19914653902515 - 19914653902515 \text{ I}) u_{oI} - (296157894719235 + 282049854099535 \text{ I}) u_{oI+1} + (-78606156142140 + 539457690285100 \text{ I}) u_{oI+2} \right)$$

$$+ (90645486604212 - 20699245254924 \text{ I}) u_{ol+3} + (608971259057 - 2460166081930 \text{ I}) u_{ol+4} + (7092038272 - 12976206851 \text{ I}) u_{ol+5}), O(\Delta_{ol}^{16})$$

Formula:, 502, Var:, 1

*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :,  $\epsilon$

*Error order:*, 15, *Error:*,  $8.1835142070708114887 \times 10^{-36}$ , *New Error:*,  $7.9793501834539753457 \times 10^{-5}$

*Error order:*, 15, *Error:*,  $7.9793501834539753457 \times 10^{-51}$ , *New Error:*,  $7.9590671242202043927 \times 10^{-61}$

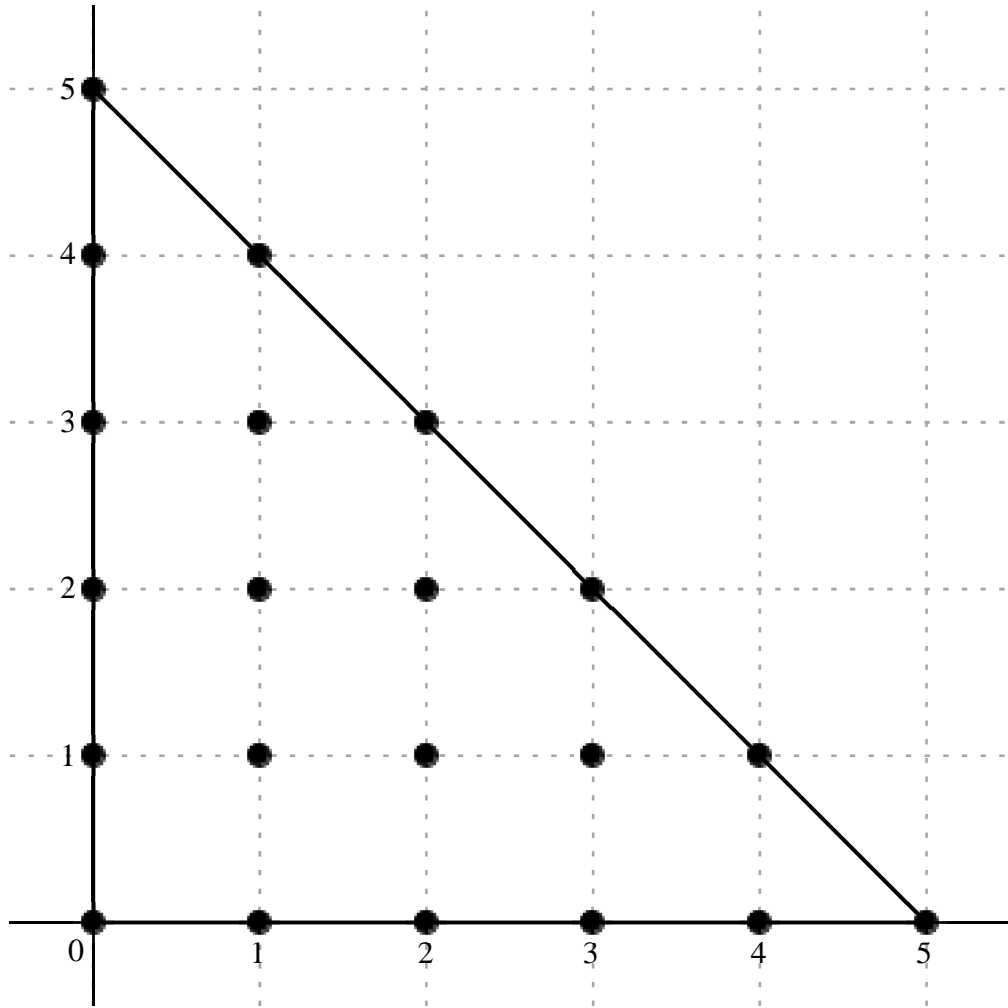
*Error order:*, 15, *Error:*,  $7.9590671242202043927 \times 10^{-66}$ , *New Error:*,  $7.9570401557047964482 \times 10^{-8}$

*Error order:*, 15, *Error:*,  $7.9570401557047964482 \times 10^{-81}$ , *New Error:*,  $7.9568374722312207633 \times 10^{-90}$

*Error order:*, 15, *Error:*,  $7.9568374722312207633 \times 10^{-96}$ , *New Error:*,  $7.9568172040176467222 \times 10^{-11}$

$$x_o + h \cdot , \left[ \begin{array}{ccccc} 5 \text{ I} & & & & \\ 4 \text{ I} & 1+4 \text{ I} & & & \\ 3 \text{ I} & 1+3 \text{ I} & 2+3 \text{ I} & & \\ 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} & 3+2 \text{ I} & \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

[illegible]



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u\big(x_{ol}\big) = \frac{1}{2102152000 \, \Delta x_{ol}^6} \big( (-19742856251 + 61305088937 \, \mathrm{I}) \, u_{ol+51} + (-5951927184122 + 9197192300030 \, \mathrm{I}) \, u_{ol+41} - (24610903494531 + 38884877063823 \, \mathrm{I}) \, u_{ol+1+41} + (197773813634624 + 344141212507048 \, \mathrm{I}) \, u_{ol+31} + (2565822501724384 + 4742444875356128 \, \mathrm{I}) \, u_{ol+1+31} + (-881564521768880$$

$$+ 1208033042844380 \, \mathrm{I}) \, u_{ol+2+31} + (1448231254930080 - 1750338897994000 \, \mathrm{I}) \, u_{ol+21} - (62170116703833600 + 2881266259388760 \, \mathrm{I}) \, u_{ol+1+21} + 45624387086430120 \, \mathrm{I} u_{ol+2+21} + (881564521768880 + 1208033042844380 \, \mathrm{I}) \, u_{ol+3+21} - (1603419967475160 + 132466721272390 \, \mathrm{I}) \, u_{ol+1}$$

$$- 48725458767560640 \, \mathrm{I} u_{ol+1+1} + (62170116703833600 - 2881266259388760 \, \mathrm{I}) \, u_{ol+2+1} + (-2565822501724384 + 4742444875356128 \, \mathrm{I}) \, u_{ol+3+1} + (24610903494531 - 38884877063823 \, \mathrm{I}) \, u_{ol+4+1} + 99229936375420 \, \mathrm{I} u_{ol} + (1603419967475160 - 132466721272390 \, \mathrm{I}) \, u_{ol+1} - (1448231254930080 + 1750338897994000 \, \mathrm{I}) \, u_{ol+2} + (-197773813634624$$

$$+ 344141212507048 \, \mathrm{I}) \, u_{ol+3} + (5951927184122 + 9197192300030 \, \mathrm{I}) \, u_{ol+4} + (19742856251 + 61305088937 \, \mathrm{I}) \, u_{ol+5} \big), \, O(\, \Delta x_{ol}^{15} \, )$$

Formula:, 503, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 7

Error order:, 14, Error:, 5.2900249351057518391 × 10−33, New Error:, 5.2270626464016712442 × 10−47

Error order:, 14, Error:, 5.2270626464016712442 × 10−47, New Error:, 5.2207377970629225916 × 10−61

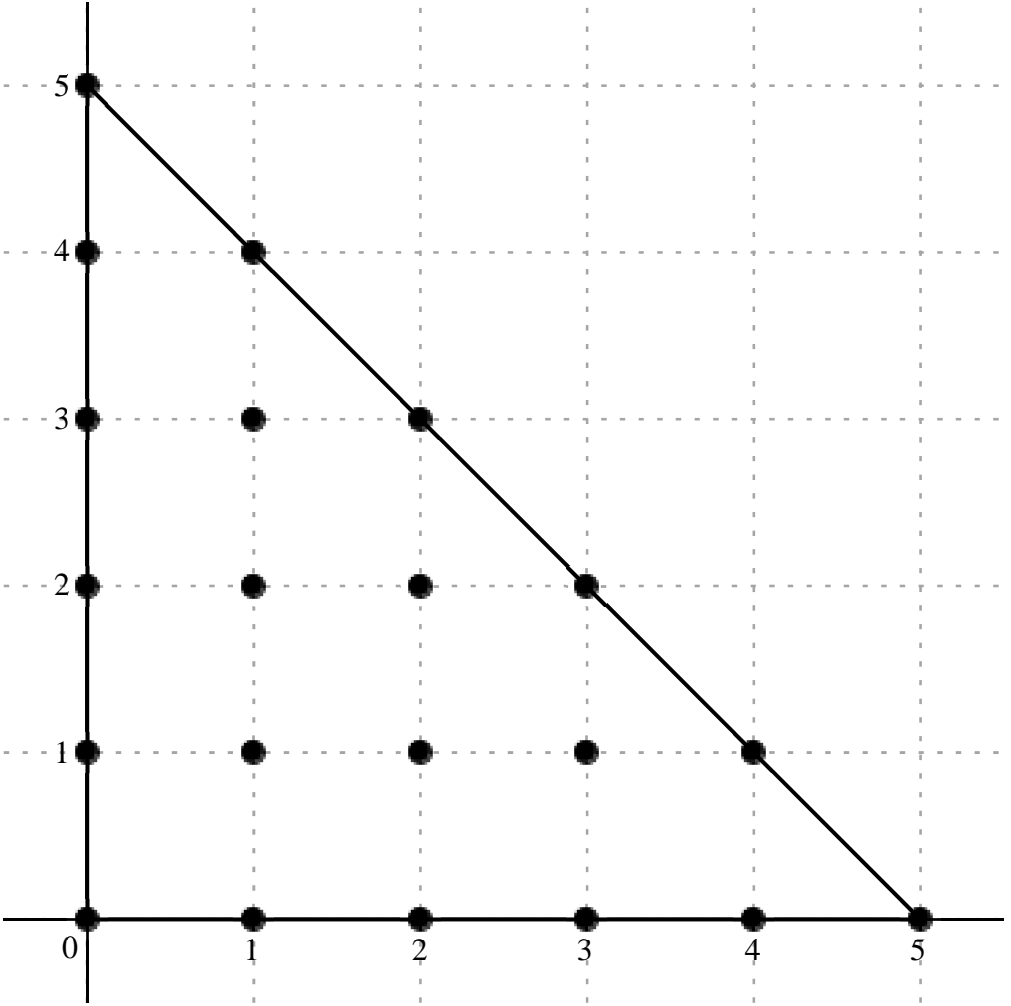
Error order:, 14, Error:, 5.2207377970629225916 × 10−61, New Error:, 5.2201050347754063631 × 10−75

Error order:, 14, Error:, 5.2201050347754063631 × 10−75, New Error:, 5.2200417557819107391 × 10−89

Error order:, 14, Error:, 5.2200417557819107391 × 10−89, New Error:, 5.2200354278549225232 × 10−103

$$x_o \neq h. , \left[ \begin{array}{cccccc} 5 \, \mathrm{I} & & & & & \\ 4 \, \mathrm{I} & 1+4 \, \mathrm{I} & & & & \\ 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & 2+3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & 3+2 \, \mathrm{I} & & \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & 4+\mathrm{I} & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} -\frac{41344335039}{525538000} & -\frac{346245716103 \text{ I}}{2102152000} & & & & & & & & & & \\ -\frac{1577264857}{289952} & -\frac{549172839789 \text{ I}}{18122000} & \frac{3454982517}{27625} & + \frac{3234728707 \text{ I}}{104000} & & & & & & & & \\ -\frac{464040911313}{442000} & -\frac{145712521031 \text{ I}}{442000} & -\frac{46087644337}{3250} & -\frac{14881925919 \text{ I}}{3250} & -\frac{6277040091}{10400} & -\frac{656787537 \text{ I}}{160} & & & & & & \\ \frac{5444548473}{19720} & + \frac{604841970621 \text{ I}}{98600} & \frac{658561770657}{5200} & -\frac{23133967353 \text{ I}}{208} & -\frac{459717699609}{5200} & -\frac{459717699609 \text{ I}}{5200} & -\frac{656787537}{160} & -\frac{6277040091 \text{ I}}{10400} & & & & \\ \frac{1158467693971}{353600} & -\frac{886970084119 \text{ I}}{353600} & \frac{38546019344}{425} & + \frac{38546019344 \text{ I}}{425} & -\frac{23133967353}{208} & + \frac{658561770657 \text{ I}}{5200} & -\frac{14881925919}{3250} & -\frac{46087644337 \text{ I}}{3250} & \frac{3234728707}{104000} & + \frac{3454982517 \text{ I}}{27625} & & \\ -\frac{5843779151}{35360} & -\frac{5843779151 \text{ I}}{35360} & -\frac{886970084119}{353600} & + \frac{1158467693971 \text{ I}}{353600} & \frac{604841970621}{98600} & + \frac{5444548473 \text{ I}}{19720} & -\frac{145712521031}{442000} & -\frac{464040911313 \text{ I}}{442000} & -\frac{549172839789}{18122000} & -\frac{1577264857 \text{ I}}{289952} & -\frac{346245716103}{2102152000} & -\frac{41344335039 \text{ I}}{525538000} \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{2102152000 \, \Delta x_{ol}^7} \big( 7 \, \big( -(23625334308 + 49463673729 \, \text{I}) \, u_{ol+51} - (1633595744750 + 9100578487932 \, \text{I}) \, u_{ol+41} + (37558621373376 + 9340510193513 \, \text{I}) \, u_{ol+1+41} - (315282653457804 + 99001250003348 \, \text{I}) \, u_{ol+31} - (4258603679925856 + 1375123970746272 \, \text{I}) \, u_{ol+1+31} - (181254016227690 \\ + 1232738602213950 \, \text{I}) \, u_{ol+2+31} + (82912695317400 + 1842175830519960 \, \text{I}) \, u_{ol+21} + (38032883057971260 - 33400491579013500 \, \text{I}) \, u_{ol+1+21} - (26549353891990620 + 26549353891990620 \, \text{I}) \, u_{ol+2+21} - (1232738602213950 + 181254016227690 \, \text{I}) \, u_{ol+3+21} + (983870062951085 - 753291021441065 \, \text{I}) \, u_{ol+1} \\ + (27236837531438080 + 27236837531438080 \, \text{I}) \, u_{ol+1+1} + (-33400491579013500 + 38032883057971260 \, \text{I}) \, u_{ol+2+1} - (1375123970746272 + 4258603679925856 \, \text{I}) \, u_{ol+3+1} + (9340510193513 + 37558621373376 \, \text{I}) \, u_{ol+4+1} - (49630381503850 + 49630381503850 \, \text{I}) \, u_{ol} + (-753291021441065 + 983870062951085 \, \text{I}) \, u_{ol+1} \\ + (1842175830519960 + 82912695317400 \, \text{I}) \, u_{ol+2} - (99001250003348 + 315282653457804 \, \text{I}) \, u_{ol+3} - (9100578487932 + 1633595744750 \, \text{I}) \, u_{ol+4} - (49463673729 + 23625334308 \, \text{I}) \, u_{ol+5} \big) \big) , \, O( \, \Delta x_{ol}^{14} \, )$$

Formula:, 504, Var.:, 1

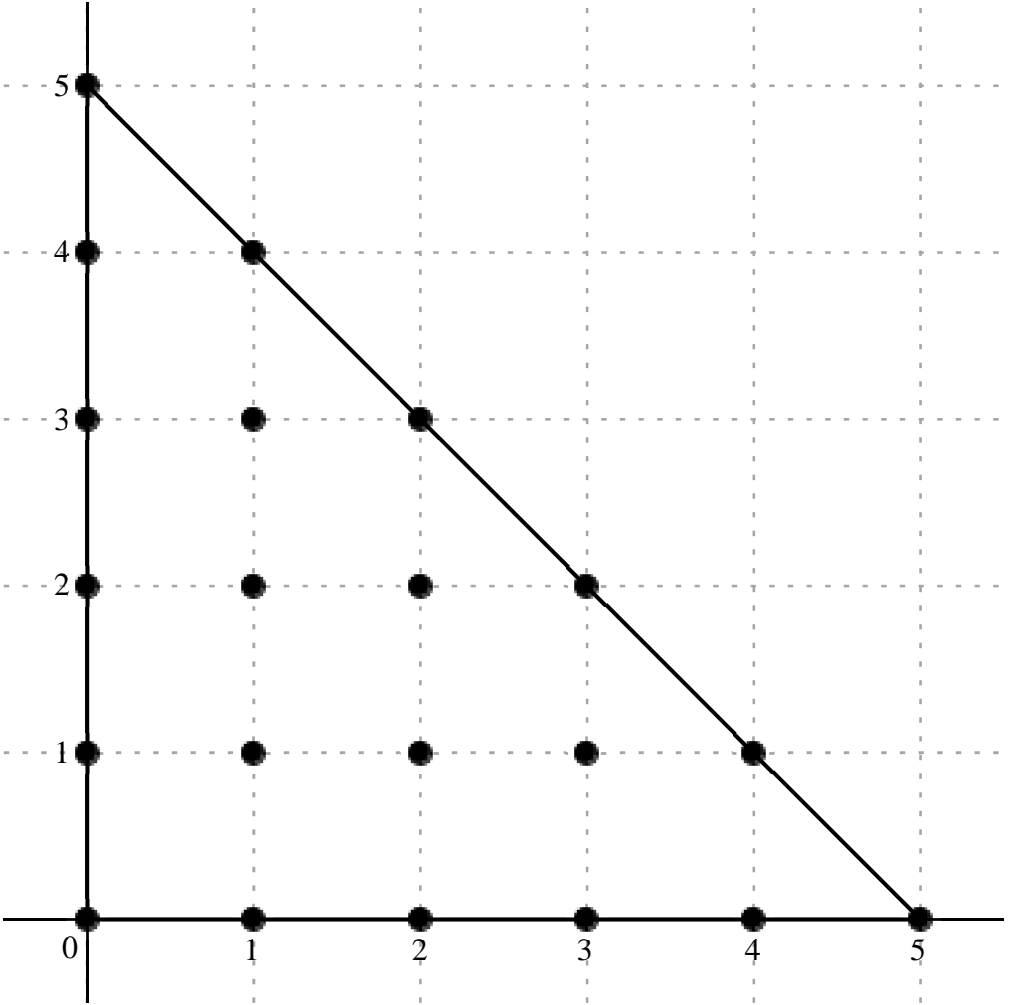
Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 8

Error order:., 13, Error:., 2.3589956153410467271 × 10<sup>−30</sup>, New Error:., 2.3007627469495884846 × 10<sup>−43</sup>

*Error order:*, 13,    *Error:*,  $2.3007627469495884846 \times 10^{-43}$ ,    *New Error:*,  $2.2949771241677465250 \times 10^{-56}$   
*Error order:*, 13,    *Error:*,  $2.2949771241677465250 \times 10^{-56}$ ,    *New Error:*,  $2.2943989396428891000 \times 10^{-69}$   
*Error order:*, 13,    *Error:*,  $2.2943989396428891000 \times 10^{-69}$ ,    *New Error:*,  $2.2943411249690240553 \times 10^{-82}$   
*Error order:*, 13,    *Error:*,  $2.2943411249690240553 \times 10^{-82}$ ,    *New Error:*,  $2.2943353435394248428 \times 10^{-95}$

$$c =,$$

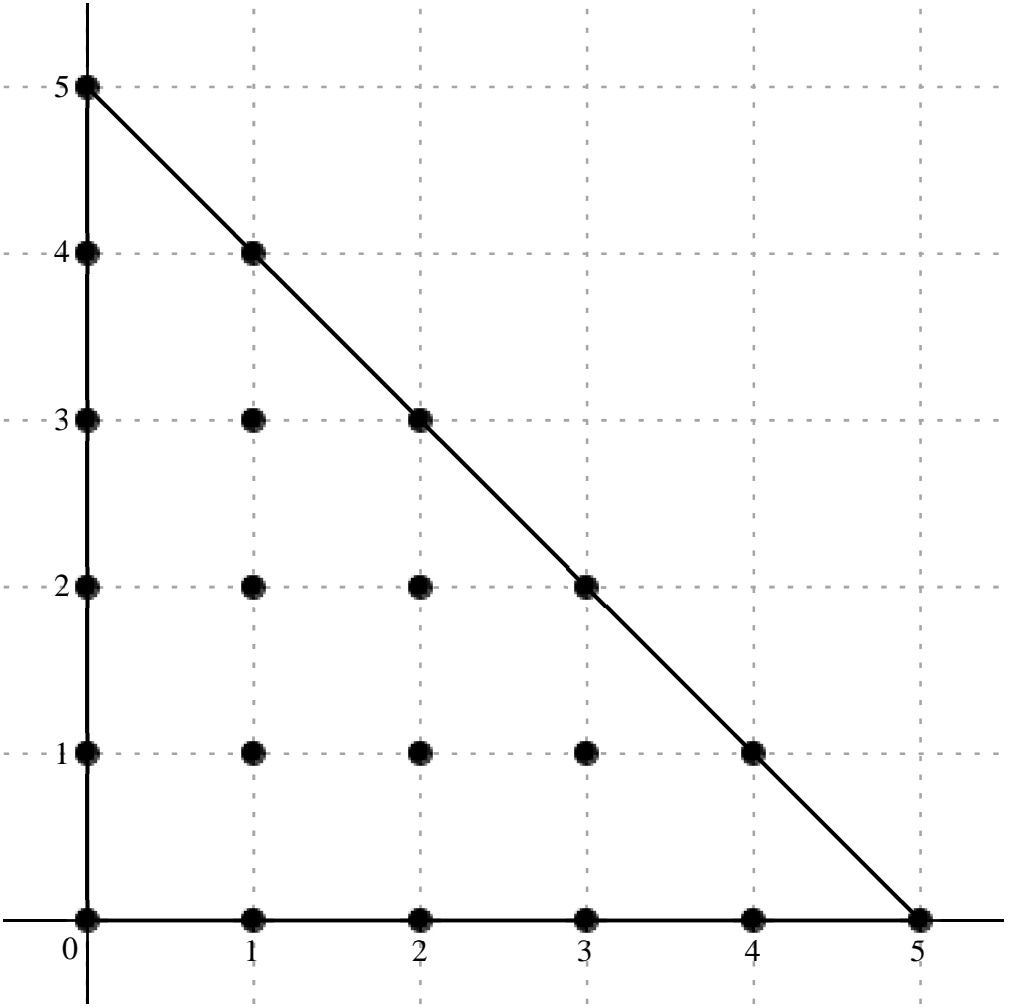
$$\left[ \begin{array}{cccccc} \frac{83928634951}{90610000} + \frac{32563844523 \text{ I}}{90610000} & & & & & \\ \frac{92612377347}{697000} + \frac{36083947473 \text{ I}}{362440} & -\frac{266078520491}{442000} + \frac{151633506577 \text{ I}}{442000} & & & & \\ \frac{11242933723}{2125} - \frac{137508653779 \text{ I}}{55250} & \frac{578224445442}{8125} - \frac{279178109406 \text{ I}}{8125} & \frac{5724149739}{325} + \frac{17356746001 \text{ I}}{1300} & & & \\ -\frac{123875615444}{5525} - \frac{24897710873 \text{ I}}{1105} & -\frac{117583267599}{1625} + \frac{2837988387171 \text{ I}}{3250} & \frac{427566304683}{650} & \frac{5724149739}{325} - \frac{17356746001 \text{ I}}{1300} & & \\ -\frac{39124422561}{11050} + \frac{886855008879 \text{ I}}{44200} & -\frac{276009760348}{425} & -\frac{117583267599}{1625} - \frac{2837988387171 \text{ I}}{3250} & \frac{578224445442}{8125} + \frac{279178109406 \text{ I}}{8125} & -\frac{266078520491}{442000} - \frac{151633506577 \text{ I}}{442000} & \\ \frac{119181167203}{110500} & -\frac{39124422561}{11050} - \frac{886855008879 \text{ I}}{44200} & -\frac{123875615444}{5525} + \frac{24897710873 \text{ I}}{1105} & \frac{11242933723}{2125} + \frac{137508653779 \text{ I}}{55250} & \frac{92612377347}{697000} - \frac{36083947473 \text{ I}}{362440} & \frac{83928634951}{90610000} - \frac{32563844523 \text{ I}}{90610000} \end{array} \right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x} u(x_{ol}) = \frac{1}{90610000 \Delta x_{ol}^8} \big( 7 \big( (11989804993 + 4651977789 \text{ I}) u_{ol+51} + (1719944150730 + 1288712409750 \text{ I}) u_{ol+41} + (-7792299528665 + 4440695549755 \text{ I}) u_{ol+1+41} + (68485527706960 - 32216313171080 \text{ I}) u_{ol+31} + (921194145081312 - 444770610870816 \text{ I}) u_{ol+1+31} + (227984706747600 + 172823599467100 \text{ I}) u_{ol+2+31} \\ - (290222870468800 + 291658898798000 \text{ I}) u_{ol+21} + (-936634714474320 + 11303302319189640 \text{ I}) u_{ol+1+21} + 8514677553258600 u_{ol+2+21} + (227984706747600 - 172823599467100 \text{ I}) u_{ol+3+21} + (-45831466428600 + 259721824028850 \text{ I}) u_{ol+1} - 8406468700884800 u_{ol+1+1} - (936634714474320 \\ + 11303302319189640 \text{ I}) u_{ol+2+1} + (921194145081312 + 444770610870816 \text{ I}) u_{ol+3+1} - (7792299528665 + 4440695549755 \text{ I}) u_{ol+4+1} + 13961222443780 u_{ol} - (45831466428600 + 259721824028850 \text{ I}) u_{ol+1} + (-290222870468800 + 291658898798000 \text{ I}) u_{ol+2} + (68485527706960 + 32216313171080 \text{ I}) u_{ol+3} + (1719944150730$$







$$\frac{d^9}{dx_{ol}^9} u(x_{ol}) = \frac{1}{40426000 \Delta x_{ol}^9} (63 \left( (-2937689323 + 1182795506 I) u_{ol+5I} + (-520923202160 + 55035350416 I) u_{ol+4I} + (628071898923 - 2088267469146 I) u_{ol+1+4I} + (-6867428373492 + 16806669527196 I) u_{ol+3I} + (-86201326143104 + 229592663789312 I) u_{ol+1+3I} + (-68375464100350 + 8753024785810 I) u_{ol+2+3I} \right.$$
  
$$+ (96028658465600 + 4601374423680 I) u_{ol+2I} - (1687827101183820 + 2064493744664220 I) u_{ol+1+2I} + (-1432822272253920 + 1432822272253920 I) u_{ol+2+2I} + (-8753024785810 + 68375464100350 I) u_{ol+3+2I} - (32059370174105 + 49626712243905 I) u_{ol+1} + (1363714435221120 - 1363714435221120 I) u_{ol+1+1}$$
  
$$+ (2064493744664220 + 1687827101183820 I) u_{ol+2+1} + (-229592663789312 + 86201326143104 I) u_{ol+3+1} + (2088267469146 - 628071898923 I) u_{ol+4+1} + (-2093116170720 + 2093116170720 I) u_{ol} + (49626712243905 + 32059370174105 I) u_{ol+1} - (4601374423680 + 96028658465600 I) u_{ol+2} + (-16806669527196$$
  
$$+ 6867428373492 I) u_{ol+3} + (-55035350416 + 520923202160 I) u_{ol+4} + (-1182795506 + 2937689323 I) u_{ol+5} \Big), O(\Delta x_{ol}^{12})$$

Formula:, 506, Var.:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 10

Error order:., 11, Error:., 4.8080767412344766148 × 10<sup>-25</sup>, New Error:., 4.6910560002811609410 × 10<sup>-36</sup>

Error order:., 11, Error:., 4.6910560002811609410 × 10<sup>-36</sup>, New Error:., 4.6794286549543535309 × 10<sup>-47</sup>

Error order:., 11, Error:., 4.6794286549543535309 × 10<sup>-47</sup>, New Error:., 4.6782666698907639710 × 10<sup>-58</sup>

Error order:., 11, Error:., 4.6782666698907639710 × 10<sup>-58</sup>, New Error:., 4.6781504788812282174 × 10<sup>-69</sup>

Error order:., 11, Error:., 4.6781504788812282174 × 10<sup>-69</sup>, New Error:., 4.6781388598552450015 × 10<sup>-80</sup>

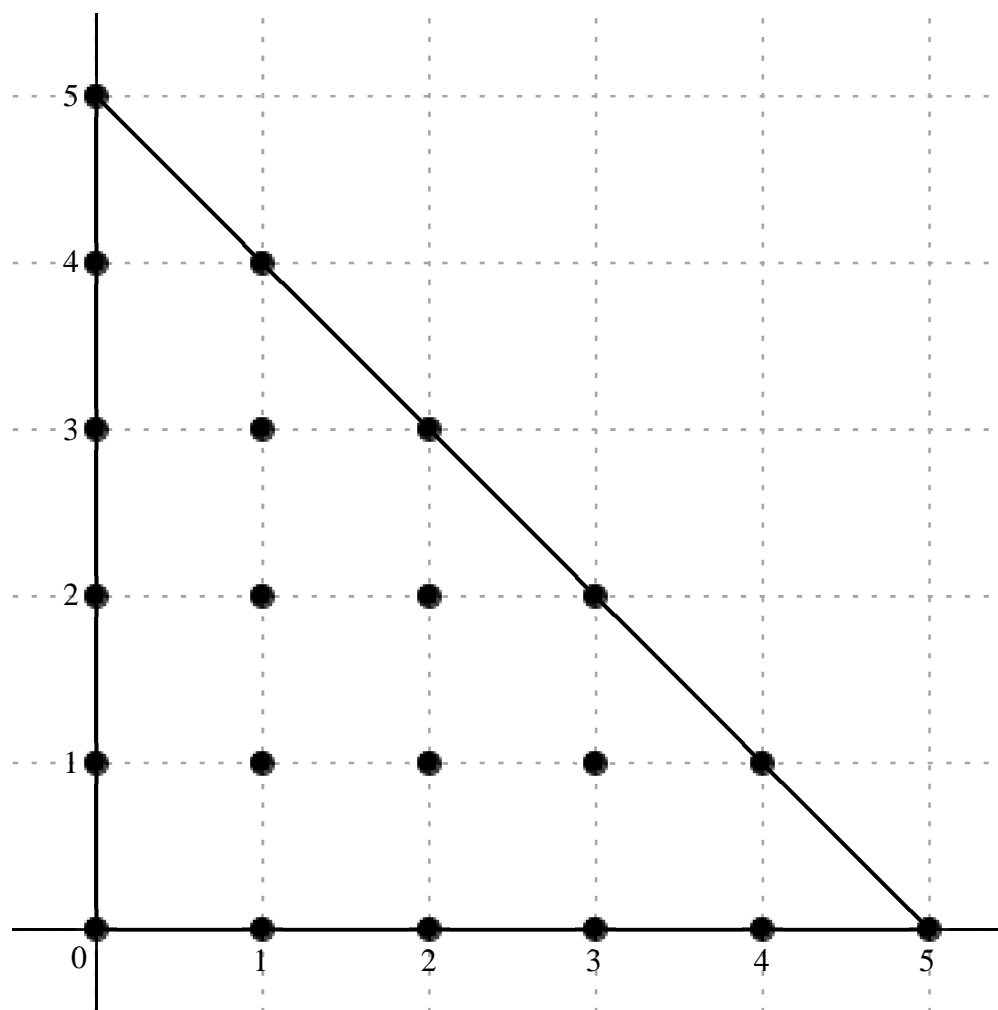
$$x_o \neq h. , \left[ \begin{array}{cccccc} 5 I & & & & & \\ 4 I & 1 + 4 I & & & & \\ 3 I & 1 + 3 I & 2 + 3 I & & & \\ 2 I & 1 + 2 I & 2 + 2 I & 3 + 2 I & & \\ I & 1 + I & 2 + I & 3 + I & 4 + I & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$



*Error order*:, 10, *Error*:,  $2.1565990252830151576 \times 10^{-62}$ , *New Error*:,  $2.1565964868466806334 \times 10^{-72}$

$$x_o \neq h., \left[ \begin{array}{cccccc} 5 \text{ I} & & & & & \\ 4 \text{ I} & 1+4 \text{ I} & & & & \\ 3 \text{ I} & 1+3 \text{ I} & 2+3 \text{ I} & & & \\ 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} & 3+2 \text{ I} & & \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

$$c = , \quad \begin{array}{cccccccccccccccc} \frac{22513710681}{808520} + \frac{35088701571 I}{404260} & & & & & & & & & & & & & & & \\ \frac{2617501887}{6970} + \frac{256514433021 I}{17425} & - \frac{195681303279}{3400} & - \frac{2067787953 I}{100} & & & & & & & & & & & & & \\ \frac{372935970099}{850} + \frac{191180467863 I}{850} & 6134441544 + \frac{13226326344 I}{5} & \frac{4088063133}{20} + \frac{7557390225 I}{4} & & & & & & & & & & & & & \\ \frac{161121758490}{493} - \frac{6060411789894 I}{2465} & - \frac{556062310881}{10} + \frac{84933738351 I}{2} & \frac{192646977831}{5} + \frac{192646977831 I}{5} & \frac{7557390225}{4} + \frac{4088063133 I}{20} & & & & & & & & & & & & \\ -\frac{841768334253}{680} + \frac{473075811747 I}{680} & -\frac{2910096615888}{85} - \frac{2910096615888 I}{85} & \frac{84933738351}{2} - \frac{556062310881 I}{10} & \frac{13226326344}{5} + 6134441544 I & - \frac{2067787953}{100} & - \frac{195681303279 I}{3400} & & & & & & & & & & \\ \frac{7863175089}{170} + \frac{7863175089 I}{170} & \frac{473075811747}{680} - \frac{841768334253 I}{680} & - \frac{6060411789894}{2465} + \frac{161121758490 I}{493} & \frac{191180467863}{850} + \frac{372935970099 I}{850} & \frac{256514433021}{17425} + \frac{2617501887 I}{6970} & \frac{35088701571}{404260} + \frac{22513710681 I}{808520} \end{array}$$



$$\frac{d^{11}}{dx_{ol}^{11}} u(x_{ol}) = \frac{1}{4042600 \Delta x_{ol}^{11}} (693 ((162436585 + 506330470 I) u_{ol+51} + (2190694220 + 85874961704 I) u_{ol+41} - (335736031167 + 120623947746 I) u_{ol+1+41} + (2559427812108 + 1312055274396 I) u_{ol+31} + (35785127540800 + 15431095780160 I) u_{ol+1+31} + (1192381242530 + 11021466711250 I) u_{ol+2+31} + (1906491226000 I) u_{ol+21} - (2432377705334420 + 247729531499100 I) u_{ol+1+21} + (224760367266840 + 224760367266840 I) u_{ol+2+21} + (11021466711250 + 1192381242530 I) u_{ol+3+21} + (-7221230515345 + 4058348774655 I) u_{ol+1} - (199717453176960 + 199717453176960 I) u_{ol+1+1} + (247729531499100 I) u_{ol+2+1} + (15431095780160 + 35785127540800 I) u_{ol+3+1} - (120623947746 + 335736031167 I) u_{ol+4+1} + (269821505940 + 269821505940 I) u_{ol} + (4058348774655 - 7221230515345 I) u_{ol+1} + (-14342100051120 + 1906491226000 I) u_{ol+2} + (1312055274396 + 2559427812108 I) u_{ol+3} + (85874961704 I) u_{ol+4})$$

$+2190694220 \operatorname{I} \left. u_{oI+4} + \left( 506330470 + 162436585 \operatorname{I} \right) u_{oI+5} \right) \Big) , \; O( \; \Delta x_{oI}^{10} \; )$

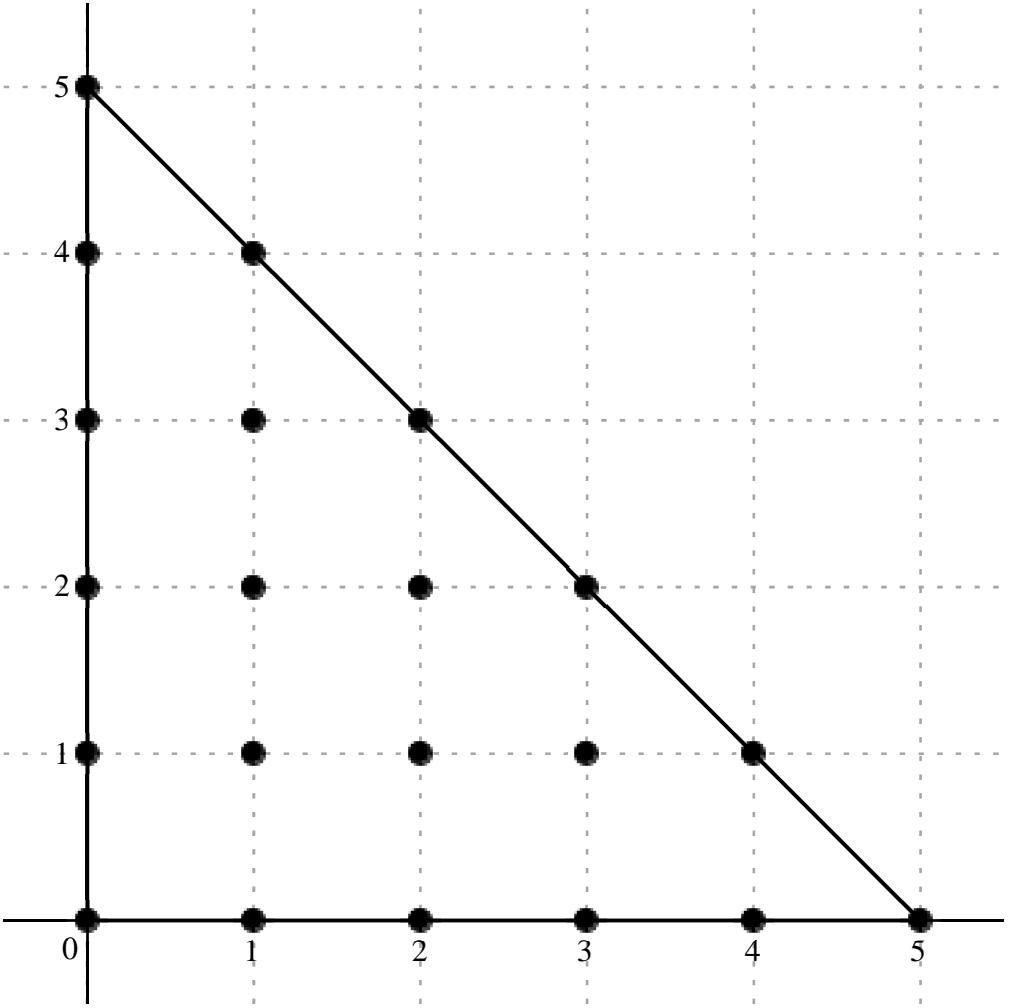
Formula.: 508, Var.: 1

Variavel .:  $x_{oI}$ , Derivada de Ordem .: 12

Error order.: 9, Error.:  $6.7578144699744354666 \times 10^{-20}$ , New Error.:  $6.5965732493740993010 \times 10^{-29}$   
Error order.: 9, Error.:  $6.5965732493740993010 \times 10^{-29}$ , New Error.:  $6.5805503271875959610 \times 10^{-38}$   
Error order.: 9, Error.:  $6.5805503271875959610 \times 10^{-38}$ , New Error.:  $6.5789490498752202602 \times 10^{-47}$   
Error order.: 9, Error.:  $6.5789490498752202602 \times 10^{-47}$ , New Error.:  $6.5787889322958884098 \times 10^{-56}$   
Error order.: 9, Error.:  $6.5787889322958884098 \times 10^{-56}$ , New Error.:  $6.5787729206394771185 \times 10^{-65}$

$$x_o + h . , \left[ \begin{array}{ccccc} 5 \operatorname{I} & & & & \\ 4 \operatorname{I} & 1 + 4 \operatorname{I} & & & \\ 3 \operatorname{I} & 1 + 3 \operatorname{I} & 2 + 3 \operatorname{I} & & \\ 2 \operatorname{I} & 1 + 2 \operatorname{I} & 2 + 2 \operatorname{I} & 3 + 2 \operatorname{I} & \\ \operatorname{I} & 1 + \operatorname{I} & 2 + \operatorname{I} & 3 + \operatorname{I} & 4 + \operatorname{I} \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} -\frac{1471418156439}{5053250} & -\frac{416542845411 \operatorname{I}}{2526625} & & & & & & \\ -\frac{645828216957}{17425} & -\frac{133668641799 \operatorname{I}}{3485} & \frac{86275317051}{425} & -\frac{75483523269 \operatorname{I}}{850} & & & & \\ -\frac{718483576734}{425} & +\frac{197709070482 \operatorname{I}}{425} & -\frac{2796085652976}{125} & +\frac{1033182733968 \operatorname{I}}{125} & -\frac{26390370699}{5} & -\frac{21681643599 \operatorname{I}}{5} & & \\ \frac{12231951310656}{2465} & +\frac{3468100199256 \operatorname{I}}{493} & \frac{910427526162}{25} & -\frac{6065252491914 \operatorname{I}}{25} & -\frac{967175407044}{5} & -\frac{26390370699}{5} & +\frac{21681643599 \operatorname{I}}{5} & \\ \frac{239751171891}{170} & -\frac{777228534621 \operatorname{I}}{170} & \frac{14145053164704}{85} & \frac{910427526162}{25} & +\frac{6065252491914 \operatorname{I}}{25} & -\frac{2796085652976}{125} & -\frac{1033182733968 \operatorname{I}}{125} & \frac{86275317051}{425} & +\frac{75483523269 \operatorname{I}}{850} \\ & -\frac{90648919746}{425} & \frac{239751171891}{170} & +\frac{777228534621 \operatorname{I}}{170} & \frac{12231951310656}{2465} & -\frac{3468100199256 \operatorname{I}}{493} & -\frac{718483576734}{425} & -\frac{197709070482 \operatorname{I}}{425} & -\frac{645828216957}{17425} & +\frac{133668641799 \operatorname{I}}{3485} & -\frac{1471418156439}{5053250} & +\frac{416542845411 \operatorname{I}}{2526625} \end{array} \right]$$



$$\frac{d^{12}}{dx_{ol}^{12}} u(x_{ol}) = \frac{1}{5053250 \Delta x_{ol}^{12}} \left( 2079 \left( -(707752841 + 400714618 I) u_{ol+5I} - (90086668070 + 93227287450 I) u_{ol+4I} + (493416796410 - 215848747395 I) u_{ol+1+4I} + (-4109076347940 + 1130717098620 I) u_{ol+3I} + (-54369677059744 + 20090161232992 I) u_{ol+1+3I} - (12828969767650 + 10539948582650 I) u_{ol+2+3I} \right. \right. \\ + (12061327651200 + 17098618106000 I) u_{ol+2I} + (88515976846140 - 589691912549580 I) u_{ol+1+2I} - 470166342053400 u_{ol+2+2I} + (-12828969767650 + 10539948582650 I) u_{ol+3+2I} + (3427899752025 - 11112610962775 I) u_{ol+1} + 404484565003200 u_{ol+1+1} + (88515976846140 + 589691912549580 I) u_{ol+2+1} \\ \left. \left. - (54369677059744 + 20090161232992 I) u_{ol+3+1} + (493416796410 + 215848747395 I) u_{ol+4+1} - 518429848860 u_{ol} + (3427899752025 + 11112610962775 I) u_{ol+1} + (12061327651200 - 17098618106000 I) u_{ol+2} - (4109076347940 + 1130717098620 I) u_{ol+3} + (-90086668070 + 93227287450 I) u_{ol+4} + (-707752841 + 400714618 I) u_{ol+5} \right) \right), \quad O(\Delta x_{ol}^9)$$

Formula:, 509, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 13

Error order:., 8, Error:.,  $2.5040369229665252210 \times 10^{-17}$ , New Error:.,  $2.4757756943378440230 \times 10^{-25}$

Error order:., 8, Error:.,  $2.4757756943378440230 \times 10^{-25}$ , New Error:.,  $2.4729373341589746441 \times 10^{-33}$

Error order:., 8, Error:.,  $2.4729373341589746441 \times 10^{-33}$ , New Error:.,  $2.4726533794014853744 \times 10^{-41}$

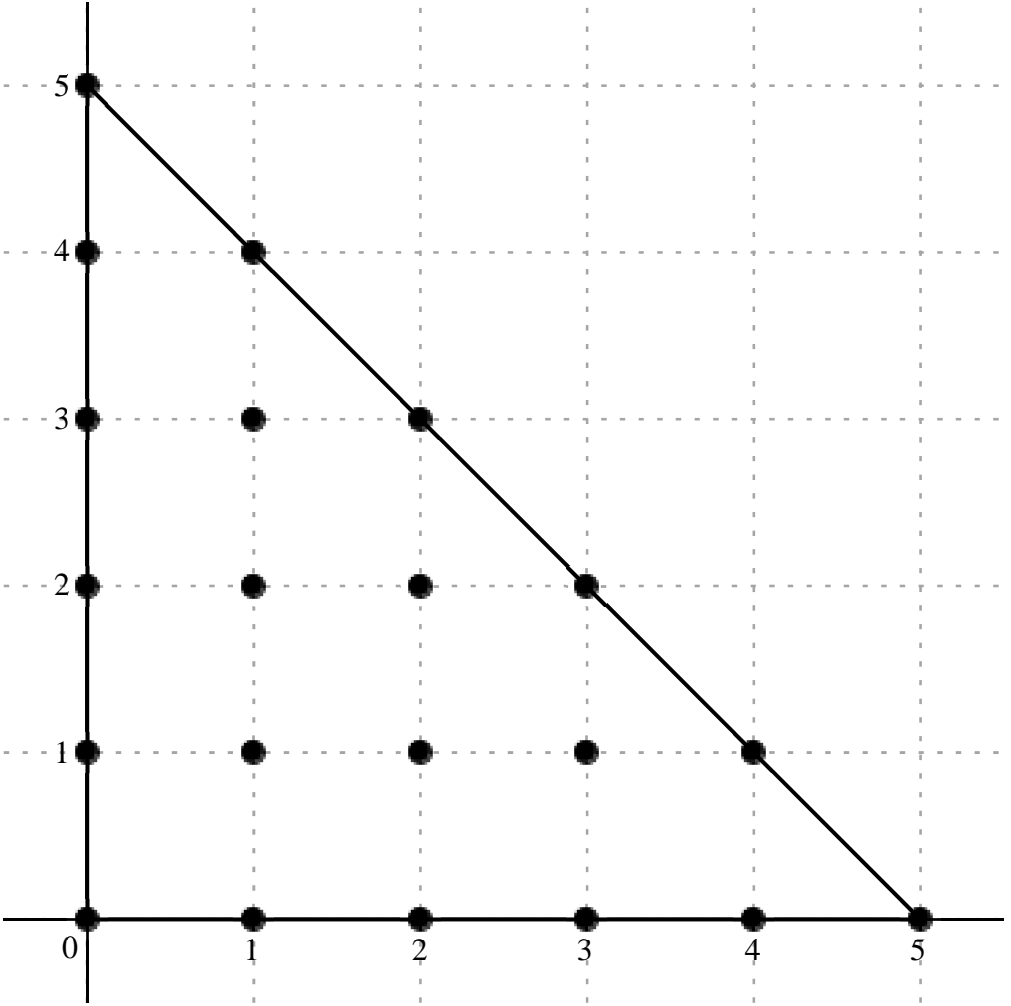
Error order:., 8, Error:.,  $2.4726533794014853744 \times 10^{-41}$ , New Error:.,  $2.4726249827419508131 \times 10^{-49}$

Error order:., 8, Error:.,  $2.4726249827419508131 \times 10^{-49}$ , New Error:.,  $2.4726221430641631087 \times 10^{-57}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} 5I & & & & & \\ 4I & 1+4I & & & & \\ 3I & 1+3I & 2+3I & & & \\ 2I & 1+2I & 2+2I & 3+2I & & \\ I & 1+I & 2+I & 3+I & 4+I & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

$$c = ,$$

$\frac{537596732673}{505325} - \frac{124158740706 \text{ I}}{505325}$									
$\frac{596708376264}{3485} + \frac{183983275476 \text{ I}}{17425}$	$-\frac{6987641661}{25} + \frac{279125720874 \text{ I}}{425}$								
$\frac{1249551290988}{425} - \frac{1993126979844 \text{ I}}{425}$	$\frac{833099275008}{25} - \frac{1698520247424 \text{ I}}{25}$	$\frac{21759325434}{5} - \frac{9516634974 \text{ I}}{5}$							
$-\frac{12810427405776}{493} - \frac{13515269944176 \text{ I}}{2465}$	$\frac{2226061665828}{5} + \frac{3111252131988 \text{ I}}{5}$	$\frac{2159641732248}{5} - \frac{2159641732248 \text{ I}}{5}$	$\frac{9516634974}{5} - 21759325434 \text{ I}$						
$\frac{545585319279}{85} + \frac{1093098285279 \text{ I}}{85}$	$-\frac{30614493926016}{85} + \frac{30614493926016 \text{ I}}{85}$	$-\frac{3111252131988}{5} - \frac{2226061665828 \text{ I}}{5}$	$\frac{1698520247424}{25} - \frac{833099275008 \text{ I}}{25}$	$-\frac{279125720874}{425} + \frac{6987641661 \text{ I}}{25}$					
$\frac{37433900196}{85} - \frac{37433900196 \text{ I}}{85}$	$-\frac{1093098285279}{85} - \frac{545585319279 \text{ I}}{85}$	$\frac{13515269944176}{2465} + \frac{12810427405776 \text{ I}}{493}$	$\frac{1993126979844}{425} - \frac{1249551290988 \text{ I}}{425}$	$-\frac{183983275476}{17425} - \frac{596708376264 \text{ I}}{3485}$	$\frac{124158740706}{505325} - \frac{537596732673 \text{ I}}{505325}$				



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}} \; u(x_{ol}) = \frac{1}{505325 \; \Delta x_{ol}^{13}} \Big( 2079 \Big( (258584287 - 59720414 \text{ I}) \; u_{ol+51} + (41617467320 + 2566385276 \text{ I}) \; u_{ol+41} + ( -67937085567 + 159634671534 \text{ I}) \; u_{ol+1+41} + (714630343908 - 1139888397804 \text{ I}) \; u_{ol+31} + (8099776645376 - 16513799788928 \text{ I}) \; u_{ol+1+31} + (5288855759950 - 462625643890 \text{ I}) \; u_{ol+2+31} - (6315867287600$$

$$+ 1332674525520 \text{ I}) \; u_{ol+21} + (108214007819580 + 151245164367180 \text{ I}) \; u_{ol+1+21} + (104985181178280 - 104985181178280 \text{ I}) \; u_{ol+2+21} + (462625643890 - 5288855759950 \text{ I}) \; u_{ol+3+21} + (1560127331945 + 3125766861945 \text{ I}) \; u_{ol+1} + ( -87543610577280 + 87543610577280 \text{ I}) \; u_{ol+1+1} - (151245164367180$$

$$+ 108214007819580 \text{ I}) \; u_{ol+2+1} + (16513799788928 - 8099776645376 \text{ I}) \; u_{ol+3+1} + ( -159634671534 + 67937085567 \text{ I}) \; u_{ol+4+1} + (107044029180 - 107044029180 \text{ I}) \; u_{ol} - (3125766861945 + 1560127331945 \text{ I}) \; u_{ol+1} + (1332674525520 + 6315867287600 \text{ I}) \; u_{ol+2} + (1139888397804 - 714630343908 \text{ I}) \; u_{ol+3} - (2566385276$$

$$+ 41617467320 \text{ I}) \; u_{ol+4} + (59720414 - 258584287 \text{ I}) \; u_{ol+5} \Big) \Big) , \; O( \; \Delta x_{ol}^8 \; )$$

Formula:; 510, Var:; 1

Variavel :; x<sub>ol</sub>, Derivada de Ordem :; 14

Error order:; 7, Error:; 6.1989326161622984522 × 10<sup>−15</sup>, New Error:; 6.0553837814667531795 × 10<sup>−22</sup>



Formula:, 511, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 15

*Error order:*, 6, *Error:*,  $1.7962103042826287017 \times 10^{-12}$ , *New Error:*,  $1.7767006071547648433 \times 10^{-18}$

*Error order:*, 6, *Error:*,  $1.7767006071547648433 \times 10^{-18}$ , *New Error:*,  $1.7747414569039294619 \times 10^{-24}$

*Error order:*, 6, *Error:*,  $1.7747414569039294619 \times 10^{-24}$ , *New Error:*,  $1.7745454624419810822 \times 10^{-30}$

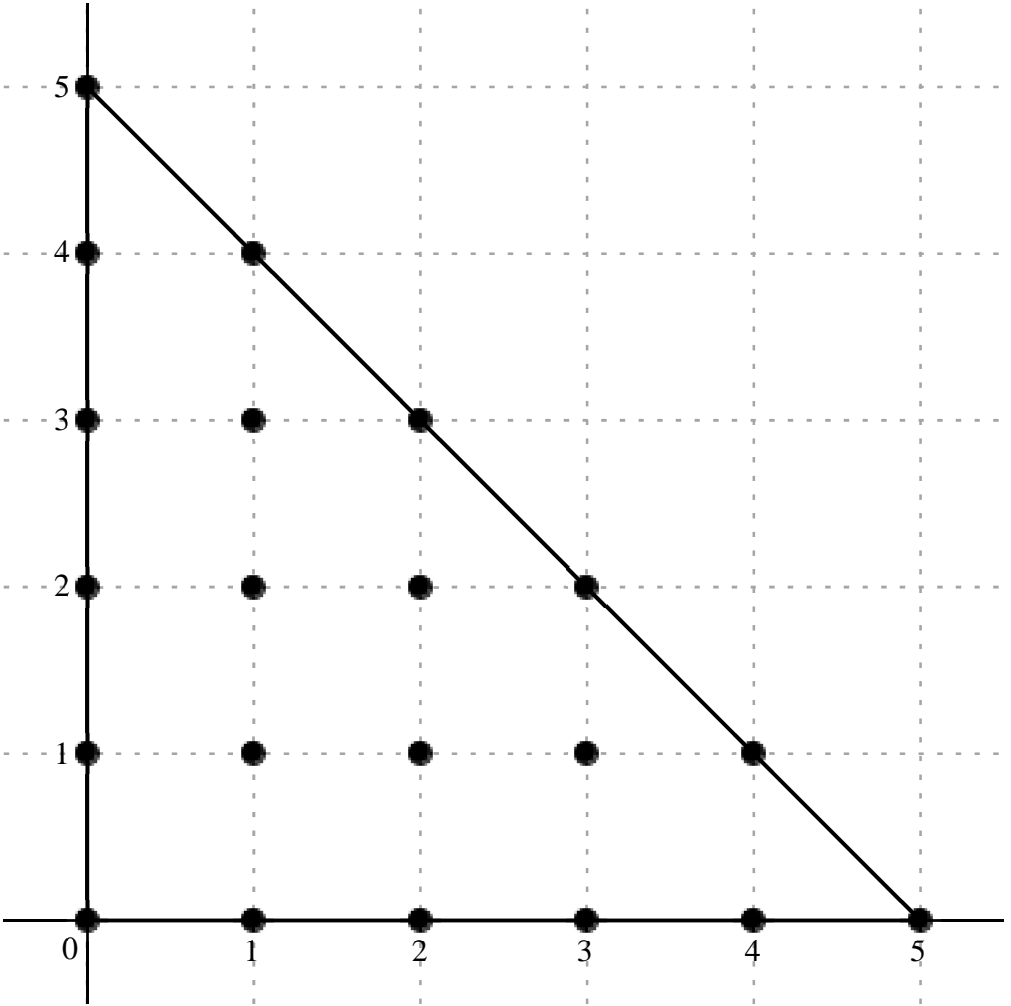
*Error order:*, 6, *Error:*,  $1.7745454624419810822 \times 10^{-30}$ , *New Error:*,  $1.7745258622037713414 \times 10^{-36}$

*Error order:*, 6, *Error:*,  $1.7745258622037713414 \times 10^{-36}$ , *New Error:*,  $1.7745239021720325705 \times 10^{-42}$

$$x_o + h., \left[ \begin{array}{cccccc} 5 \text{ I} & & & & & \\ 4 \text{ I} & 1+4 \text{ I} & & & & \\ 3 \text{ I} & 1+3 \text{ I} & 2+3 \text{ I} & & & \\ 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} & 3+2 \text{ I} & & \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I} & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

[illegible]





$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}}\,u(x_{ol})=\frac{1}{2465\,\Delta x_{ol}^{15}}\Big(87318\,(- (28197+215391\,\mathrm{I})\,u_{ol+51}+(5136190-32665716\,\mathrm{I})\,u_{ol+41}+(123899223+62188499\,\mathrm{I})\,u_{ol+1+41}-(820895112+618556544\,\mathrm{I})\,u_{ol+31}-(12472332064+6910881888\,\mathrm{I})\,u_{ol+1+31}-(274177020+4179062400\,\mathrm{I})\,u_{ol+2+31}+(-1290394200+4548693480\,\mathrm{I})\,u_{ol+21}+(115794341280$$
  
$$-77772623400\,\mathrm{I})\,u_{ol+1+21}-(80754198660+80754198660\,\mathrm{I})\,u_{ol+2+21}-(4179062400+274177020\,\mathrm{I})\,u_{ol+3+21}+(2230508030-1002874520\,\mathrm{I})\,u_{ol+1}+(63435648640+63435648640\,\mathrm{I})\,u_{ol+1+1}+(-77772623400+115794341280\,\mathrm{I})\,u_{ol+2+1}-(6910881888+12472332064\,\mathrm{I})\,u_{ol+3+1}+(62188499+123899223\,\mathrm{I})\,u_{ol+4+1}$$
  
$$-(71510230+71510230\,\mathrm{I})\,u_{ol}+(-1002874520+2230508030\,\mathrm{I})\,u_{ol+1}+(4548693480-1290394200\,\mathrm{I})\,u_{ol+2}-(618556544+820895112\,\mathrm{I})\,u_{ol+3}+(-32665716+5136190\,\mathrm{I})\,u_{ol+4}-(215391+28197\,\mathrm{I})\,u_{ol+5}\Big),\,O(\,\Delta x_{ol}^6\,)$$

Formula:, 512, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 16

Error order:, 5, Error:,  $3.3633096173558326514 \times 10^{-10}$ , New Error:,  $3.2892722789101827626 \times 10^{-15}$

Error order:, 5, Error:,  $3.2892722789101827626 \times 10^{-15}$ , New Error:,  $3.2819121220385142514 \times 10^{-20}$

Error order:, 5, Error:,  $3.2819121220385142514 \times 10^{-20}$ , New Error:,  $3.2811765433064166934 \times 10^{-25}$

Error order:, 5, Error:,  $3.2811765433064166934 \times 10^{-25}$ , New Error:,  $3.2811029898039178048 \times 10^{-30}$

Error order:, 5, Error:,  $3.2811029898039178048 \times 10^{-30}$ , New Error:,  $3.2810956344973761823 \times 10^{-35}$

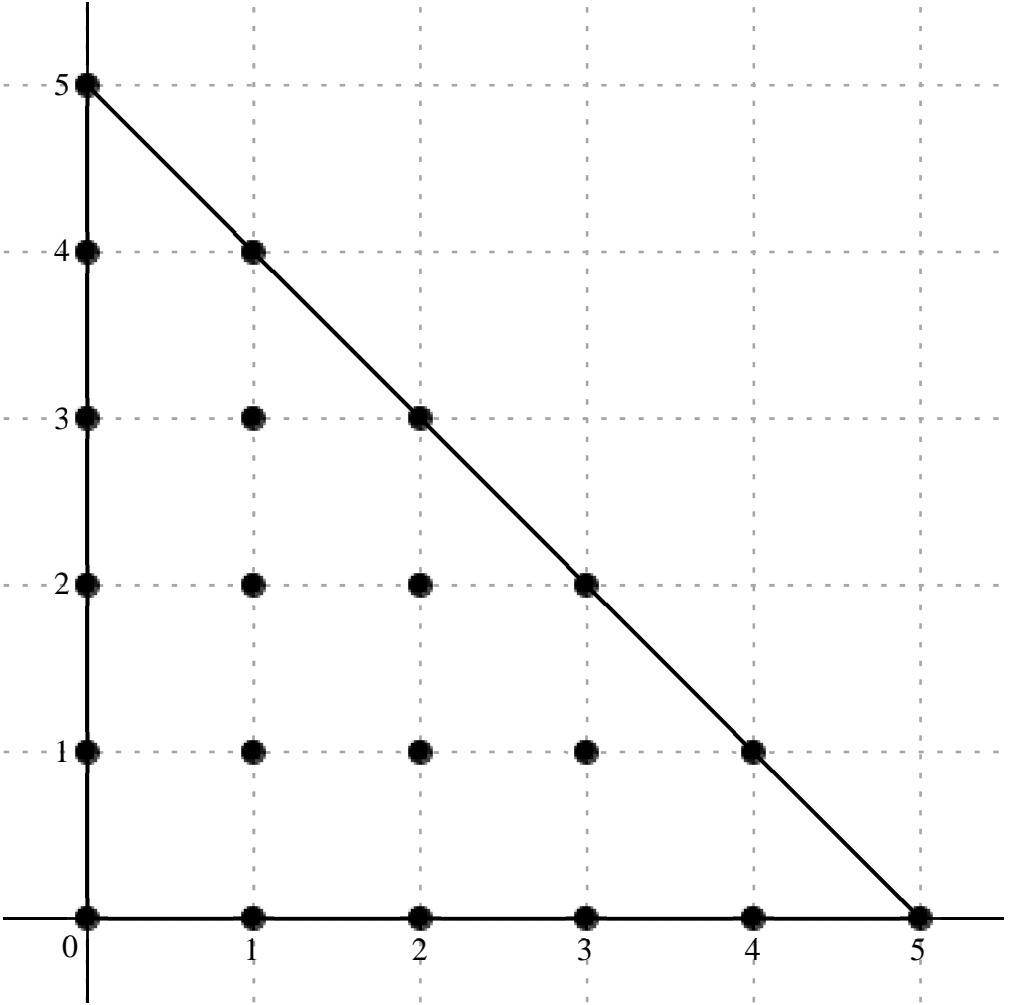
$$x_o+h\cdot,\left[\begin{array}{cccccc}5&1\\4&1+4\,\mathrm{I}\\3&1+3\,\mathrm{I}&2+3\,\mathrm{I}\\2&1+2\,\mathrm{I}&2+2\,\mathrm{I}&3+2\,\mathrm{I}\\1&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}&4+\mathrm{I}\\0&1&2&3&4&5\end{array}\right]$$



*Error order:*, 4,    *Error:*,  $6.9811091565404827868 \times 10^{-16}$ ,    *New Error:*,  $6.9803919042932318749 \times 10^{-20}$   
*Error order:*, 4,    *Error:*,  $6.9803919042932318749 \times 10^{-20}$ ,    *New Error:*,  $6.9803201763182329894 \times 10^{-24}$   
*Error order:*, 4,    *Error:*,  $6.9803201763182329894 \times 10^{-24}$ ,    *New Error:*,  $6.9803130034932382066 \times 10^{-28}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} 5 \text{ I} & & & & & \\ 4 \text{ I} & 1 + 4 \text{ I} & & & & \\ 3 \text{ I} & 1 + 3 \text{ I} & 2 + 3 \text{ I} & & & \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & 3 + 2 \text{ I} & & \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} & 4 + \text{I} & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccccc} -\frac{157439942352}{5945} + \frac{2672629344 \text{ I}}{5945} & & & & & & & & & & \\ -\frac{154517932800}{41} - \frac{203818374144 \text{ I}}{205} & -\frac{42266801808}{5} - \frac{71331122016 \text{ I}}{5} & & & & & & & & & \\ -\frac{390282121152}{5} + \frac{435195706176 \text{ I}}{5} & -\frac{4379211454464}{5} + \frac{7019506593792 \text{ I}}{5} & -495791604000 + 20829184992 \text{ I} & & & & & & & & \\ \frac{14176978421760}{29} + \frac{5003095071744 \text{ I}}{29} & -8371907337024 - 13271159651904 \text{ I} & -9323114701824 + 9323114701824 \text{ I} & -20829184992 + 495791604000 \text{ I} & & & & & & & \\ -97760534256 - 239117898096 \text{ I} & 6914982057984 - 6914982057984 \text{ I} & 13271159651904 + 8371907337024 \text{ I} & -\frac{7019506593792}{5} + \frac{4379211454464 \text{ I}}{5} & \frac{71331122016}{5} - \frac{42266801808 \text{ I}}{5} & & & & & & \\ -7276034304 + 7276034304 \text{ I} & 239117898096 + 97760534256 \text{ I} & -\frac{5003095071744}{29} - \frac{14176978421760 \text{ I}}{29} & -\frac{435195706176}{5} + \frac{390282121152 \text{ I}}{5} & \frac{203818374144}{205} + \frac{154517932800 \text{ I}}{41} & -\frac{2672629344}{5945} + \frac{157439942352 \text{ I}}{5945} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{17}}{\mathrm{d}x_{ol}^{17}}\; u(x_{ol}) = \frac{1}{5945 \; \Delta x_{ol}^{17}} \Big( 698544 \Big( ( -225383 + 3826 \; \text{I} ) \; u_{ol+5 \text{ I}} - ( 32074000 + 8461504 \; \text{I} ) \; u_{ol+4 \text{ I}} + ( 71942823 - 121413546 \; \text{I} ) \; u_{ol+1+4 \text{ I}} + ( -664303812 + 740751756 \; \text{I} ) \; u_{ol+3 \text{ I}} + ( -7453907584 + 11947985152 \; \text{I} ) \; u_{ol+1+3 \text{ I}} + ( -4219463750 + 177268010 \; \text{I} ) \; u_{ol+2+3 \text{ I}} + ( 4160483200 + 1468246080 \; \text{I} ) \; u_{ol+2 \text{ I}} - ( 71249612220$$

$$+ 112944988620 \; \text{I} ) \; u_{ol+1+2 \text{ I}} + ( -79344918720 + 79344918720 \; \text{I} ) \; u_{ol+2+2 \text{ I}} + ( -177268010 + 4219463750 \; \text{I} ) \; u_{ol+3+2 \text{ I}} - ( 831996805 + 2035027005 \; \text{I} ) \; u_{ol+1 \text{ I}} + ( 58850363520 - 58850363520 \; \text{I} ) \; u_{ol+1+1 \text{ I}} + ( 112944988620 + 71249612220 \; \text{I} ) \; u_{ol+2+1 \text{ I}} + ( -11947985152 + 7453907584 \; \text{I} ) \; u_{ol+3+1 \text{ I}} + ( 121413546 - 71942823 \; \text{I} ) \; u_{ol+4+1 \text{ I}}$$

$$+ ( -61923120 + 61923120 \; \text{I} ) \; u_{ol} + ( 2035027005 + 831996805 \; \text{I} ) \; u_{ol+1} - ( 1468246080 + 4160483200 \; \text{I} ) \; u_{ol+2} + ( -740751756 + 664303812 \; \text{I} ) \; u_{ol+3} + ( 8461504 + 32074000 \; \text{I} ) \; u_{ol+4} + ( -3826 + 225383 \; \text{I} ) \; u_{ol+5} \Big) \Big) , \; O( \; \Delta x_{ol}^4 \; )$$

Formula.: 514, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 18

Error order.: 3, Error.:  $8.9592629366310038236 \times 10^{-6}$ , New Error.:  $8.7820348698932403490 \times 10^{-9}$

Error order.: 3, Error.:  $8.7820348698932403490 \times 10^{-9}$ , New Error.:  $8.7644090859033917733 \times 10^{-12}$

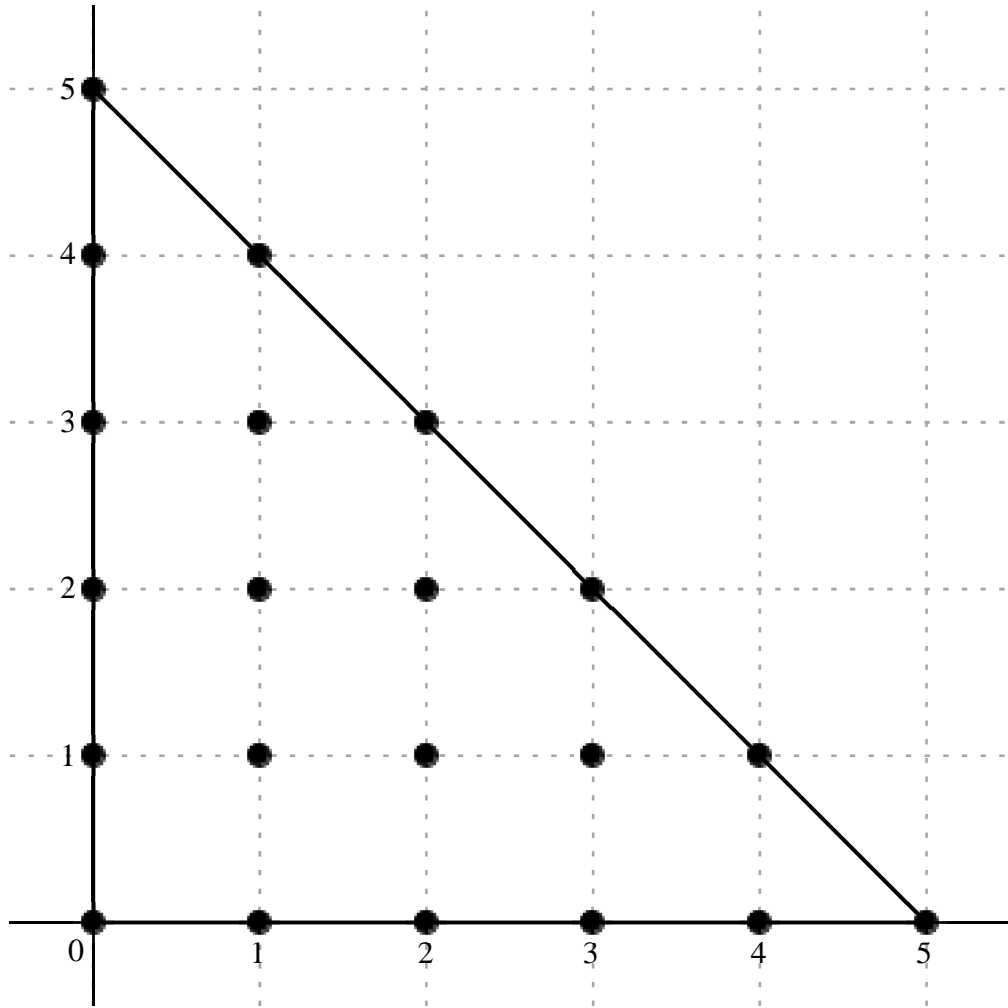
Error order.: 3, Error.:  $8.7644090859033917733 \times 10^{-12}$ , New Error.:  $8.7626474802301941677 \times 10^{-15}$

Error order.: 3, Error.:  $8.7626474802301941677 \times 10^{-15}$ , New Error.:  $8.7624713293925803023 \times 10^{-18}$

Error order.: 3, Error.:  $8.7624713293925803023 \times 10^{-18}$ , New Error.:  $8.7624537144061184177 \times 10^{-21}$

$$x_o + h. , \left[ \begin{array}{cccccc} 5 & I & & & & \\ 4 & I & 1 + 4 & I & & \\ 3 & I & 1 + 3 & I & 2 + 3 & I \\ 2 & I & 1 + 2 & I & 2 + 2 & I & 3 + 2 & I \\ I & 1 + I & 2 + I & 3 + I & 4 + I & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccccccc} \frac{147138513984}{5945} - \frac{133898311008 \text{ I}}{5945} & & & & & & & & & & & & & & & & & \\ \frac{883635806592}{205} - \frac{90481007232 \text{ I}}{41} & & \frac{21916119456}{5} + \frac{101772272448 \text{ I}}{5} & & & & & & & & & & & & & & & \\ - \frac{8198112384}{5} - \frac{714241680768 \text{ I}}{5} & & - \frac{2038362568704}{5} - \frac{10027649415168 \text{ I}}{5} & & 426226401216 - 451876936896 \text{ I} & & & & & & & & & & & & & \\ - \frac{16527394566144}{29} + \frac{7304870200320 \text{ I}}{29} & & 18583813100160 + 4486278690432 \text{ I} & & -16282960049664 \text{ I} & & -426226401216 - 451876936896 \text{ I} & & & & & & & & & & & \\ 279779445792 + 122581898208 \text{ I} & & 11737685127168 \text{ I} & & -18583813100160 + 4486278690432 \text{ I} & & \frac{2038362568704}{5} - \frac{10027649415168 \text{ I}}{5} & & - \frac{21916119456}{5} + \frac{101772272448 \text{ I}}{5} & & & & & & & & & \\ -11970249984 \text{ I} & & -279779445792 + 122581898208 \text{ I} & & \frac{16527394566144}{29} + \frac{7304870200320 \text{ I}}{29} & & \frac{8198112384}{5} - \frac{714241680768 \text{ I}}{5} & & - \frac{883635806592}{205} - \frac{90481007232 \text{ I}}{41} & & - \frac{147138513984}{5945} - \frac{133898311008 \text{ I}}{5945} & & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{18}}{\mathrm{d}x_{ol}^{18}}\;u(x_{ol})=\frac{1}{5945\;\Delta x_{ol}^{18}}\left( (12573792\left((11702-10649\;{\rm I})\;u_{ol+5{\rm I}}+(2038004-1043420\;{\rm I})\;u_{ol+4{\rm I}}+(2072427+9623766\;{\rm I})\;u_{ol+1+4{\rm I}}-(775228+67539956\;{\rm I})\;u_{ol+3{\rm I}}-(192751168+948232256\;{\rm I})\;u_{ol+1+3{\rm I}}+(201523610-213651410\;{\rm I})\;u_{ol+2+3{\rm I}}+(-269458560+119096800\;{\rm I})\;u_{ol+2{\rm I}}+(8786591100+2121152220\;{\rm I})\;u_{ol+1+2{\rm I}}\right.\\ \left.-7698727440\;{\rm I}u_{ol+2+2{\rm I}}-(201523610+213651410\;{\rm I})\;u_{ol+3+2{\rm I}}+(132282195+57957805\;{\rm I})\;u_{ol+1}+5549681280\;{\rm I}u_{ol+1+1}+(-8786591100+2121152220\;{\rm I})\;u_{ol+2+1}+(192751168-948232256\;{\rm I})\;u_{ol+3+1}+(-2072427+9623766\;{\rm I})\;u_{ol+4+1}-5659640\;{\rm I}u_{ol}+(-132282195+57957805\;{\rm I})\;u_{ol+1}+(269458560\right.\\ \left.+119096800\;{\rm I})\;u_{ol+2}+(775228-67539956\;{\rm I})\;u_{ol+3}-(2038004+1043420\;{\rm I})\;u_{ol+4}-(11702+10649\;{\rm I})\;u_{ol+5}\right)),\;O(\;\Delta x_{ol}^3\;)$$

Formula:, 515, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 19

Error order:, 2, Error:, 0.0011556408159742600753, New Error:, 0.000011459154032576614360

Error order:, 2, Error:, 0.000011459154032576614360, New Error:, 1.1449394098613848778 × 10<sup>−7</sup>

Error order:, 2, Error:, 1.1449394098613848778 × 10<sup>−7</sup>, New Error:, 1.1448417768942505609 × 10<sup>−9</sup>

Error order:, 2, Error:, 1.1448417768942505609 × 10<sup>−9</sup>, New Error:, 1.1448320132621506954 × 10<sup>−11</sup>

Error order:, 2, Error:, 1.1448320132621506954 × 10<sup>−11</sup>, New Error:, 1.1448310368955877327 × 10<sup>−13</sup>

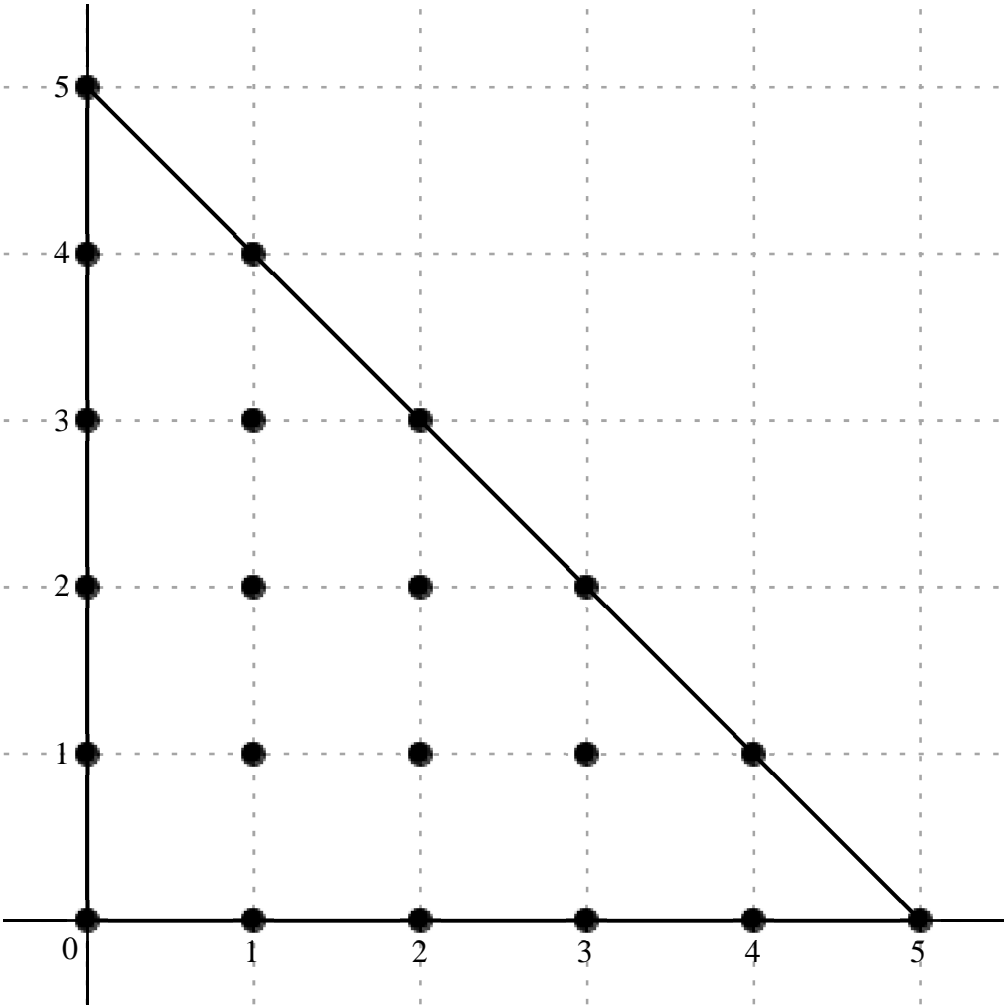
$$x_o\;+h\;, \left[\begin{array}{cccccc} 5{\rm I} & & & & & \\ 4{\rm I} & 1+4{\rm I} & & & & \\ 3{\rm I} & 1+3{\rm I} & 2+3{\rm I} & & & \\ 2{\rm I} & 1+2{\rm I} & 2+2{\rm I} & 3+2{\rm I} & & \\ {\rm I} & 1+{\rm I} & 2+{\rm I} & 3+{\rm I} & 4+{\rm I} & \\ 0 & 1 & 2 & 3 & 4 & 5 \end{array}\right]$$



Error order:, 1, Error:, 0.00073985276023305517234, New Error:, 0.000073975407076762717086  
Error order:, 1, Error:, 0.000073975407076762717086, New Error:, 7.3974420227298451698 × 10−6  
Error order:, 1, Error:, 7.3974420227298451698 × 10−6, New Error:, 7.3974321542803935457 × 10−7

$$x_o+h.,\left[\begin{array}{cccccc}5\text{ I}\\4\text{ I} & 1+4\text{ I}\\3\text{ I} & 1+3\text{ I} & 2+3\text{ I}\\2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & 3+2\text{ I}\\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & 4+\text{I}\\0 & 1 & 2 & 3 & 4 & 5\end{array}\right]$$

$$c=,\left[\begin{array}{ccccccccc} -\frac{41091152256}{5945}-\frac{61158924288\text{ I}}{5945} & & & & & & & & \\ -\frac{24845812992}{41}-\frac{66892573440\text{ I}}{41} & 7644865536-955608192\text{ I} & & & & & & & \\ -49691625984-3822432768\text{ I} & -\frac{3638955995136}{5}+\frac{519850856448\text{ I}}{5} & -162453392640-162453392640\text{ I} & & & & & & \\ \frac{2140562350080}{29}+\frac{5733649152000\text{ I}}{29} & 1754496640512-6433154348544\text{ I} & -5848322135040 & -162453392640+162453392640\text{ I} & & & & & \\ 43002368640-90782778240\text{ I} & 3975330078720 & 1754496640512+6433154348544\text{ I} & -\frac{3638955995136}{5}-\frac{519850856448\text{ I}}{5} & 7644865536+955608192\text{ I} & & & & \\ -3822432768 & 43002368640+90782778240\text{ I} & \frac{2140562350080}{29}-\frac{5733649152000\text{ I}}{29} & -49691625984+3822432768\text{ I} & -\frac{24845812992}{41}+\frac{66892573440\text{ I}}{41} & -\frac{41091152256}{5945}+\frac{61158924288\text{ I}}{5945} & & & \end{array}\right]$$



$$\frac{\mathbb{d}^{20}}{\mathrm{d} x_{oI}^{20}}\,u(x_o)=\frac{1}{5945\,\Delta x_{oI}^{20}}\big(955608192\,\big(-(43+64\,\text{I})\,u_{oI+51}-(3770+10150\,\text{I})\,u_{oI+41}+(47560-5945\,\text{I})\,u_{oI+1+41}-(309140+23780\,\text{I})\,u_{oI+31}+(-4527712+646816\,\text{I})\,u_{oI+1+31}-(1010650+1010650\,\text{I})\,u_{oI+2+31}+(459200+1230000\,\text{I})\,u_{oI+21}+(10915020-40021740\,\text{I})\,u_{oI+1+21}-36383400\,u_{oI+2+21}+(-1010650\\ +1010650\,\text{I})\,u_{oI+3+21}+(267525-564775\,\text{I})\,u_{oI+1}+24731200\,u_{oI+1+1}+(10915020+40021740\,\text{I})\,u_{oI+2+1}-(4527712+646816\,\text{I})\,u_{oI+3+1}+(47560+5945\,\text{I})\,u_{oI+4+1}-23780\,u_{oI}+(267525+564775\,\text{I})\,u_{oI+1}+(459200-1230000\,\text{I})\,u_{oI+2}+(-309140+23780\,\text{I})\,u_{oI+3}+(-3770+10150\,\text{I})\,u_{oI+4}+(-43+64\,\text{I})\,u_{oI+5}\big)\big),\\ O(\,\Delta x_{oI}\,)$$

Formula.: 517, Var.: 1

Variavel .:  $x_{oi}$  , Derivada de Ordem .: 1

Error order.: 20, Error.:  $2.7399699590940571163 \times 10^{-50}$ , New Error.:  $2.7927907830402138792 \times 10^{-70}$

Error order.: 20, Error.:  $2.7927907830402138792 \times 10^{-70}$ , New Error.:  $2.7980887240263275389 \times 10^{-90}$

Error order.: 20, Error.:  $2.7980887240263275389 \times 10^{-90}$ , New Error.:  $2.7986186734543835185 \times 10^{-110}$

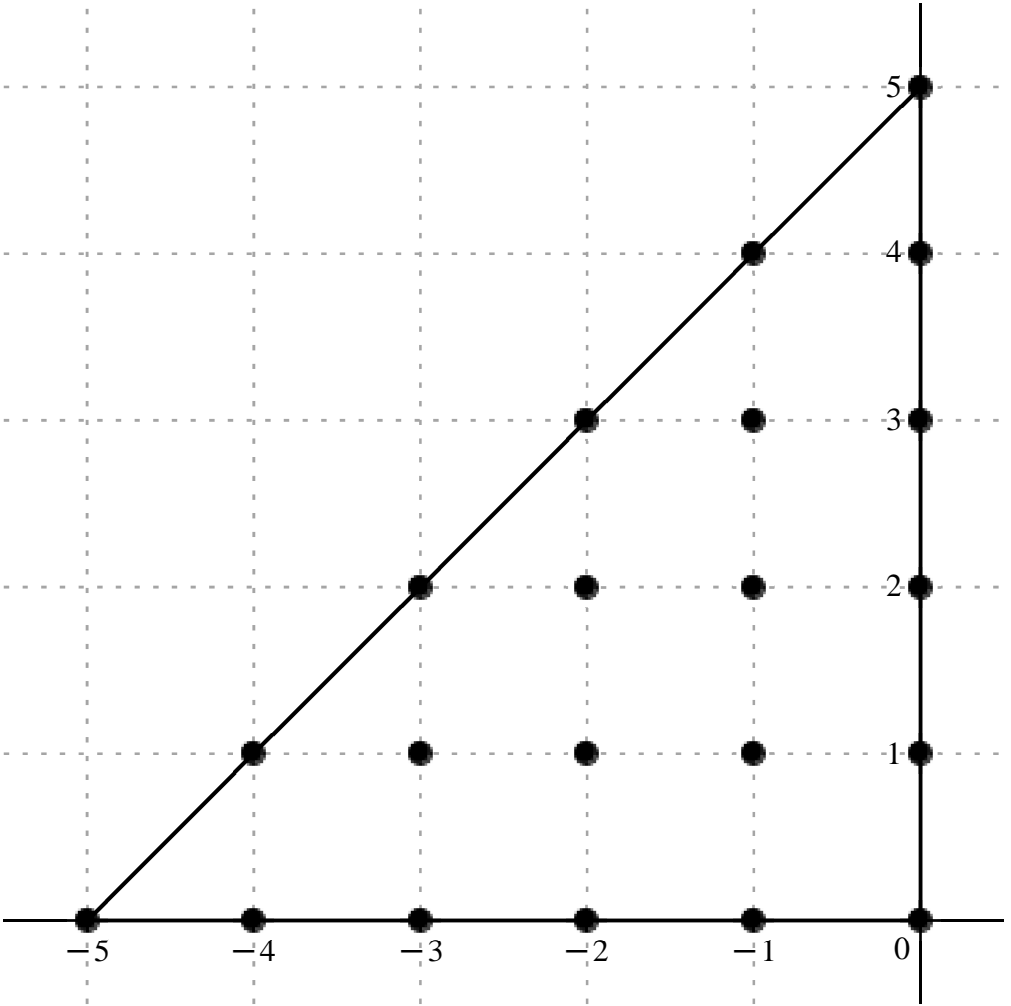
Error order.: 20, Error.:  $2.7986186734543835185 \times 10^{-110}$ , New Error.:  $2.7986716699471931120 \times 10^{-130}$

Error order.: 20, Error.:  $2.7986716699471931120 \times 10^{-130}$ , New Error.:  $2.7986769696119708174 \times 10^{-150}$

$$x_o + h . , \left[ \begin{array}{cccccc} & & & & & 5 \text{ I} \\ & & & & -1 + 4 \text{ I} & 4 \text{ I} \\ & & & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ & -4 + \text{I} & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} & & & & & \frac{16}{29725} + \frac{43 \text{ I}}{118900} \\ & & & & -\frac{1}{17} - \frac{33 \text{ I}}{68} & \frac{35}{328} + \frac{13 \text{ I}}{328} \\ & & & \frac{425}{26} + \frac{85 \text{ I}}{26} & \frac{272}{25} + \frac{1496 \text{ I}}{25} & \frac{1}{3} + \frac{13 \text{ I}}{3} \\ & & \frac{85}{26} + \frac{425 \text{ I}}{26} & \frac{765}{2} + \frac{765 \text{ I}}{2} & \frac{2907}{5} - \frac{2601 \text{ I}}{5} & -\frac{750}{29} - \frac{280 \text{ I}}{29} \\ & -\frac{33}{68} - \frac{\text{I}}{17} & \frac{1496}{25} + \frac{272 \text{ I}}{25} & -\frac{2601}{5} + \frac{2907 \text{ I}}{5} & -520 - 520 \text{ I} & \frac{95}{4} - \frac{45 \text{ I}}{4} \\ \frac{43}{118900} + \frac{16 \text{ I}}{29725} & \frac{13}{328} + \frac{35 \text{ I}}{328} & \frac{13}{3} + \frac{\text{I}}{3} & -\frac{280}{29} - \frac{750 \text{ I}}{29} & -\frac{45}{4} + \frac{95 \text{ I}}{4} & \frac{31241}{6630} + \frac{31241 \text{ I}}{6630} \end{array} \right]$$





$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{157661400 \Delta x_{ol}} \left( (84864 + 57018 I) u_{ol+5I} - (9274200 + 76512150 I) u_{ol-1+4I} + (16823625 + 6248775 I) u_{ol+4I} + (2577157500 + 515431500 I) u_{ol-2+3I} + (1715356032 + 9434458176 I) u_{ol-1+3I} + (52553800 + 683199400 I) u_{ol+3I} + (515431500 + 2577157500 I) u_{ol-3+2I} + (60305485500 + 60305485500 I) u_{ol-2+2I} \right. \\ \left. + (91664337960 - 82015460280 I) u_{ol-1+2I} - (4077450000 + 1522248000 I) u_{ol+2I} - (76512150 + 9274200 I) u_{ol-4+I} + (9434458176 + 1715356032 I) u_{ol-3+I} + (-82015460280 + 91664337960 I) u_{ol-2+I} - (81983928000 + 81983928000 I) u_{ol-1+I} + (3744458250 - 1773690750 I) u_{ol+I} + (57018 + 84864 I) u_{ol-5} + (6248775 \right. \\ \left. + 16823625 I) u_{ol-4} + (683199400 + 52553800 I) u_{ol-3} - (1522248000 + 4077450000 I) u_{ol-2} + (-1773690750 + 3744458250 I) u_{ol-1} + (742910980 + 742910980 I) u_{ol} \right), O(\Delta x_{ol}^{20})$$

Formula:, 518, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 2

Error order:, 19, Error:, 2.8793310149677387935 × 10<sup>-47</sup>, New Error:, 2.8954886622863328014 × 10<sup>-66</sup>

Error order:, 19, Error:, 2.8954886622863328014 × 10<sup>-66</sup>, New Error:, 2.8970550509910034466 × 10<sup>-85</sup>

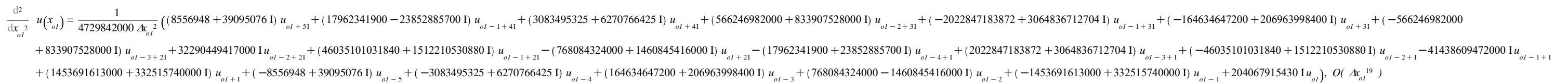
Error order:, 19, Error:, 2.8970550509910034466 × 10<sup>-85</sup>, New Error:, 2.8972111890716879043 × 10<sup>-104</sup>

Error order:, 19, Error:, 2.8972111890716879043 × 10<sup>-104</sup>, New Error:, 2.8972267978647941286 × 10<sup>-123</sup>

Error order:, 19, Error:, 2.8972267978647941286 × 10<sup>-123</sup>, New Error:, 2.8972283586939480610 × 10<sup>-142</sup>

$$x_o + h \cdot , \begin{bmatrix} & & & & 5 I \\ & & & -1 + 4 I & 4 I \\ & & -2 + 3 I & -1 + 3 I & 3 I \\ & -3 + 2 I & -2 + 2 I & -1 + 2 I & 2 I \\ -4 + I & -3 + I & -2 + I & -1 + I & I \\ -5 & -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

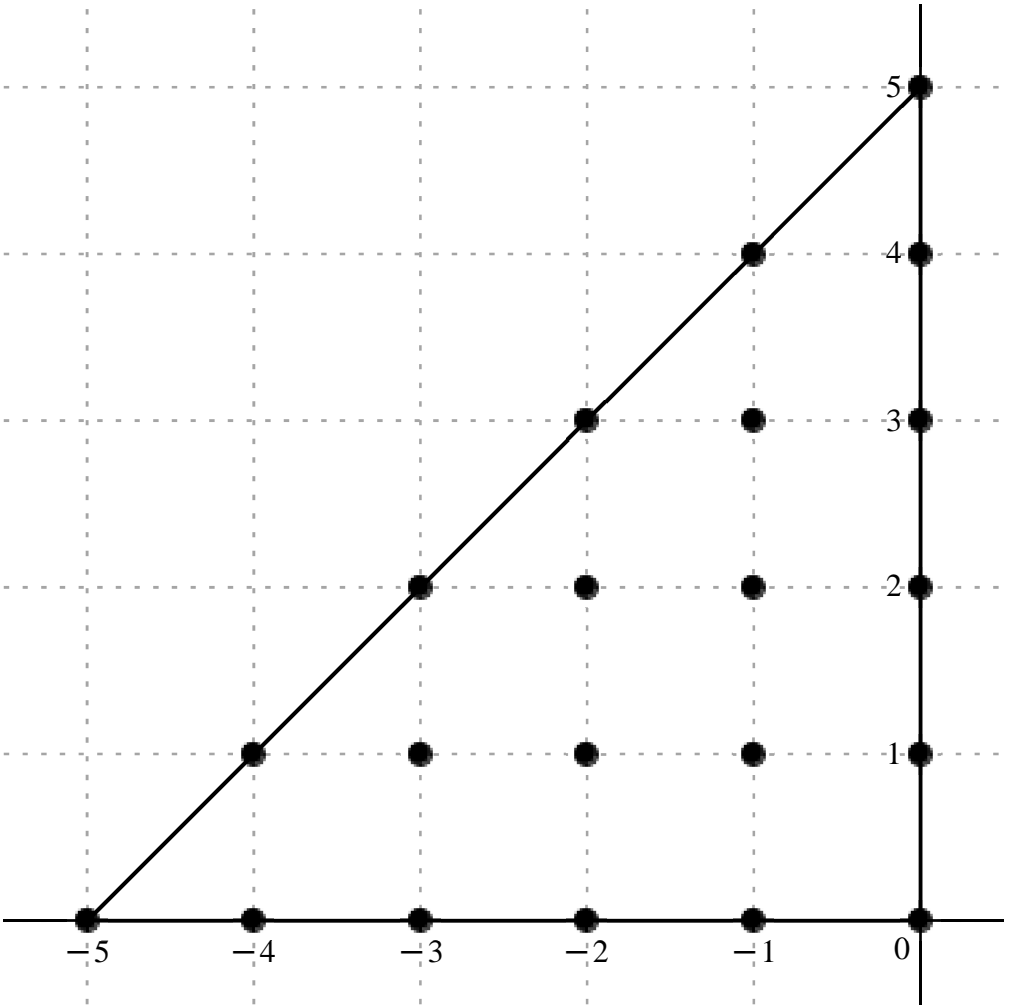
								$\frac{237693}{131384500} + \frac{3257923\text{ I}}{394153500}$
						$\frac{50357}{13260} - \frac{66871\text{ I}}{13260}$		$\frac{1417699}{2174640} + \frac{961037\text{ I}}{724880}$
				$\frac{4669}{39} + \frac{2292\text{ I}}{13}$		$-\frac{694976}{1625} + \frac{242992\text{ I}}{375}$		$-\frac{346162}{9945} + \frac{435164\text{ I}}{9945}$
			$-\frac{4669}{39} + \frac{2292\text{ I}}{13}$	$\frac{177501\text{ I}}{26}$		$\frac{3163194}{325} + \frac{103908\text{ I}}{325}$		$-\frac{3122294}{19227} - \frac{5938396\text{ I}}{19227}$
		$-\frac{50357}{13260} - \frac{66871\text{ I}}{13260}$	$\frac{694976}{1625} + \frac{242992\text{ I}}{375}$	$-\frac{3163194}{325} + \frac{103908\text{ I}}{325}$		$-\frac{446816\text{ I}}{51}$		$\frac{407539}{1326} + \frac{46610\text{ I}}{663}$
$-\frac{237693}{131384500} + \frac{3257923\text{ I}}{394153500}$	$-\frac{1417699}{2174640} + \frac{961037\text{ I}}{724880}$	$\frac{346162}{9945} + \frac{435164\text{ I}}{9945}$	$\frac{3122294}{19227} - \frac{5938396\text{ I}}{19227}$	$-\frac{407539}{1326} + \frac{46610\text{ I}}{663}$				$\frac{17162987\text{ I}}{397800}$



*Error order:*, 18, *Error:*,  $2.9875012322999318071 \times 10^{-62}$ , *New Error:*,  $2.9931331080111412670 \times 10^{-80}$

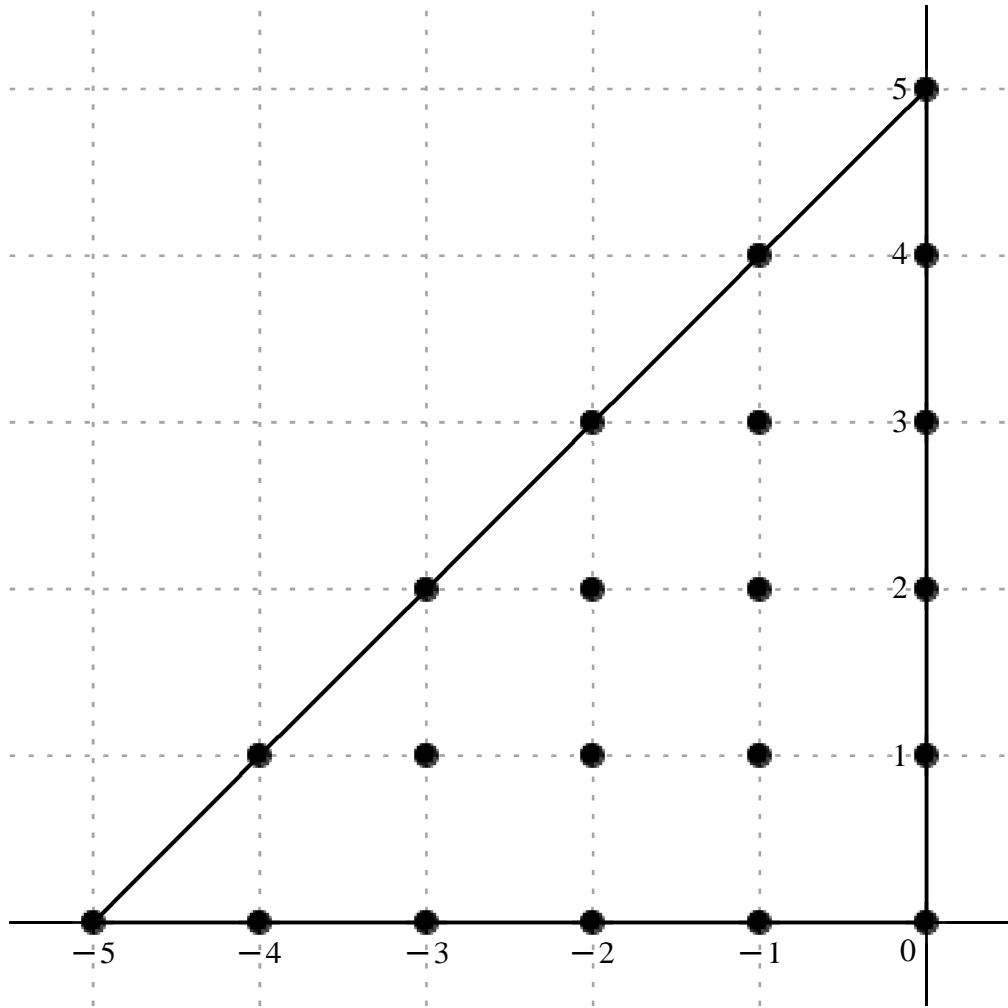
*Error order:*, 18,    *Error:*,  $2.9931331080111412670 \times 10^{-80}$ ,    *New Error:*,  $2.9936964597265417402 \times 10^{-98}$   
*Error order:*, 18,    *Error:*,  $2.9936964597265417402 \times 10^{-98}$ ,    *New Error:*,  $2.9937527965360670005 \times 10^{-116}$   
*Error order:*, 18,    *Error:*,  $2.9937527965360670005 \times 10^{-116}$ ,    *New Error:*,  $2.9937584302333959175 \times 10^{-134}$

$$\begin{aligned}
 & x_o + h \cdot, \left[ \begin{array}{cccccc} & & & & & 5 \text{ I} \\ & & & & -1 + 4 \text{ I} & 4 \text{ I} \\ & & & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ & -4 + \text{I} & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{array} \right] \\
 & c =, \left[ \begin{array}{cccccccc} & & & & & & & -\frac{1237933}{29580000} + \frac{3296699 \text{ I}}{48067500} \\ & & & & & & \frac{10357601}{176800} - \frac{1247041 \text{ I}}{132600} & -\frac{2193563}{530400} + \frac{706633 \text{ I}}{53040} \\ & & & & -\frac{85523}{240} + \frac{1217735 \text{ I}}{624} & -\frac{171450433}{24375} + \frac{38969806 \text{ I}}{24375} & -\frac{22856919}{44200} + \frac{10336489 \text{ I}}{132600} \\ & & -\frac{1217735}{624} + \frac{85523 \text{ I}}{240} & -\frac{46163931}{1040} + \frac{46163931 \text{ I}}{1040} & \frac{160876653}{2600} + \frac{164792631 \text{ I}}{2600} & \frac{75602939}{96135} - \frac{79570347 \text{ I}}{25636} \\ & \frac{1247041}{132600} - \frac{10357601 \text{ I}}{176800} & -\frac{38969806}{24375} + \frac{171450433 \text{ I}}{24375} & -\frac{164792631}{2600} - \frac{160876653 \text{ I}}{2600} & \frac{13811867}{255} - \frac{13811867 \text{ I}}{255} & \frac{58946561}{35360} + \frac{228287393 \text{ I}}{106080} \\ -\frac{3296699}{48067500} + \frac{1237933 \text{ I}}{29580000} & -\frac{706633}{53040} + \frac{2193563 \text{ I}}{530400} & -\frac{10336489}{132600} + \frac{22856919 \text{ I}}{44200} & \frac{79570347}{25636} - \frac{75602939 \text{ I}}{96135} & -\frac{228287393}{106080} - \frac{58946561 \text{ I}}{35360} & -\frac{503358637}{2652000} + \frac{503358637 \text{ I}}{2652000} \end{array} \right]
 \end{aligned}$$



$$\begin{aligned}
 \frac{\mathrm{d}^3}{\mathrm{d}x_oI^3} \, u(x_oI) = & \frac{1}{384540000 \, \Delta x_oI^3} \Big( (-16093129 + 26373592 \, \mathrm{I}) \, u_{oI+5I} + (22527782175 - 3616418900 \, \mathrm{I}) \, u_{oI-1+4I} + (-1590333175 + 5123089250 \, \mathrm{I}) \, u_{oI+4I} + (-137029226750 + 750429193750 \, \mathrm{I}) \, u_{oI-2+3I} + (-2704802031008 + 614787659456 \, \mathrm{I}) \, u_{oI-1+3I} + (-198855195300 + 29975818100 \, \mathrm{I}) \, u_{oI+3I} + (-750429193750 \\
 & + 137029226750 \, \mathrm{I}) \, u_{oI-3+2I} + (-17069113487250 + 17069113487250 \, \mathrm{I}) \, u_{oI-2+2I} + (23793656978700 + 24372830124900 \, \mathrm{I}) \, u_{oI-1+2I} + (302411756000 - 1193555205000 \, \mathrm{I}) \, u_{oI+2I} + (3616418900 - 22527782175 \, \mathrm{I}) \, u_{oI-4+I} + (-614787659456 + 2704802031008 \, \mathrm{I}) \, u_{oI-3+I} - (24372830124900 + 23793656978700 \, \mathrm{I}) \, u_{oI-2+I} \\
 & + (20828295436000 - 20828295436000 \, \mathrm{I}) \, u_{oI-1+I} + (641043850875 + 827541799625 \, \mathrm{I}) \, u_{oI+I} + (-26373592 + 16093129 \, \mathrm{I}) \, u_{oI-5} + (-5123089250 + 1590333175 \, \mathrm{I}) \, u_{oI-4} + (-29975818100 + 198855195300 \, \mathrm{I}) \, u_{oI-3} + (1193555205000 - 302411756000 \, \mathrm{I}) \, u_{oI-2} - (827541799625 + 641043850875 \, \mathrm{I}) \, u_{oI-1} + (-72987002365
 \end{aligned}$$





$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{78830700000 \, \Delta x_{ol}^4} \, ( (-49534105071 + 13209804533 \, \mathrm{I}) \, u_{ol+5\mathrm{I}} + (30780692797825 + 21351886295525 \, \mathrm{I}) \, u_{ol-1+4\mathrm{I}} + (-7708206987550 + 4340303430950 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (-1014676803540500 + 713905857672000 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} - (3859513931178464 + 2315255069795552 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} - (271103538769400 + 185043614375200 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (1014676803540500 + 713905857672000 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} - 38786410053792000 \, u_{ol-2+2\mathrm{I}} + (429348809775240 + 54128571450835680 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (1636325890001000 - 1093960913459000 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (30780692797825 - 21351886295525 \, \mathrm{I}) \, u_{ol-4+1} + (-3859513931178464 + 2315255069795552 \, \mathrm{I}) \, u_{ol-3+1} + (429348809775240 - 54128571450835680 \, \mathrm{I}) \, u_{ol-2+1} + 45164113359352000 \, u_{ol-1+1} + (-69532498548750 + 1569071010158000 \, \mathrm{I}) \, u_{ol+1} - (49534105071 + 13209804533 \, \mathrm{I}) \, u_{ol-5} - (7708206987550 + 4340303430950 \, \mathrm{I}) \, u_{ol-4} + (-271103538769400 + 185043614375200 \, \mathrm{I}) \, u_{ol-3} + (1636325890001000 + 1093960913459000 \, \mathrm{I}) \, u_{ol-2} - (69532498548750 + 1569071010158000 \, \mathrm{I}) \, u_{ol-1} - 125445064448660 \, u_{ol} ), \, O( \, \Delta x_{ol}^{17} \, )$$

Formula:, 521, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 5

Error order:., 16, Error:., 1.4894630186788288004 × 10−38, New Error:., 1.5177782919206095810 × 10−54

Error order:., 16, Error:., 1.5177782919206095810 × 10−54, New Error:., 1.5206182090332946943 × 10−70

Error order:., 16, Error:., 1.5206182090332946943 × 10−70, New Error:., 1.5209022829399690088 × 10−86

Error order:., 16, Error:., 1.5209022829399690088 × 10−86, New Error:., 1.5209306911508704664 × 10−102

Error order:., 16, Error:., 1.5209306911508704664 × 10−102, New Error:., 1.5209335319801612306 × 10−118

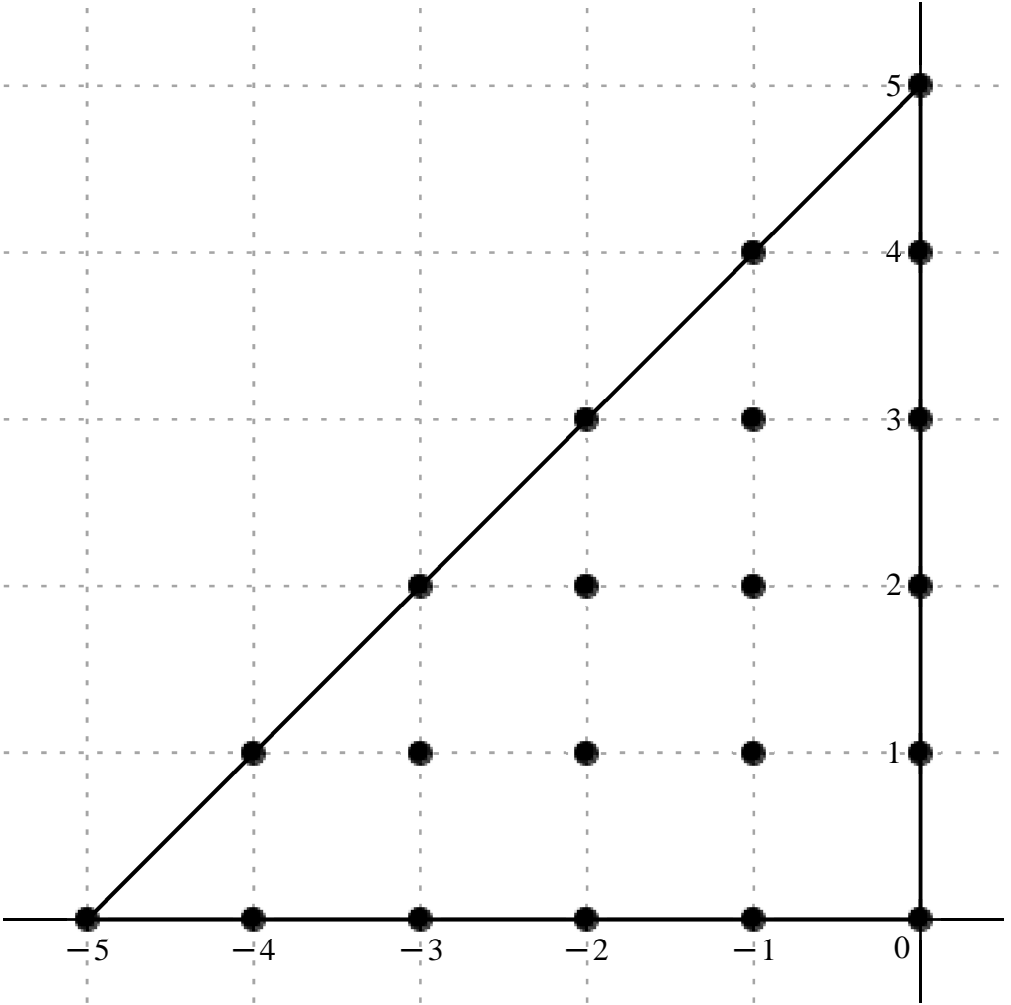
$$x_o \neq h \, , \, \left[ \begin{array}{rrrrr} & & & & 5 \, \mathrm{I} \\ & & & -1 + 4 \, \mathrm{I} & 4 \, \mathrm{I} \\ & & -2 + 3 \, \mathrm{I} & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ & -3 + 2 \, \mathrm{I} & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -4 + \mathrm{I} & -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{array} \right]$$



*Error order:*, 15, *Error:*,  $7.9521085946261480397 \times 10^{-51}$ , *New Error:*,  $7.9563456655435552059 \times 10^{-66}$   
*Error order:*, 15, *Error:*,  $7.9563456655435552059 \times 10^{-66}$ , *New Error:*,  $7.9567680368616936702 \times 10^{-81}$   
*Error order:*, 15, *Error:*,  $7.9567680368616936702 \times 10^{-81}$ , *New Error:*,  $7.9568102606171786077 \times 10^{-96}$   
*Error order:*, 15, *Error:*,  $7.9568102606171786077 \times 10^{-96}$ , *New Error:*,  $7.9568144828589452104 \times 10^{-111}$

$$x_o+h\cdot,\left[\begin{array}{cccccc} & & & & & 5\text{ I}\\ & & & & -1+4\text{ I} & 4\text{ I}\\ & & & -2+3\text{ I} & -1+3\text{ I} & 3\text{ I}\\ & & -3+2\text{ I} & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I}\\ & -4+\text{ I} & -3+\text{ I} & -2+\text{ I} & -1+\text{ I} & \text{ I}\\ -5 & -4 & -3 & -2 & -1 & 0\end{array}\right]$$

$$c=,\left[\begin{array}{cccccccccccc} & & & & & & & & & & -\frac{19742856251}{2102152000}-\frac{61305088937\text{ I}}{2102152000} & -\frac{19742856251}{2102152000}-\frac{61305088937\text{ I}}{2102152000} \\ & & & & & & & & & & -\frac{102619434209}{36244000}-\frac{31714456207\text{ I}}{7248800} & -\frac{102619434209}{36244000}-\frac{31714456207\text{ I}}{7248800} \\ & & & & & & & & & & -\frac{20698825479}{1768000}+\frac{32703849507\text{ I}}{1768000} & -\frac{20698825479}{1768000}+\frac{32703849507\text{ I}}{1768000} \\ & & & & & & & & & & -\frac{545171747}{1300}-\frac{2988257663\text{ I}}{5200} & -\frac{545171747}{1300}-\frac{2988257663\text{ I}}{5200} \\ & & & & & & & & & & -\frac{56429509581\text{ I}}{2600} & -\frac{56429509581\text{ I}}{2600} \\ & & & & & & & & & & -\frac{1922343192}{65}+\frac{3563630163\text{ I}}{2600} & -\frac{1922343192}{65}+\frac{3563630163\text{ I}}{2600} \\ & & & & & & & & & & \frac{9851009811\text{ I}}{425} & \frac{9851009811\text{ I}}{425} \\ & & & & & & & & & & -\frac{33713624211}{44200}+\frac{11141019451\text{ I}}{176800} & -\frac{33713624211}{44200}+\frac{11141019451\text{ I}}{176800} \\ & & & & & & & & & & -\frac{4172831639\text{ I}}{88400} & -\frac{4172831639\text{ I}}{88400} \\ \frac{19742856251}{2102152000}-\frac{61305088937\text{ I}}{2102152000} & \frac{102619434209}{36244000}-\frac{31714456207\text{ I}}{7248800} & \frac{20698825479}{1768000}+\frac{32703849507\text{ I}}{1768000} & -\frac{545171747}{1300}-\frac{2988257663\text{ I}}{5200} & -\frac{56429509581\text{ I}}{2600} & -\frac{1922343192}{65}+\frac{3563630163\text{ I}}{2600} & \frac{9851009811\text{ I}}{425} & -\frac{33713624211}{44200}+\frac{11141019451\text{ I}}{176800} & -\frac{4172831639\text{ I}}{88400} & \frac{19742856251}{2102152000}-\frac{61305088937\text{ I}}{2102152000} & \frac{102619434209}{36244000}-\frac{31714456207\text{ I}}{7248800} & \frac{20698825479}{1768000}+\frac{32703849507\text{ I}}{1768000} & -\frac{545171747}{1300}-\frac{2988257663\text{ I}}{5200} & -\frac{56429509581\text{ I}}{2600} & -\frac{1922343192}{65}+\frac{3563630163\text{ I}}{2600} & \frac{9851009811\text{ I}}{425} & -\frac{33713624211}{44200}+\frac{11141019451\text{ I}}{176800} & -\frac{4172831639\text{ I}}{88400}\end{array}\right]$$



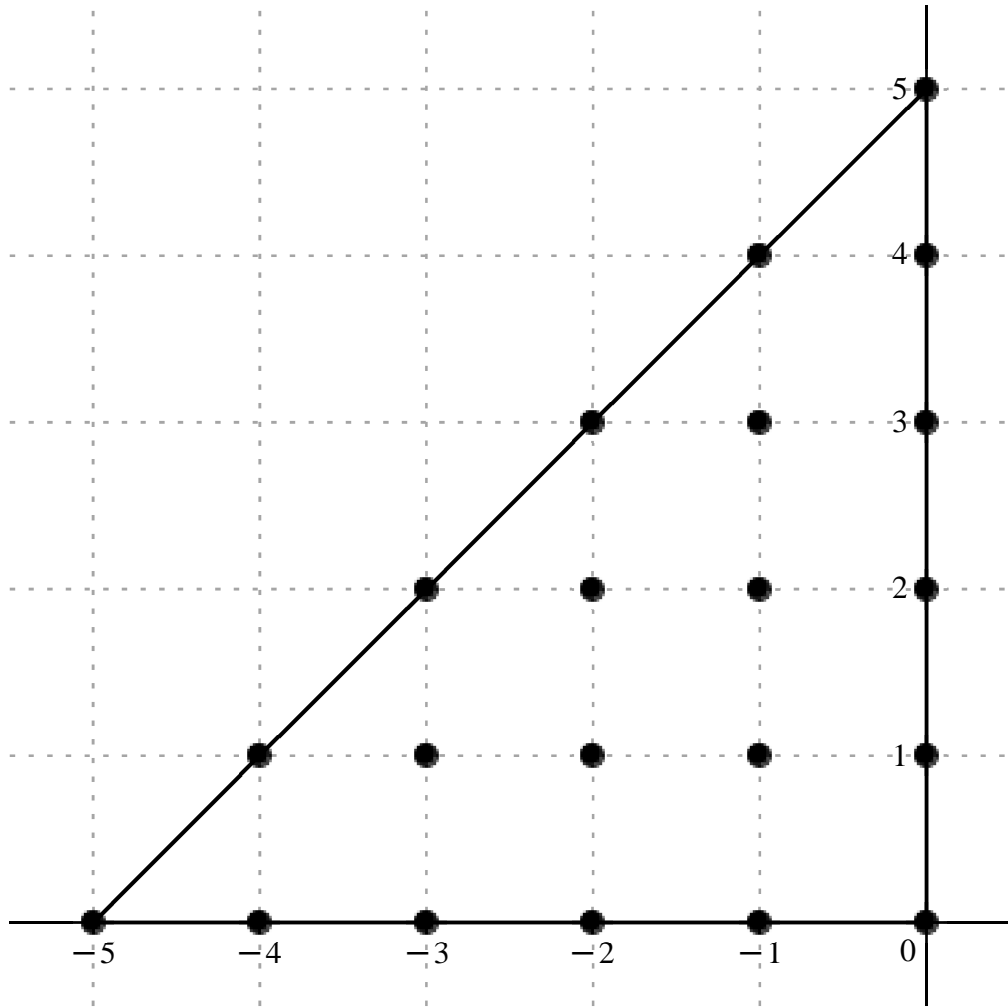
$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6}u(x_{ol})=\frac{1}{2102152000\Delta x_{ol}^6}\Big( -(19742856251+61305088937\text{ I})\,u_{ol+51}+(\,-24610903494531+38884877063823\text{ I})\,u_{ol-1+41}-(5951927184122+9197192300030\text{ I})\,u_{ol+41}-(881564521768880+1208033042844380\text{ I})\,u_{ol-2+31}+(2565822501724384-4742444875356128\text{ I})\,u_{ol-1+31}+(197773813634624$$

$$-344141212507048\text{ I})\,u_{ol+31}+(881564521768880-1208033042844380\text{ I})\,u_{ol-3+21}-45624387086430120\text{ I}\,u_{ol-2+21}+(\,-62170116703833600+2881266259388760\text{ I})\,u_{ol-1+21}+(1448231254930080+1750338897994000\text{ I})\,u_{ol+21}+(24610903494531+38884877063823\text{ I})\,u_{ol-4+1}-(2565822501724384$$

$$+4742444875356128\text{ I})\,u_{ol-3+1}+(62170116703833600+2881266259388760\text{ I})\,u_{ol-2+1}+48725458767560640\text{ I}\,u_{ol-1+1}+(\,-1603419967475160+132466721272390\text{ I})\,u_{ol+1}+(19742856251-61305088937\text{ I})\,u_{ol-5}+(5951927184122-9197192300030\text{ I})\,u_{ol-4}-(197773813634624+344141212507048\text{ I})\,u_{ol-3}$$







$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{2102152000 \, \Delta x_{ol}^7} \Big( 7 \, \big( (23625334308 - 49463673729 \, \mathrm{I}) \, u_{ol+5\mathrm{I}} + (-37558621373376 + 9340510193513 \, \mathrm{I}) \, u_{ol-1+4\mathrm{I}} + (1633595744750 - 9100578487932 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (181254016227690 - 1232738602213950 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (4258603679925856 - 1375123970746272 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (315282653457804 - 99001250003348 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (1232738602213950 - 181254016227690 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + (26549353891990620 - 26549353891990620 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} - (38032883057971260 + 33400491579013500 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (-82912695317400 + 1842175830519960 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (-9340510193513 + 37558621373376 \, \mathrm{I}) \, u_{ol-4+1} + (1375123970746272 - 4258603679925856 \, \mathrm{I}) \, u_{ol-3+1} + (33400491579013500 + 38032883057971260 \, \mathrm{I}) \, u_{ol-2+1} + (-27236837531438080 + 27236837531438080 \, \mathrm{I}) \, u_{ol-1+1} - (983870062951085 + 753291021441065 \, \mathrm{I}) \, u_{ol+1} + (49463673729 - 23625334308 \, \mathrm{I}) \, u_{ol-5} + (9100578487932 - 1633595744750 \, \mathrm{I}) \, u_{ol-4} + (99001250003348 - 315282653457804 \, \mathrm{I}) \, u_{ol-3} + (-1842175830519960 + 82912695317400 \, \mathrm{I}) \, u_{ol-2} + (753291021441065 + 983870062951085 \, \mathrm{I}) \, u_{ol-1} + (49630381503850 - 49630381503850 \, \mathrm{I}) \, u_{ol} \big) \Big), \, O( \, \Delta x_{ol}^{14} \, )$$

Formula:, 524, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 13, Error:,  $2.2805344887604290428 \times 10^{-30}$ , New Error:,  $2.2929922727534777077 \times 10^{-43}$

Error order:, 13, Error:,  $2.2929922727534777077 \times 10^{-43}$ , New Error:,  $2.2942008394304768369 \times 10^{-56}$

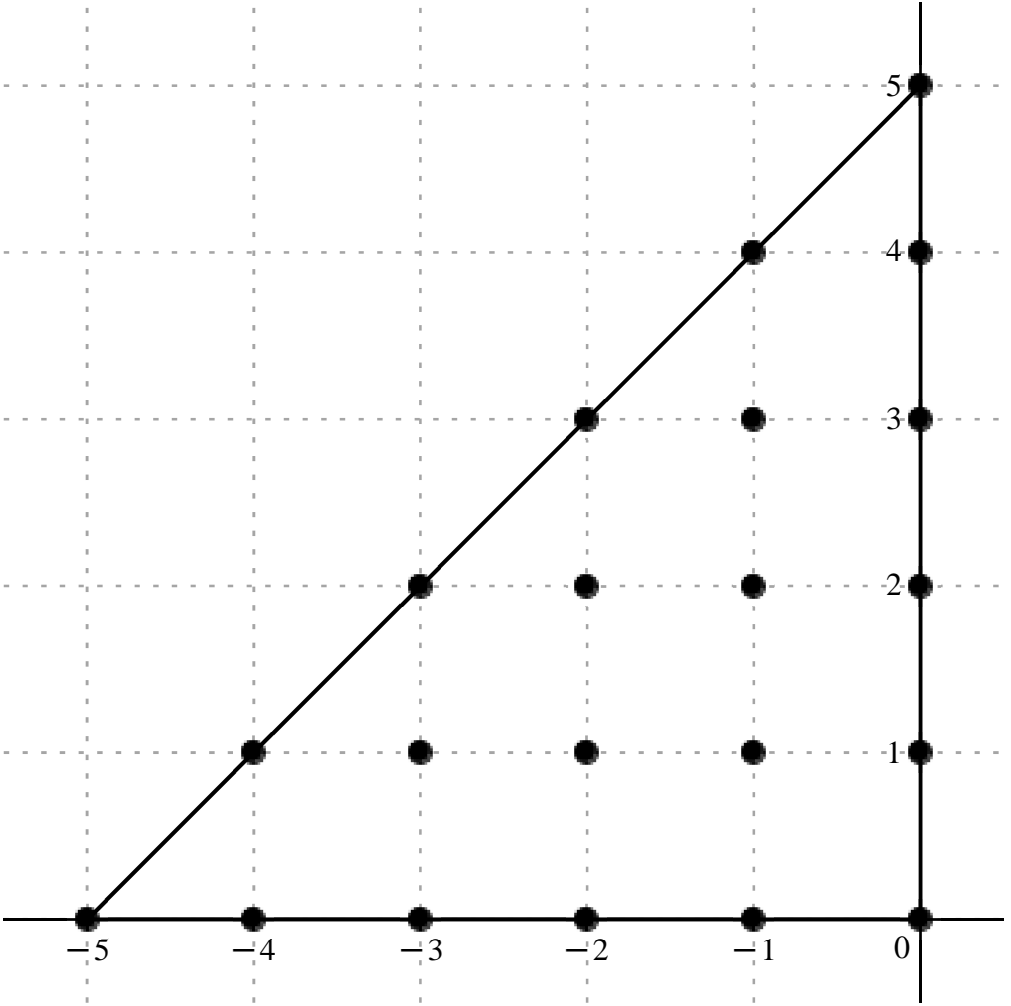
Error order:, 13, Error:,  $2.2942008394304768369 \times 10^{-56}$ , New Error:,  $2.2943213188022830922 \times 10^{-69}$

Error order:, 13, Error:,  $2.2943213188022830922 \times 10^{-69}$ , New Error:,  $2.2943333629613009617 \times 10^{-82}$

Error order:, 13, Error:,  $2.2943333629613009617 \times 10^{-82}$ , New Error:,  $2.2943345673394159148 \times 10^{-95}$

$$x_o + h \, , \, \left[ \begin{array}{cccccc} & & & & 5 \, \mathrm{I} & \\ & & & & -1 + 4 \, \mathrm{I} & 4 \, \mathrm{I} \\ & & & -2 + 3 \, \mathrm{I} & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ & & -3 + 2 \, \mathrm{I} & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -4 + \mathrm{I} & -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} & \\ -5 & -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccc} \frac{83928634951}{90610000} + \frac{32563844523 \text{ I}}{90610000} & -\frac{266078520491}{442000} + \frac{151633506577 \text{ I}}{442000} & \frac{5724149739}{325} + \frac{17356746001 \text{ I}}{1300} & \frac{5724149739}{325} - \frac{17356746001 \text{ I}}{1300} & \frac{578224445442}{8125} + \frac{279178109406 \text{ I}}{8125} & \frac{578224445442}{8125} - \frac{279178109406 \text{ I}}{8125} & \frac{83928634951}{90610000} - \frac{32563844523 \text{ I}}{90610000} & \frac{32563844523 \text{ I}}{90610000} \\ \frac{92612377347}{697000} + \frac{36083947473 \text{ I}}{362440} & -\frac{117583267599}{1625} + \frac{2837988387171 \text{ I}}{3250} & \frac{427566304683}{650} & \frac{427566304683}{650} & \frac{578224445442}{8125} + \frac{279178109406 \text{ I}}{8125} & \frac{578224445442}{8125} - \frac{279178109406 \text{ I}}{8125} & \frac{92612377347}{697000} - \frac{36083947473 \text{ I}}{362440} & \frac{36083947473 \text{ I}}{362440} \\ \frac{11242933723}{2125} - \frac{137508653779 \text{ I}}{55250} & -\frac{117583267599}{1625} + \frac{2837988387171 \text{ I}}{3250} & \frac{427566304683}{650} & \frac{427566304683}{650} & \frac{578224445442}{8125} + \frac{279178109406 \text{ I}}{8125} & \frac{578224445442}{8125} - \frac{279178109406 \text{ I}}{8125} & \frac{11242933723}{2125} + \frac{137508653779 \text{ I}}{55250} & \frac{137508653779 \text{ I}}{55250} \\ \frac{123875615444}{5525} - \frac{24897710873 \text{ I}}{1105} & -\frac{117583267599}{1625} + \frac{2837988387171 \text{ I}}{3250} & \frac{427566304683}{650} & \frac{427566304683}{650} & \frac{578224445442}{8125} + \frac{279178109406 \text{ I}}{8125} & \frac{578224445442}{8125} - \frac{279178109406 \text{ I}}{8125} & \frac{123875615444}{5525} + \frac{24897710873 \text{ I}}{1105} & \frac{24897710873 \text{ I}}{1105} \\ \frac{39124422561}{11050} + \frac{886855008879 \text{ I}}{44200} & -\frac{276009760348}{425} & \frac{276009760348}{425} & \frac{276009760348}{425} & \frac{578224445442}{8125} + \frac{279178109406 \text{ I}}{8125} & \frac{578224445442}{8125} - \frac{279178109406 \text{ I}}{8125} & \frac{39124422561}{11050} - \frac{886855008879 \text{ I}}{44200} & \frac{886855008879 \text{ I}}{44200} \\ \frac{119181167203}{110500} & \frac{119181167203}{110500} & \frac{119181167203}{110500} & \frac{119181167203}{110500} & \frac{578224445442}{8125} + \frac{279178109406 \text{ I}}{8125} & \frac{578224445442}{8125} - \frac{279178109406 \text{ I}}{8125} & \frac{119181167203}{110500} & \frac{119181167203}{110500} \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{90610000 \, \Delta x_{ol}^8} \, (7 \, ((11989804993 - 4651977789 \, \text{I}) \, u_{ol+51} - (7792299528665 + 4440695549755 \, \text{I}) \, u_{ol-1+41} + (1719944150730 - 1288712409750 \, \text{I}) \, u_{ol+41} + (227984706747600 - 172823599467100 \, \text{I}) \, u_{ol-2+31} + (921194145081312 + 444770610870816 \, \text{I}) \, u_{ol-1+31} + (68485527706960 + 32216313171080 \, \text{I}) \, u_{ol+31} \\ + (227984706747600 + 172823599467100 \, \text{I}) \, u_{ol-3+21} + 8514677553258600 \, u_{ol-2+21} - (936634714474320 + 11303302319189640 \, \text{I}) \, u_{ol-1+21} + (-290222870468800 + 291658898798000 \, \text{I}) \, u_{ol+21} + (-7792299528665 + 4440695549755 \, \text{I}) \, u_{ol-4+1} + (921194145081312 - 444770610870816 \, \text{I}) \, u_{ol-3+1} + (-936634714474320 \\ + 11303302319189640 \, \text{I}) \, u_{ol-2+1} - 8406468700884800 \, u_{ol-1+1} - (45831466428600 + 259721824028850 \, \text{I}) \, u_{ol+1} + (11989804993 + 4651977789 \, \text{I}) \, u_{ol-5} + (1719944150730 + 1288712409750 \, \text{I}) \, u_{ol-4} + (68485527706960 - 32216313171080 \, \text{I}) \, u_{ol-3} - (290222870468800 + 291658898798000 \, \text{I}) \, u_{ol-2} + (-45831466428600 \\ + 259721824028850 \, \text{I}) \, u_{ol-1} + 13961222443780 \, u_{ol})), \, O(\, \Delta x_{ol}^{13} \, )$$

Formula:, 525, Var:, 1

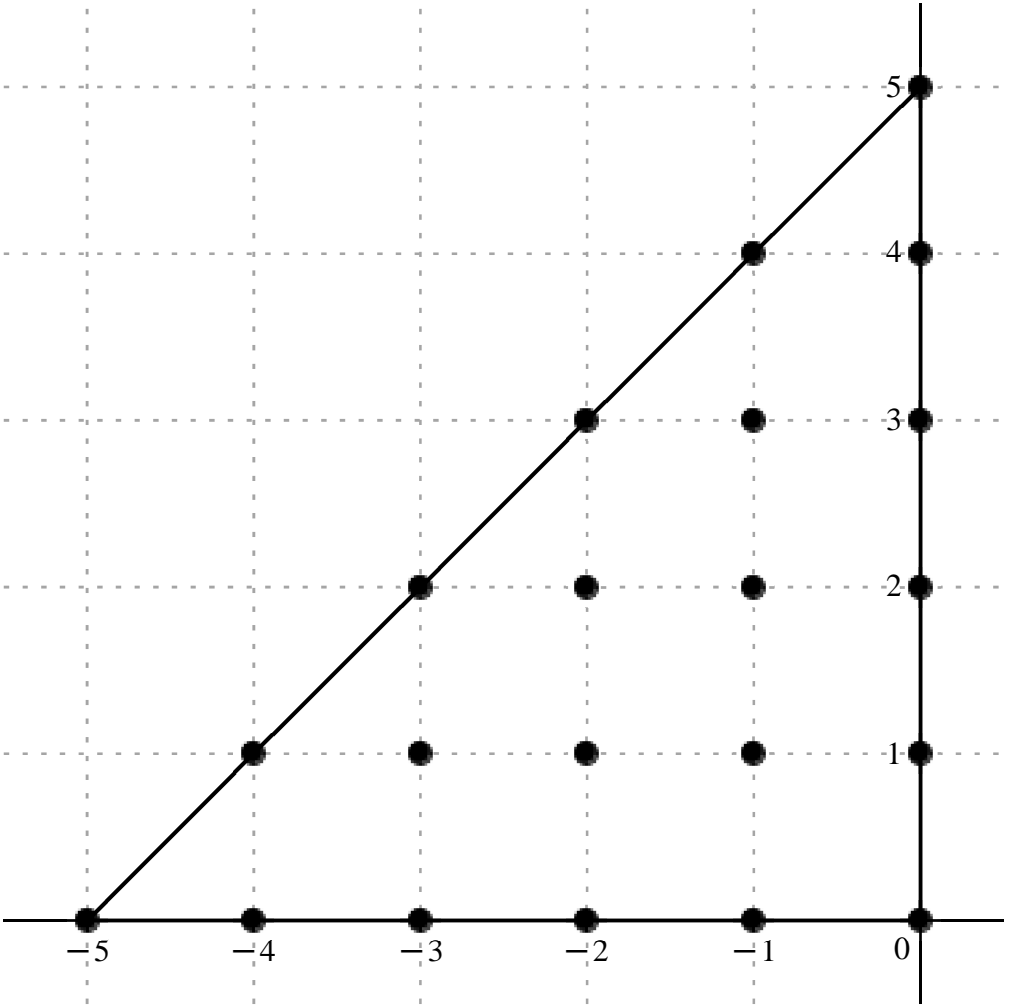
Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 9

Error order:, 12, Error:, 1.2417011308140558982 × 10<sup>-27</sup>, New Error:, 1.2647853855896904907 × 10<sup>-39</sup>

*Error order:*, 12, *Error:*,  $1.2673552497129258609 \times 10^{-75}$ , *New Error:*,  $1.2673575655690651436 \times 10^{-87}$

$$\frac{d^9}{dx_o^9} u(x_o) = \frac{1}{40426000 \Delta x_o^9} (63 ((^{d9} 2937689323 + 1182795506 I) u_{oI+51} - (628071898923 + 2088267469146 I) u_{oI-1+41} + (520923202160 + 55035350416 I) u_{oI+41} + (68375464100350 + 8753024785810 I) u_{oI-2+31} + (86201326143104 + 229592663789312 I) u_{oI-1+31} + (6867428373492 + 16806669527196 I) u_{oI+31} + (8753024785810 + 68375464100350 I) u_{oI-3+21} + (1432822272253920 + 1432822272253920 I) u_{oI-2+21} + (1687827101183820 - 2064493744664220 I) u_{oI-1+21} + (-96028658465600 + 4601374423680 I) u_{oI+21} - (2088267469146 + 628071898923 I) u_{oI-4+1} + (229592663789312 + 86201326143104 I) u_{oI-3+1} + (-2064493744664220 + 1687827101183820 I) u_{oI-2+1} - (1363714435221120 + 1363714435221120 I) u_{oI-1+1} + (32059370174105 - 49626712243905 I) u_{oI+1} + (1182795506 + 2937689323 I) u_{oI-5} + (55035350416 + 520923202160 I) u_{oI-4} + (16806669527196 + 6867428373492 I) u_{oI-3} + (4601374423680 - 96028658465600 I) u_{oI-2}$$





$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\; u(x_{ol}) = \frac{1}{139400\; \Delta x_{ol}^{10}}\; (63\; ((20904938 + 44692781\; \mathrm{I})\; u_{ol+51} + (15111753063 - 29940708954\; \mathrm{I})\; u_{ol-1+41} + (5315543996 + 6071685620\; \mathrm{I})\; u_{ol+41} + (650763647690 + 825231251090\; \mathrm{I})\; u_{ol-2+31} + (-1455906937792 + 3420879702464\; \mathrm{I})\; u_{ol-1+31} + (-95525569212 + 257887333524\; \mathrm{I})\; u_{ol+31} + (-650763647690$$
  
$$+ 825231251090\; \mathrm{I})\; u_{ol-3+21} + 30511128774960\; \mathrm{I}\; u_{ol-2+21} + (39393581226300 - 4625289030780\; \mathrm{I})\; u_{ol-1+21} - (1090421725440 + 907840794400\; \mathrm{I})\; u_{ol+21} - (15111753063 + 29940708954\; \mathrm{I})\; u_{ol-4+1} + (1455906937792 + 3420879702464\; \mathrm{I})\; u_{ol-3+1} - (39393581226300 + 4625289030780\; \mathrm{I})\; u_{ol-2+1} - 28038840769920\; \mathrm{I}\; u_{ol-1+1}$$
  
$$+ (814908749355 - 203290277245\; \mathrm{I})\; u_{ol+1} + (-20904938 + 44692781\; \mathrm{I})\; u_{ol-5} + (-5315543996 + 6071685620\; \mathrm{I})\; u_{ol-4} + (95525569212 + 257887333524\; \mathrm{I})\; u_{ol-3} + (1090421725440 - 907840794400\; \mathrm{I})\; u_{ol-2} - (814908749355 + 203290277245\; \mathrm{I})\; u_{ol-1} + 40204286760\; \mathrm{I}\; u_{ol})),\; O(\; \Delta x_{ol}^{11}\; )$$

Formula.: 527, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 11

Error order.: 10, Error.:  $2.1136717409837743968 \times 10^{-22}$ , New Error.:  $2.1522926065897193368 \times 10^{-32}$   
Error order.: 10, Error.:  $2.1522926065897193368 \times 10^{-32}$ , New Error.:  $2.1561657356339093328 \times 10^{-42}$   
Error order.: 10, Error.:  $2.1561657356339093328 \times 10^{-42}$ , New Error.:  $2.1565531567904243017 \times 10^{-52}$   
Error order.: 10, Error.:  $2.1565531567904243017 \times 10^{-52}$ , New Error.:  $2.1565918999864022805 \times 10^{-62}$   
Error order.: 10, Error.:  $2.1565918999864022805 \times 10^{-62}$ , New Error.:  $2.1565957743168011466 \times 10^{-72}$

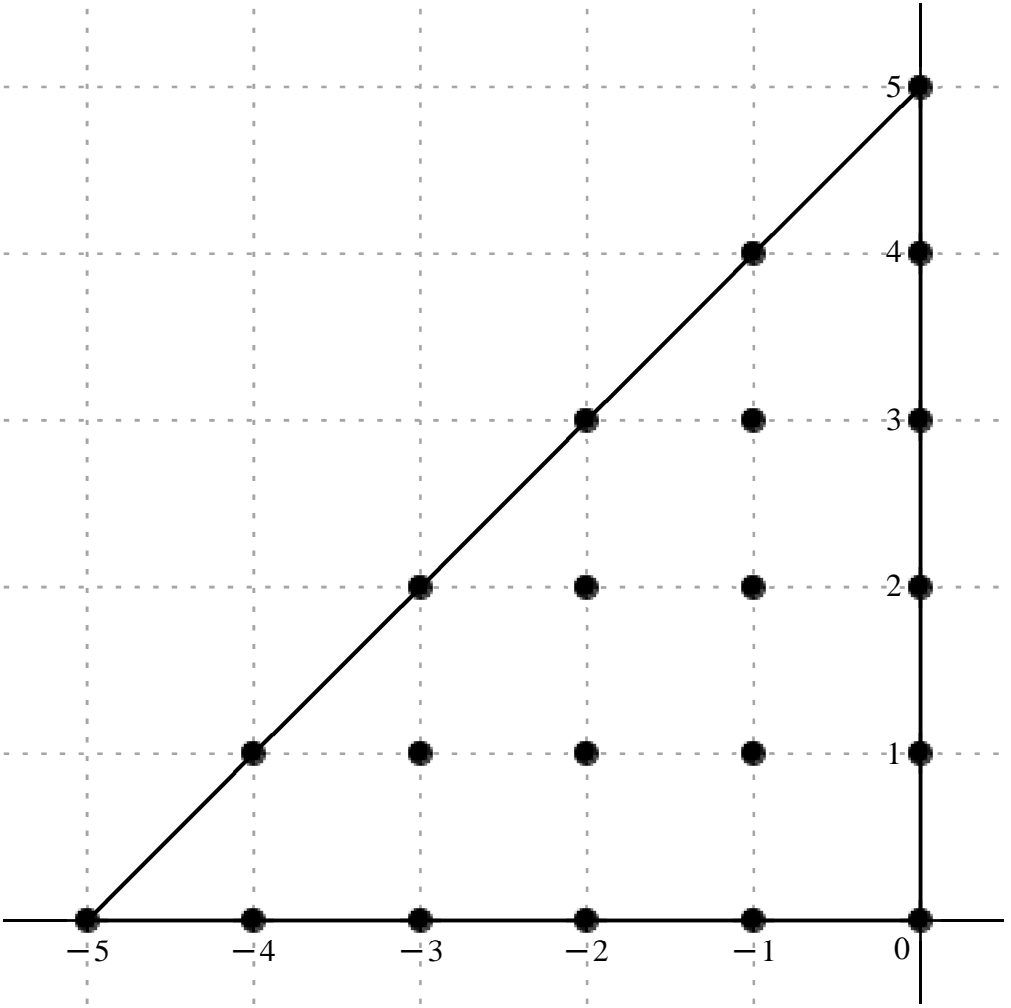
$$x_o + h . , \left[ \begin{array}{cccccc} & & & & 5\; \mathrm{I} & \\ & & & & -1+4\; \mathrm{I} & 4\; \mathrm{I} \\ & & & -2+3\; \mathrm{I} & -1+3\; \mathrm{I} & 3\; \mathrm{I} \\ & & -3+2\; \mathrm{I} & -2+2\; \mathrm{I} & -1+2\; \mathrm{I} & 2\; \mathrm{I} \\ & -4+\mathrm{I} & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{array} \right]$$











$$\frac{d^{13}}{dx_{ol}^{13}} u(x_{ol}) = \frac{1}{505325 \Delta x_{ol}^{13}} (2079 (-(258584287 + 59720414 I) u_{ol+5I} + (67937085567 + 159634671534 I) u_{ol-1+4I} + (-41617467320 + 2566385276 I) u_{ol+4I} - (5288855759950 + 462625643890 I) u_{ol-2+3I} - (8099776645376 + 16513799788928 I) u_{ol-1+3I} - (714630343908 + 1139888397804 I) u_{ol+3I} - (462625643890 + 5288855759950 I) u_{ol-3+2I} - (104985181178280 + 104985181178280 I) u_{ol-2+2I} + (-108214007819580 + 151245164367180 I) u_{ol-1+2I} + (6315867287600 - 1332674525520 I) u_{ol+2I} + (159634671534 + 67937085567 I) u_{ol-4+1I} - (16513799788928 + 8099776645376 I) u_{ol-3+1I} + (151245164367180 - 108214007819580 I) u_{ol-2+1I} + (87543610577280 + 87543610577280 I) u_{ol-1+1I} + (-1560127331945 + 3125766861945 I) u_{ol+1I} - (59720414 + 258584287 I) u_{ol-5I} + (2566385276 - 41617467320 I) u_{ol-4I} - (1139888397804 + 714630343908 I) u_{ol-3I} + (-1332674525520 + 6315867287600 I) u_{ol-2I} + (3125766861945 - 1560127331945 I) u_{ol-1I} - (107044029180 + 107044029180 I) u_{olI})), O(\Delta x_{ol}^8)$$

Formula:, 530, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:, 7, Error:,  $6.0055557780547032645 \times 10^{-15}$ , New Error:,  $6.0362226251900438409 \times 10^{-22}$

Error order:, 7, Error:,  $6.0362226251900438409 \times 10^{-22}$ , New Error:,  $6.0392024385800784851 \times 10^{-29}$

Error order:, 7, Error:,  $6.0392024385800784851 \times 10^{-29}$ , New Error:,  $6.0394995396963101321 \times 10^{-36}$

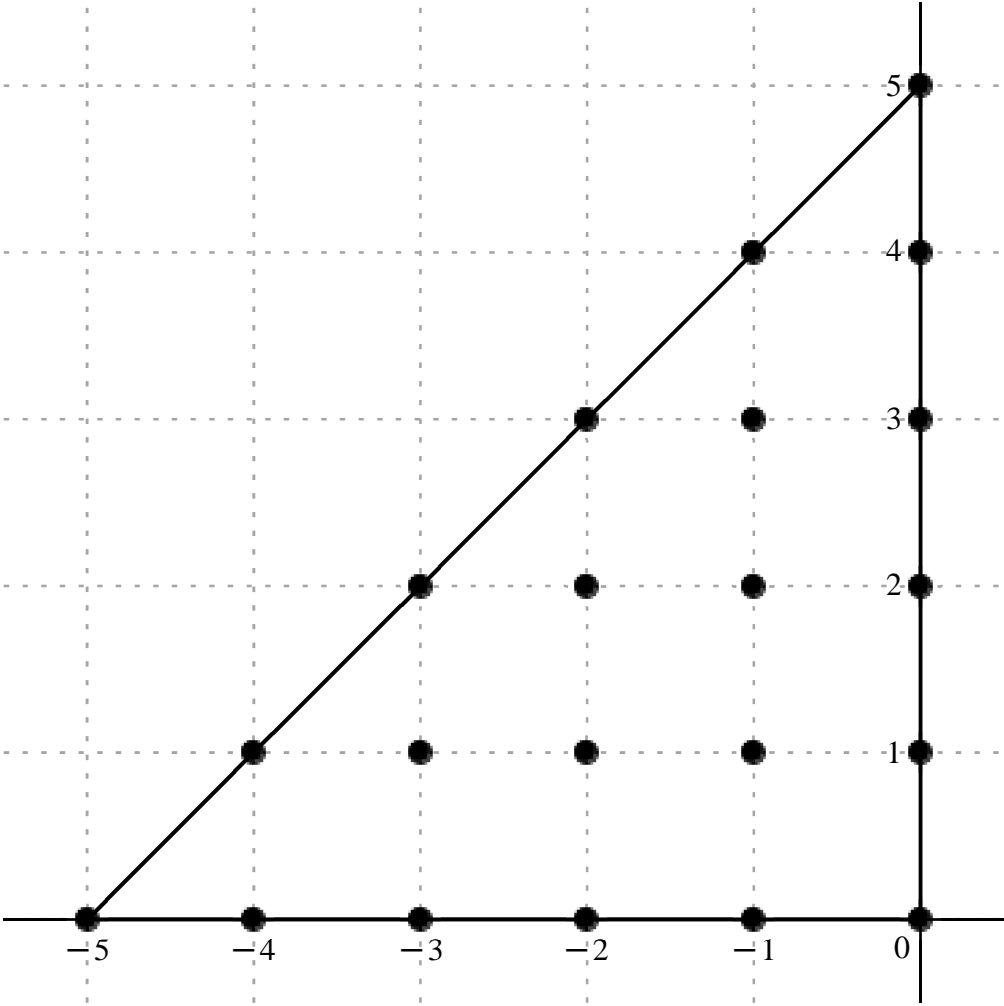
Error order:, 7, Error:,  $6.0394995396963101321 \times 10^{-36}$ , New Error:,  $6.0395292409941425608 \times 10^{-43}$

Error order:, 7, Error:,  $6.0395292409941425608 \times 10^{-43}$ , New Error:,  $6.0395322110357763280 \times 10^{-50}$

$$x_o + h, \begin{bmatrix} & & & & 5 I \\ & & & -1 + 4 I & 4 I \\ & & -2 + 3 I & -1 + 3 I & 3 I \\ & -3 + 2 I & -2 + 2 I & -1 + 2 I & 2 I \\ -4 + I & -3 + I & -2 + I & -1 + I & I \\ -5 & -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$c =$ ,

$$\left[ \begin{array}{cccccccc} & & & & & & -\frac{897922806858}{505325} & -\frac{1298528273196 \text{ I}}{505325} \\ & & & & & & -\frac{6562084323564}{17425} & -\frac{211193659908 \text{ I}}{697} \\ & & & & & -\frac{295866040932}{425} + \frac{804615024906 \text{ I}}{425} & -\frac{1180232815608}{425} & -\frac{6397168039416 \text{ I}}{425} \\ & & & & -\frac{199549164276}{5} - \frac{232707301596 \text{ I}}{5} & -\frac{1579228225344}{25} - \frac{5023806435648 \text{ I}}{25} & \frac{1180232815608}{425} & -\frac{6397168039416 \text{ I}}{425} \\ & & & & -\frac{8465864997744 \text{ I}}{5} & -2060809930872 + \frac{1867770789192 \text{ I}}{5} & \frac{151708173680448}{2465} + \frac{18286376324832 \text{ I}}{493} \\ & & \frac{295866040932}{425} + \frac{804615024906 \text{ I}}{425} & -\frac{1579228225344}{25} - \frac{5023806435648 \text{ I}}{25} & 2060809930872 + \frac{1867770789192 \text{ I}}{5} & \frac{116434671889536 \text{ I}}{85} & -\frac{3039235102134}{85} + \frac{1087261935606 \text{ I}}{85} \\ \frac{897922806858}{505325} & -\frac{1298528273196 \text{ I}}{505325} & \frac{6562084323564}{17425} & -\frac{211193659908 \text{ I}}{697} & -\frac{1180232815608}{425} - \frac{6397168039416 \text{ I}}{425} & -\frac{151708173680448}{2465} + \frac{18286376324832 \text{ I}}{493} & \frac{3039235102134}{85} + \frac{1087261935606 \text{ I}}{85} & -\frac{136443921768 \text{ I}}{85} \end{array} \right]$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}} \; u(x_{ol}) = \frac{1}{505325 \; \Delta x_{ol}^{14}} \Big( 29106 \; \Big( -(30850093 + 44613766 \text{ I}) \; u_{ol+51} + (-12086330058 + 32869073889 \text{ I}) \; u_{ol-1+41} - (6538186126 + 5260613050 \text{ I}) \; u_{ol+41} - (692896182490 + 808031451790 \text{ I}) \; u_{ol-2+31} + (1096713396512 - 3488840771104 \text{ I}) \; u_{ol-1+31} + (48213317452 - 261328688204 \text{ I}) \; u_{ol+31} + (692896182490 - 808031451790 \text{ I}) \; u_{ol-3+21} - 29396091733560 \text{ I} \; u_{ol-2+21} + (-35778835233900 + 6485475668580 \text{ I}) \; u_{ol-1+21} + (1068514244640 + 643974978800 \text{ I}) \; u_{ol+21} + (12086330058 + 32869073889 \text{ I}) \; u_{ol-4+1} - (1096713396512 + 3488840771104 \text{ I}) \; u_{ol-3+1} + (35778835233900 + 6485475668580 \text{ I}) \; u_{ol-2+1} + 23782179769920 \text{ I} \; u_{ol-1+1} + (-620774159355 + 222076967195 \text{ I}) \; u_{ol+1} + (30850093 - 44613766 \text{ I}) \; u_{ol-5} + (6538186126 - 5260613050 \text{ I}) \; u_{ol-4} - (48213317452 + 261328688204 \text{ I}) \; u_{ol-3} + (-1068514244640 + 643974978800 \text{ I}) \; u_{ol-2} + (620774159355 + 222076967195 \text{ I}) \; u_{ol-1} - 27869137460 \text{ I} \; u_{ol} \Big) \Big) , \; O( \; \Delta x_{ol}^7 \; )$$

Formula.: 531, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 15

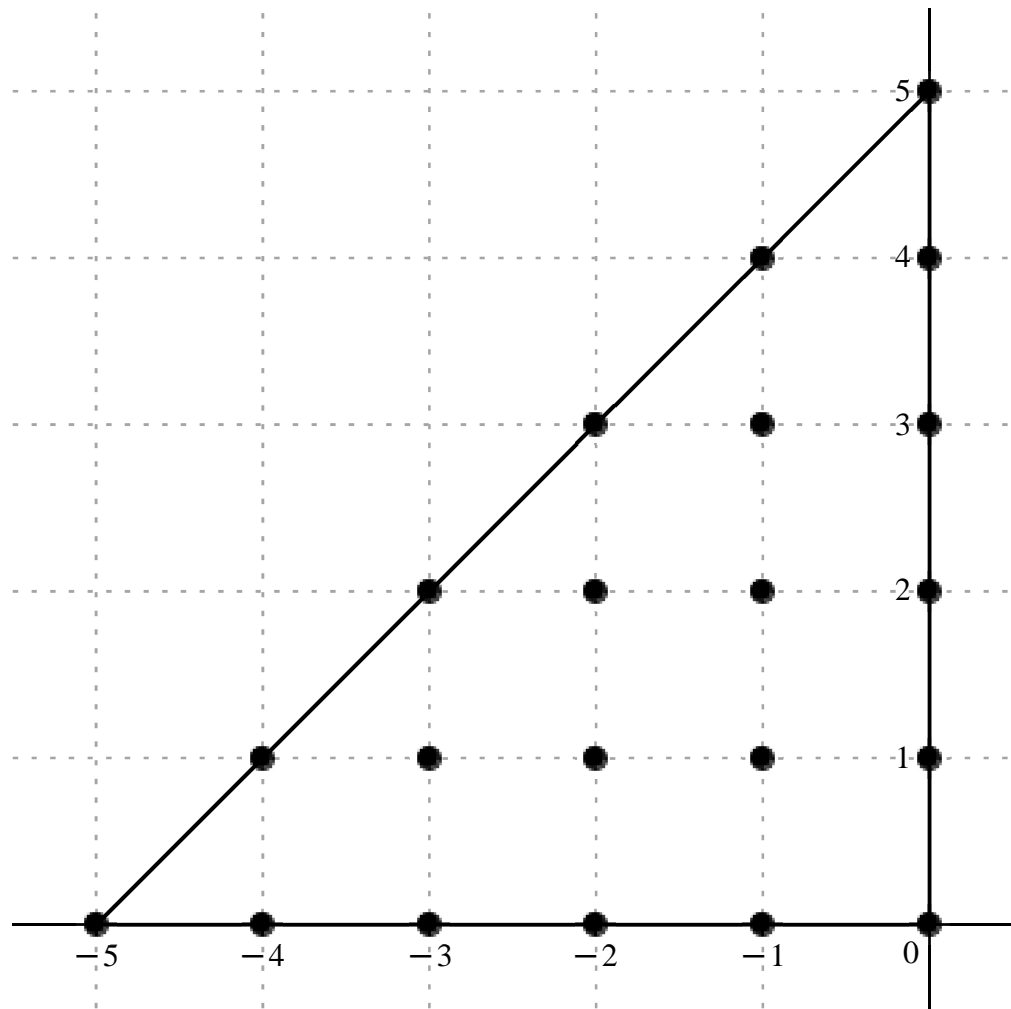
Error order.: 6, Error.:  $1.7413750195546577878 \times 10^{-12}$ , New Error.:  $1.7712006506409502379 \times 10^{-18}$

Error order.: 6, Error.:  $1.7712006506409502379 \times 10^{-18}$ , New Error.:  $1.7741913008693274035 \times 10^{-24}$

*Error order.*: 6, *Error.*:  $1.7745203604674363554 \times 10^{-36}$ , *New Error.*:  $1.7745233519982391213 \times 10^{-42}$

$$c = , \quad x_o + h. , \quad \begin{bmatrix} & & & & 5 \text{ I} \\ & & & -1 + 4 \text{ I} & 4 \text{ I} \\ & & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -4 + \text{I} & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$

$$\begin{aligned} & \frac{18807511338}{2465} - \frac{2462105646 \text{ I}}{2465} - \frac{98355344472}{85} + \frac{3092978196 \text{ I}}{17} - \frac{1862452424448}{85} - \frac{2471686875504 \text{ I}}{85} - \frac{22534928151120}{493} + \frac{79436563457328 \text{ I}}{493} \\ & - \frac{11014554474}{5} + \frac{373056288066 \text{ I}}{85} - \frac{1224025121088}{5} - \frac{2209044809664 \text{ I}}{5} - \frac{2754949261680}{493} + \frac{4101797278656 \text{ I}}{493} - \frac{38200510123776}{17} + \frac{38200510123776 \text{ I}}{17} - \frac{1343196552852}{17} - \frac{603924119568 \text{ I}}{17} \\ & \frac{148035444480}{85} - \frac{9712206504 \text{ I}}{85} - \frac{2860565971032}{85} - \frac{2860565971032 \text{ I}}{85} - \frac{4101797278656}{85} - \frac{2754949261680 \text{ I}}{85} - \frac{2209044809664}{85} - \frac{1224025121088 \text{ I}}{85} - \frac{373056288066}{85} - \frac{11014554474 \text{ I}}{85} - \frac{98355344472}{85} - \frac{2462105646 \text{ I}}{85} - \frac{18807511338}{85} \end{aligned}$$



$$\frac{d^{15}}{dx_{ol}^{15}} u(x_{ol}) = \frac{1}{2465 \mathcal{A}x_{ol}^{15}} (87318 ((28197 - 215391 \mathbb{I}) u_{ol+5\mathbb{I}} + (-123899223 + 62188499 \mathbb{I}) u_{ol-1+4\mathbb{I}} - (5136190 + 32665716 \mathbb{I}) u_{ol+4\mathbb{I}} + (274177020 - 4179062400 \mathbb{I}) u_{ol-2+3\mathbb{I}} + (12472332064 - 6910881888 \mathbb{I}) u_{ol-1+3\mathbb{I}} + (820895112 - 618556544 \mathbb{I}) u_{ol+3\mathbb{I}} + (4179062400 - 274177020 \mathbb{I}) u_{ol-3+2\mathbb{I}} + (80754198660 - 80754198660 \mathbb{I}) u_{ol-2+2\mathbb{I}} - (115794341280 + 77772623400 \mathbb{I}) u_{ol-1+2\mathbb{I}} + (1290394200 + 4548693480 \mathbb{I}) u_{ol+2\mathbb{I}} + (-62188499 + 123899223 \mathbb{I}) u_{ol-4+1\mathbb{I}} + (6910881888 - 12472332064 \mathbb{I}) u_{ol-3+1\mathbb{I}} + (77772623400 + 115794341280 \mathbb{I}) u_{ol-2+1\mathbb{I}} + (-63435648640 + 63435648640 \mathbb{I}) u_{ol-1+1\mathbb{I}} - (2230508030 + 1002874520 \mathbb{I}) u_{ol+1\mathbb{I}} + (215391 - 28197 \mathbb{I}) u_{ol-5} + (32665716 + 5136190 \mathbb{I}) u_{ol-4} + (618556544 - 820895112 \mathbb{I}) u_{ol-3} - (4548693480 + 1290394200 \mathbb{I}) u_{ol-2} + (1002874520 + 2230508030 \mathbb{I}) u_{ol-1} + (71510230 - 71510230 \mathbb{I}) u_{ol})), \mathcal{O}(\mathcal{A}x_{ol}^6)$$

Formula:, 532, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 16

*Error order:*, 5, *Error:*,  $3.2635855833865019957 \times 10^{-10}$ , *New Error:*,  $3.2793874286173024150 \times 10^{-15}$

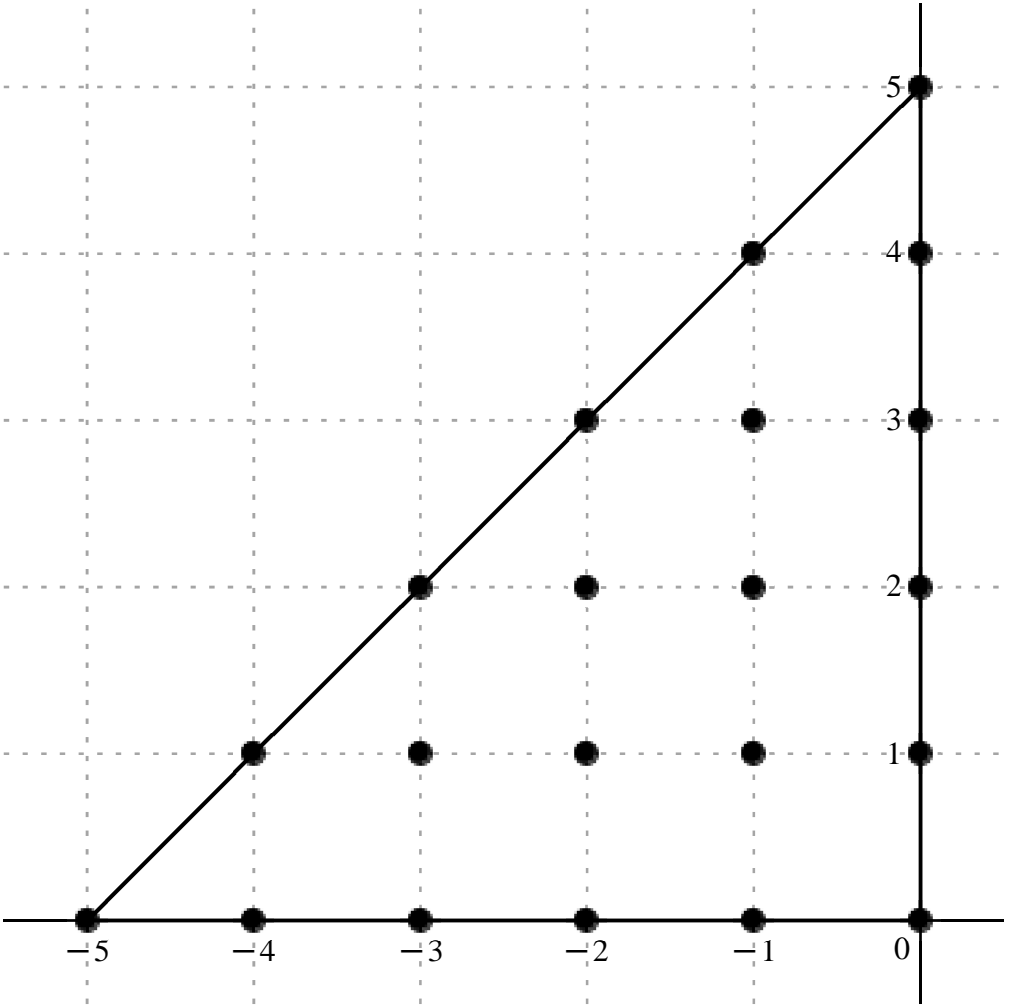
*Error order:*, 5, *Error:*,  $3.2793874286173024150 \times 10^{-15}$ , *New Error:*,  $3.2809245192604364514 \times 10^{-20}$

*Error order:*, 5, *Error:*,  $3.2809245192604364514 \times 10^{-20}$ , *New Error:*,  $3.2810777918578410226 \times 10^{-25}$

*Error order:*, 5, *Error:*,  $3.2810777918578410226 \times 10^{-25}$ , *New Error:*,  $3.2810931147473592788 \times 10^{-30}$

*Error order:*, 5, *Error:*,  $3.2810931147473592788 \times 10^{-30}$ , *New Error:*,  $3.2810946469926033268 \times 10^{-35}$

[illegible]



$$\frac{\mathrm{d}^{16}}{\mathrm{d}x_{ol}^{16}}\,u(x_{ol})=\frac{1}{505325\,\mathcal{A}\kappa_{ol}^{16}}\left(698544\left((8722747-7490481\,\mathrm{I})\,u_{ol+51}-(6965572205+2050983385\,\mathrm{I})\,u_{ol-1+41}+(942377910-1440071850\,\mathrm{I})\,u_{ol+41}+(162409433700-145743815200\,\mathrm{I})\,u_{ol-2+31}+(712049334048+184717066464\,\mathrm{I})\,u_{ol-1+31}+(52286845720+5087778560\,\mathrm{I})\,u_{ol+31}+(162409433700+145743815200\,\mathrm{I})\,u_{ol-3+21}\right.\right.$$

$$\left.+5874572914200\,u_{ol-2+21}-(1465239561480+6930397352160\,\mathrm{I})\,u_{ol-1+21}+(-108854737600+210642338000\,\mathrm{I})\,u_{ol+21}+(-6965572205+2050983385\,\mathrm{I})\,u_{ol-4+1}+(712049334048-184717066464\,\mathrm{I})\,u_{ol-3+1}+(-1465239561480+6930397352160\,\mathrm{I})\,u_{ol-2+1}-4483346129600\,u_{ol-1+1}-(44688624450\right.$$

$$\left.+111663508200\,\mathrm{I})\,u_{ol+1}+(8722747+7490481\,\mathrm{I})\,u_{ol-5}+(942377910+1440071850\,\mathrm{I})\,u_{ol-4}+(52286845720-5087778560\,\mathrm{I})\,u_{ol-3}-(108854737600+210642338000\,\mathrm{I})\,u_{ol-2}+(-44688624450+111663508200\,\mathrm{I})\,u_{ol-1}+4876778620\,u_{ol}\right)\Big),\,O(\,\mathcal{A}\kappa_{ol}^5\,)$$

Formula:, 533, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 17

Error order:, 4, Error:,  $6.8589859953510440567\times 10^{-8}$ , New Error:,  $6.9681512474237574447\times 10^{-12}$

Error order:, 4, Error:,  $6.9681512474237574447\times 10^{-12}$ , New Error:,  $6.9790958323150959320\times 10^{-16}$

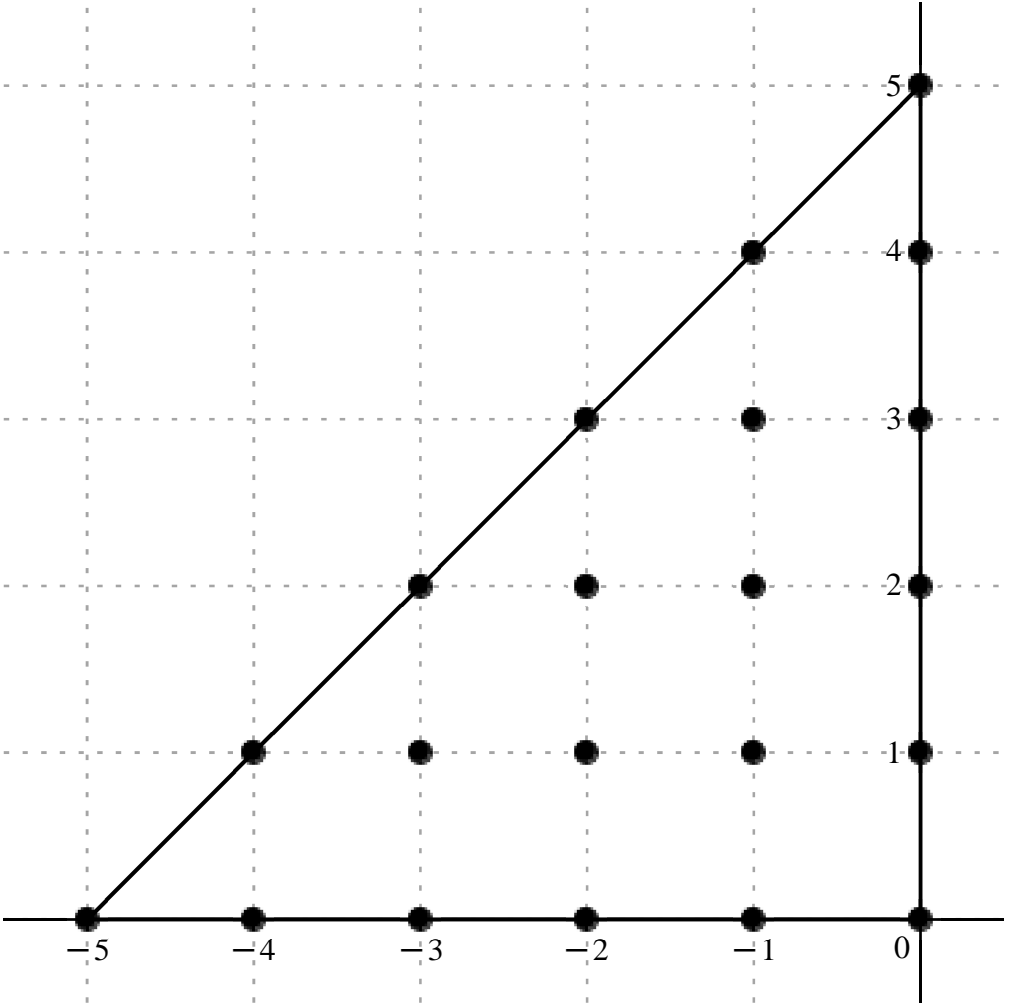
Error order:, 4, Error:,  $6.9790958323150959320\times 10^{-16}$ , New Error:,  $6.9801905663149012692\times 10^{-20}$

Error order:, 4, Error:,  $6.9801905663149012692\times 10^{-20}$ , New Error:,  $6.9803000424648550046\times 10^{-24}$

Error order:, 4, Error:,  $6.9803000424648550046\times 10^{-24}$ , New Error:,  $6.9803109901073449719\times 10^{-28}$

$$x_o+h\cdot,\left[\begin{array}{cccccc} & & & & 5\,\mathrm{I} & \\ & & & & -1+4\,\mathrm{I} & 4\,\mathrm{I} \\ & & & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ & & -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ & -4+\mathrm{I} & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{array}\right]$$

$$c = , \left[ \begin{array}{cccccccc} & & & & & & & \frac{157439942352}{5945} + \frac{2672629344 \text{ I}}{5945} \\ & & & & & & -\frac{42266801808}{5} - \frac{71331122016 \text{ I}}{5} & \frac{154517932800}{41} - \frac{203818374144 \text{ I}}{205} \\ & & & & 495791604000 + 20829184992 \text{ I} & \frac{4379211454464}{5} + \frac{7019506593792 \text{ I}}{5} & \frac{390282121152}{5} + \frac{435195706176 \text{ I}}{5} & \frac{390282121152}{5} + \frac{435195706176 \text{ I}}{5} \\ & & 20829184992 + 495791604000 \text{ I} & 9323114701824 + 9323114701824 \text{ I} & 8371907337024 - 13271159651904 \text{ I} & -\frac{14176978421760}{29} + \frac{5003095071744 \text{ I}}{29} & -\frac{14176978421760}{29} + \frac{5003095071744 \text{ I}}{29} & -\frac{14176978421760}{29} + \frac{5003095071744 \text{ I}}{29} \\ & -\frac{71331122016}{5} - \frac{42266801808 \text{ I}}{5} & \frac{7019506593792}{5} + \frac{4379211454464 \text{ I}}{5} & -13271159651904 + 8371907337024 \text{ I} & -6914982057984 - 6914982057984 \text{ I} & 97760534256 - 239117898096 \text{ I} & 97760534256 - 239117898096 \text{ I} & 97760534256 - 239117898096 \text{ I} \\ \frac{2672629344}{5945} + \frac{157439942352 \text{ I}}{5945} & -\frac{203818374144}{205} + \frac{154517932800 \text{ I}}{41} & \frac{435195706176}{5} + \frac{390282121152 \text{ I}}{5} & \frac{5003095071744}{29} - \frac{14176978421760 \text{ I}}{29} & -239117898096 + 97760534256 \text{ I} & 7276034304 + 7276034304 \text{ I} & 7276034304 + 7276034304 \text{ I} & 7276034304 + 7276034304 \text{ I} \end{array} \right]$$



$$\frac{\mathrm{d}^{17}}{\mathrm{d}x_{ol}^{17}} \; u(x_{ol}) = \frac{1}{5945 \; \Delta x_{ol}^{17}} \Big( 698544 \; \big( (225383 + 3826 \; \text{I}) \; u_{ol+51} - (71942823 + 121413546 \; \text{I}) \; u_{ol-1+41} + (32074000 - 8461504 \; \text{I}) \; u_{ol+41} + (4219463750 + 177268010 \; \text{I}) \; u_{ol-2+31} + (7453907584 + 11947985152 \; \text{I}) \; u_{ol-1+31} + (664303812 + 740751756 \; \text{I}) \; u_{ol+31} + (177268010 + 4219463750 \; \text{I}) \; u_{ol-3+21} + (79344918720$$

$$+ 79344918720 \; \text{I}) \; u_{ol-2+21} + (71249612220 - 112944988620 \; \text{I}) \; u_{ol-1+21} + (-4160483200 + 1468246080 \; \text{I}) \; u_{ol+21} - (121413546 + 71942823 \; \text{I}) \; u_{ol-4+1} + (11947985152 + 7453907584 \; \text{I}) \; u_{ol-3+1} + (-112944988620 + 71249612220 \; \text{I}) \; u_{ol-2+1} - (58850363520 + 58850363520 \; \text{I}) \; u_{ol-1+1} + (831996805 - 2035027005 \; \text{I}) \; u_{ol+1}$$

$$+ (3826 + 225383 \; \text{I}) \; u_{ol-5} + (-8461504 + 32074000 \; \text{I}) \; u_{ol-4} + (740751756 + 664303812 \; \text{I}) \; u_{ol-3} + (1468246080 - 4160483200 \; \text{I}) \; u_{ol-2} + (-2035027005 + 831996805 \; \text{I}) \; u_{ol-1} + (61923120 + 61923120 \; \text{I}) \; u_{ol} \big) \Big), \; O( \; \Delta x_{ol}^4 \; )$$

Formula: 534, Var: 1

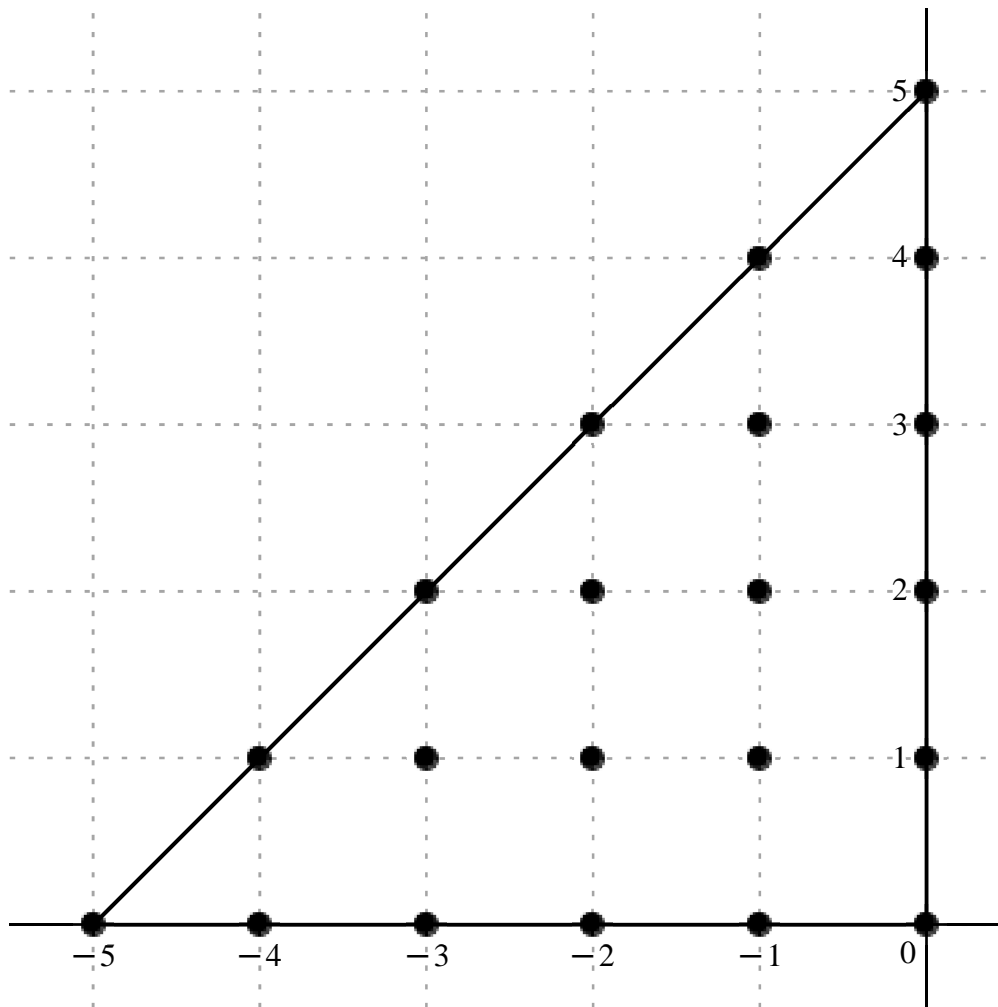
Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 18

Error order: 3, Error: 8.7206004736158325271 × 10−6, New Error: 8.7583636131002061955 × 10−9

Error order: 3, Error: 8.7583636131002061955 × 10−9, New Error: 8.7620439243004157563 × 10−12

*Error order.*: 3, *Error.*:  $8.7624476799386085849 \times 10^{-18}$ , *New Error.*:  $8.7624513494626868964 \times 10^{-21}$

$$c =, \quad x_o + h., \quad \begin{bmatrix} & & & & & 5 \text{ I} \\ & & & & -1 + 4 \text{ I} & 4 \text{ I} \\ & & & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ & -4 + \text{I} & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{bmatrix}$$



$$\frac{d^{18}}{dx_{ol}^{18}} u(x_{ol}) = \frac{1}{5945 \mathfrak{A}_{ol}^{18}} (12573792 ((11702 + 10649 \mathbf{I}) u_{ol+51} + (2072427 - 9623766 \mathbf{I}) u_{ol-1+41} + (2038004 + 1043420 \mathbf{I}) u_{ol+41} + (201523610 + 213651410 \mathbf{I}) u_{ol-2+31} + (-192751168 + 948232256 \mathbf{I}) u_{ol-1+31} + (-775228 + 67539956 \mathbf{I}) u_{ol+31} + (-201523610 + 213651410 \mathbf{I}) u_{ol-3+21} + 7698727440 \mathbf{I} u_{ol-2+21} + (8786591100 - 2121152220 \mathbf{I}) u_{ol-1+21} - (269458560 + 119096800 \mathbf{I}) u_{ol+21} - (2072427 + 9623766 \mathbf{I}) u_{ol-4+1} + (192751168 + 948232256 \mathbf{I}) u_{ol-3+1} - (8786591100 + 2121152220 \mathbf{I}) u_{ol-2+1} - 5549681280 \mathbf{I} u_{ol-1+1} + (132282195 - 57957805 \mathbf{I}) u_{ol+1} + (-11702 + 10649 \mathbf{I}) u_{ol-5} + (-2038004 + 1043420 \mathbf{I}) u_{ol-4} + (775228 + 67539956 \mathbf{I}) u_{ol-3} + (269458560 - 119096800 \mathbf{I}) u_{ol-2} - (132282195 + 57957805 \mathbf{I}) u_{ol-1} + 5659640 \mathbf{I} u_{ol})), \mathcal{O}(\mathfrak{A}_{ol}^3)$$

Formula:, 535, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 19

Error order:, 2, Error:, 0.0011283114743936963873, New Error:, 0.000011431755321182953758

Error order:, 2, Error:, 0.000011431755321182953758, New Error:,  $1.1446653548490602531 \times 10^{-7}$

Error order:, 2, Error:,  $1.1446653548490602531 \times 10^{-7}$ , New Error:,  $1.1448143707155056122 \times 10^{-9}$

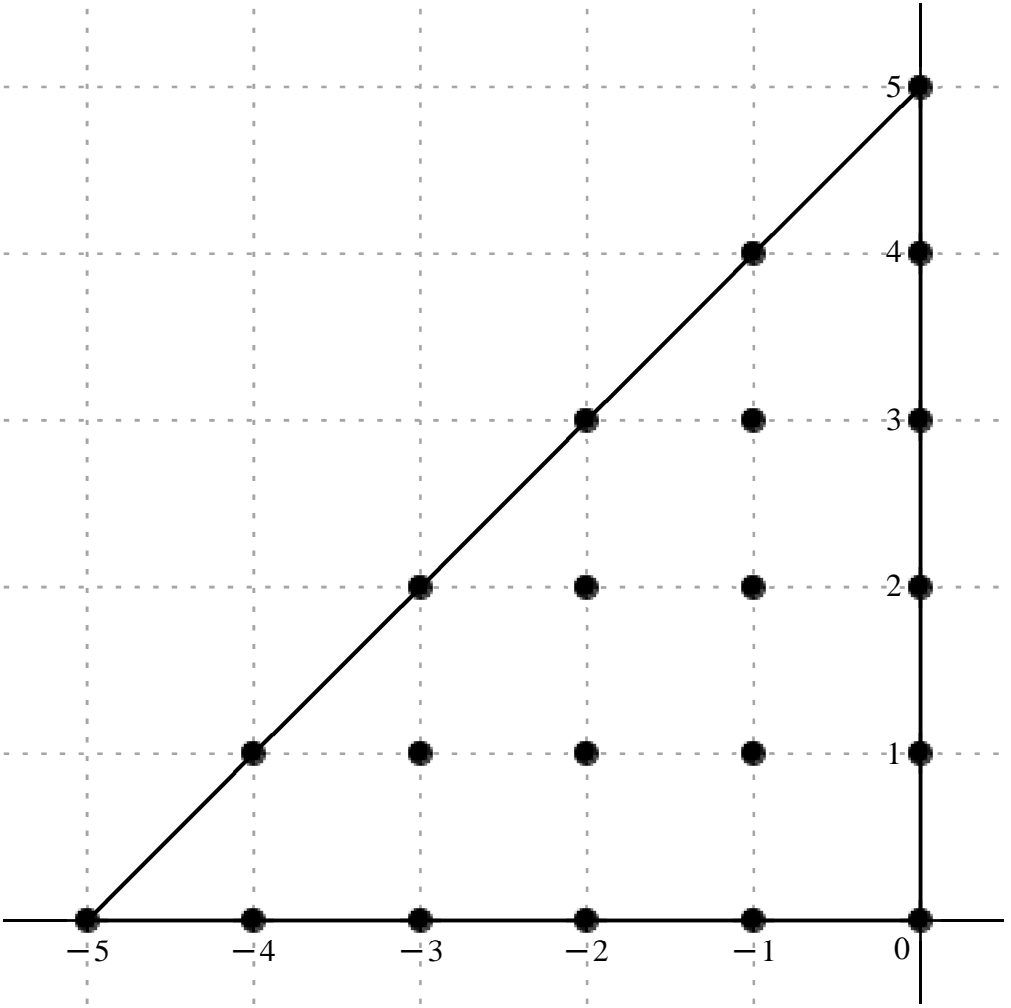
Error order:, 2, Error:,  $1.1448143707155056122 \times 10^{-9}$ , New Error:,  $1.1448292726375025471 \times 10^{-11}$

Error order:, 2, Error:,  $1.1448292726375025471 \times 10^{-11}$ , New Error:,  $1.1448307628330551828 \times 10^{-13}$

$$x_o + h . , \left[ \begin{array}{cccccc} & & & & 5 \text{ I} & \\ & & & -1 + 4 \text{ I} & 4 \text{ I} & \\ & & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} & \\ & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & \\ -4 + \text{I} & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & \\ -5 & -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} & & & & & & \frac{19828869984}{5945} + \frac{168664845888 \text{ I}}{5945} & \\ & & & & & \frac{72387320544}{5} - \frac{51125038272 \text{ I}}{5} & \frac{60203316096}{41} + \frac{777865068288 \text{ I}}{205} & \\ & & & & -8122669632 + 527973526080 \text{ I} & -\frac{7017986562048}{5} + \frac{4938583136256 \text{ I}}{5} & -\frac{404222265216}{5} + \frac{430979294592 \text{ I}}{5} & \\ & & -527973526080 + 8122669632 \text{ I} & -9649731522816 + 9649731522816 \text{ I} & 13597348963968 + 8041442935680 \text{ I} & -\frac{5714536988160}{29} - \frac{13565813893632 \text{ I}}{29} & & \\ & \frac{51125038272}{5} - \frac{72387320544 \text{ I}}{5} & -\frac{4938583136256}{5} + \frac{7017986562048 \text{ I}}{5} & -8041442935680 - 13597348963968 \text{ I} & 6758061133824 - 6758061133824 \text{ I} & 229584868128 + 85765835232 \text{ I} & & \\ -\frac{168664845888}{5945} - \frac{19828869984 \text{ I}}{5945} & -\frac{777865068288}{205} - \frac{60203316096 \text{ I}}{41} & -\frac{430979294592}{5} + \frac{404222265216 \text{ I}}{5} & \frac{13565813893632}{29} + \frac{5714536988160 \text{ I}}{29} & -85765835232 - 229584868128 \text{ I} & -6689257344 + 6689257344 \text{ I} & & \end{array} \right]$$





$$\frac{\mathrm{d}^{19}}{\mathrm{d}x_{ol}^{19}}\; u(x_{ol}) = \frac{1}{5945\; \Delta x_{ol}^{19}}\; \Big( 238902048\; \big( (83 + 706\; \mathrm{I})\; u_{ol+51} + (360267 - 254446\; \mathrm{I})\; u_{ol-1+41} + (36540 + 94424\; \mathrm{I})\; u_{ol+41} + (-202130 + 13138450\; \mathrm{I})\; u_{ol-2+31} + (-34928064 + 24579008\; \mathrm{I})\; u_{ol-1+31} + (-2011788 + 2144956\; \mathrm{I})\; u_{ol+31} + (-13138450 + 202130\; \mathrm{I})\; u_{ol-3+21} + (-240130440 + 240130440\; \mathrm{I})\; u_{ol-2+21} + (338365620$$
  
$$+ 200108700\; \mathrm{I})\; u_{ol-1+21} - (4903600 + 11640720\; \mathrm{I})\; u_{ol+21} + (254446 - 360267\; \mathrm{I})\; u_{ol-4+1} + (-24579008 + 34928064\; \mathrm{I})\; u_{ol-3+1} - (200108700 + 338365620\; \mathrm{I})\; u_{ol-2+1} + (168172160 - 168172160\; \mathrm{I})\; u_{ol-1+1} + (5713145 + 2134255\; \mathrm{I})\; u_{ol+1} - (706 + 83\; \mathrm{I})\; u_{ol-5} - (94424 + 36540\; \mathrm{I})\; u_{ol-4} + (-2144956 + 2011788\; \mathrm{I})\; u_{ol-3}$$
  
$$+ (11640720 + 4903600\; \mathrm{I})\; u_{ol-2} - (2134255 + 5713145\; \mathrm{I})\; u_{ol-1} + (-166460 + 166460\; \mathrm{I})\; u_{ol} \Big) \Big),\; O(\; \Delta x_{ol}^2\; )$$

Formula:, 536, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 20

Error order:, 1, Error:, 0.073740873938296324550, New Error:, 0.0073951417993036007777

Error order:, 1, Error:, 0.0073951417993036007777, New Error:, 0.00073972025878727376589

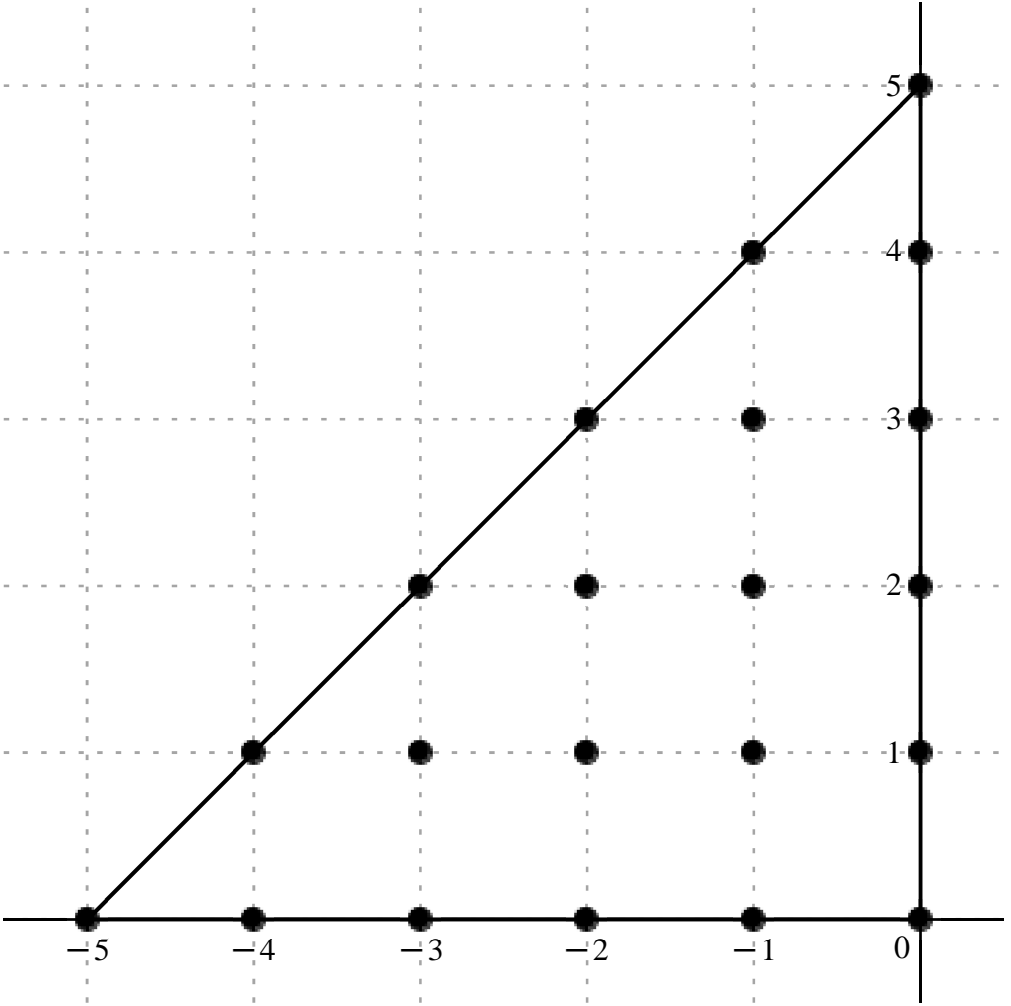
Error order:, 1, Error:, 0.00073972025878727376589, New Error:, 0.000073974082153593592747

Error order:, 1, Error:, 0.000073974082153593592747, New Error:, 7.3974287735894485091 × 10<sup>-6</sup>

Error order:, 1, Error:, 7.3974287735894485091 × 10<sup>-6</sup>, New Error:, 7.3974308293672668313 × 10<sup>-7</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccccc} & & & & 5\; \mathrm{I} & \\ & & & & -1 + 4\; \mathrm{I} & 4\; \mathrm{I} \\ & & & -2 + 3\; \mathrm{I} & -1 + 3\; \mathrm{I} & 3\; \mathrm{I} \\ & & -3 + 2\; \mathrm{I} & -2 + 2\; \mathrm{I} & -1 + 2\; \mathrm{I} & 2\; \mathrm{I} \\ & -4 + \mathrm{I} & -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} \\ -5 & -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = \begin{bmatrix} -\frac{41091152256}{5945} - \frac{61158924288 \text{ I}}{5945} & -\frac{24845812992}{41} - \frac{66892573440 \text{ I}}{41} & \frac{7644865536 - 955608192 \text{ I}}{5} & -\frac{3638955995136}{5} + \frac{519850856448 \text{ I}}{5} & -\frac{41091152256}{5945} + \frac{61158924288 \text{ I}}{5945} \\ -\frac{162453392640 - 162453392640 \text{ I}}{5} & -\frac{3638955995136}{5} + \frac{519850856448 \text{ I}}{5} & -162453392640 + 162453392640 \text{ I} & -\frac{3638955995136}{5} - \frac{519850856448 \text{ I}}{5} & -\frac{24845812992}{41} + \frac{66892573440 \text{ I}}{41} \\ -162453392640 - 162453392640 \text{ I} & -5848322135040 & -162453392640 + 162453392640 \text{ I} & -5848322135040 & -49691625984 + 3822432768 \text{ I} \\ 1754496640512 - 6433154348544 \text{ I} & 1754496640512 + 6433154348544 \text{ I} & 1754496640512 - 6433154348544 \text{ I} & 1754496640512 + 6433154348544 \text{ I} & \frac{2140562350080}{29} - \frac{5733649152000 \text{ I}}{29} \\ 3975330078720 & 3975330078720 & 3975330078720 & 3975330078720 & \frac{2140562350080}{29} + \frac{5733649152000 \text{ I}}{29} \\ 43002368640 - 90782778240 \text{ I} & 43002368640 + 90782778240 \text{ I} & 43002368640 - 90782778240 \text{ I} & 43002368640 + 90782778240 \text{ I} & 43002368640 - 90782778240 \text{ I} \\ -3822432768 & -3822432768 & -3822432768 & -3822432768 & -3822432768 \end{bmatrix}$$



$$\frac{\mathrm{d}^{20}}{\mathrm{d}x_{ol}^{20}} \; u(x_{ol}) = \frac{1}{5945 \; \Delta x_{ol}^{20}} \Big( 955608192 \; \big( (-43 + 64 \; \text{I}) \; u_{ol+51} + (47560 + 5945 \; \text{I}) \; u_{ol-1+41} + (-3770 + 10150 \; \text{I}) \; u_{ol+41} + (-1010650 + 1010650 \; \text{I}) \; u_{ol-2+31} - (4527712 + 646816 \; \text{I}) \; u_{ol-1+31} + (-309140 + 23780 \; \text{I}) \; u_{ol+31} - (1010650 + 1010650 \; \text{I}) \; u_{ol-3+21} - 36383400 \; u_{ol-2+21} + (10915020 + 40021740 \; \text{I}) \; u_{ol-1+21} + (459200 - 1230000 \; \text{I}) \; u_{ol+21} + (47560 - 5945 \; \text{I}) \; u_{ol-4+1} + (-4527712 + 646816 \; \text{I}) \; u_{ol-3+1} + (10915020 - 40021740 \; \text{I}) \; u_{ol-2+1} + 24731200 \; u_{ol-1+1} + (267525 + 564775 \; \text{I}) \; u_{ol+1} - (43 + 64 \; \text{I}) \; u_{ol-5} - (3770 + 10150 \; \text{I}) \; u_{ol-4} - (309140 + 23780 \; \text{I}) \; u_{ol-3} + (459200 + 1230000 \; \text{I}) \; u_{ol-2} + (267525 - 564775 \; \text{I}) \; u_{ol-1} - 23780 \; u_{ol} \big) \Big) \; O(\; \Delta x_{ol} \; )$$

Formula: 537, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 1

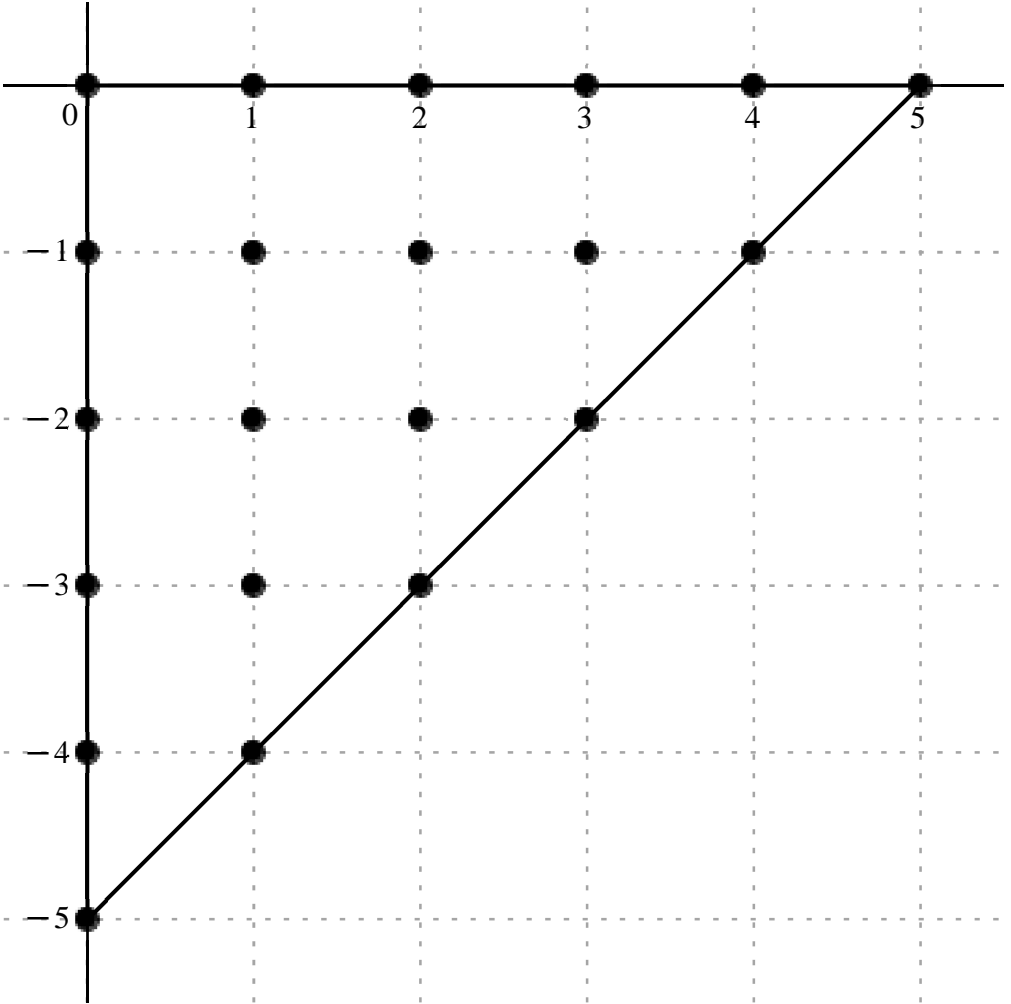
Error order: 20, Error: 2.8577329235728505618 × 10<sup>−50</sup>, New Error: 2.8045678123039492531 × 10<sup>−70</sup>

Error order: 20, Error: 2.8045678123039492531 × 10<sup>−70</sup>, New Error: 2.7992664276854876903 × 10<sup>−90</sup>

Error order: 20, Error: 2.7992664276854876903 × 10<sup>−90</sup>, New Error: 2.7987364438210323199 × 10<sup>−110</sup>

*Error order:*, 20,    *Error:*,  $2.7987364438210323199 \times 10^{-110}$ ,    *New Error:*,  $2.7986834469838587249 \times 10^{-130}$   
*Error order:*, 20,    *Error:*,  $2.7986834469838587249 \times 10^{-130}$ ,    *New Error:*,  $2.7986781473156373794 \times 10^{-150}$

$$\begin{aligned}
 & x_o \neq h., \quad \begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \\ -I & 1-I & 2-I & 3-I & 4-I & 5-I \\ -2I & 1-2I & 2-2I & 3-2I & 4-2I & 5-2I \\ -3I & 1-3I & 2-3I & 3-3I & 4-3I & 5-3I \\ -4I & 1-4I & 2-4I & 3-4I & 4-4I & 5-4I \\ -5I & 1-5I & 2-5I & 3-5I & 4-5I & 5-5I \end{bmatrix} \\
 & c =, \quad \begin{bmatrix} -\frac{31241}{6630} - \frac{31241 I}{6630} & \frac{45}{4} - \frac{95 I}{4} & \frac{280}{29} + \frac{750 I}{29} & -\frac{13}{3} - \frac{I}{3} & -\frac{13}{328} - \frac{35 I}{328} & -\frac{43}{118900} - \frac{16 I}{29725} \\ -\frac{95}{4} + \frac{45 I}{4} & 520 + 520 I & \frac{2601}{5} - \frac{2907 I}{5} & -\frac{1496}{25} - \frac{272 I}{25} & \frac{33}{68} + \frac{I}{17} & \\ \frac{750}{29} + \frac{280 I}{29} & -\frac{2907}{5} + \frac{2601 I}{5} & -\frac{765}{2} - \frac{765 I}{2} & -\frac{85}{26} - \frac{425 I}{26} & & \\ -\frac{1}{3} - \frac{13 I}{3} & -\frac{272}{25} - \frac{1496 I}{25} & -\frac{425}{26} - \frac{85 I}{26} & & & \\ -\frac{35}{328} - \frac{13 I}{328} & \frac{1}{17} + \frac{33 I}{68} & & & & \\ -\frac{16}{29725} - \frac{43 I}{118900} & & & & & \end{bmatrix}
 \end{aligned}$$



$$\begin{aligned}
 \frac{d}{dx_{ol}} u(x_{ol}) = & \frac{1}{157661400 \Delta x_{ol}} \big( -(742910980 + 742910980 I) u_{ol} + (1773690750 - 3744458250 I) u_{ol+1} + (1522248000 + 4077450000 I) u_{ol+2} \\
 & - (683199400 + 52553800 I) u_{ol+3} - (6248775 + 16823625 I) u_{ol+4} - (57018 + 84864 I) u_{ol+5} + (-3744458250 + 1773690750 I) u_{ol-1} + (81983928000 + 81983928000 I) u_{ol+1-1} \\
 & + (82015460280 - 91664337960 I) u_{ol+2-1} - (9434458176 + 1715356032 I) u_{ol+3-1} + (76512150 + 9274200 I) u_{ol+4-1} + (4077450000 + 1522248000 I) u_{ol-21} \\
 & + (-91664337960 + 82015460280 I) u_{ol+1-21} - (60305485500 + 60305485500 I) u_{ol+2-21} - (515431500 + 2577157500 I) u_{ol+3-21} - (52553800 + 683199400 I) u_{ol-31} \\
 & - (1715356032 + 9434458176 I) u_{ol+1-31} - (2577157500 + 515431500 I) u_{ol+2-31} - (16823625 + 6248775 I) u_{ol-41} + (9274200 + 76512150 I) u_{ol+1-41} - (84864 + 57018 I) u_{ol-51} \big), \quad O(\Delta x_{ol}^{20})
 \end{aligned}$$

Formula:, 538, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

*Error order*., 19, *Error*.,  $2.9140001015250317618 \times 10^{-47}$ , *New Error*.,  $2.8989571432509276205 \times 10^{-66}$

*Error order*., 19, *Error*.,  $2.8989571432509276205 \times 10^{-66}$ , *New Error*.,  $2.8974019006597632771 \times 10^{-85}$

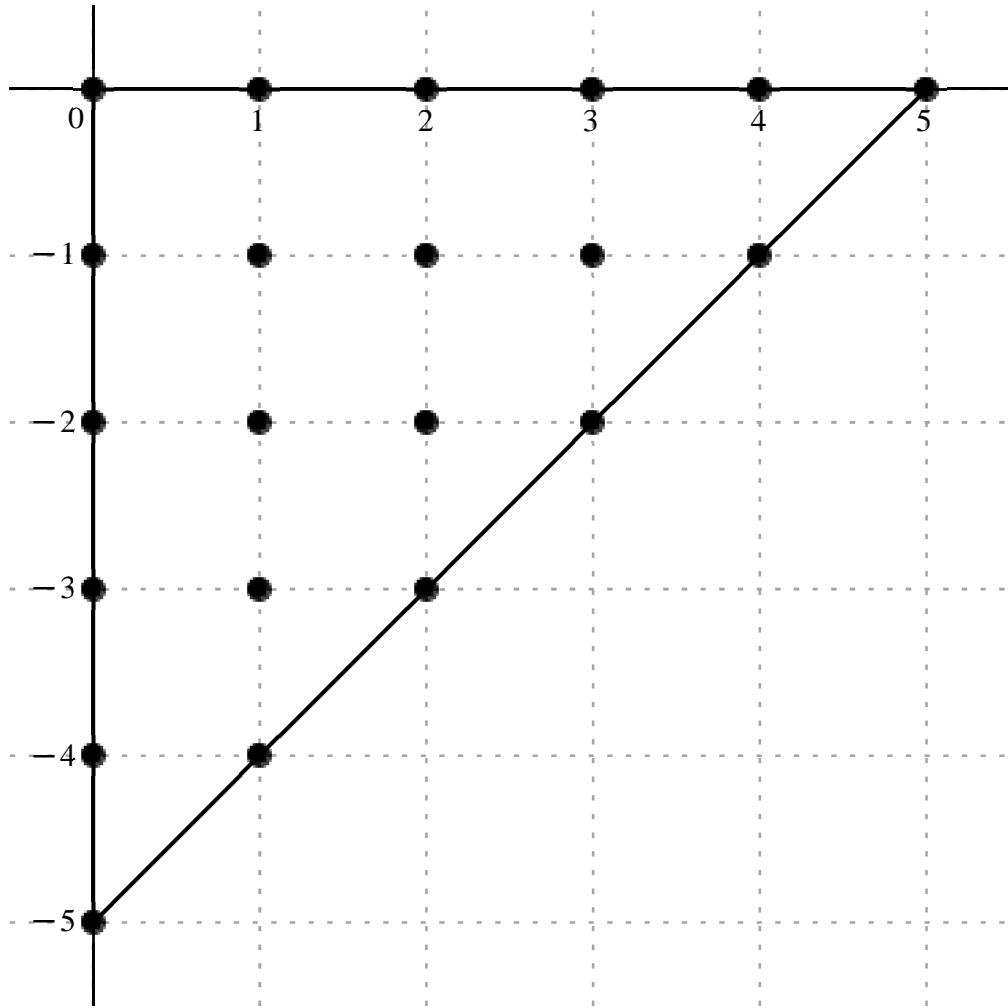
*Error order:*, 19, *Error:*,  $2.8974019006597632771 \times 10^{-85}$ , *New Error:*,  $2.8972458740401361876 \times 10^{-104}$

*Error order*., 19, *Error*.,  $2.8972458740401361876 \times 10^{-104}$ , *New Error*.,  $2.8972302663616405293 \times 10^{-123}$

*Error order:*, 19, *Error:*,  $2.8972302663616405293 \times 10^{-123}$ , *New Error:*,  $2.8972287055436327026 \times 10^{-142}$

$$x_o + h \cdot \begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \\ -1 & 1-1 & 2-1 & 3-1 & 4-1 \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & 3-2 \text{ I} \\ -3 \text{ I} & 1-3 \text{ I} & 2-3 \text{ I} \\ -4 \text{ I} & 1-4 \text{ I} \\ -5 \text{ I} \end{bmatrix}$$

$$c = \begin{bmatrix} \frac{17162987 \text{ I}}{397800} & -\frac{407539}{1326} + \frac{46610 \text{ I}}{663} & \frac{3122294}{19227} - \frac{5938396 \text{ I}}{19227} & \frac{346162}{9945} + \frac{435164 \text{ I}}{9945} & -\frac{1417699}{2174640} + \frac{961037 \text{ I}}{724880} & -\frac{237693}{131384500} + \frac{3257923 \text{ I}}{394153500} \\ \frac{407539}{1326} + \frac{46610 \text{ I}}{663} & -\frac{446816 \text{ I}}{51} & -\frac{3163194}{325} + \frac{103908 \text{ I}}{325} & \frac{694976}{1625} + \frac{242992 \text{ I}}{375} & -\frac{50357}{13260} - \frac{66871 \text{ I}}{13260} \\ -\frac{3122294}{19227} - \frac{5938396 \text{ I}}{19227} & \frac{3163194}{325} + \frac{103908 \text{ I}}{325} & \frac{177501 \text{ I}}{26} & -\frac{4669}{39} + \frac{2292 \text{ I}}{13} \\ -\frac{346162}{9945} + \frac{435164 \text{ I}}{9945} & -\frac{694976}{1625} + \frac{242992 \text{ I}}{375} & \frac{4669}{39} + \frac{2292 \text{ I}}{13} \\ \frac{1417699}{2174640} + \frac{961037 \text{ I}}{724880} & \frac{50357}{13260} - \frac{66871 \text{ I}}{13260} \\ \frac{237693}{131384500} + \frac{3257923 \text{ I}}{394153500} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{4729842000 \, \Delta x_{ol}^2} \Big( 204067915430 \, \mathrm{I} u_{ol} + ( -1453691613000 + 332515740000 \, \mathrm{I} ) \, u_{ol+1} + ( 768084324000 - 1460845416000 \, \mathrm{I} ) \, u_{ol+2} + ( 164634647200 + 206963998400 \, \mathrm{I} ) \, u_{ol+3} + ( -3083495325 + 6270766425 \, \mathrm{I} ) \, u_{ol+4} + ( -8556948 + 39095076 \, \mathrm{I} ) \, u_{ol+5} + ( 1453691613000 + 332515740000 \, \mathrm{I} ) \, u_{ol-1} \\ - 41438609472000 \, \mathrm{I} u_{ol+1-1} + ( -46035101031840 + 1512210530880 \, \mathrm{I} ) \, u_{ol+2-1} + ( 2022847183872 + 3064836712704 \, \mathrm{I} ) \, u_{ol+3-1} - ( 17962341900 + 23852885700 \, \mathrm{I} ) \, u_{ol+4-1} - ( 768084324000 + 1460845416000 \, \mathrm{I} ) \, u_{ol-21} + ( 46035101031840 + 1512210530880 \, \mathrm{I} ) \, u_{ol+1-21} + 32290449417000 \, \mathrm{I} u_{ol+2-21} + ( -566246982000 \\ + 833907528000 \, \mathrm{I} ) \, u_{ol+3-21} + ( -164634647200 + 206963998400 \, \mathrm{I} ) \, u_{ol-31} + ( -2022847183872 + 3064836712704 \, \mathrm{I} ) \, u_{ol+1-31} + ( 566246982000 + 833907528000 \, \mathrm{I} ) \, u_{ol+2-31} + ( 3083495325 + 6270766425 \, \mathrm{I} ) \, u_{ol-41} + ( 17962341900 - 23852885700 \, \mathrm{I} ) \, u_{ol+1-41} + ( 8556948 + 39095076 \, \mathrm{I} ) \, u_{ol-51} \Big), \, O( \, \Delta x_{ol}^{19} \, )$$

Formula.: 539, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 3

Error order.: 18, Error.: 3.0565355778480157766 × 10<sup>−44</sup>, New Error.: 3.0000205559631932562 × 10<sup>−62</sup>

Error order.: 18, Error.: 3.0000205559631932562 × 10<sup>−62</sup>, New Error.: 2.9943850411474695082 × 10<sup>−80</sup>

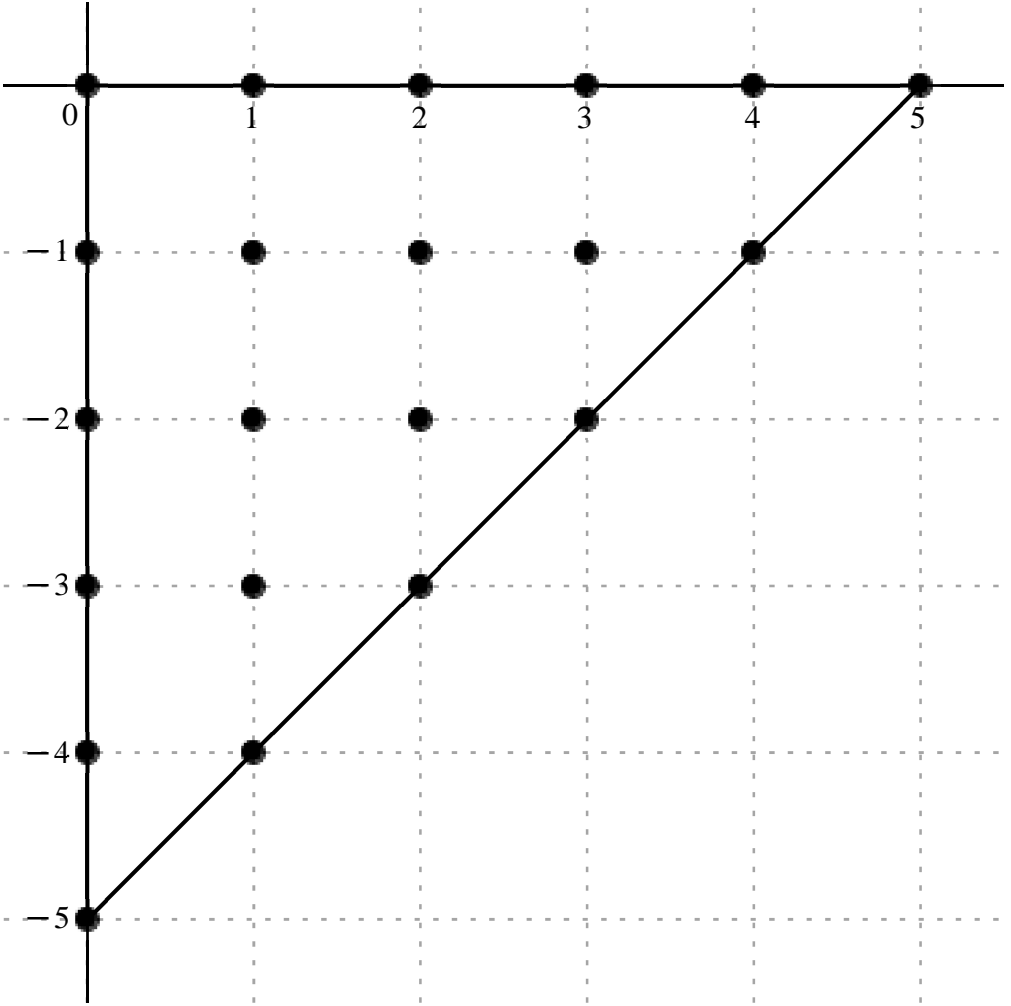
Error order.: 18, Error.: 2.9943850411474695082 × 10<sup>−80</sup>, New Error.: 2.9938216530409445661 × 10<sup>−98</sup>

Error order.: 18, Error.: 2.9938216530409445661 × 10<sup>−98</sup>, New Error.: 2.9937653158675080531 × 10<sup>−116</sup>

Error order.: 18, Error.: 2.9937653158675080531 × 10<sup>−116</sup>, New Error.: 2.9937596821665400236 × 10<sup>−134</sup>

$$x_o \neq h.,, \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -1 & 1-1 & 2-1 & 3-1 & 4-1 & \\ -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} & 3-2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & 1-3 \, \mathrm{I} & 2-3 \, \mathrm{I} & & & \\ -4 \, \mathrm{I} & 1-4 \, \mathrm{I} & & & & \\ -5 \, \mathrm{I} & & & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} \frac{503358637}{2652000} - \frac{503358637 \text{ I}}{2652000} & \frac{228287393}{106080} + \frac{58946561 \text{ I}}{35360} & -\frac{79570347}{25636} + \frac{75602939 \text{ I}}{96135} & \frac{10336489}{132600} - \frac{22856919 \text{ I}}{44200} & \frac{706633}{53040} - \frac{2193563 \text{ I}}{530400} & \frac{3296699}{48067500} - \frac{1237933 \text{ I}}{29580000} \\ -\frac{58946561}{35360} - \frac{228287393 \text{ I}}{106080} & -\frac{13811867}{255} + \frac{13811867 \text{ I}}{255} & \frac{164792631}{2600} + \frac{160876653 \text{ I}}{2600} & \frac{38969806}{24375} - \frac{171450433 \text{ I}}{24375} & -\frac{1247041}{132600} + \frac{10357601 \text{ I}}{176800} & \\ -\frac{75602939}{96135} + \frac{79570347 \text{ I}}{25636} & -\frac{160876653}{2600} - \frac{164792631 \text{ I}}{2600} & \frac{46163931}{1040} - \frac{46163931 \text{ I}}{1040} & \frac{1217735}{624} - \frac{85523 \text{ I}}{240} & & \\ \frac{22856919}{44200} - \frac{10336489 \text{ I}}{132600} & \frac{171450433}{24375} - \frac{38969806 \text{ I}}{24375} & \frac{85523}{240} - \frac{1217735 \text{ I}}{624} & & & \\ \frac{2193563}{530400} - \frac{706633 \text{ I}}{53040} & -\frac{10357601}{176800} + \frac{1247041 \text{ I}}{132600} & & & & \\ \frac{1237933}{29580000} - \frac{3296699 \text{ I}}{48067500} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{384540000 \, \Delta x_{ol}^3} \, \big( (72987002365 - 72987002365 \, \mathrm{I}) \, u_{ol} + (827541799625 + 641043850875 \, \mathrm{I}) \, u_{ol+1} + (-1193555205000 + 302411756000 \, \mathrm{I}) \, u_{ol+2} + (29975818100 - 198855195300 \, \mathrm{I}) \, u_{ol+3} + (5123089250 - 1590333175 \, \mathrm{I}) \, u_{ol+4} + (26373592 - 16093129 \, \mathrm{I}) \, u_{ol+5} - (641043850875 + 827541799625 \, \mathrm{I}) \, u_{ol-1} \\ + (-20828295436000 + 20828295436000 \, \mathrm{I}) \, u_{ol+1-1} + (24372830124900 + 23793656978700 \, \mathrm{I}) \, u_{ol+2-1} + (614787659456 - 2704802031008 \, \mathrm{I}) \, u_{ol+3-1} + (-3616418900 + 22527782175 \, \mathrm{I}) \, u_{ol+4-1} + (-302411756000 + 1193555205000 \, \mathrm{I}) \, u_{ol-21} - (23793656978700 + 24372830124900 \, \mathrm{I}) \, u_{ol+1-21} + (17069113487250 \\ - 17069113487250 \, \mathrm{I}) \, u_{ol+2-21} + (750429193750 - 137029226750 \, \mathrm{I}) \, u_{ol+3-21} + (198855195300 - 29975818100 \, \mathrm{I}) \, u_{ol-31} + (2704802031008 - 614787659456 \, \mathrm{I}) \, u_{ol+1-31} + (137029226750 - 750429193750 \, \mathrm{I}) \, u_{ol+2-31} + (1590333175 - 5123089250 \, \mathrm{I}) \, u_{ol-41} + (-22527782175 + 3616418900 \, \mathrm{I}) \, u_{ol+1-41} + (16093129 \\ - 26373592 \, \mathrm{I}) \, u_{ol-51} \big), \, O( \, \Delta x_{ol}^{18} \, )$$

Formula:, 540, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 4

Error order:., 17, Error:., 1.9400392282053946798 × 10<sup>-41</sup>, New Error:., 1.9300887948402093114 × 10<sup>-58</sup>

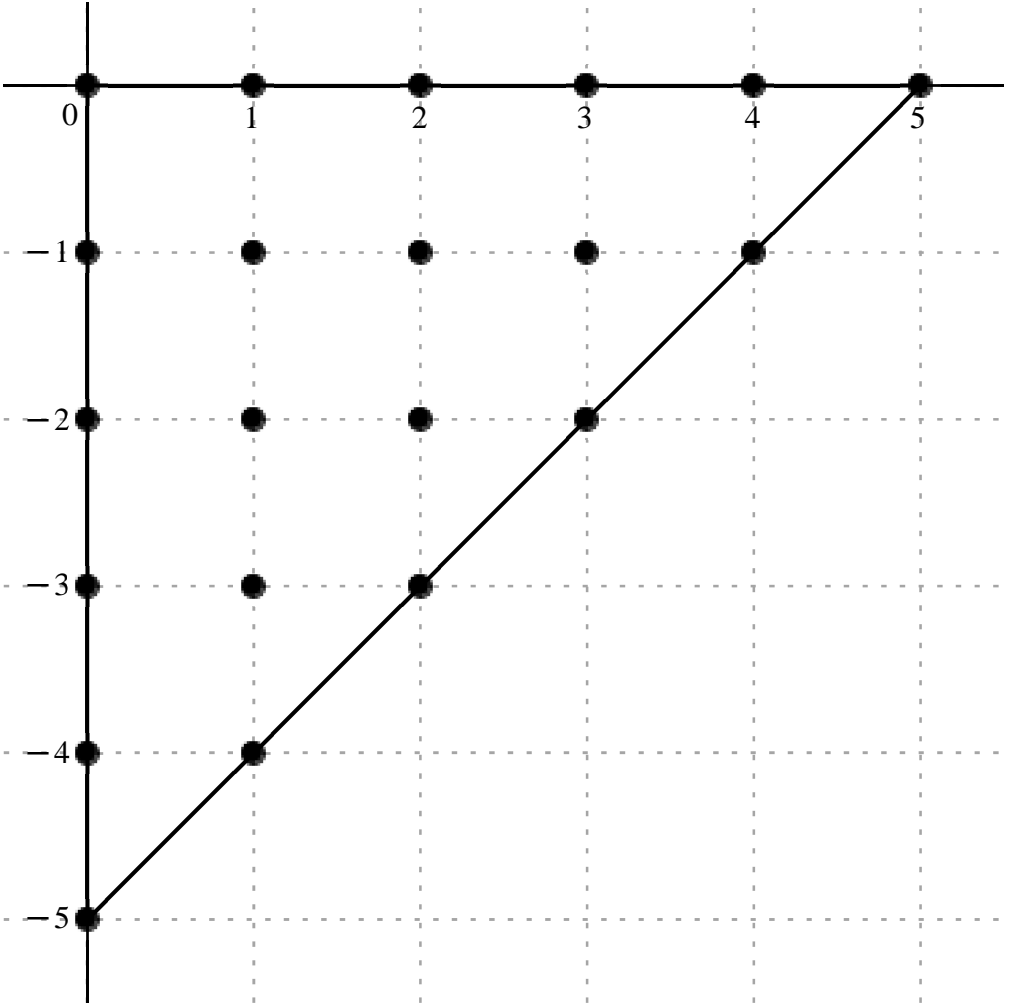
*Error order:*, 17,    *Error:*,  $1.9300887948402093114 \times 10^{-58}$ ,    *New Error:*,  $1.9290602759696745627 \times 10^{-75}$   
*Error order:*, 17,    *Error:*,  $1.9290602759696745627 \times 10^{-75}$ ,    *New Error:*,  $1.9289570939692856505 \times 10^{-92}$   
*Error order:*, 17,    *Error:*,  $1.9289570939692856505 \times 10^{-92}$ ,    *New Error:*,  $1.9289467724727327026 \times 10^{-109}$   
*Error order:*, 17,    *Error:*,  $1.9289467724727327026 \times 10^{-109}$ ,    *New Error:*,  $1.9289457402901168843 \times 10^{-126}$

$$x_o+h\cdot,$$

$$\begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} & 4-\text{I} & \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & 3-2\text{ I} & & \\ -3\text{ I} & 1-3\text{ I} & 2-3\text{ I} & & & \\ -4\text{ I} & 1-4\text{ I} & & & & \\ -5\text{ I} & & & & & \end{bmatrix}$$

$$c=,$$

$$\begin{bmatrix} -\frac{5275233997}{3315000} & -\frac{15594617}{17680}-\frac{659828011\text{ I}}{33150} & \frac{39910387561}{1922700}+\frac{26681973499\text{ I}}{1922700} & -\frac{1140048523}{331500}+\frac{194537021\text{ I}}{82875} & -\frac{5316004819}{54366000}-\frac{2993312711\text{ I}}{54366000} & -\frac{16511368357}{26276900000}-\frac{13209804533\text{ I}}{78830700000} \\ -\frac{15594617}{17680}+\frac{659828011\text{ I}}{33150} & \frac{730479934}{1275} & \frac{177010179}{32500}-\frac{5578976757\text{ I}}{8125} & -\frac{458995583}{9375}+\frac{3579464747\text{ I}}{121875} & \frac{1035515317}{2652000}-\frac{718314089\text{ I}}{2652000} & \\ \frac{39910387561}{1922700}-\frac{26681973499\text{ I}}{1922700} & \frac{177010179}{32500}+\frac{5578976757\text{ I}}{8125} & -\frac{159907032}{325} & -\frac{100398437}{7800}-\frac{2943262\text{ I}}{325} & & \\ -\frac{1140048523}{331500}-\frac{194537021\text{ I}}{82875} & -\frac{458995583}{9375}-\frac{3579464747\text{ I}}{121875} & -\frac{100398437}{7800}+\frac{2943262\text{ I}}{325} & & & \\ -\frac{5316004819}{54366000}+\frac{2993312711\text{ I}}{54366000} & \frac{1035515317}{2652000}+\frac{718314089\text{ I}}{2652000} & & & & \\ -\frac{16511368357}{26276900000}+\frac{13209804533\text{ I}}{78830700000} & & & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4}u(x_{ol})=\frac{1}{78830700000\Delta x_{ol}^4}\left(-125445064448660\,u_{ol}-(69532498548750+1569071010158000\,\mathrm{I})\,u_{ol+1}+(1636325890001000+1093960913459000\,\mathrm{I})\,u_{ol+2}+(-271103538769400+185043614375200\,\mathrm{I})\,u_{ol+3}-(7708206987550+4340303430950\,\mathrm{I})\,u_{ol+4}-(49534105071+13209804533\,\mathrm{I})\,u_{ol+5}+(-69532498548750\right.$$

$$\left.+1569071010158000\,\mathrm{I})\,u_{ol-1}+45164113359352000\,u_{ol+1-1}+(429348809775240-54128571450835680\,\mathrm{I})\,u_{ol+2-1}+(-3859513931178464+2315255069795552\,\mathrm{I})\,u_{ol+3-1}+(30780692797825-21351886295525\,\mathrm{I})\,u_{ol+4-1}+(1636325890001000-1093960913459000\,\mathrm{I})\,u_{ol-21}+(429348809775240\right.$$

$$\left.+54128571450835680\,\mathrm{I})\,u_{ol+1-21}-38786410053792000\,u_{ol+2-21}-(1014676803540500+713905857672000\,\mathrm{I})\,u_{ol+3-21}-(271103538769400+185043614375200\,\mathrm{I})\,u_{ol-31}-(3859513931178464+2315255069795552\,\mathrm{I})\,u_{ol+1-31}+(-1014676803540500+713905857672000\,\mathrm{I})\,u_{ol+2-31}+(-7708206987550\right.$$

$+4340303430950 \text{ I}) u_{oI-41} + (30780692797825 + 21351886295525 \text{ I}) u_{oI+1-41} + (-49534105071 + 13209804533 \text{ I}) u_{oI-51}), O( \Delta x_{oI}^{17} )$

Formula:, 541, Var:, 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 5

Error order:, 16, Error:,  $1.5525887094049461607 \times 10^{-38}$ , New Error:,  $1.5240912440557193842 \times 10^{-54}$

Error order:, 16, Error:,  $1.5240912440557193842 \times 10^{-54}$ , New Error:,  $1.5212495046298532466 \times 10^{-70}$

Error order:, 16, Error:,  $1.5212495046298532466 \times 10^{-70}$ , New Error:,  $1.5209654125000079114 \times 10^{-86}$

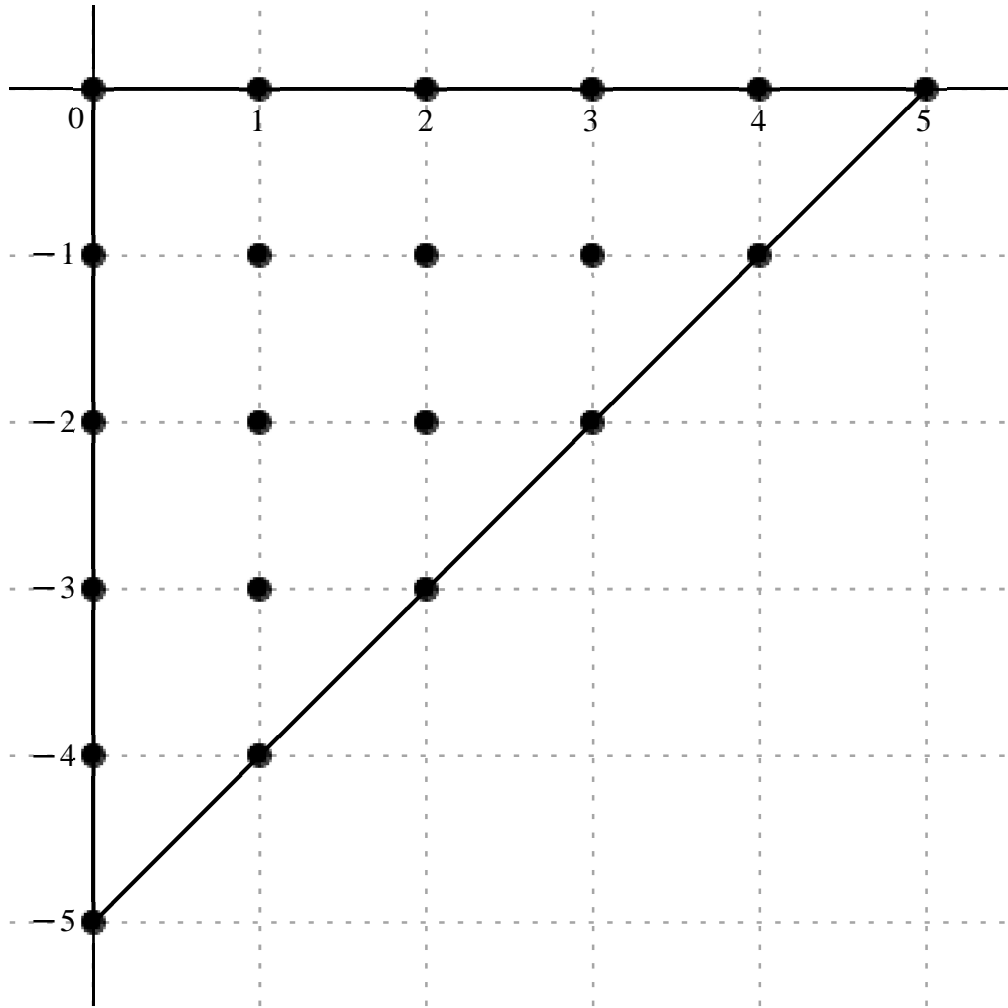
Error order:, 16, Error:,  $1.5209654125000079114 \times 10^{-86}$ , New Error:,  $1.5209370041068747397 \times 10^{-102}$

Error order:, 16, Error:,  $1.5209370041068747397 \times 10^{-102}$ , New Error:,  $1.5209341632757616583 \times 10^{-118}$

$$x_o \neq h., \begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \\ -1 & 1-1 & 2-1 & 3-1 & 4-1 \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & 3-2 \text{ I} \\ -3 \text{ I} & 1-3 \text{ I} & 2-3 \text{ I} \\ -4 \text{ I} & 1-4 \text{ I} \\ -5 \text{ I} \end{bmatrix}$$

$$c =, \left[ \begin{array}{cccccc} \frac{1116605209}{176800} + \frac{1116605209 \text{ I}}{176800} & -\frac{16605432841}{176800} + \frac{47443205063 \text{ I}}{530400} & -\frac{31953722009}{1281800} - \frac{131575046411 \text{ I}}{769080} & \frac{6353061859}{221000} + \frac{1450746093 \text{ I}}{221000} & \frac{20999008933}{108732000} + \frac{8483331317 \text{ I}}{10873200} & \frac{221626196}{98538375} + \frac{12976206851 \text{ I}}{3153228000} \\ \frac{47443205063}{530400} - \frac{16605432841 \text{ I}}{176800} & -\frac{1149678054}{425} - \frac{1149678054 \text{ I}}{425} & -\frac{8947883163}{2600} + \frac{8471149203 \text{ I}}{2600} & \frac{1891497109}{4875} + \frac{517447753 \text{ I}}{4875} & -\frac{734219829}{221000} - \frac{34936149 \text{ I}}{52000} \\ -\frac{131575046411}{769080} - \frac{31953722009 \text{ I}}{1281800} & \frac{8471149203}{2600} - \frac{8947883163 \text{ I}}{2600} & \frac{12627561351}{5200} + \frac{12627561351 \text{ I}}{5200} & \frac{282772819}{15600} + \frac{342293117 \text{ I}}{3120} \\ \frac{1450746093}{221000} + \frac{6353061859 \text{ I}}{221000} & \frac{517447753}{4875} + \frac{1891497109 \text{ I}}{4875} & \frac{342293117}{3120} + \frac{282772819 \text{ I}}{15600} \\ \frac{8483331317}{10873200} + \frac{20999008933 \text{ I}}{108732000} & -\frac{34936149}{52000} - \frac{734219829 \text{ I}}{221000} \\ \frac{12976206851}{3153228000} + \frac{221626196 \text{ I}}{98538375} \end{array} \right]$$





$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u\big(x_{ol}\big) = \frac{1}{3153228000 \, \Delta x_{ol}^5} \Big( (19914653902515 + 19914653902515 \, \mathrm{I}) \, u_{ol} + ( -296157894719235 + 282049854099535 \, \mathrm{I}) \, u_{ol+1} - (78606156142140 + 539457690285100 \, \mathrm{I}) \, u_{ol+2} + (90645486604212 + 20699245254924 \, \mathrm{I}) \, u_{ol+3} + (608971259057 + 2460166081930 \, \mathrm{I}) \, u_{ol+4} + (7092038272 + 12976206851 \, \mathrm{I}) \, u_{ol+5} + (282049854099535 - 296157894719235 \, \mathrm{I}) \, u_{ol-1} - (8529875366725440 + 8529875366725440 \, \mathrm{I}) \, u_{ol+1-1} + ( -10851813742423140 + 10273640330414340 \, \mathrm{I}) \, u_{ol+2-1} + (1223450594054944 + 334693485804448 \, \mathrm{I}) \, u_{ol+3-1} - (10475848520172 + 2118493139211 \, \mathrm{I}) \, u_{ol+4-1} - (539457690285100 + 78606156142140 \, \mathrm{I}) \, u_{ol-21} + (10273640330414340 - 10851813742423140 \, \mathrm{I}) \, u_{ol+1-21} + (7657226927632890 + 7657226927632890 \, \mathrm{I}) \, u_{ol+2-21} + (57156869904470 + 345938538696050 \, \mathrm{I}) \, u_{ol+3-21} + (20699245254924 + 90645486604212 \, \mathrm{I}) \, u_{ol-31} + (334693485804448 + 1223450594054944 \, \mathrm{I}) \, u_{ol+1-31} + (345938538696050 + 57156869904470 \, \mathrm{I}) \, u_{ol+2-31} + (2460166081930 + 608971259057 \, \mathrm{I}) \, u_{ol-41} - (2118493139211 + 10475848520172 \, \mathrm{I}) \, u_{ol+1-41} + (12976206851 + 7092038272 \, \mathrm{I}) \, u_{ol-51} \Big), \, O( \, \Delta x_{ol}^{16} \, )$$

Formula:, 542, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 6

Error order:., 15, Error:., 8.0022060790577894694 × 10−36, New Error:., 7.9614912792751514892 × 10−51

Error order:., 15, Error:., 7.9614912792751514892 × 10−51, New Error:., 7.9572839381465868685 × 10−66

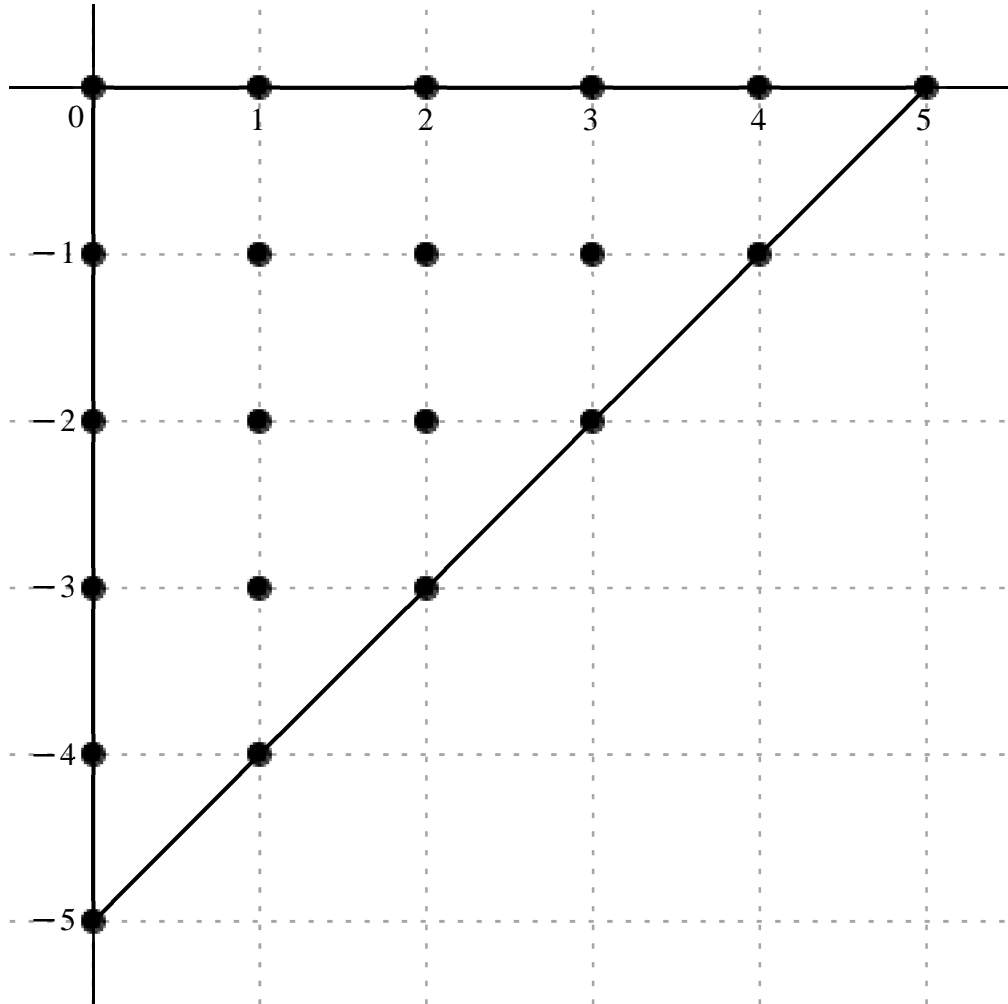
Error order:., 15, Error:., 7.9572839381465868685 × 10−66, New Error:., 7.9568618641261349676 × 10−81

Error order:., 15, Error:., 7.9568618641261349676 × 10−81, New Error:., 7.9568196433436268756 × 10−96

Error order:., 15, Error:., 7.9568196433436268756 × 10−96, New Error:., 7.9568154211315900413 × 10−111

$$x_o \neq h., \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -1 & 1-1 & 2-1 & 3-1 & 4-1 & \\ -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} & 3-2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & 1-3 \, \mathrm{I} & 2-3 \, \mathrm{I} & & & \\ -4 \, \mathrm{I} & 1-4 \, \mathrm{I} & & & & \\ -5 \, \mathrm{I} & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{4172831639 \text{ I}}{88400} & \frac{33713624211}{44200} + \frac{11141019451 \text{ I}}{176800} & -\frac{220766959593}{320450} + \frac{21345596317 \text{ I}}{25636} & -\frac{2599004069}{27625} - \frac{36179690129 \text{ I}}{221000} & \frac{102619434209}{36244000} - \frac{31714456207 \text{ I}}{7248800} & \frac{19742856251}{2102152000} - \frac{61305088937 \text{ I}}{2102152000} \\ -\frac{33713624211}{44200} + \frac{11141019451 \text{ I}}{176800} & \frac{9851009811 \text{ I}}{425} & \frac{1922343192}{65} + \frac{3563630163 \text{ I}}{2600} & -\frac{3966850699}{3250} - \frac{7331984483 \text{ I}}{3250} & \frac{20698825479}{1768000} + \frac{32703849507 \text{ I}}{1768000} & \\ \frac{220766959593}{320450} + \frac{21345596317 \text{ I}}{25636} & -\frac{1922343192}{65} + \frac{3563630163 \text{ I}}{2600} & -\frac{56429509581 \text{ I}}{2600} & \frac{545171747}{1300} - \frac{2988257663 \text{ I}}{5200} & & \\ \frac{2599004069}{27625} - \frac{36179690129 \text{ I}}{221000} & \frac{3966850699}{3250} - \frac{7331984483 \text{ I}}{3250} & -\frac{545171747}{1300} - \frac{2988257663 \text{ I}}{5200} & & & \\ -\frac{102619434209}{36244000} - \frac{31714456207 \text{ I}}{7248800} & -\frac{20698825479}{1768000} + \frac{32703849507 \text{ I}}{1768000} & & & & \\ -\frac{19742856251}{2102152000} - \frac{61305088937 \text{ I}}{2102152000} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}{}^6} \, u(x_{ol}) = \frac{1}{2102152000 \, \Delta x_{ol}{}^6} \Big( \, -99229936375420 \, \mathrm{I} \, u_{ol} + (1603419967475160 + 132466721272390 \, \mathrm{I}) \, u_{ol+1} + ( \, -1448231254930080 + 1750338897994000 \, \mathrm{I}) \, u_{ol+2} - (197773813634624 + 344141212507048 \, \mathrm{I}) \, u_{ol+3} + (5951927184122 - 9197192300030 \, \mathrm{I}) \, u_{ol+4} + (19742856251 - 61305088937 \, \mathrm{I}) \, u_{ol+5} + ( \, -1603419967475160 \\ + 132466721272390 \, \mathrm{I}) \, u_{ol-1} + 48725458767560640 \, \mathrm{I} \, u_{ol+1-1} + (62170116703833600 + 2881266259388760 \, \mathrm{I}) \, u_{ol+2-1} - (2565822501724384 + 4742444875356128 \, \mathrm{I}) \, u_{ol+3-1} + (24610903494531 + 38884877063823 \, \mathrm{I}) \, u_{ol+4-1} + (1448231254930080 + 1750338897994000 \, \mathrm{I}) \, u_{ol-21} + ( \, -62170116703833600 \\ + 2881266259388760 \, \mathrm{I}) \, u_{ol+1-21} - 45624387086430120 \, \mathrm{I} \, u_{ol+2-21} + (881564521768880 - 1208033042844380 \, \mathrm{I}) \, u_{ol+3-21} + (197773813634624 - 344141212507048 \, \mathrm{I}) \, u_{ol-31} + (2565822501724384 - 4742444875356128 \, \mathrm{I}) \, u_{ol+1-31} - (881564521768880 + 1208033042844380 \, \mathrm{I}) \, u_{ol+2-31} - (5951927184122 \\ + 9197192300030 \, \mathrm{I}) \, u_{ol-41} + ( \, -24610903494531 + 38884877063823 \, \mathrm{I}) \, u_{ol+1-41} - (19742856251 + 61305088937 \, \mathrm{I}) \, u_{ol-51} \Big), \, O( \, \Delta x_{ol}^{15} \, )$$

Formula: 543, Var: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 7

Error order: , 14, Error: , 5.3276506703415191860 × 10<sup>−33</sup>, New Error: , 5.2307690493012161287 × 10<sup>−47</sup>

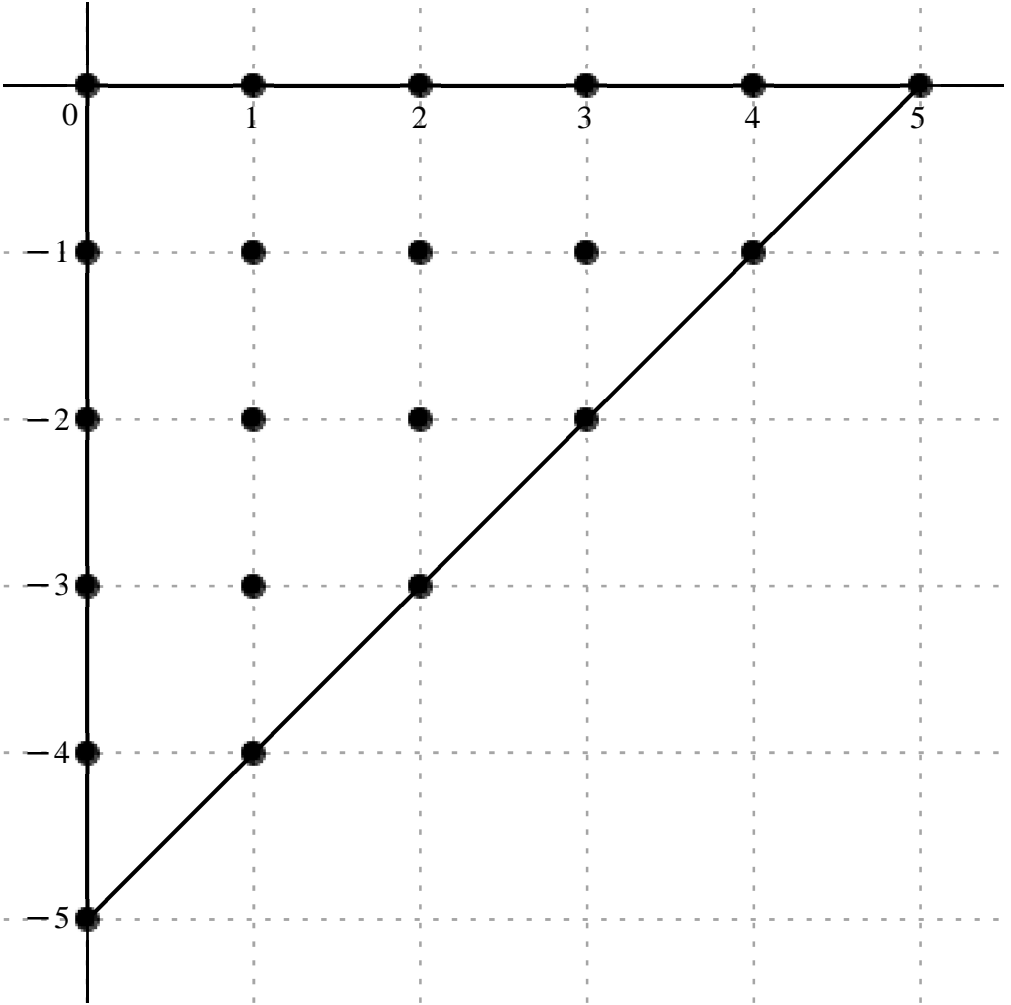
*Error order:*, 14,    *Error:*,  $5.2307690493012161287 \times 10^{-47}$ ,    *New Error:*,  $5.2211078786790222042 \times 10^{-61}$   
*Error order:*, 14,    *Error:*,  $5.2211078786790222042 \times 10^{-61}$ ,    *New Error:*,  $5.2201420373533102460 \times 10^{-75}$   
*Error order:*, 14,    *Error:*,  $5.2201420373533102460 \times 10^{-75}$ ,    *New Error:*,  $5.2200454559838670990 \times 10^{-89}$   
*Error order:*, 14,    *Error:*,  $5.2200454559838670990 \times 10^{-89}$ ,    *New Error:*,  $5.2200357978745598220 \times 10^{-103}$

$$x_o + h \cdot,$$

0	1	2	3	4	5
−I	1 −I	2 −I	3 −I	4 −I	
−2 I	1 −2 I	2 −2 I	3 −2 I		
−3 I	1 −3 I	2 −3 I			
−4 I	1 −4 I				
−5 I					

$$c =,$$

$-\frac{5843779151}{35360} + \frac{5843779151 \text{ I}}{35360}$	$-\frac{886970084119}{353600} - \frac{1158467693971 \text{ I}}{353600}$	$\frac{604841970621}{98600} - \frac{5444548473 \text{ I}}{19720}$	$-\frac{145712521031}{442000} + \frac{464040911313 \text{ I}}{442000}$	$-\frac{549172839789}{18122000} + \frac{1577264857 \text{ I}}{289952}$	$-\frac{346245716103}{2102152000} + \frac{41344335039 \text{ I}}{525538000}$
$\frac{1158467693971}{353600} + \frac{886970084119 \text{ I}}{353600}$	$\frac{38546019344}{425} - \frac{38546019344 \text{ I}}{425}$	$-\frac{23133967353}{208} - \frac{658561770657 \text{ I}}{5200}$	$-\frac{14881925919}{3250} + \frac{46087644337 \text{ I}}{3250}$	$\frac{3234728707}{104000} - \frac{3454982517 \text{ I}}{27625}$	
$\frac{5444548473}{19720} - \frac{604841970621 \text{ I}}{98600}$	$\frac{658561770657}{5200} + \frac{23133967353 \text{ I}}{208}$	$-\frac{459717699609}{5200} + \frac{459717699609 \text{ I}}{5200}$	$-\frac{656787537}{160} + \frac{6277040091 \text{ I}}{10400}$		
$-\frac{464040911313}{442000} + \frac{145712521031 \text{ I}}{442000}$	$-\frac{46087644337}{3250} + \frac{14881925919 \text{ I}}{3250}$	$-\frac{6277040091}{10400} + \frac{656787537 \text{ I}}{160}$			
$-\frac{1577264857}{289952} + \frac{549172839789 \text{ I}}{18122000}$	$\frac{3454982517}{27625} - \frac{3234728707 \text{ I}}{104000}$				
$-\frac{41344335039}{525538000} + \frac{346245716103 \text{ I}}{2102152000}$					



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{2102152000 \, \Delta x_{ol}^7} \Big( 7 \, \big( (-49630381503850 + 49630381503850 \, \mathrm{I}) \, u_{ol} - (753291021441065 + 983870062951085 \, \mathrm{I}) \, u_{ol+1} + (1842175830519960 - 82912695317400 \, \mathrm{I}) \, u_{ol+2} + (-99001250003348 + 315282653457804 \, \mathrm{I}) \, u_{ol+3} + (-9100578487932 + 1633595744750 \, \mathrm{I}) \, u_{ol+4} + (-49463673729 + 23625334308 \, \mathrm{I}) \, u_{ol+5}$$

$$+ (983870062951085 + 753291021441065 \, \mathrm{I}) \, u_{ol-1} + (27236837531438080 - 27236837531438080 \, \mathrm{I}) \, u_{ol+1-1} - (33400491579013500 + 38032883057971260 \, \mathrm{I}) \, u_{ol+2-1} + (-1375123970746272 + 4258603679925856 \, \mathrm{I}) \, u_{ol+3-1} + (9340510193513 - 37558621373376 \, \mathrm{I}) \, u_{ol+4-1} + (82912695317400 - 1842175830519960 \, \mathrm{I}) \, u_{ol-21}$$

$$+ (38032883057971260 + 33400491579013500 \, \mathrm{I}) \, u_{ol+1-21} + (-26549353891990620 + 26549353891990620 \, \mathrm{I}) \, u_{ol+2-21} + (-1232738602213950 + 181254016227690 \, \mathrm{I}) \, u_{ol+3-21} + (-315282653457804 + 99001250003348 \, \mathrm{I}) \, u_{ol-31} + (-4258603679925856 + 1375123970746272 \, \mathrm{I}) \, u_{ol+1-31} + (-181254016227690$$

$$+ 1232738602213950 \, \text{I}) \, u_{oI + 2 - 3 \text{I}} + ( -1633595744750 + 9100578487932 \, \text{I}) \, u_{oI - 4 \text{I}} + ( 37558621373376 - 9340510193513 \, \text{I}) \, u_{oI + 1 - 4 \text{I}} + ( -23625334308 + 49463673729 \, \text{I}) \, u_{oI - 5 \text{I}} \Big) \Big) \cdot O( \Delta x_{oI}^{14} )$$

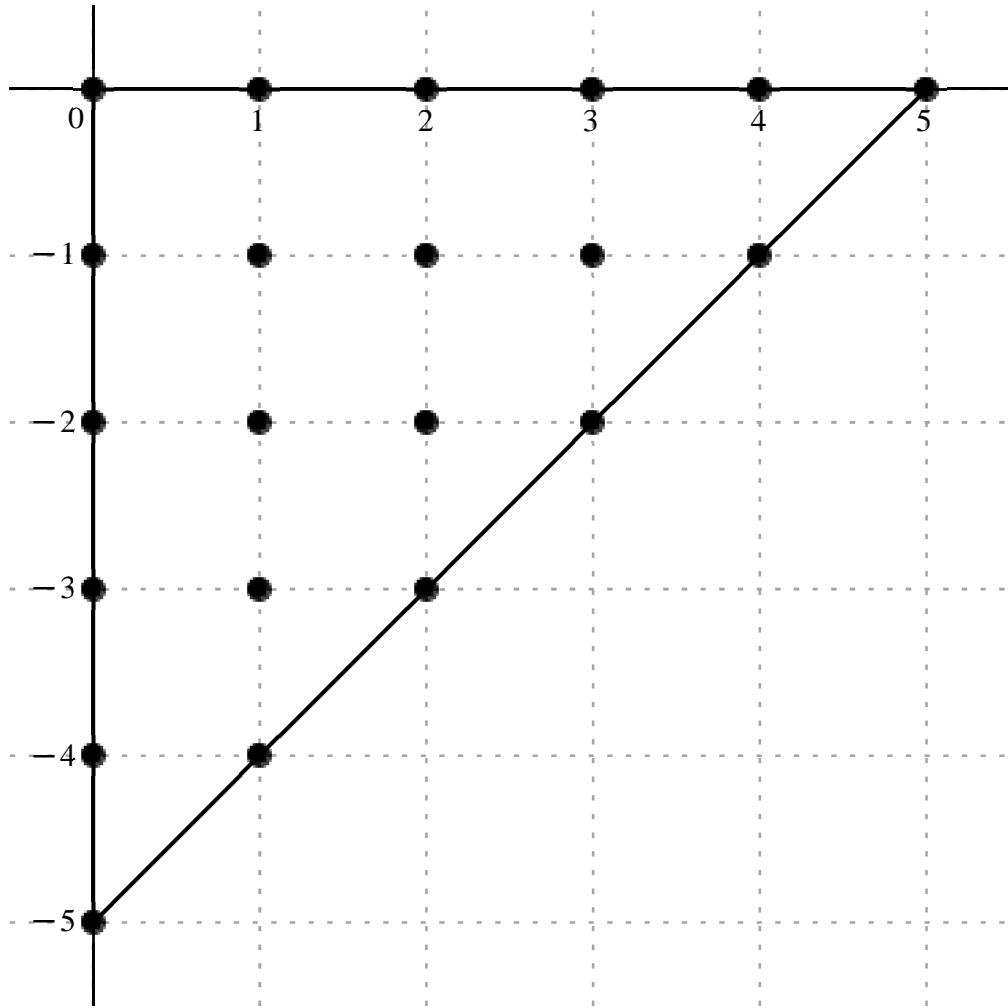
Formula:, 544, Var:, 1

Variavel :,  $x_{oI}$ , Derivada de Ordem :, 8

Error order:, 13, Error:,  $2.3072866546779727977 \times 10^{-30}$ , New Error:,  $2.2956686475354419156 \times 10^{-43}$   
Error order:, 13, Error:,  $2.2956686475354419156 \times 10^{-43}$ , New Error:,  $2.2944684780668574565 \times 10^{-56}$   
Error order:, 13, Error:,  $2.2944684780668574565 \times 10^{-56}$ , New Error:,  $2.2943480826670793383 \times 10^{-69}$   
Error order:, 13, Error:,  $2.2943480826670793383 \times 10^{-69}$ , New Error:,  $2.2943360393477817445 \times 10^{-82}$   
Error order:, 13, Error:,  $2.2943360393477817445 \times 10^{-82}$ , New Error:,  $2.2943348349780639942 \times 10^{-95}$

$$x_o \neq h \cdot , \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} & 4-\text{I} & \\ -2 \, \text{I} & 1-2 \, \text{I} & 2-2 \, \text{I} & 3-2 \, \text{I} & & \\ -3 \, \text{I} & 1-3 \, \text{I} & 2-3 \, \text{I} & & & \\ -4 \, \text{I} & 1-4 \, \text{I} & & & & \\ -5 \, \text{I} & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} \frac{119181167203}{110500} & -\frac{39124422561}{11050} + \frac{886855008879 \, \text{I}}{44200} & -\frac{123875615444}{5525} - \frac{24897710873 \, \text{I}}{1105} & \frac{11242933723}{2125} - \frac{137508653779 \, \text{I}}{55250} & \frac{92612377347}{697000} + \frac{36083947473 \, \text{I}}{362440} & \frac{83928634951}{90610000} + \frac{32563844523 \, \text{I}}{90610000} & & \\ -\frac{39124422561}{11050} - \frac{886855008879 \, \text{I}}{44200} & -\frac{276009760348}{425} & -\frac{117583267599}{1625} + \frac{2837988387171 \, \text{I}}{3250} & \frac{578224445442}{8125} - \frac{279178109406 \, \text{I}}{8125} & -\frac{266078520491}{442000} + \frac{151633506577 \, \text{I}}{442000} & & & \\ -\frac{123875615444}{5525} + \frac{24897710873 \, \text{I}}{1105} & -\frac{117583267599}{1625} - \frac{2837988387171 \, \text{I}}{3250} & \frac{427566304683}{650} & \frac{5724149739}{325} + \frac{17356746001 \, \text{I}}{1300} & & & & \\ \frac{11242933723}{2125} + \frac{137508653779 \, \text{I}}{55250} & \frac{578224445442}{8125} + \frac{279178109406 \, \text{I}}{8125} & \frac{5724149739}{325} - \frac{17356746001 \, \text{I}}{1300} & & & & & \\ \frac{92612377347}{697000} - \frac{36083947473 \, \text{I}}{362440} & -\frac{266078520491}{442000} - \frac{151633506577 \, \text{I}}{442000} & & & & & & \\ \frac{83928634951}{90610000} - \frac{32563844523 \, \text{I}}{90610000} & & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{90610000 \, \Delta x_{ol}^8} \, \big( 7 \, \big( 13961222443780 \, u_{ol} + ( \, -45831466428600 + 259721824028850 \, \mathrm{I} \, ) \, u_{ol+1} - ( 290222870468800 + 291658898798000 \, \mathrm{I} \, ) \, u_{ol+2} + ( 68485527706960 - 32216313171080 \, \mathrm{I} \, ) \, u_{ol+3} + ( 1719944150730 + 1288712409750 \, \mathrm{I} \, ) \, u_{ol+4} + ( 11989804993 + 4651977789 \, \mathrm{I} \, ) \, u_{ol+5} - ( 45831466428600$$

$$+ 259721824028850 \, \mathrm{I} \, ) \, u_{ol-1} - 8406468700884800 \, u_{ol+1-1} + ( \, -936634714474320 + 11303302319189640 \, \mathrm{I} \, ) \, u_{ol+2-1} + ( 921194145081312 - 444770610870816 \, \mathrm{I} \, ) \, u_{ol+3-1} + ( \, -7792299528665 + 4440695549755 \, \mathrm{I} \, ) \, u_{ol+4-1} + ( \, -290222870468800 + 291658898798000 \, \mathrm{I} \, ) \, u_{ol-21} - ( 936634714474320 + 11303302319189640 \, \mathrm{I} \, ) \, u_{ol+1-21}$$

$$+ 8514677553258600 \, u_{ol+2-21} + ( 227984706747600 + 172823599467100 \, \mathrm{I} \, ) \, u_{ol+3-21} + ( 68485527706960 + 32216313171080 \, \mathrm{I} \, ) \, u_{ol-31} + ( 921194145081312 + 444770610870816 \, \mathrm{I} \, ) \, u_{ol+1-31} + ( 227984706747600 - 172823599467100 \, \mathrm{I} \, ) \, u_{ol+2-31} + ( 1719944150730 - 1288712409750 \, \mathrm{I} \, ) \, u_{ol-41} - ( 7792299528665$$

$$+ 4440695549755 \, \mathrm{I} \, ) \, u_{ol+1-41} + ( 11989804993 - 4651977789 \, \mathrm{I} \, ) \, u_{ol-51} \big) \big) \cdot \, O( \, \Delta x_{ol}^{13} \, )$$

Formula:, 545, Var.:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 9

Error order:., 12, Error:., 1.2931615812550726542 × 10<sup>−27</sup>, New Error:., 1.2699317311485544092 × 10<sup>−39</sup>

Error order:., 12, Error:., 1.2699317311485544092 × 10<sup>−39</sup>, New Error:., 1.2676151476695238868 × 10<sup>−51</sup>

Error order:., 12, Error:., 1.2676151476695238868 × 10<sup>−51</sup>, New Error:., 1.2673835547030056612 × 10<sup>−63</sup>

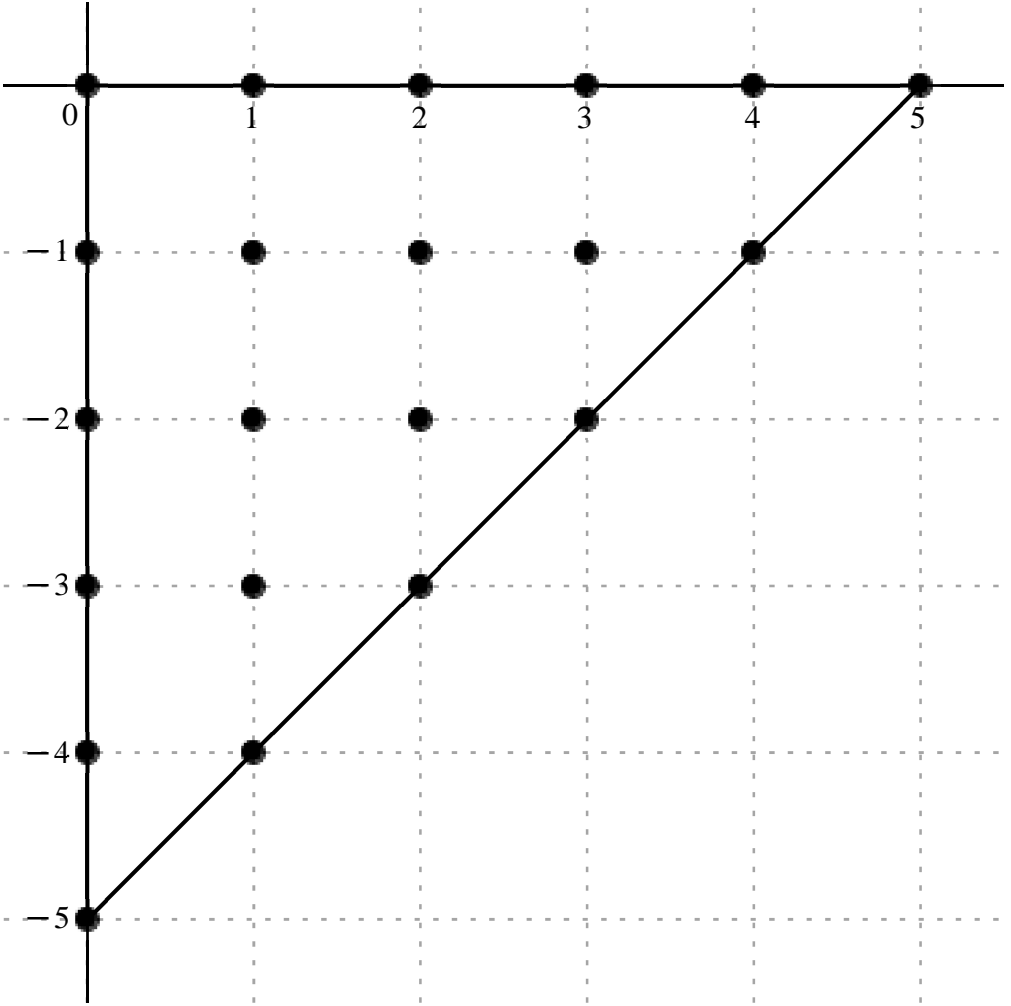
Error order:., 12, Error:., 1.2673835547030056612 × 10<sup>−63</sup>, New Error:., 1.2673603960615201101 × 10<sup>−75</sup>

Error order:., 12, Error:., 1.2673603960615201101 × 10<sup>−75</sup>, New Error:., 1.2673580802039245688 × 10<sup>−87</sup>

$$x_o \neq h., \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & 4-\mathrm{I} & \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & 3-2\,\mathrm{I} & & \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & 2-3\,\mathrm{I} & & & \\ -4\,\mathrm{I} & 1-4\,\mathrm{I} & & & & \\ -5\,\mathrm{I} & & & & & \end{array} \right]$$

$$c = ,$$

$-\frac{1386315378}{425}$	$-\frac{1386315378 \text{ I}}{425}$	$\frac{525901239927}{6800}$	$-\frac{339737648607 \text{ I}}{6800}$	$-\frac{88380057528}{12325}$	$+\frac{368890578252 \text{ I}}{2465}$	$-\frac{222628296933}{8500}$	$-\frac{90968878791 \text{ I}}{8500}$	$-\frac{7472472147}{87125}$	$-\frac{14145759369 \text{ I}}{17425}$	$-\frac{37258058439}{20213000}$	$-\frac{185074427349 \text{ I}}{40426000}$
$-\frac{339737648607}{6800}$	$+\frac{525901239927 \text{ I}}{6800}$	$\frac{903217088088}{425}$	$+\frac{903217088088 \text{ I}}{425}$	$\frac{321731326161}{100}$	$-\frac{263031483141 \text{ I}}{100}$	$-\frac{44724737232}{125}$	$-\frac{16792050744 \text{ I}}{125}$	$\frac{55324159191}{17000}$	$+\frac{1957578273 \text{ I}}{2000}$		
$\frac{368890578252}{2465}$	$-\frac{88380057528 \text{ I}}{12325}$	$-\frac{263031483141}{100}$	$+\frac{321731326161 \text{ I}}{100}$	$-\frac{55822863474}{25}$	$-\frac{55822863474 \text{ I}}{25}$	$-\frac{2728148031}{200}$	$-\frac{4262261157 \text{ I}}{40}$				
$-\frac{90968878791}{8500}$	$-\frac{222628296933 \text{ I}}{8500}$	$-\frac{16792050744}{125}$	$-\frac{44724737232 \text{ I}}{125}$	$-\frac{4262261157}{40}$	$-\frac{2728148031 \text{ I}}{200}$						
$-\frac{14145759369}{17425}$	$-\frac{7472472147 \text{ I}}{87125}$	$\frac{1957578273}{2000}$	$+\frac{55324159191 \text{ I}}{17000}$								
$-\frac{185074427349}{40426000}$	$-\frac{37258058439 \text{ I}}{20213000}$										



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{40426000 \, \Delta x_{ol}^9} \, (63 \, ( -(2093116170720 + 2093116170720 \, \text{I}) \, u_{ol} + (49626712243905 - 32059370174105 \, \text{I}) \, u_{ol+1} + ( -4601374423680 + 96028658465600 \, \text{I}) \, u_{ol+2} - (16806669527196 + 6867428373492 \, \text{I}) \, u_{ol+3} - (55035350416 + 520923202160 \, \text{I}) \, u_{ol+4} - (1182795506 + 2937689323 \, \text{I}) \, u_{ol+5} + ( -32059370174105$$

$$+ 49626712243905 \, \text{I}) \, u_{ol-1} + (1363714435221120 + 1363714435221120 \, \text{I}) \, u_{ol+1-1} + (2064493744664220 - 1687827101183820 \, \text{I}) \, u_{ol+2-1} - (229592663789312 + 86201326143104 \, \text{I}) \, u_{ol+3-1} + (2088267469146 + 628071898923 \, \text{I}) \, u_{ol+4-1} + (96028658465600 - 4601374423680 \, \text{I}) \, u_{ol-21} + ( -1687827101183820$$

$$+ 2064493744664220 \, \text{I}) \, u_{ol+1-21} - (1432822272253920 + 1432822272253920 \, \text{I}) \, u_{ol+2-21} - (8753024785810 + 68375464100350 \, \text{I}) \, u_{ol+3-21} - (6867428373492 + 16806669527196 \, \text{I}) \, u_{ol-31} - (86201326143104 + 229592663789312 \, \text{I}) \, u_{ol+1-31} - (68375464100350 + 8753024785810 \, \text{I}) \, u_{ol+2-31} - (520923202160$$

$$+ 55035350416 \, \text{I}) \, u_{ol-41} + (628071898923 + 2088267469146 \, \text{I}) \, u_{ol+1-41} - (2937689323 + 1182795506 \, \text{I}) \, u_{ol-51} \Big) \Big), \, O( \, \Delta x_{ol}^{12} \, )$$

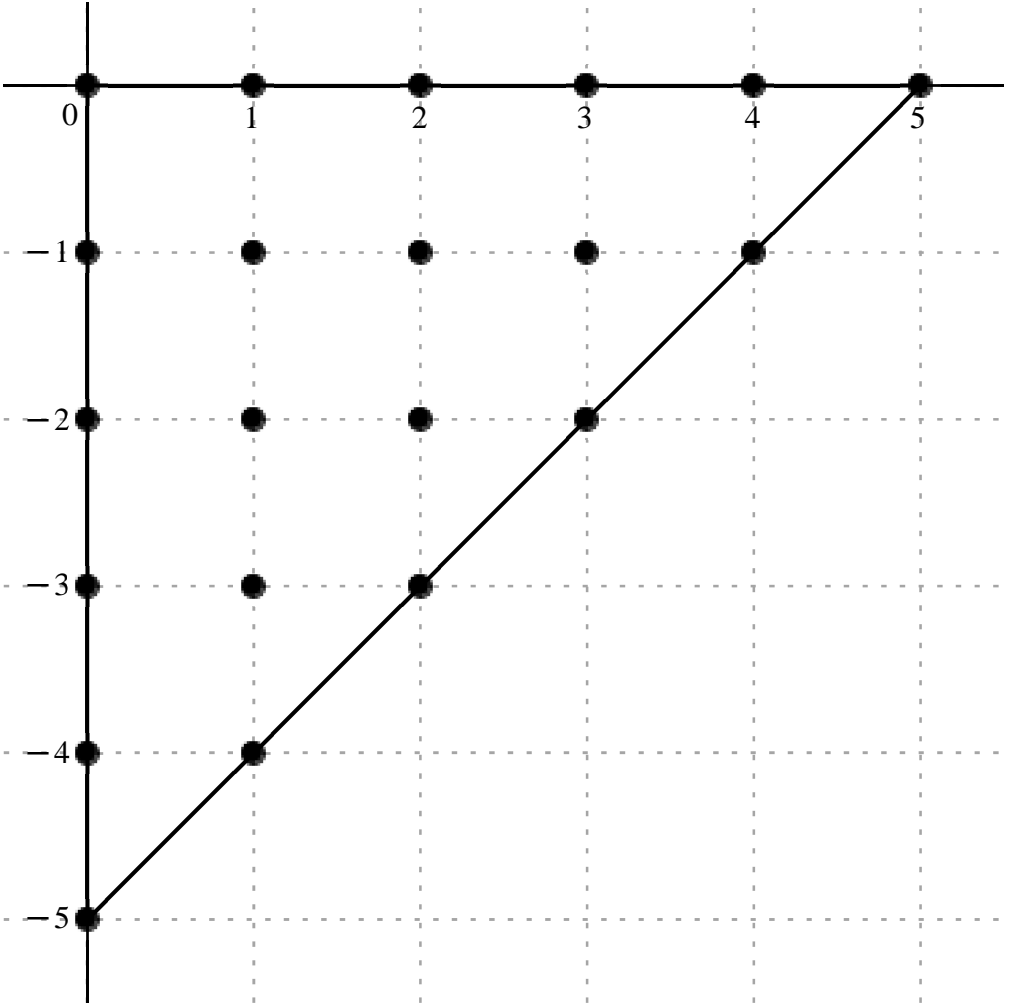
Formula:, 546, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

Error order:., 11, Error:., 4.7041784939172659250 × 10<sup>-25</sup>, New Error:., 4.6808185302677985777 × 10<sup>-36</sup>

*Error order:*, 11,    *Error:*,  $4.6808185302677985777 \times 10^{-36}$ ,    *New Error:*,  $4.6784064234094986320 \times 10^{-47}$   
*Error order:*, 11,    *Error:*,  $4.6784064234094986320 \times 10^{-47}$ ,    *New Error:*,  $4.6781644618827523721 \times 10^{-58}$   
*Error order:*, 11,    *Error:*,  $4.6781644618827523721 \times 10^{-58}$ ,    *New Error:*,  $4.6781402582318837055 \times 10^{-69}$   
*Error order:*, 11,    *Error:*,  $4.6781402582318837055 \times 10^{-69}$ ,    *New Error:*,  $4.6781378377918251087 \times 10^{-80}$

$$\begin{aligned}
& x_o + h \cdot, \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -\mathbf{I} & 1-\mathbf{I} & 2-\mathbf{I} & 3-\mathbf{I} & 4-\mathbf{I} & \\ -2\mathbf{I} & 1-2\mathbf{I} & 2-2\mathbf{I} & 3-2\mathbf{I} & & \\ -3\mathbf{I} & 1-3\mathbf{I} & 2-3\mathbf{I} & & & \\ -4\mathbf{I} & 1-4\mathbf{I} & & & & \\ -5\mathbf{I} & & & & & \end{array} \right] \\
c =, & \left[ \begin{array}{ccccccccc} \frac{1544432967\mathbf{I}}{85} & -\frac{250435371753}{680} & -\frac{62474573007\mathbf{I}}{680} & \frac{41888151648}{85} & -\frac{6974874396\mathbf{I}}{17} & \frac{36695797929}{850} + \frac{99066475683\mathbf{I}}{850} & -\frac{83719817937}{34850} + \frac{19125809703\mathbf{I}}{6970} & -\frac{658505547}{69700} + \frac{2815645203\mathbf{I}}{139400} \\ \frac{250435371753}{680} & -\frac{62474573007\mathbf{I}}{680} & -\frac{1077101810064\mathbf{I}}{85} & -\frac{35606823777}{2} & -\frac{20903386581\mathbf{I}}{10} & \frac{16449450696}{25} + \frac{38650541832\mathbf{I}}{25} & -\frac{23220498609}{3400} & -\frac{23003227611\mathbf{I}}{1700} \\ -\frac{41888151648}{85} & -\frac{6974874396\mathbf{I}}{17} & \frac{35606823777}{2} & -\frac{20903386581\mathbf{I}}{10} & \frac{68945520546\mathbf{I}}{5} & -\frac{5882081751}{20} + \frac{7459048611\mathbf{I}}{20} & & \\ -\frac{36695797929}{850} + \frac{99066475683\mathbf{I}}{850} & -\frac{16449450696}{25} + \frac{38650541832\mathbf{I}}{25} & \frac{5882081751}{20} + \frac{7459048611\mathbf{I}}{20} & & & & & \\ \frac{83719817937}{34850} + \frac{19125809703\mathbf{I}}{6970} & \frac{23220498609}{3400} & -\frac{23003227611\mathbf{I}}{1700} & & & & & \\ \frac{658505547}{69700} + \frac{2815645203\mathbf{I}}{139400} & & & & & & & \end{array} \right]
\end{aligned}$$



$$\begin{aligned}
\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\, u(x_{ol}) = & \frac{1}{139400\, \Delta x_{ol}^{10}} \Big( 63\, (40204286760\, \mathbf{I}\, u_{ol} - (814908749355 + 203290277245\, \mathbf{I})\, u_{ol+1} + (1090421725440 - 907840794400\, \mathbf{I})\, u_{ol+2} \\
& + (95525569212 + 257887333524\, \mathbf{I})\, u_{ol+3} + (-5315543996 + 6071685620\, \mathbf{I})\, u_{ol+4} + (-20904938 + 44692781\, \mathbf{I})\, u_{ol+5} \\
& + (814908749355 - 203290277245\, \mathbf{I})\, u_{ol-1} - 28038840769920\, \mathbf{I}\, u_{ol+1-1} \\
& - (39393581226300 + 4625289030780\, \mathbf{I})\, u_{ol+2-1} + (1455906937792 + 3420879702464\, \mathbf{I})\, u_{ol+3-1} - (15111753063 + 29940708954\, \mathbf{I})\, u_{ol+4-1} \\
& - (1090421725440 + 907840794400\, \mathbf{I})\, u_{ol-21} + (39393581226300 - 4625289030780\, \mathbf{I})\, u_{ol+1-21} + 30511128774960\, \mathbf{I}\, u_{ol+2-21} \\
& + (-650763647690 + 825231251090\, \mathbf{I})\, u_{ol+3-21} + (-95525569212 + 257887333524\, \mathbf{I})\, u_{ol-31} \\
& + (-1455906937792 + 3420879702464\, \mathbf{I})\, u_{ol+1-31} + (650763647690 + 825231251090\, \mathbf{I})\, u_{ol+2-31} + (5315543996 + 6071685620\, \mathbf{I})\, u_{ol-41} \\
& + (15111753063 - 29940708954\, \mathbf{I})\, u_{ol+1-41} + (20904938 + 44692781\, \mathbf{I})\, u_{ol-51} \Big) \Big), \, O(\, \Delta x_{ol}^{11} \,)
\end{aligned}$$

Formula:, 547, Var:, 1

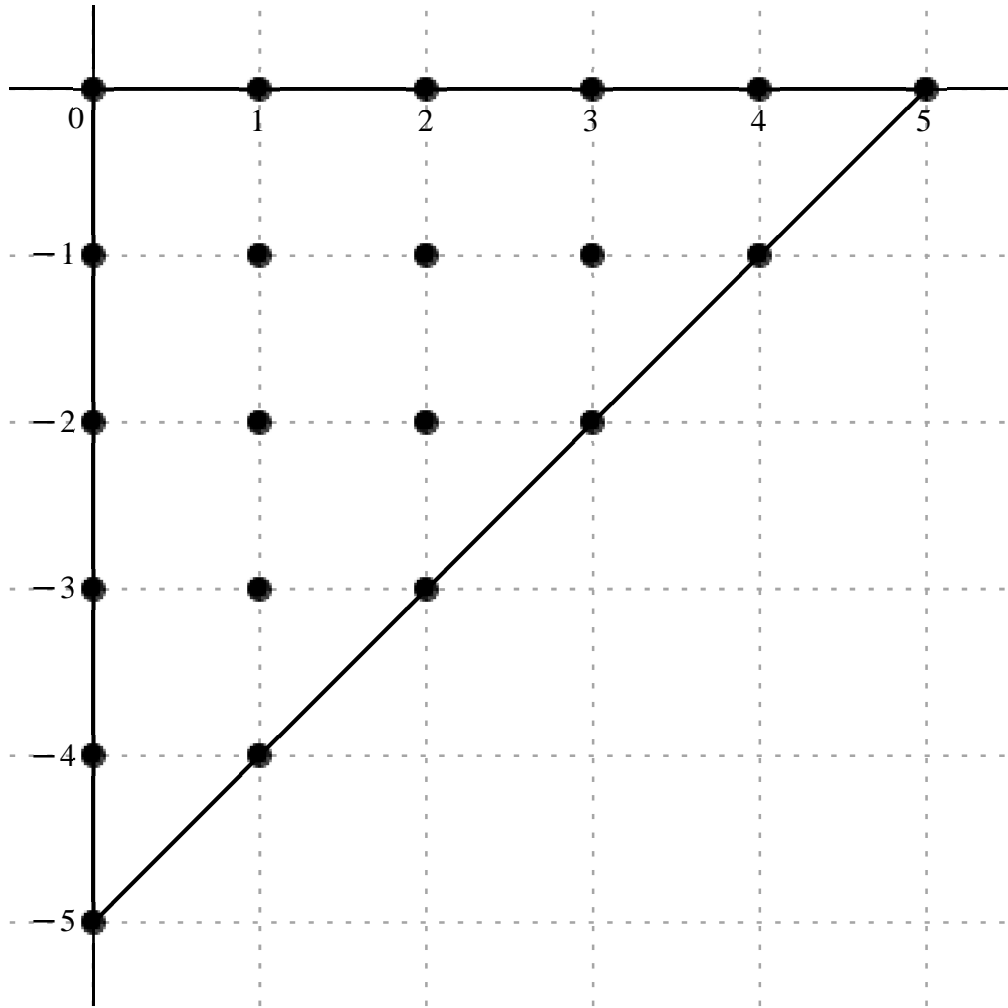
Variavel :,  $x_{oi}$ , Derivada de Ordem :, 11

Error order:, 10, Error:,  $2.1997630623030117601 \times 10^{-22}$ , New Error:,  $2.1609022274289303601 \times 10^{-32}$   
Error order:, 10, Error:,  $2.1609022274289303601 \times 10^{-32}$ , New Error:,  $2.1570266982065197625 \times 10^{-42}$   
Error order:, 10, Error:,  $2.1570266982065197625 \times 10^{-42}$ , New Error:,  $2.1566392530481740338 \times 10^{-52}$   
Error order:, 10, Error:,  $2.1566392530481740338 \times 10^{-52}$ , New Error:,  $2.1566005096121777424 \times 10^{-62}$   
Error order:, 10, Error:,  $2.1566005096121777424 \times 10^{-62}$ , New Error:,  $2.1565966352793786933 \times 10^{-72}$

$$x_o + h \cdot \begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \\ -I & 1-I & 2-I & 3-I & 4-I \\ -2\,I & 1-2\,I & 2-2\,I & 3-2\,I \\ -3\,I & 1-3\,I & 2-3\,I \\ -4\,I & 1-4\,I \\ -5\,I \end{bmatrix}$$

$$c = , \left[ \begin{array}{cccccccc} \frac{7863175089}{170} - \frac{7863175089\,I}{170} & \frac{473075811747}{680} + \frac{841768334253\,I}{680} & -\frac{6060411789894}{2465} - \frac{161121758490\,I}{493} & \frac{191180467863}{850} - \frac{372935970099\,I}{850} & \frac{256514433021}{17425} - \frac{2617501887\,I}{6970} & \frac{35088701571}{404260} - \frac{22513710681\,I}{808520} \\ -\frac{841768334253}{680} - \frac{473075811747\,I}{680} & -\frac{2910096615888}{85} + \frac{2910096615888\,I}{85} & \frac{84933738351}{2} + \frac{556062310881\,I}{10} & \frac{13226326344}{5} - 6134441544\,I & -\frac{2067787953}{100} + \frac{195681303279\,I}{3400} \\ \frac{161121758490}{493} + \frac{6060411789894\,I}{2465} & -\frac{556062310881}{10} - \frac{84933738351\,I}{2} & \frac{192646977831}{5} - \frac{192646977831\,I}{5} & \frac{7557390225}{4} - \frac{4088063133\,I}{20} \\ \frac{372935970099}{850} - \frac{191180467863\,I}{850} & 6134441544 - \frac{13226326344\,I}{5} & \frac{4088063133}{20} - \frac{7557390225\,I}{4} \\ \frac{2617501887}{6970} - \frac{256514433021\,I}{17425} & -\frac{195681303279}{3400} + \frac{2067787953\,I}{100} \\ \frac{22513710681}{808520} - \frac{35088701571\,I}{404260} \end{array} \right]$$





$$\frac{\mathrm{d}^{11}}{\mathrm{d}x_{ol}^{11}}\;u(x_{ol})=\frac{1}{4042600\,\Delta x_{ol}^{11}}\left(693\left((269821505940-269821505940\,\mathrm{I})\,u_{ol}+(4058348774655+7221230515345\,\mathrm{I})\,u_{ol+1}-(14342100051120+1906491226000\,\mathrm{I})\,u_{ol+2}+(1312055274396-2559427812108\,\mathrm{I})\,u_{ol+3}+(85874961704-2190694220\,\mathrm{I})\,u_{ol+4}+(506330470-162436585\,\mathrm{I})\,u_{ol+5}-(7221230515345\right.\\ \left.+4058348774655\,\mathrm{I})\,u_{ol-1}+(-199717453176960+199717453176960\,\mathrm{I})\,u_{ol+1-1}+(247729531499100+324377705334420\,\mathrm{I})\,u_{ol+2-1}+(15431095780160-35785127540800\,\mathrm{I})\,u_{ol+3-1}+(-120623947746+335736031167\,\mathrm{I})\,u_{ol+4-1}+(1906491226000+14342100051120\,\mathrm{I})\,u_{ol-21}-(324377705334420\right.\\ \left.+247729531499100\,\mathrm{I})\,u_{ol+1-21}+(224760367266840-224760367266840\,\mathrm{I})\,u_{ol+2-21}+(11021466711250-1192381242530\,\mathrm{I})\,u_{ol+3-21}+(2559427812108-1312055274396\,\mathrm{I})\,u_{ol-31}+(35785127540800-15431095780160\,\mathrm{I})\,u_{ol+1-31}+(1192381242530-11021466711250\,\mathrm{I})\,u_{ol+2-31}+(2190694220-85874961704\,\mathrm{I})\,u_{ol-41}\right.\\ \left.+(-335736031167+120623947746\,\mathrm{I})\,u_{ol+1-41}+(162436585-506330470\,\mathrm{I})\,u_{ol-51}\right)\Big),\;O(\;\Delta x_{ol}^{10}\;)$$

Formula:, 548, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 12

Error order:., 9, Error:., 6.6146775897844679495 × 10<sup>−20</sup>, New Error:., 6.5824658553617920482 × 10<sup>−29</sup>

Error order:., 9, Error:., 6.5824658553617920482 × 10<sup>−29</sup>, New Error:., 6.5791416399387431636 × 10<sup>−38</sup>

Error order:., 9, Error:., 6.5791416399387431636 × 10<sup>−38</sup>, New Error:., 6.5788082016610707852 × 10<sup>−47</sup>

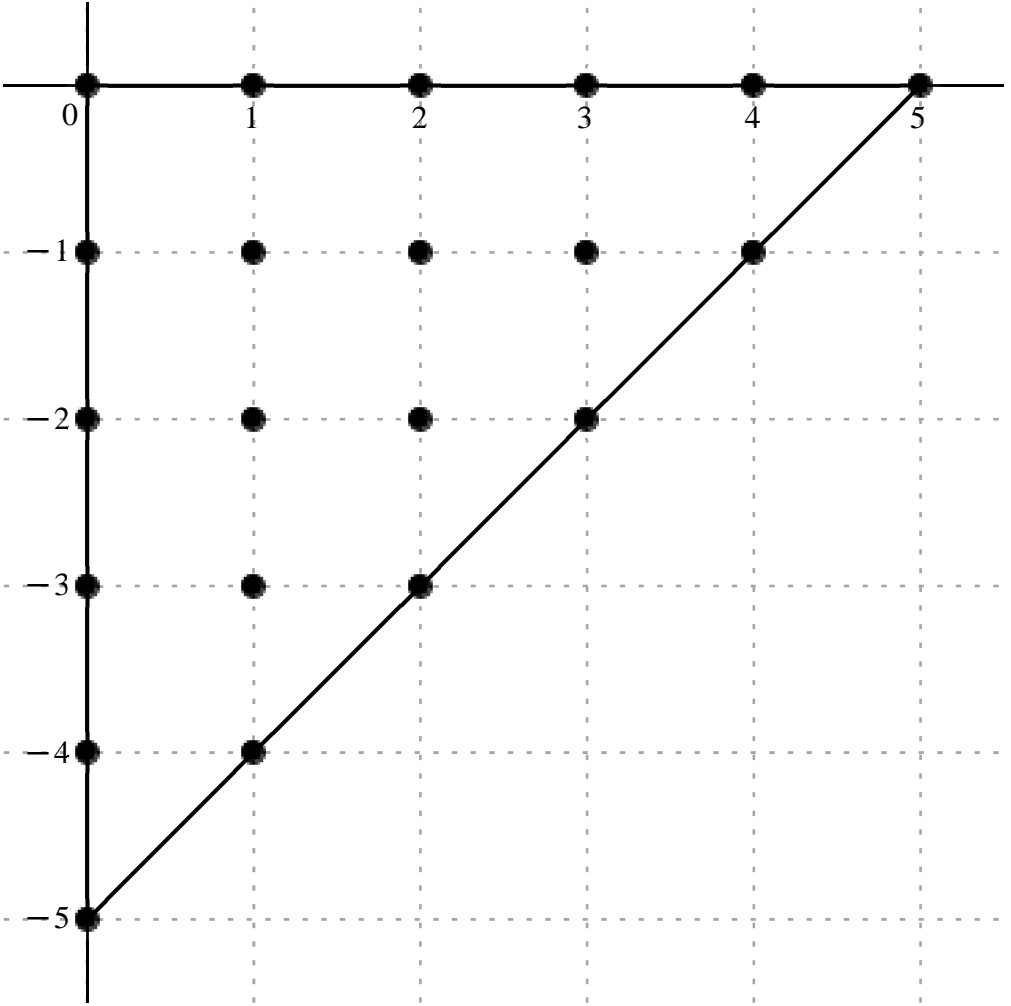
Error order:., 9, Error:., 6.5788082016610707852 × 10<sup>−47</sup>, New Error:., 6.5787748476795700323 × 10<sup>−56</sup>

Error order:., 9, Error:., 6.5787748476795700323 × 10<sup>−56</sup>, New Error:., 6.5787715121798962357 × 10<sup>−65</sup>

$$x_o \neq h., \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -1 & 1-1 & 2-1 & 3-1 & 4-1 & \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & 3-2\,\mathrm{I} & & \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & 2-3\,\mathrm{I} & & & \\ -4\,\mathrm{I} & 1-4\,\mathrm{I} & & & & \\ -5\,\mathrm{I} & & & & & \end{array} \right]$$

$$c = ,$$

$-\frac{90648919746}{425}$	$\frac{239751171891}{170} - \frac{777228534621 \text{ I}}{170}$	$\frac{12231951310656}{2465} + \frac{3468100199256 \text{ I}}{493}$	$-\frac{718483576734}{425} + \frac{197709070482 \text{ I}}{425}$	$-\frac{645828216957}{17425} - \frac{133668641799 \text{ I}}{3485}$	$-\frac{1471418156439}{5053250} - \frac{416542845411 \text{ I}}{2526625}$
$\frac{239751171891}{170} + \frac{777228534621 \text{ I}}{170}$	$\frac{14145053164704}{85}$	$\frac{910427526162}{25} - \frac{6065252491914 \text{ I}}{25}$	$-\frac{2796085652976}{125} + \frac{1033182733968 \text{ I}}{125}$	$\frac{86275317051}{425} - \frac{75483523269 \text{ I}}{850}$	
$\frac{12231951310656}{2465} - \frac{3468100199256 \text{ I}}{493}$	$\frac{910427526162}{25} + \frac{6065252491914 \text{ I}}{25}$	$-\frac{967175407044}{5}$	$-\frac{26390370699}{5} - \frac{21681643599 \text{ I}}{5}$		
$-\frac{718483576734}{425} - \frac{197709070482 \text{ I}}{425}$	$-\frac{2796085652976}{125} - \frac{1033182733968 \text{ I}}{125}$	$-\frac{26390370699}{5} + \frac{21681643599 \text{ I}}{5}$			
$-\frac{645828216957}{17425} + \frac{133668641799 \text{ I}}{3485}$	$\frac{86275317051}{425} + \frac{75483523269 \text{ I}}{850}$				
$-\frac{1471418156439}{5053250} + \frac{416542845411 \text{ I}}{2526625}$					



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}} \; u(x_{ol}) = \frac{1}{5053250 \; \Delta x_{ol}^{12}} \big( 2079 \; \big( -518429848860 \; u_{ol} + (3427899752025 - 11112610962775 \; \text{I}) \; u_{ol+1} + (12061327651200 + 17098618106000 \; \text{I}) \; u_{ol+2} + (-4109076347940 + 1130717098620 \; \text{I}) \; u_{ol+3} - (90086668070 + 93227287450 \; \text{I}) \; u_{ol+4} - (707752841 + 400714618 \; \text{I}) \; u_{ol+5} + (3427899752025 + 11112610962775 \; \text{I}) \; u_{ol-1}$$

$$+ 404484565003200 \; u_{ol+1-1} + (88515976846140 - 589691912549580 \; \text{I}) \; u_{ol+2-1} + (-54369677059744 + 20090161232992 \; \text{I}) \; u_{ol+3-1} + (493416796410 - 215848747395 \; \text{I}) \; u_{ol+4-1} + (12061327651200 - 17098618106000 \; \text{I}) \; u_{ol-21} + (88515976846140 + 589691912549580 \; \text{I}) \; u_{ol+1-21} - 470166342053400 \; u_{ol+2-21}$$

$$- (12828969767650 + 10539948582650 \; \text{I}) \; u_{ol+3-21} - (4109076347940 + 1130717098620 \; \text{I}) \; u_{ol-31} - (54369677059744 + 20090161232992 \; \text{I}) \; u_{ol+1-31} + (-12828969767650 + 10539948582650 \; \text{I}) \; u_{ol+2-31} + (-90086668070 + 93227287450 \; \text{I}) \; u_{ol-41} + (493416796410 + 215848747395 \; \text{I}) \; u_{ol+1-41} + (-707752841$$

$$+ 400714618 \; \text{I}) \; u_{ol-51} \big) \big) , \; O( \; \Delta x_{ol}^9 \; )$$

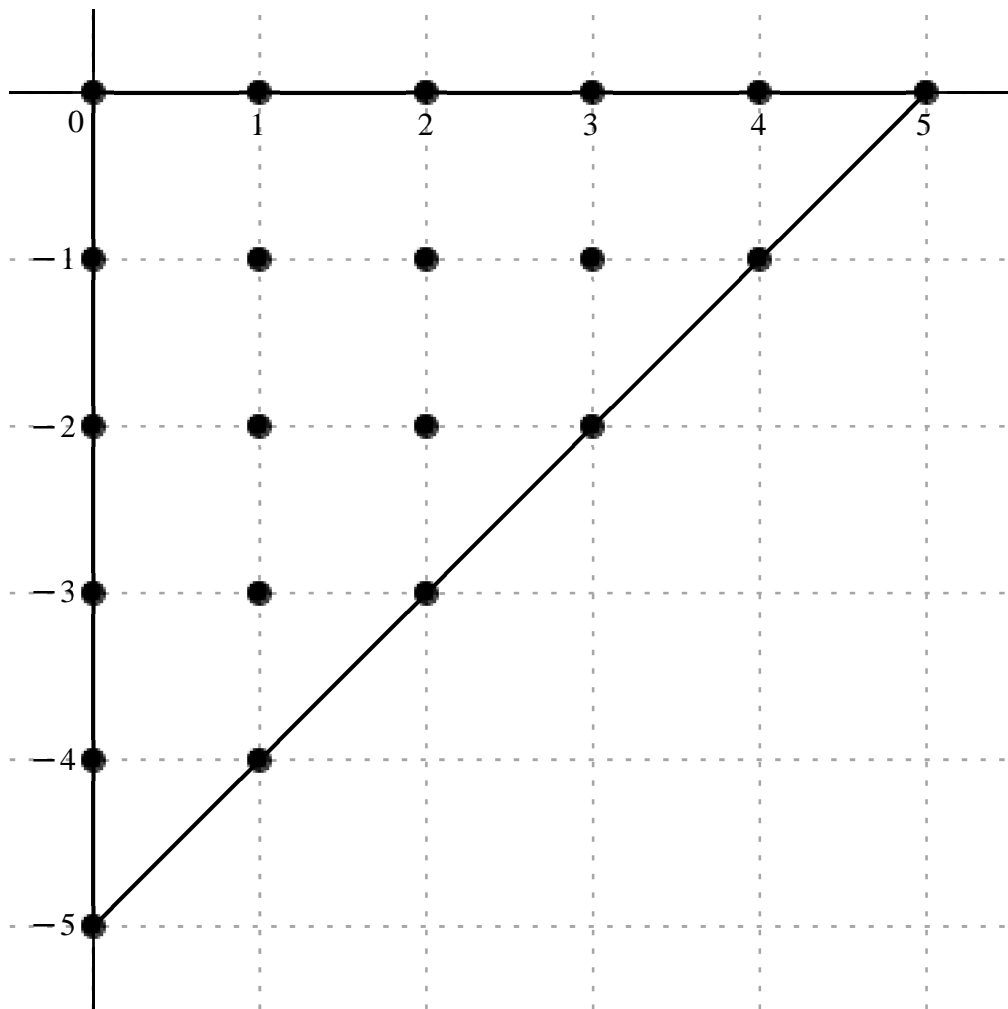
Formula.: 549, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 13

Error order.: 8, Error.: 2.5209086994530457650 × 10<sup>-17</sup>, New Error.: 2.4774388268668365494 × 10<sup>-25</sup>

*Error order:*, 8, *Error:*,  $2.4774388268668365494 \times 10^{-25}$ , *New Error:*,  $2.4731034082058892816 \times 10^{-33}$   
*Error order:*, 8, *Error:*,  $2.4731034082058892816 \times 10^{-33}$ , *New Error:*,  $2.4726699844153622364 \times 10^{-41}$   
*Error order:*, 8, *Error:*,  $2.4726699844153622364 \times 10^{-41}$ , *New Error:*,  $2.4726266432194315986 \times 10^{-49}$   
*Error order:*, 8, *Error:*,  $2.4726266432194315986 \times 10^{-49}$ , *New Error:*,  $2.4726223091116721195 \times 10^{-57}$

$$c = \left[ \begin{array}{cccccc} \frac{37433900196}{85} + \frac{37433900196 \text{ I}}{85} & -\frac{1093098285279}{85} + \frac{545585319279 \text{ I}}{85} & \frac{13515269944176}{2465} - \frac{12810427405776 \text{ I}}{493} & \frac{1993126979844}{425} + \frac{1249551290988 \text{ I}}{425} & -\frac{183983275476}{17425} + \frac{596708376264 \text{ I}}{3485} & \frac{124158740706}{505325} + \frac{537596732673 \text{ I}}{505325} \\ \frac{545585319279}{85} - \frac{1093098285279 \text{ I}}{85} & -\frac{30614493926016}{85} - \frac{30614493926016 \text{ I}}{85} & -\frac{3111252131988}{5} + \frac{2226061665828 \text{ I}}{5} & \frac{1698520247424}{25} + \frac{833099275008 \text{ I}}{25} & -\frac{279125720874}{425} - \frac{6987641661 \text{ I}}{25} & \\ -\frac{12810427405776}{493} + \frac{13515269944176 \text{ I}}{2465} & \frac{2226061665828}{5} - \frac{3111252131988 \text{ I}}{5} & \frac{2159641732248}{5} + \frac{2159641732248 \text{ I}}{5} & \frac{9516634974}{5} + 21759325434 \text{ I} & & \\ \frac{1249551290988}{425} + \frac{1993126979844 \text{ I}}{425} & \frac{833099275008}{25} + \frac{1698520247424 \text{ I}}{25} & 21759325434 + \frac{9516634974 \text{ I}}{5} & & & \\ \frac{596708376264}{3485} - \frac{183983275476 \text{ I}}{17425} & -\frac{6987641661}{25} - \frac{279125720874 \text{ I}}{425} & & & & \\ \frac{537596732673}{505325} + \frac{124158740706 \text{ I}}{505325} & & & & & \end{array} \right]$$



$$\frac{d^{13}}{dx_{ol}^{13}} u(x_{ol}) = \frac{1}{505325 \Delta x_{ol}^{13}} (2079 ((107044029180 + 107044029180 I) u_{ol} + (-3125766861945 + 1560127331945 I) u_{ol+1} + (1332674525520 - 6315867287600 I) u_{ol+2} + (1139888397804 + 714630343908 I) u_{ol+3} + (-2566385276 + 41617467320 I) u_{ol+4} + (59720414 + 258584287 I) u_{ol+5} + (1560127331945 - 3125766861945 I) u_{ol-1} - (87543610577280 + 87543610577280 I) u_{ol+1-1} + (-151245164367180 + 108214007819580 I) u_{ol+2-1} + (16513799788928 + 8099776645376 I) u_{ol+3-1} - (159634671534 + 67937085567 I) u_{ol+4-1} + (-6315867287600 + 1332674525520 I) u_{ol-21} + (108214007819580 - 151245164367180 I) u_{ol+1-21} + (104985181178280 + 104985181178280 I) u_{ol+2-21} + (462625643890 + 5288855759950 I) u_{ol+3-21} + (714630343908 + 1139888397804 I) u_{ol-31} + (8099776645376 + 16513799788928 I) u_{ol+1-31} + (5288855759950 + 462625643890 I) u_{ol+2-31} + (41617467320 - 2566385276 I) u_{ol-41} - (67937085567$$

$$+ 159634671534 \text{ I} \big) u_{oI+1-41} + (258584287 + 59720414 \text{ I} \big) u_{oI-51} \big) \big) , \mathcal{O}(\Delta x_{oI}^8)$$

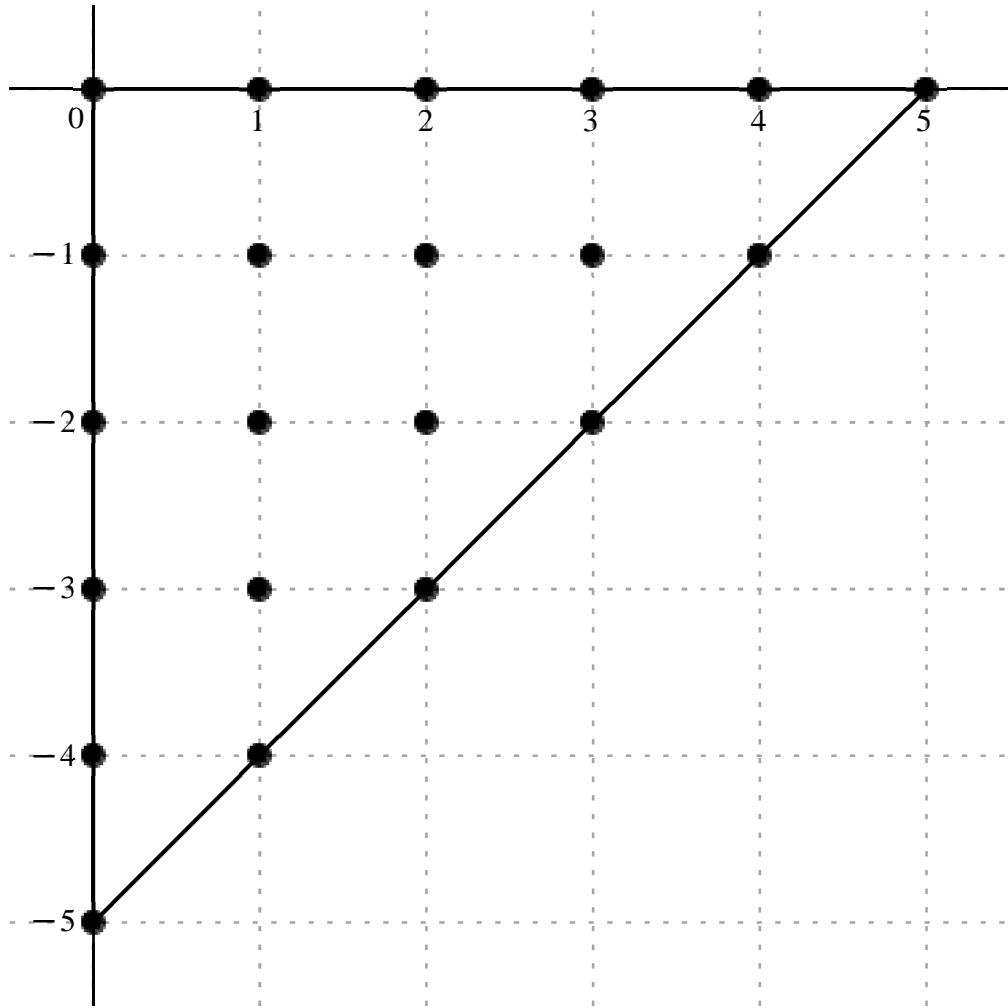
Formula.: 550, Var.: 1

Variavel .:  $x_{oI}$ , Derivada de Ordem .: 14

Error order.: 7, Error.:  $6.0715304909761210949 \times 10^{-15}$ , New Error.:  $6.0428226699494404165 \times 10^{-22}$   
Error order.: 7, Error.:  $6.0428226699494404165 \times 10^{-22}$ , New Error.:  $6.0398624456294731276 \times 10^{-29}$   
Error order.: 7, Error.:  $6.0398624456294731276 \times 10^{-29}$ , New Error.:  $6.0395655404038230512 \times 10^{-36}$   
Error order.: 7, Error.:  $6.0395655404038230512 \times 10^{-36}$ , New Error.:  $6.0395358410648964262 \times 10^{-43}$   
Error order.: 7, Error.:  $6.0395358410648964262 \times 10^{-43}$ , New Error.:  $6.0395328710428517171 \times 10^{-50}$

$$x_o \neq h. , \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -1 & 1-1 & 2-1 & 3-1 & 4-1 & \\ -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & 3-2 \text{ I} & & \\ -3 \text{ I} & 1-3 \text{ I} & 2-3 \text{ I} & & & \\ -4 \text{ I} & 1-4 \text{ I} & & & & \\ -5 \text{ I} & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} -\frac{136443921768 \text{ I}}{85} & \frac{3039235102134}{85} + \frac{1087261935606 \text{ I}}{85} & -\frac{151708173680448}{2465} + \frac{18286376324832 \text{ I}}{493} & -\frac{1180232815608}{425} - \frac{6397168039416 \text{ I}}{425} & \frac{6562084323564}{17425} - \frac{211193659908 \text{ I}}{697} & \frac{897922806858}{505325} - \frac{1298528273196 \text{ I}}{505325} & & & \\ -\frac{3039235102134}{85} + \frac{1087261935606 \text{ I}}{85} & \frac{116434671889536 \text{ I}}{85} & 2060809930872 + \frac{1867770789192 \text{ I}}{5} & -\frac{1579228225344}{25} - \frac{5023806435648 \text{ I}}{25} & \frac{295866040932}{425} + \frac{804615024906 \text{ I}}{425} & & & & \\ \frac{151708173680448}{2465} + \frac{18286376324832 \text{ I}}{493} & -2060809930872 + \frac{1867770789192 \text{ I}}{5} & -\frac{8465864997744 \text{ I}}{5} & \frac{199549164276}{5} - \frac{232707301596 \text{ I}}{5} & & & & & \\ \frac{1180232815608}{425} - \frac{6397168039416 \text{ I}}{425} & \frac{1579228225344}{25} - \frac{5023806435648 \text{ I}}{25} & -\frac{199549164276}{5} - \frac{232707301596 \text{ I}}{5} & & & & & & \\ -\frac{6562084323564}{17425} - \frac{211193659908 \text{ I}}{697} & -\frac{295866040932}{425} + \frac{804615024906 \text{ I}}{425} & & & & & & & \\ -\frac{897922806858}{505325} - \frac{1298528273196 \text{ I}}{505325} & & & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}}\;u(x_{ol})=\frac{1}{505325\; \mathcal{A}x_{ol}^{14}}\left(29106\left(-27869137460\; \mathbf{I} u_{ol}+(620774159355+222076967195\; \mathbf{I})\;u_{ol+1}+(-1068514244640+643974978800\; \mathbf{I})\;u_{ol+2}-(48213317452+261328688204\; \mathbf{I})\;u_{ol+3}+(6538186126-5260613050\; \mathbf{I})\;u_{ol+4}+(30850093-44613766\; \mathbf{I})\;u_{ol+5}+(-620774159355+222076967195\; \mathbf{I})\;u_{ol-1}\right.\\ \left.+23782179769920\; \mathbf{I} u_{ol+1-1}+(35778835233900+6485475668580\; \mathbf{I})\;u_{ol+2-1}-(1096713396512+3488840771104\; \mathbf{I})\;u_{ol+3-1}+(12086330058+32869073889\; \mathbf{I})\;u_{ol+4-1}+(1068514244640+643974978800\; \mathbf{I})\;u_{ol-21}+(-35778835233900+6485475668580\; \mathbf{I})\;u_{ol+1-21}-29396091733560\; \mathbf{I} u_{ol+2-21}+(692896182490\right.\\ \left.-808031451790\; \mathbf{I})\;u_{ol+3-21}+(48213317452-261328688204\; \mathbf{I})\;u_{ol-31}+(1096713396512-3488840771104\; \mathbf{I})\;u_{ol+1-31}-(692896182490+808031451790\; \mathbf{I})\;u_{ol+2-31}-(6538186126+5260613050\; \mathbf{I})\;u_{ol-41}+(-12086330058+32869073889\; \mathbf{I})\;u_{ol+1-41}-(30850093+44613766\; \mathbf{I})\;u_{ol-51}\Big)\Big),\;O(\;\mathcal{A}x_{ol}^7\;)$$

Formula.: 551, Var.: 1

Variavel.:  $x_{ol}$ , Derivada de Ordem.: 15

Error order.: 6, Error.:  $1.8078500385779796404 \times 10^{-12}$ , New Error.:  $1.7778484953615768486 \times 10^{-18}$

Error order.: 6, Error.:  $1.7778484953615768486 \times 10^{-18}$ , New Error.:  $1.7748560856841966550 \times 10^{-24}$

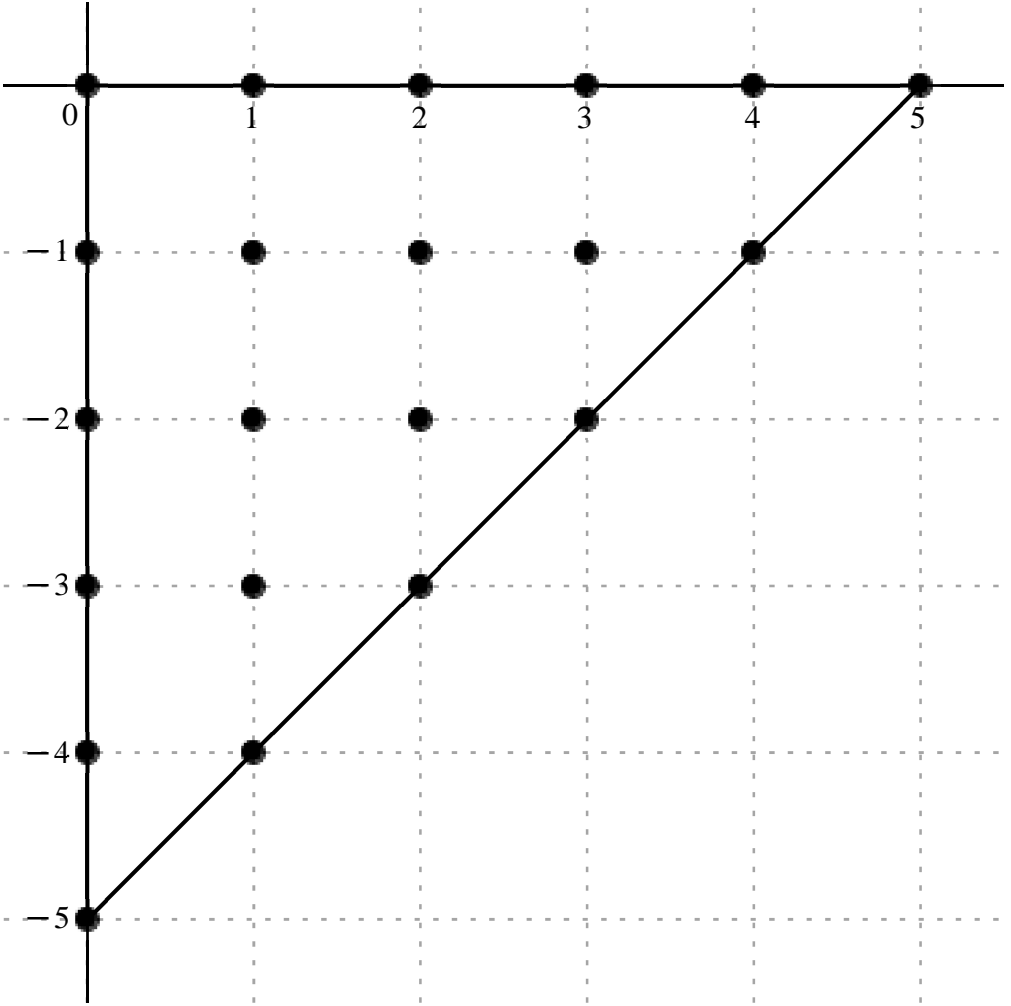
Error order.: 6, Error.:  $1.7748560856841966550 \times 10^{-24}$ , New Error.:  $1.7745569237204154949 \times 10^{-30}$

Error order.: 6, Error.:  $1.7745569237204154949 \times 10^{-30}$ , New Error.:  $1.7745270083156196714 \times 10^{-36}$

Error order.: 6, Error.:  $1.7745270083156196714 \times 10^{-36}$ , New Error.:  $1.7745240167830574532 \times 10^{-42}$

$$x_o \neq h.,, \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -\mathbf{I} & 1-\mathbf{I} & 2-\mathbf{I} & 3-\mathbf{I} & 4-\mathbf{I} & \\ -2\; \mathbf{I} & 1-2\mathbf{I} & 2-2\mathbf{I} & 3-2\mathbf{I} & & \\ -3\; \mathbf{I} & 1-3\mathbf{I} & 2-3\mathbf{I} & & & \\ -4\; \mathbf{I} & 1-4\mathbf{I} & & & & \\ -5\; \mathbf{I} & & & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} -\frac{43062967332}{17} + \frac{43062967332 \text{ I}}{17} & -\frac{603924119568}{17} - \frac{1343196552852 \text{ I}}{17} & \frac{79436563457328}{493} + \frac{22534928151120 \text{ I}}{493} & -\frac{1862452424448}{85} + \frac{2471686875504 \text{ I}}{85} & -\frac{98355344472}{85} - \frac{3092978196 \text{ I}}{17} & -\frac{18807511338}{2465} + \frac{2462105646 \text{ I}}{2465} \\ \frac{1343196552852}{17} + \frac{603924119568 \text{ I}}{17} & \frac{38200510123776}{17} - \frac{38200510123776 \text{ I}}{17} & -2754949261680 - 4101797278656 \text{ I} & -\frac{1224025121088}{5} + \frac{2209044809664 \text{ I}}{5} & \frac{11014554474}{5} - \frac{373056288066 \text{ I}}{85} & \\ -\frac{22534928151120}{493} - \frac{79436563457328 \text{ I}}{493} & 4101797278656 + 2754949261680 \text{ I} & -2860565971032 + 2860565971032 \text{ I} & -148035444480 + 9712206504 \text{ I} & & \\ -\frac{2471686875504}{85} + \frac{1862452424448 \text{ I}}{85} & -\frac{2209044809664}{5} + \frac{1224025121088 \text{ I}}{5} & -9712206504 + 148035444480 \text{ I} & & & \\ \frac{3092978196}{17} + \frac{98355344472 \text{ I}}{85} & \frac{373056288066}{85} - \frac{11014554474 \text{ I}}{5} & & & & \\ -\frac{2462105646}{2465} + \frac{18807511338 \text{ I}}{2465} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}}\; u(x_{ol}) = \frac{1}{2465 \; \Delta x_{ol}^{15}} \Big( 87318 \; \big( (-71510230 + 71510230 \text{ I}) \; u_{ol} - (1002874520 + 2230508030 \text{ I}) \; u_{ol+1} + (4548693480 + 1290394200 \text{ I}) \; u_{ol+2} + (-618556544 + 820895112 \text{ I}) \; u_{ol+3} - (32665716 + 5136190 \text{ I}) \; u_{ol+4} + (-215391 + 28197 \text{ I}) \; u_{ol+5} + (2230508030 + 1002874520 \text{ I}) \; u_{ol-1} + (63435648640 - 63435648640 \text{ I}) \; u_{ol+1-1} \\ - (77772623400 + 115794341280 \text{ I}) \; u_{ol+2-1} + (-6910881888 + 12472332064 \text{ I}) \; u_{ol+3-1} + (62188499 - 123899223 \text{ I}) \; u_{ol+4-1} - (1290394200 + 4548693480 \text{ I}) \; u_{ol-21} + (115794341280 + 77772623400 \text{ I}) \; u_{ol+1-21} + (-80754198660 + 80754198660 \text{ I}) \; u_{ol+2-21} + (-4179062400 + 274177020 \text{ I}) \; u_{ol+3-21} + (-820895112 \\ + 618556544 \text{ I}) \; u_{ol-31} + (-12472332064 + 6910881888 \text{ I}) \; u_{ol+1-31} + (-274177020 + 4179062400 \text{ I}) \; u_{ol+2-31} + (5136190 + 32665716 \text{ I}) \; u_{ol-41} + (123899223 - 62188499 \text{ I}) \; u_{ol+1-41} + (-28197 + 215391 \text{ I}) \; u_{ol-51} \big) \Big), \; O( \; \Delta x_{ol}^6 \; )$$

Formula: 552, Var: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 16

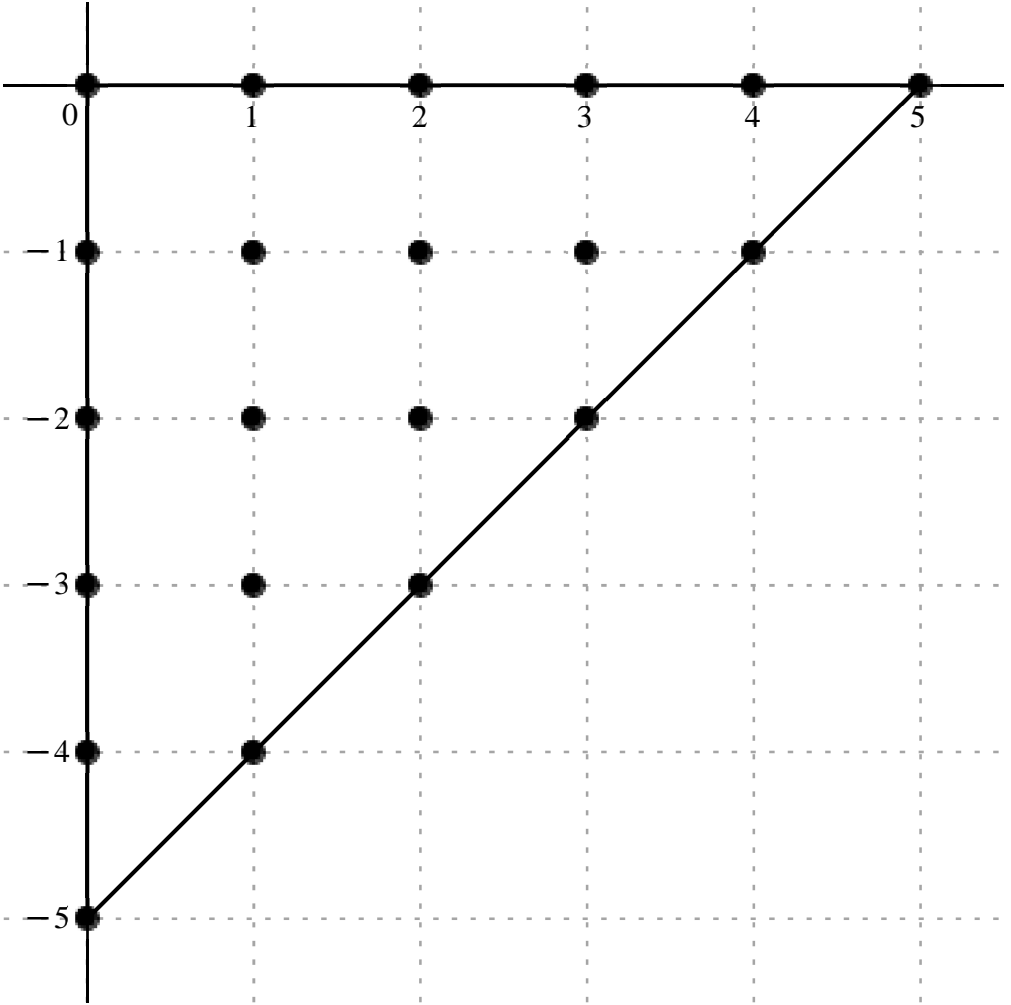
Error order: 5, Error: 3.2976228860949882927 × 10−10, New Error: 3.2827923947727119182 × 10−15

Error order: 5, Error: 3.2827923947727119182 × 10−15, New Error: 3.2812650171118563600 × 10−20

*Error order:*, 5,    *Error:*,  $3.2812650171118563600 \times 10^{-20}$ ,    *New Error:*,  $3.2811118416442188924 \times 10^{-25}$   
*Error order:*, 5,    *Error:*,  $3.2811118416442188924 \times 10^{-25}$ ,    *New Error:*,  $3.2810965197259983017 \times 10^{-30}$   
*Error order:*, 5,    *Error:*,  $3.2810965197259983017 \times 10^{-30}$ ,    *New Error:*,  $3.2810949874904672303 \times 10^{-35}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} & 4-\text{I} & \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & 3-2\text{ I} & & \\ -3\text{ I} & 1-3\text{ I} & 2-3\text{ I} & & & \\ -4\text{ I} & 1-4\text{ I} & & & & \\ -5\text{ I} & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} \frac{573026819904}{85} & & -\frac{1050192446688}{17} + \frac{2624116860288\text{ I}}{17} & -\frac{74185193972736}{493} - \frac{143554089127680\text{ I}}{493} & \frac{6143761540224}{85} - \frac{597819543552\text{ I}}{85} & \frac{4539947825952}{3485} + \frac{1387522138464\text{ I}}{697} & \frac{6093222580368}{505325} + \frac{5232430559664\text{ I}}{505325} \\ -\frac{1050192446688}{17} - \frac{2624116860288\text{ I}}{17} & -\frac{105359614424064}{17} & -\frac{10127485323648}{5} + \frac{47901721545216\text{ I}}{5} & \frac{24607816257024}{25} - \frac{6383663903232\text{ I}}{25} & \frac{24607816257024}{25} - \frac{6383663903232\text{ I}}{25} & -\frac{818462349936}{85} + \frac{240992790192\text{ I}}{85} & \\ -\frac{74185193972736}{493} + \frac{143554089127680\text{ I}}{493} & -\frac{10127485323648}{5} - \frac{47901721545216\text{ I}}{5} & 8120808710784 & 224509247424 + 201471266304\text{ I} & & & \\ \frac{6143761540224}{85} + \frac{597819543552\text{ I}}{85} & \frac{24607816257024}{25} + \frac{6383663903232\text{ I}}{25} & 224509247424 - 201471266304\text{ I} & & & & \\ \frac{4539947825952}{3485} - \frac{1387522138464\text{ I}}{697} & -\frac{818462349936}{85} - \frac{240992790192\text{ I}}{85} & & & & & \\ \frac{6093222580368}{505325} - \frac{5232430559664\text{ I}}{505325} & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{16}}{\mathrm{d}x_{ol}^{16}}\, u(x_{ol}) = \frac{1}{505325\, \Delta x_{ol}^{16}} \big( 698544\, (4876778620\, u_{ol} + (-44688624450 + 111663508200\, \text{I})\, u_{ol+1} - (108854737600 + 210642338000\, \text{I})\, u_{ol+2} + (52286845720 - 5087778560\, \text{I})\, u_{ol+3} + (942377910 + 1440071850\, \text{I})\, u_{ol+4} + (8722747 + 7490481\, \text{I})\, u_{ol+5} - (44688624450 + 111663508200\, \text{I})\, u_{ol-1} - 4483346129600\, u_{ol+1-1}$$

$$+ (-1465239561480 + 6930397352160\, \text{I})\, u_{ol+2-1} + (712049334048 - 184717066464\, \text{I})\, u_{ol+3-1} + (-6965572205 + 2050983385\, \text{I})\, u_{ol+4-1} + (-108854737600 + 210642338000\, \text{I})\, u_{ol-21} - (1465239561480 + 6930397352160\, \text{I})\, u_{ol+1-21} + 5874572914200\, u_{ol+2-21} + (162409433700 + 145743815200\, \text{I})\, u_{ol+3-21} + (52286845720$$

$$+ 5087778560\, \text{I})\, u_{ol-31} + (712049334048 + 184717066464\, \text{I})\, u_{ol+1-31} + (162409433700 - 145743815200\, \text{I})\, u_{ol+2-31} + (942377910 - 1440071850\, \text{I})\, u_{ol-41} - (6965572205 + 2050983385\, \text{I})\, u_{ol+1-41} + (8722747 - 7490481\, \text{I})\, u_{ol-51} \big) \big) , \, O(\, \Delta x_{ol}^5 \, )$$

Formula:, 553, Var:, 1

Variavel :,  $x_o$ , Derivada de Ordem :, 17

Error order:, 4, Error:,  $7.1022554606548431502 \times 10^{-8}$ , New Error:,  $6.9924793370881302153 \times 10^{-12}$

Error order:, 4, Error:,  $6.9924793370881302153 \times 10^{-12}$ , New Error:,  $6.9815286424246304937 \times 10^{-16}$

Error order:, 4, Error:,  $6.9815286424246304937 \times 10^{-16}$ , New Error:,  $6.9804338473269978223 \times 10^{-20}$

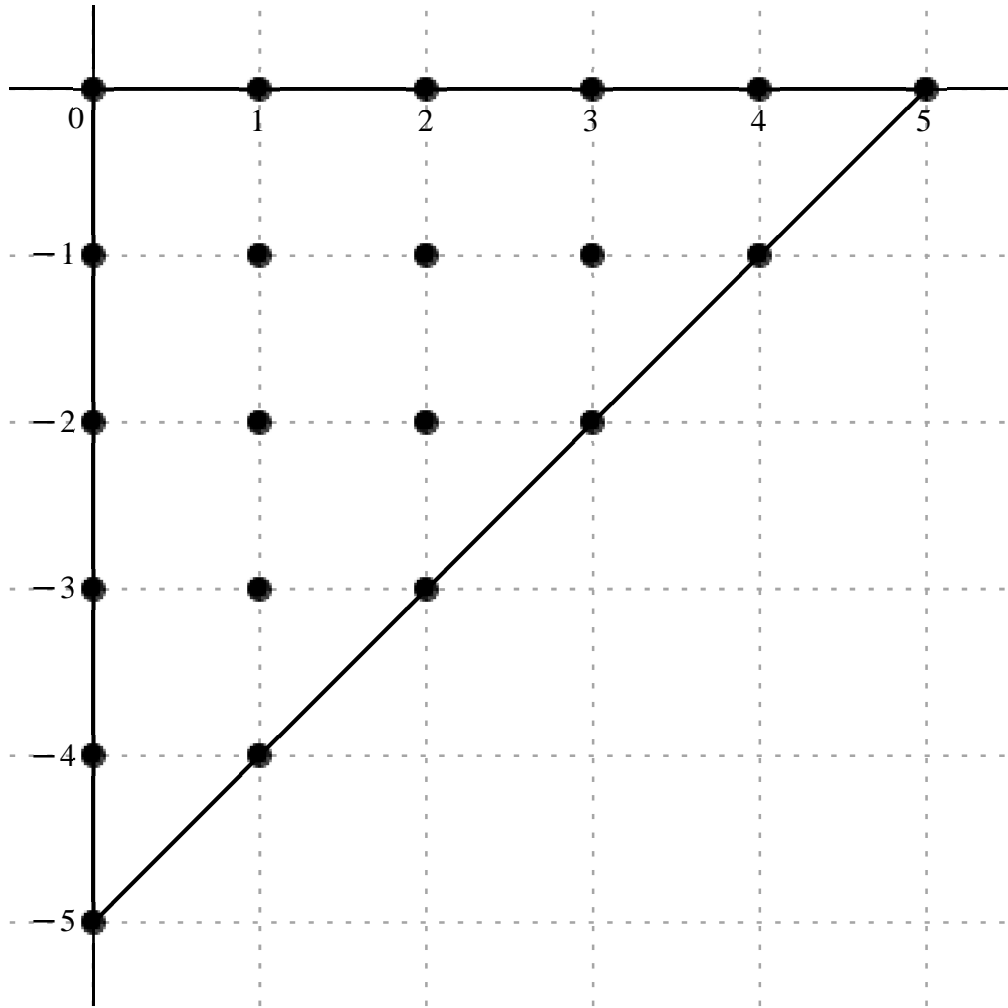
Error order:, 4, Error:,  $6.9804338473269978223 \times 10^{-20}$ , New Error:,  $6.9803243705660658030 \times 10^{-24}$

Error order:, 4, Error:,  $6.9803243705660658030 \times 10^{-24}$ , New Error:,  $6.9803134229174660529 \times 10^{-28}$

$$x_o + h \cdot \begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \\ -I & 1-I & 2-I & 3-I & 4-I \\ -2\ I & 1-2\ I & 2-2\ I & 3-2\ I \\ -3\ I & 1-3\ I & 2-3\ I \\ -4\ I & 1-4\ I \\ -5\ I \end{bmatrix}$$

$$c =, \begin{bmatrix} -7276034304 - 7276034304\ I & 239117898096 - 97760534256\ I & -\frac{5003095071744}{29} + \frac{14176978421760\ I}{29} & -\frac{435195706176}{5} - \frac{390282121152\ I}{5} & \frac{203818374144}{205} - \frac{154517932800\ I}{41} & -\frac{2672629344}{5945} - \frac{157439942352\ I}{5945} \\ -97760534256 + 239117898096\ I & 6914982057984 + 6914982057984\ I & 13271159651904 - 8371907337024\ I & -\frac{7019506593792}{5} - \frac{4379211454464\ I}{5} & \frac{71331122016}{5} + \frac{42266801808\ I}{5} & \\ \frac{14176978421760}{29} - \frac{5003095071744\ I}{29} & -8371907337024 + 13271159651904\ I & -9323114701824 - 9323114701824\ I & -20829184992 - 495791604000\ I & & \\ -\frac{390282121152}{5} - \frac{435195706176\ I}{5} & -\frac{4379211454464}{5} - \frac{7019506593792\ I}{5} & -495791604000 - 20829184992\ I & & & \\ -\frac{154517932800}{41} + \frac{203818374144\ I}{205} & \frac{42266801808}{5} + \frac{71331122016\ I}{5} & & & & \\ -\frac{157439942352}{5945} - \frac{2672629344\ I}{5945} & & & & & \end{bmatrix}$$





$$\frac{\mathrm{d}^{17}}{\mathrm{d}x_{ol}^{17}}\;u(x_{ol})=\frac{1}{5945\; \mathcal{A}x_{ol}^{17}}\left(698544\left(-(61923120+61923120\; \mathrm{I})\;u_{ol}+(2035027005-831996805\; \mathrm{I})\;u_{ol+1}+(-1468246080+4160483200\; \mathrm{I})\;u_{ol+2}-(740751756+664303812\; \mathrm{I})\;u_{ol+3}+(8461504-32074000\; \mathrm{I})\;u_{ol+4}-(3826+225383\; \mathrm{I})\;u_{ol+5}+(-831996805+2035027005\; \mathrm{I})\;u_{ol-1}+(58850363520+58850363520\; \mathrm{I})\;u_{ol+1-1}\right.\\ \left.+(112944988620-71249612220\; \mathrm{I})\;u_{ol+2-1}-(11947985152+7453907584\; \mathrm{I})\;u_{ol+3-1}+(121413546+71942823\; \mathrm{I})\;u_{ol+4-1}+(4160483200-1468246080\; \mathrm{I})\;u_{ol-21}+(-71249612220+112944988620\; \mathrm{I})\;u_{ol+1-21}-(79344918720+79344918720\; \mathrm{I})\;u_{ol+2-21}-(177268010+4219463750\; \mathrm{I})\;u_{ol+3-21}-(664303812\right.\\ \left.+740751756\; \mathrm{I})\;u_{ol-31}-(7453907584+11947985152\; \mathrm{I})\;u_{ol+1-31}-(4219463750+177268010\; \mathrm{I})\;u_{ol+2-31}+(-32074000+8461504\; \mathrm{I})\;u_{ol-41}+(71942823+121413546\; \mathrm{I})\;u_{ol+1-41}-(225383+3826\; \mathrm{I})\;u_{ol-51}\right)\Big),\;O(\;\mathcal{A}x_{ol}^4\;)$$

Formula:, 554, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 18

Error order:, 3, Error:, 8.8021188691512428582 × 10−6, New Error:, 8.7665180606837763314 × 10−9

Error order:, 3, Error:, 8.7665180606837763314 × 10−9, New Error:, 8.7628593716667918446 × 10−12

Error order:, 3, Error:, 8.7628593716667918446 × 10−12, New Error:, 8.7624925284640863920 × 10−15

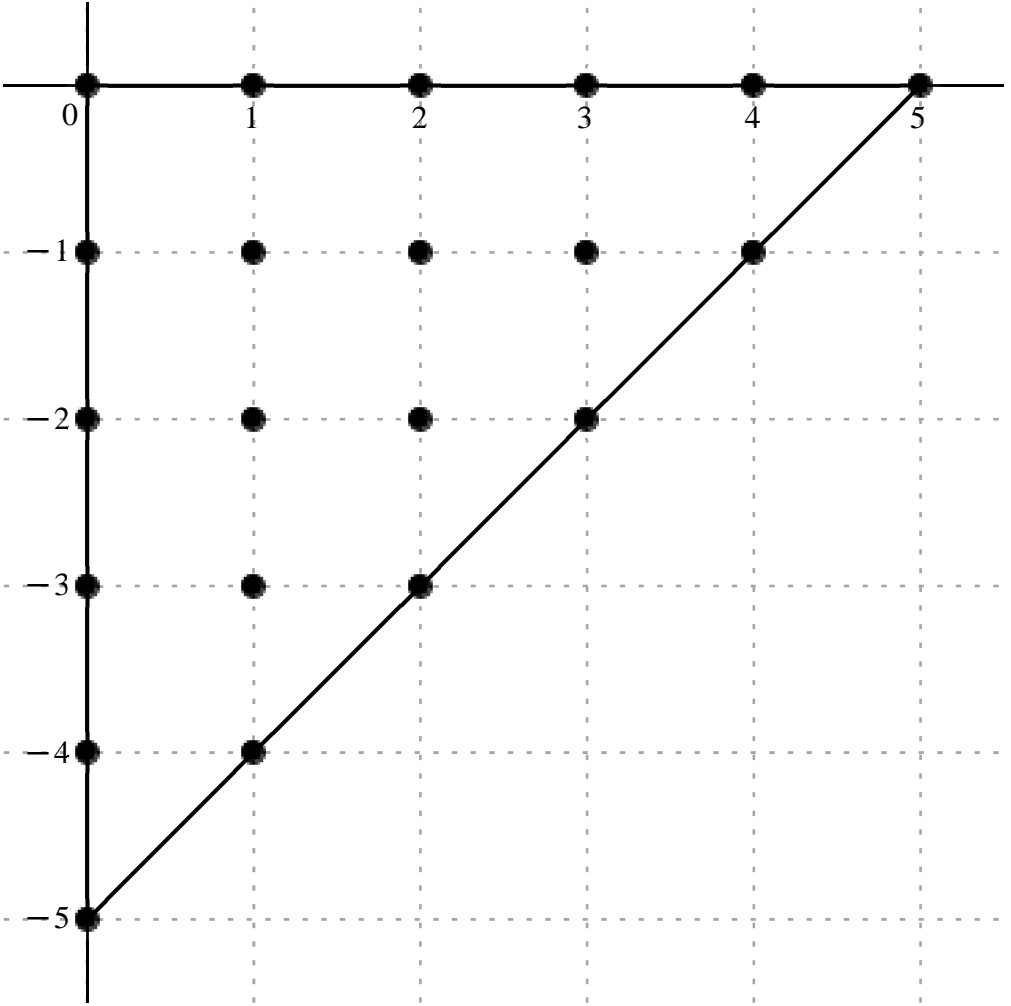
Error order:, 3, Error:, 8.7624925284640863920 × 10−15, New Error:, 8.7624558344125357557 × 10−18

Error order:, 3, Error:, 8.7624558344125357557 × 10−18, New Error:, 8.7624521649100796160 × 10−21

$$x_o+h.,,\left[\begin{array}{cccccc}0&1&2&3&4&5\\-1&1-1&2-1&3-1&4-1&\\-2\;1&1-2\;1&2-2\;1&3-2\;1&\\-3\;1&1-3\;1&2-3\;1&\\-4\;1&1-4\;1&\\-5\;1&\end{array}\right]$$

$$c = ,$$

$11970249984 \text{ I}$	$-279779445792 - 122581898208 \text{ I}$	$\frac{16527394566144}{29} - \frac{7304870200320 \text{ I}}{29}$	$\frac{8198112384}{5} + \frac{714241680768 \text{ I}}{5}$	$-\frac{883635806592}{205} + \frac{90481007232 \text{ I}}{41}$	$-\frac{147138513984}{5945} + \frac{133898311008 \text{ I}}{5945}$
$279779445792 - 122581898208 \text{ I}$	$-11737685127168 \text{ I}$	$-18583813100160 - 4486278690432 \text{ I}$	$\frac{2038362568704}{5} + \frac{10027649415168 \text{ I}}{5}$	$-\frac{21916119456}{5} - \frac{101772272448 \text{ I}}{5}$	
$-\frac{16527394566144}{29} - \frac{7304870200320 \text{ I}}{29}$	$18583813100160 - 4486278690432 \text{ I}$	$16282960049664 \text{ I}$	$-426226401216 + 451876936896 \text{ I}$		
$-\frac{8198112384}{5} + \frac{714241680768 \text{ I}}{5}$	$-\frac{2038362568704}{5} + \frac{10027649415168 \text{ I}}{5}$	$426226401216 + 451876936896 \text{ I}$			
$\frac{883635806592}{205} + \frac{90481007232 \text{ I}}{41}$	$\frac{21916119456}{5} - \frac{101772272448 \text{ I}}{5}$				
$\frac{147138513984}{5945} + \frac{133898311008 \text{ I}}{5945}$					



$$\frac{\mathrm{d}^{18}}{\mathrm{d}x_{ol}^{18}} \; u(x_{ol}) = \frac{1}{5945 \; \Delta x_{ol}^{18}} \Big( 12573792 \; \Big( 5659640 \; \text{I} u_{ol} - (132282195 + 57957805 \; \text{I}) \; u_{ol+1} + (269458560 - 119096800 \; \text{I}) \; u_{ol+2} + (775228 + 67539956 \; \text{I}) \; u_{ol+3} + (-2038004 + 1043420 \; \text{I}) \; u_{ol+4} + (-11702 + 10649 \; \text{I}) \; u_{ol+5} + (132282195 - 57957805 \; \text{I}) \; u_{ol-1} - 5549681280 \; \text{I} u_{ol+1-1} - (8786591100 + 2121152220 \; \text{I}) \; u_{ol+2-1} + (192751168$$

$$+ 948232256 \; \text{I}) \; u_{ol+3-1} - (2072427 + 9623766 \; \text{I}) \; u_{ol+4-1} - (269458560 + 119096800 \; \text{I}) \; u_{ol-21} + (8786591100 - 2121152220 \; \text{I}) \; u_{ol+1-21} + 7698727440 \; \text{I} u_{ol+2-21} + (-201523610 + 213651410 \; \text{I}) \; u_{ol+3-21} + (-775228 + 67539956 \; \text{I}) \; u_{ol-31} + (-192751168 + 948232256 \; \text{I}) \; u_{ol+1-31} + (201523610 + 213651410 \; \text{I}) \; u_{ol+2-31}$$

$$+ (2038004 + 1043420 \; \text{I}) \; u_{ol-41} + (2072427 - 9623766 \; \text{I}) \; u_{ol+1-41} + (11702 + 10649 \; \text{I}) \; u_{ol-51} \Big) \Big), \; O( \; \Delta x_{ol}^3 \; )$$

Formula.: 555,
Var.: 1

Variavel :,  $x_{ol}$ ,
Derivada de Ordem :, 19

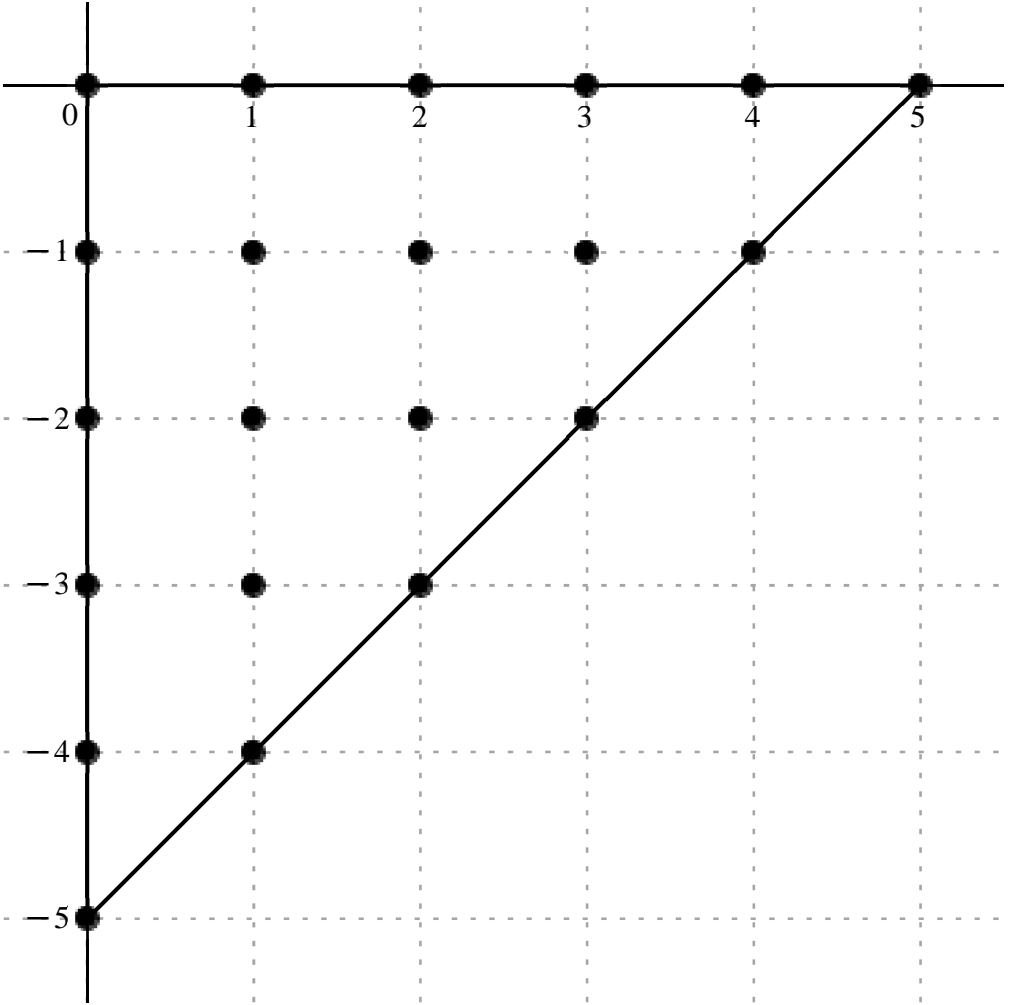
Error order.: 2,
Error.: 0.0011614256319789783540,
New Error.: 0.000011464870773113105467

Error order.: 2,
Error.: 0.000011464870773113105467,
New Error.: 1.1449965094977924898 × 10<sup>-7</sup>

*Error order:*, 2, *Error:*,  $1.1449965094977924898 \times 10^{-7}$ , *New Error:*,  $1.1448474861805082666 \times 10^{-9}$   
*Error order:*, 2, *Error:*,  $1.1448474861805082666 \times 10^{-9}$ , *New Error:*,  $1.1448325841840029419 \times 10^{-11}$   
*Error order:*, 2, *Error:*,  $1.1448325841840029419 \times 10^{-11}$ , *New Error:*,  $1.1448310939877052224 \times 10^{-13}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -I & 1-I & 2-I & 3-I & 4-I & \\ -2\,I & 1-2\,I & 2-2\,I & 3-2\,I & & \\ -3\,I & 1-3\,I & 2-3\,I & & & \\ -4\,I & 1-4\,I & & & & \\ -5\,I & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} 6689257344 - 6689257344\,I & 85765835232 + 229584868128\,I & -\frac{13565813893632}{29} - \frac{5714536988160\,I}{29} & \frac{430979294592}{5} - \frac{404222265216\,I}{5} & \frac{777865068288}{205} + \frac{60203316096\,I}{41} & \frac{168664845888}{5945} + \frac{19828869984\,I}{5945} \\ -229584868128 - 85765835232\,I & -6758061133824 + 6758061133824\,I & 8041442935680 + 13597348963968\,I & \frac{4938583136256}{5} - \frac{7017986562048\,I}{5} & -\frac{51125038272}{5} + \frac{72387320544\,I}{5} & \\ \frac{5714536988160}{29} + \frac{13565813893632\,I}{29} & -13597348963968 - 8041442935680\,I & 9649731522816 - 9649731522816\,I & 527973526080 - 8122669632\,I & & \\ \frac{404222265216}{5} - \frac{430979294592\,I}{5} & \frac{7017986562048}{5} - \frac{4938583136256\,I}{5} & 8122669632 - 527973526080\,I & & & \\ -\frac{60203316096}{41} - \frac{777865068288\,I}{205} & -\frac{72387320544}{5} + \frac{51125038272\,I}{5} & & & & \\ -\frac{19828869984}{5945} - \frac{168664845888\,I}{5945} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{19}}{\mathrm{d}x_{ol}^{19}}\,u(x_{ol})=\frac{1}{5945\,\mathcal{A}x_{ol}^{19}}\Big( (166460-166460\,I)\,u_{ol}+(2134255+5713145\,I)\,u_{ol+1}-(11640720+4903600\,I)\,u_{ol+2}+(2144956-2011788\,I)\,u_{ol+3}+(94424+36540\,I)\,u_{ol+4}+(706+83\,I)\,u_{ol+5}-(5713145+2134255\,I)\,u_{ol-1}+(-168172160+168172160\,I)\,u_{ol+1-1}+(200108700+338365620\,I)\,u_{ol+2-1}+(24579008-34928064\,I)\,u_{ol+3-1}+(-254446+360267\,I)\,u_{ol+4-1}+(4903600+11640720\,I)\,u_{ol-21}-(338365620+200108700\,I)\,u_{ol+1-21}+(240130440-240130440\,I)\,u_{ol+2-21}+(13138450-202130\,I)\,u_{ol+3-21}+(2011788-2144956\,I)\,u_{ol-31}+(34928064-24579008\,I)\,u_{ol+1-31}+(202130-13138450\,I)\,u_{ol+2-31}-(36540+94424\,I)\,u_{ol-41}+(-360267+254446\,I)\,u_{ol+1-41}-(83+706\,I)\,u_{ol-51})\Big),\,\,O(\,\,\mathcal{A}x_{ol}^2\,\,)$$

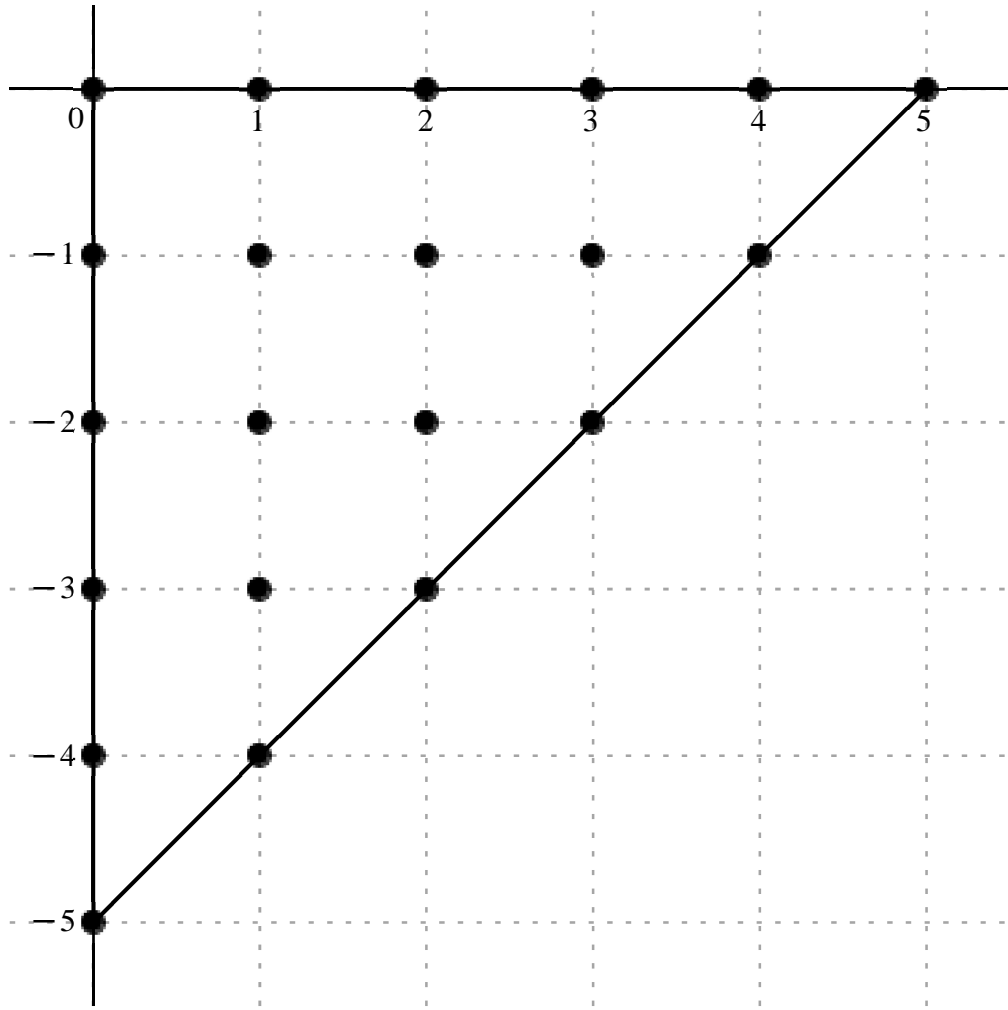
Formula.: 556, Var.: 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 20

Error order.: 1, Error.: 0.074197602863581049569, New Error.: 0.0073997101723497662897  
Error order.: 1, Error.: 0.0073997101723497662897, New Error.: 0.00073976594262611435412  
Error order.: 1, Error.: 0.00073976594262611435412, New Error.: 0.000073974538991992836522  
Error order.: 1, Error.: 0.000073974538991992836522, New Error.:  $7.3974333419734420307 \times 10^{-6}$   
Error order.: 1, Error.:  $7.3974333419734420307 \times 10^{-6}$ , New Error.:  $7.3974312862056661846 \times 10^{-7}$

$$x_o + h . , \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 \\ -I & 1-I & 2-I & 3-I & 4-I & \\ -2\ I & 1-2\ I & 2-2\ I & 3-2\ I & & \\ -3\ I & 1-3\ I & 2-3\ I & & & \\ -4\ I & 1-4\ I & & & & \\ -5\ I & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} -3822432768 & 43002368640 - 90782778240\ I & \frac{2140562350080}{29} + \frac{5733649152000\ I}{29} & -49691625984 - 3822432768\ I & -\frac{24845812992}{41} - \frac{66892573440\ I}{41} & -\frac{41091152256}{5945} - \frac{61158924288\ I}{5945} & & & \\ 43002368640 + 90782778240\ I & 3975330078720 & 1754496640512 - 6433154348544\ I & -\frac{3638955995136}{5} + \frac{519850856448\ I}{5} & 7644865536 - 955608192\ I & & & & \\ \frac{2140562350080}{29} - \frac{5733649152000\ I}{29} & 1754496640512 + 6433154348544\ I & -5848322135040 & -162453392640 - 162453392640\ I & & & & & \\ -49691625984 + 3822432768\ I & -\frac{3638955995136}{5} - \frac{519850856448\ I}{5} & -162453392640 + 162453392640\ I & & & & & & \\ -\frac{24845812992}{41} + \frac{66892573440\ I}{41} & 7644865536 + 955608192\ I & & & & & & & \\ -\frac{41091152256}{5945} + \frac{61158924288\ I}{5945} & & & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{20}}{\mathrm{d}x_{ol}^{20}}\;u(x_{ol})=\frac{1}{5945\,\mathcal{A}\mathfrak{x}_{ol}^{20}}\Big(955608192\left(-23780\,u_{ol}+(267525-564775\,\mathrm{I})\,u_{ol+1}+(459200+1230000\,\mathrm{I})\,u_{ol+2}-(309140+23780\,\mathrm{I})\,u_{ol+3}-(3770+10150\,\mathrm{I})\,u_{ol+4}-(43+64\,\mathrm{I})\,u_{ol+5}+(267525+564775\,\mathrm{I})\,u_{ol-1}+24731200\,u_{ol+1-1}+(10915020-40021740\,\mathrm{I})\,u_{ol+2-1}+(-4527712+646816\,\mathrm{I})\,u_{ol+3-1}+(47560-5945\,\mathrm{I})\,u_{ol+4-1}\right.\\ \left.+(459200-1230000\,\mathrm{I})\,u_{ol-21}+(10915020+40021740\,\mathrm{I})\,u_{ol+1-21}-36383400\,u_{ol+2-21}-(1010650+1010650\,\mathrm{I})\,u_{ol+3-21}+(-309140+23780\,\mathrm{I})\,u_{ol-31}-(4527712+646816\,\mathrm{I})\,u_{ol+1-31}+(-1010650+1010650\,\mathrm{I})\,u_{ol+2-31}+(-3770+10150\,\mathrm{I})\,u_{ol-41}+(47560+5945\,\mathrm{I})\,u_{ol+1-41}+(-43+64\,\mathrm{I})\,u_{ol-51}\right)\Big),\;O(\,\mathcal{A}\mathfrak{x}_{ol}\,)$$

Formula.: 557, Var.: 1

Variavel .:,  $x_{ol}$ , Derivada de Ordem .:, 1

Error order.: 20, Error.: 2.7599280483211247639 × 10<sup>−50</sup>, New Error.: 2.7948177049659490752 × 10<sup>−70</sup>

Error order.: 20, Error.: 2.7948177049659490752 × 10<sup>−70</sup>, New Error.: 2.7982917290842639974 × 10<sup>−90</sup>

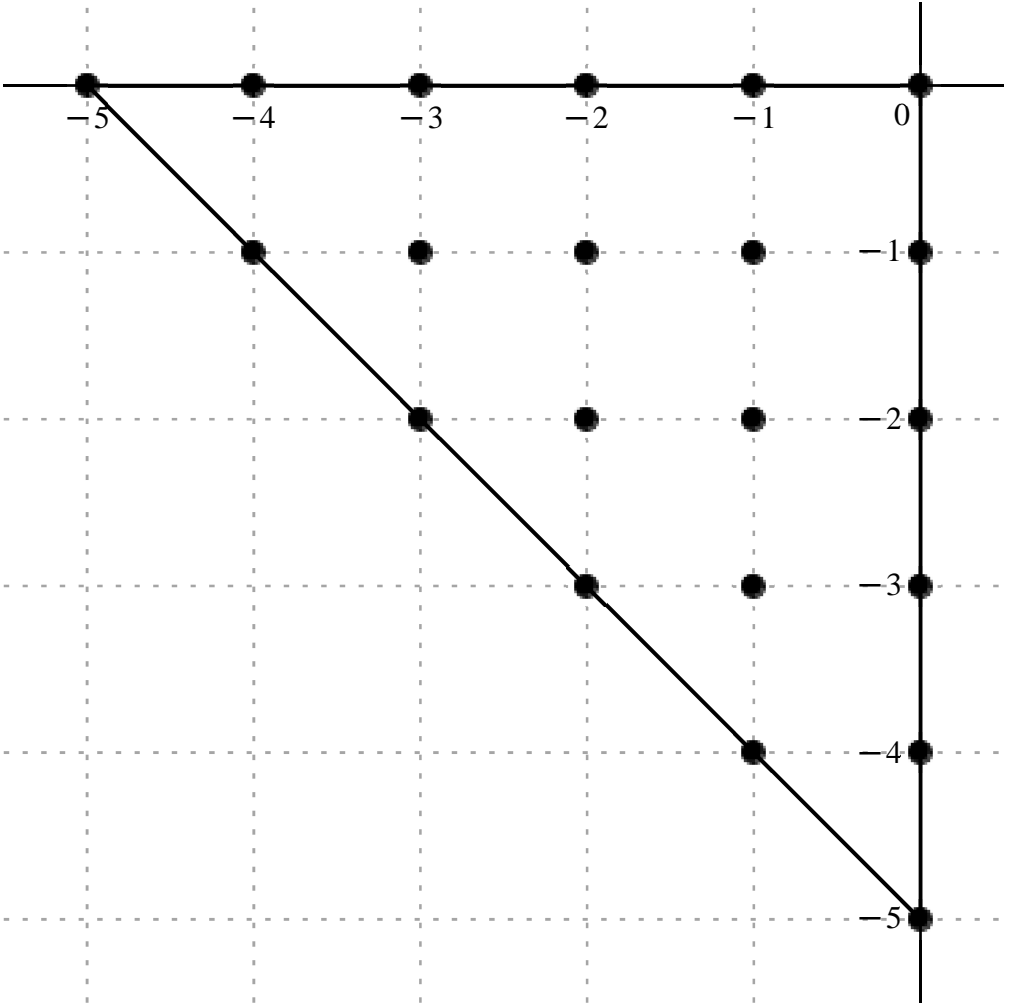
Error order.: 20, Error.: 2.7982917290842639974 × 10<sup>−90</sup>, New Error.: 2.7986389770905661764 × 10<sup>−110</sup>

Error order.: 20, Error.: 2.7986389770905661764 × 10<sup>−110</sup>, New Error.: 2.7986737003421170033 × 10<sup>−130</sup>

Error order.: 20, Error.: 2.7986737003421170033 × 10<sup>−130</sup>, New Error.: 2.7986771726517762645 × 10<sup>−150</sup>

$$x_o+h.,\left[\begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-{\rm I} & -3-{\rm I} & -2-{\rm I} & -1-{\rm I} & -{\rm I} \\ & & -3-2\,{\rm I} & -2-2\,{\rm I} & -1-2\,{\rm I} & -2\,{\rm I} \\ & & & -2-3\,{\rm I} & -1-3\,{\rm I} & -3\,{\rm I} \\ & & & & -1-4\,{\rm I} & -4\,{\rm I} \\ & & & & & -5\,{\rm I} \end{array}\right]$$

$$c =, \left[ \begin{array}{cccccc} \frac{43}{118900} - \frac{16 \text{ I}}{29725} & \frac{13}{328} - \frac{35 \text{ I}}{328} & \frac{13}{3} - \frac{\text{I}}{3} & -\frac{280}{29} + \frac{750 \text{ I}}{29} & -\frac{45}{4} - \frac{95 \text{ I}}{4} & \frac{31241}{6630} - \frac{31241 \text{ I}}{6630} \\ & -\frac{33}{68} + \frac{\text{I}}{17} & \frac{1496}{25} - \frac{272 \text{ I}}{25} & -\frac{2601}{5} - \frac{2907 \text{ I}}{5} & -520 + 520 \text{ I} & \frac{95}{4} + \frac{45 \text{ I}}{4} \\ & & \frac{85}{26} - \frac{425 \text{ I}}{26} & \frac{765}{2} - \frac{765 \text{ I}}{2} & \frac{2907}{5} + \frac{2601 \text{ I}}{5} & -\frac{750}{29} + \frac{280 \text{ I}}{29} \\ & & & \frac{425}{26} - \frac{85 \text{ I}}{26} & \frac{272}{25} - \frac{1496 \text{ I}}{25} & \frac{1}{3} - \frac{13 \text{ I}}{3} \\ & & & & -\frac{1}{17} + \frac{33 \text{ I}}{68} & \frac{35}{328} - \frac{13 \text{ I}}{328} \\ & & & & & \frac{16}{29725} - \frac{43 \text{ I}}{118900} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{1}{157661400 \, \Delta \mathfrak{x}_{ol}} \, \big( (57018 - 84864 \, \mathrm{I}) \, u_{ol-5} + (6248775 - 16823625 \, \mathrm{I}) \, u_{ol-4} + (683199400 - 52553800 \, \mathrm{I}) \, u_{ol-3} + (-1522248000 + 4077450000 \, \mathrm{I}) \, u_{ol-2} - (1773690750 + 3744458250 \, \mathrm{I}) \, u_{ol-1} + (742910980 - 742910980 \, \mathrm{I}) \, u_{ol} + (-76512150 + 9274200 \, \mathrm{I}) \, u_{ol-4-1} + (9434458176 - 1715356032 \, \mathrm{I}) \, u_{ol-3-1} - (82015460280 + 91664337960 \, \mathrm{I}) \, u_{ol-2-1} + (-81983928000 + 81983928000 \, \mathrm{I}) \, u_{ol-1-1} + (3744458250 + 1773690750 \, \mathrm{I}) \, u_{ol-1} + (515431500 - 2577157500 \, \mathrm{I}) \, u_{ol-3-21} + (60305485500 - 60305485500 \, \mathrm{I}) \, u_{ol-2-21} + (91664337960 + 82015460280 \, \mathrm{I}) \, u_{ol-1-21} + (-4077450000 + 1522248000 \, \mathrm{I}) \, u_{ol-21} + (2577157500 - 515431500 \, \mathrm{I}) \, u_{ol-2-31} + (1715356032 - 9434458176 \, \mathrm{I}) \, u_{ol-1-31} + (52553800 - 683199400 \, \mathrm{I}) \, u_{ol-31} + (-9274200 + 76512150 \, \mathrm{I}) \, u_{ol-1-41} + (16823625 - 6248775 \, \mathrm{I}) \, u_{ol-41} + (84864 - 57018 \, \mathrm{I}) \, u_{ol-51} \big), \, O(\, \Delta \mathfrak{x}_{ol}^{\, 20} \, )$$

Formula:, 558, Var:, 1

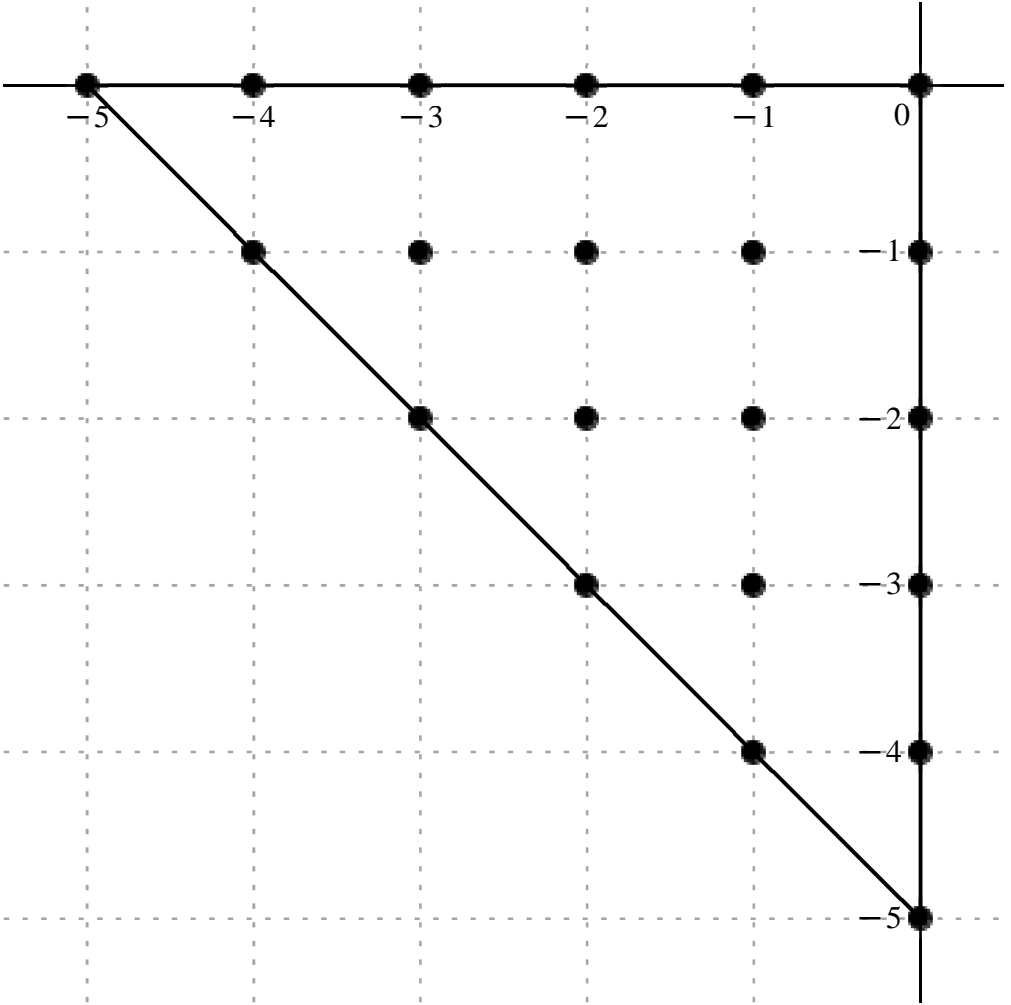
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 19, Error:, 2.8145429571382469046 × 10−47, New Error:, 2.8889091506349137176 × 10−66

Error order:, 19, Error:, 2.8889091506349137176 × 10−66, New Error:, 2.8963960871659098496 × 10−85

*Error order:*, 19,    *Error:*,  $2.8963960871659098496 \times 10^{-85}$ ,    *New Error:*,  $2.8971452825569775999 \times 10^{-104}$   
*Error order:*, 19,    *Error:*,  $2.8971452825569775999 \times 10^{-104}$ ,    *New Error:*,  $2.8972202071119954873 \times 10^{-123}$   
*Error order:*, 19,    *Error:*,  $2.8972202071119954873 \times 10^{-123}$ ,    *New Error:*,  $2.8972276996176549151 \times 10^{-142}$

$$c =, \left[ \begin{array}{c} x_o + h., \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4 - \text{I} & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -3 - 2 \text{ I} & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -2 - 3 \text{ I} & -1 - 3 \text{ I} & -3 \text{ I} \\ & & & & -1 - 4 \text{ I} & -4 \text{ I} \\ & & & & & -5 \text{ I} \end{array} \right] \\ \\ -\frac{237693}{131384500} - \frac{3257923 \text{ I}}{394153500} & -\frac{1417699}{2174640} - \frac{961037 \text{ I}}{724880} & \frac{346162}{9945} - \frac{435164 \text{ I}}{9945} & \frac{3122294}{19227} + \frac{5938396 \text{ I}}{19227} & -\frac{407539}{1326} - \frac{46610 \text{ I}}{663} & -\frac{17162987 \text{ I}}{397800} \\ & -\frac{50357}{13260} + \frac{66871 \text{ I}}{13260} & \frac{694976}{1625} - \frac{242992 \text{ I}}{375} & -\frac{3163194}{325} - \frac{103908 \text{ I}}{325} & \frac{446816 \text{ I}}{51} & \frac{407539}{1326} - \frac{46610 \text{ I}}{663} \\ & & -\frac{4669}{39} - \frac{2292 \text{ I}}{13} & -\frac{177501 \text{ I}}{26} & \frac{3163194}{325} - \frac{103908 \text{ I}}{325} & -\frac{3122294}{19227} + \frac{5938396 \text{ I}}{19227} \\ & & & \frac{4669}{39} - \frac{2292 \text{ I}}{13} & -\frac{694976}{1625} - \frac{242992 \text{ I}}{375} & -\frac{346162}{9945} - \frac{435164 \text{ I}}{9945} \\ & & & & \frac{50357}{13260} + \frac{66871 \text{ I}}{13260} & \frac{1417699}{2174640} - \frac{961037 \text{ I}}{724880} \\ & & & & & \frac{237693}{131384500} - \frac{3257923 \text{ I}}{394153500} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_o{}^2} \, u(x_o) = \frac{1}{4729842000 \, \Delta x_o{}^2} \Big( \begin{array}{l} -(8556948 + 39095076 \, \text{I}) \, u_{oI-5} - (3083495325 + 6270766425 \, \text{I}) \, u_{oI-4} + (164634647200 - 206963998400 \, \text{I}) \, u_{oI-3} + (768084324000 + 1460845416000 \, \text{I}) \, u_{oI-2} \\ - (1453691613000 + 332515740000 \, \text{I}) \, u_{oI-1} - 204067915430 \, \text{I} \, u_{oI} + (-17962341900 + 23852885700 \, \text{I}) \, u_{oI-4-1} + (2022847183872 \\ - 3064836712704 \, \text{I}) \, u_{oI-3-1} - (46035101031840 + 1512210530880 \, \text{I}) \, u_{oI-2-1} + 41438609472000 \, \text{I} \, u_{oI-1-1} + (1453691613000 - 332515740000 \, \text{I}) \, u_{oI-1} \\ - (566246982000 + 833907528000 \, \text{I}) \, u_{oI-3-21} - 32290449417000 \, \text{I} \, u_{oI-2-21} + (46035101031840 - 1512210530880 \, \text{I}) \, u_{oI-1-21} + (-768084324000 + 1460845416000 \, \text{I}) \, u_{oI-21} \\ + (566246982000 - 833907528000 \, \text{I}) \, u_{oI-2-31} - (2022847183872 + 3064836712704 \, \text{I}) \, u_{oI-1-31} - (164634647200 + 206963998400 \, \text{I}) \, u_{oI-31} + (17962341900 + 23852885700 \, \text{I}) \, u_{oI-1-41} \\ + (3083495325 - 6270766425 \, \text{I}) \, u_{oI-41} + (8556948 - 39095076 \, \text{I}) \, u_{oI-51} \Big), \, O(\, \Delta x_o{}^{19} \,)
\end{array}$$

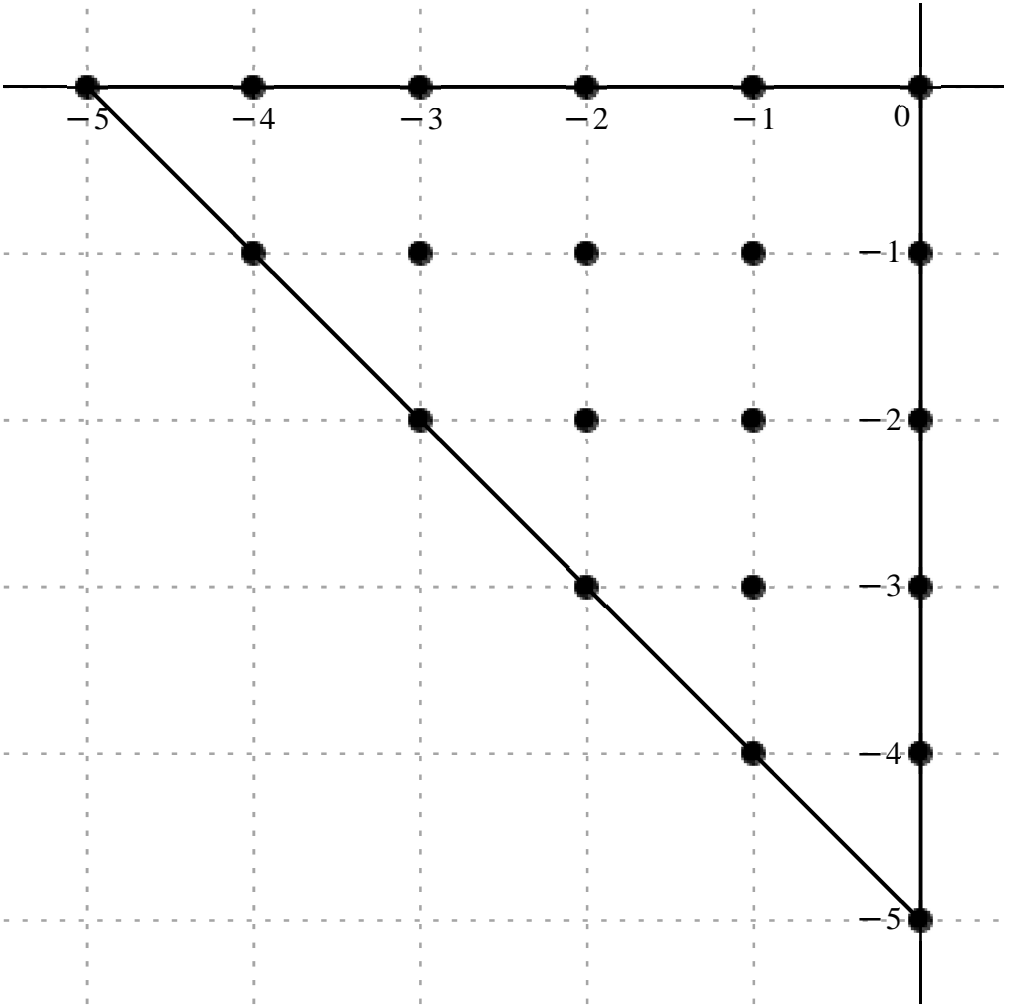
Formula.: 559, Var.: 1  
Variavel .:  $x_{oi}$ , Derivada de Ordem .: 3

Error order.: 18, Error.:  $2.9525682246734088497 \times 10^{-44}$ , New Error.:  $2.9896559308466812256 \times 10^{-62}$   
Error order.: 18, Error.:  $2.9896559308466812256 \times 10^{-62}$ , New Error.:  $2.9933489084916148223 \times 10^{-80}$   
Error order.: 18, Error.:  $2.9933489084916148223 \times 10^{-80}$ , New Error.:  $2.9937180430826705982 \times 10^{-98}$   
Error order.: 18, Error.:  $2.9937180430826705982 \times 10^{-98}$ , New Error.:  $2.9937549549047625249 \times 10^{-116}$   
Error order.: 18, Error.:  $2.9937549549047625249 \times 10^{-116}$ , New Error.:  $2.9937586460705962982 \times 10^{-134}$

$$x_o + h . , \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4 - I & -3 - I & -2 - I & -1 - I & -I \\ & & -3 - 2 I & -2 - 2 I & -1 - 2 I & -2 I \\ & & & -2 - 3 I & -1 - 3 I & -3 I \\ & & & & -1 - 4 I & -4 I \\ & & & & & -5 I \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} -\frac{3296699}{48067500} & -\frac{1237933 I}{29580000} & -\frac{706633}{53040} & -\frac{2193563 I}{530400} & -\frac{10336489}{132600} & -\frac{22856919 I}{44200} & \frac{79570347}{25636} + \frac{75602939 I}{96135} & -\frac{228287393}{106080} + \frac{58946561 I}{35360} & -\frac{503358637}{2652000} & -\frac{503358637 I}{2652000} \\ & & \frac{1247041}{132600} + \frac{10357601 I}{176800} & -\frac{38969806}{24375} - \frac{171450433 I}{24375} & -\frac{164792631}{2600} + \frac{160876653 I}{2600} & \frac{13811867}{255} + \frac{13811867 I}{255} & \frac{58946561}{35360} - \frac{228287393 I}{106080} \\ & & & -\frac{1217735}{624} - \frac{85523 I}{240} & -\frac{46163931}{1040} - \frac{46163931 I}{1040} & \frac{160876653}{2600} - \frac{164792631 I}{2600} & \frac{75602939}{96135} + \frac{79570347 I}{25636} \\ & & & & -\frac{85523}{240} - \frac{1217735 I}{624} & -\frac{171450433}{24375} - \frac{38969806 I}{24375} & -\frac{22856919}{44200} - \frac{10336489 I}{132600} \\ & & & & & \frac{10357601}{176800} + \frac{1247041 I}{132600} & -\frac{2193563}{530400} - \frac{706633 I}{53040} \\ & & & & & & -\frac{1237933}{29580000} - \frac{3296699 I}{48067500} \end{array} \right]$$





$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{384540000 \, \Delta x_{ol}^3} \Big( -(26373592 + 16093129 \, \mathrm{I}) \, u_{ol-5} - (5123089250 + 1590333175 \, \mathrm{I}) \, u_{ol-4} - (29975818100 + 198855195300 \, \mathrm{I}) \, u_{ol-3} + (1193555205000 + 302411756000 \, \mathrm{I}) \, u_{ol-2} + (-827541799625 + 641043850875 \, \mathrm{I}) \, u_{ol-1} - (72987002365 + 72987002365 \, \mathrm{I}) \, u_{ol} + (3616418900 + 22527782175 \, \mathrm{I}) \, u_{ol+1} - (614787659456 + 2704802031008 \, \mathrm{I}) \, u_{ol+3+1} + (-24372830124900 + 23793656978700 \, \mathrm{I}) \, u_{ol+2+1} + (20828295436000 + 20828295436000 \, \mathrm{I}) \, u_{ol+1+1} + (641043850875 - 827541799625 \, \mathrm{I}) \, u_{ol+1} - (750429193750 + 137029226750 \, \mathrm{I}) \, u_{ol+3+21} - (17069113487250 + 17069113487250 \, \mathrm{I}) \, u_{ol+2+21} + (23793656978700 - 24372830124900 \, \mathrm{I}) \, u_{ol+1+21} + (302411756000 + 1193555205000 \, \mathrm{I}) \, u_{ol+21} - (137029226750 + 750429193750 \, \mathrm{I}) \, u_{ol+2+31} - (2704802031008 + 614787659456 \, \mathrm{I}) \, u_{ol+1+31} - (198855195300 + 29975818100 \, \mathrm{I}) \, u_{ol+31} + (22527782175 + 3616418900 \, \mathrm{I}) \, u_{ol+1+41} - (1590333175 + 5123089250 \, \mathrm{I}) \, u_{ol+41} - (16093129 + 26373592 \, \mathrm{I}) \, u_{ol+51} \Big), \, O(\, \Delta x_{ol}^{18} \, )$$

Formula:, 560, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

Error order:., 17, Error:.,  $1.8742625670336778901 \times 10^{-41}$ , New Error:.,  $1.9234439223694564797 \times 10^{-58}$

Error order:., 17, Error:.,  $1.9234439223694564797 \times 10^{-58}$ , New Error:.,  $1.9283951222433423151 \times 10^{-75}$

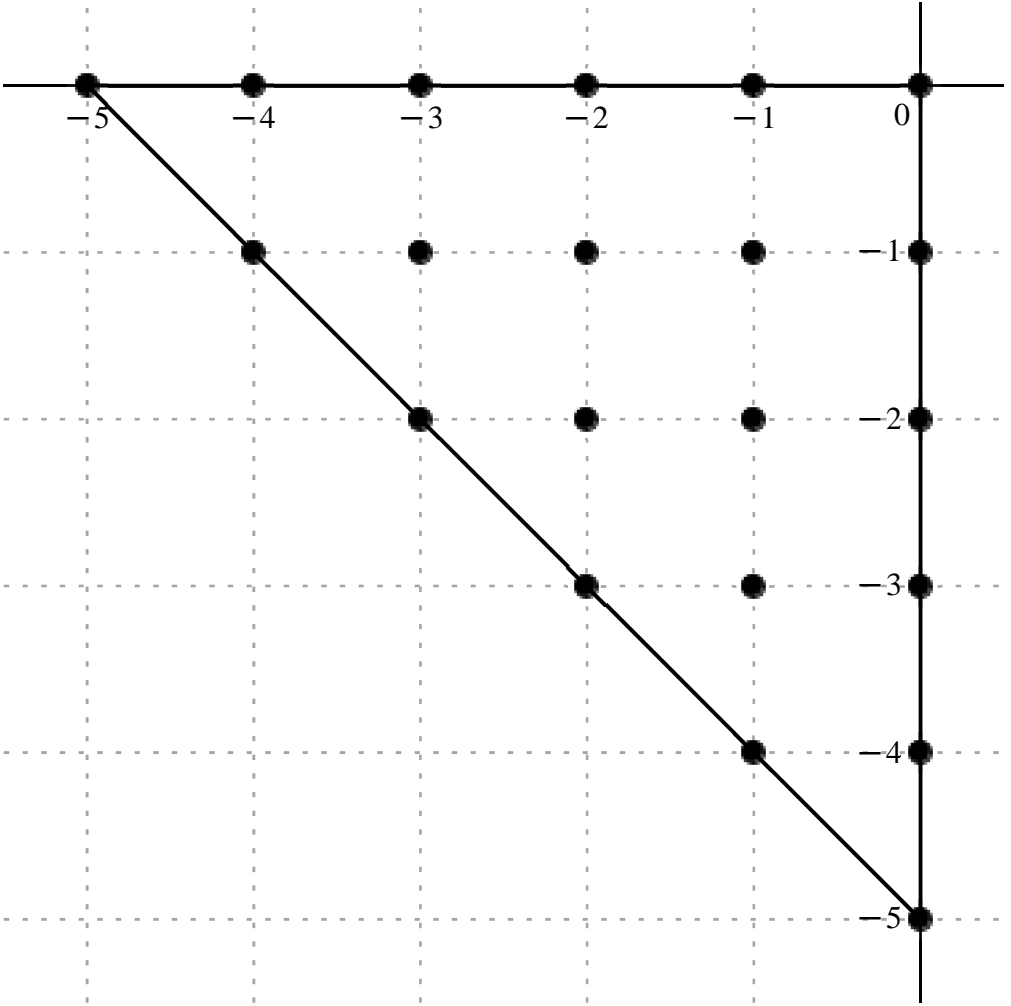
Error order:., 17, Error:.,  $1.9283951222433423151 \times 10^{-75}$ , New Error:.,  $1.9288905719374439762 \times 10^{-92}$

Error order:., 17, Error:.,  $1.9288905719374439762 \times 10^{-92}$ , New Error:.,  $1.9289401202029620348 \times 10^{-109}$

Error order:., 17, Error:.,  $1.9289401202029620348 \times 10^{-109}$ , New Error:.,  $1.9289450750624739581 \times 10^{-126}$

$$x_o + h., \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-1 & -3-1 & -2-1 & -1-1 & -1 \\ & & -3-2 \, \mathrm{I} & -2-2 \, \mathrm{I} & -1-2 \, \mathrm{I} & -2 \, \mathrm{I} \\ & & & -2-3 \, \mathrm{I} & -1-3 \, \mathrm{I} & -3 \, \mathrm{I} \\ & & & & -1-4 \, \mathrm{I} & -4 \, \mathrm{I} \\ & & & & & -5 \, \mathrm{I} \end{array} \right]$$

$$c = \left[ \begin{array}{cccccccccccc} -\frac{16511368357}{26276900000} + \frac{13209804533 \text{ I}}{78830700000} & -\frac{5316004819}{54366000} + \frac{2993312711 \text{ I}}{54366000} & -\frac{1140048523}{331500} - \frac{194537021 \text{ I}}{82875} & \frac{39910387561}{1922700} - \frac{26681973499 \text{ I}}{1922700} & -\frac{15594617}{17680} + \frac{659828011 \text{ I}}{33150} & -\frac{5275233997}{3315000} & & & & & & \\ & \frac{1035515317}{2652000} + \frac{718314089 \text{ I}}{2652000} & -\frac{458995583}{9375} - \frac{3579464747 \text{ I}}{121875} & \frac{177010179}{32500} + \frac{5578976757 \text{ I}}{8125} & \frac{730479934}{1275} & -\frac{15594617}{17680} - \frac{659828011 \text{ I}}{33150} & & & & & & \\ & & -\frac{100398437}{7800} + \frac{2943262 \text{ I}}{325} & -\frac{159907032}{325} & \frac{177010179}{32500} - \frac{5578976757 \text{ I}}{8125} & \frac{39910387561}{1922700} + \frac{26681973499 \text{ I}}{1922700} & & & & & & \\ & & & -\frac{100398437}{7800} - \frac{2943262 \text{ I}}{325} & -\frac{458995583}{9375} + \frac{3579464747 \text{ I}}{121875} & -\frac{1140048523}{331500} + \frac{194537021 \text{ I}}{82875} & & & & & & \\ & & & & \frac{1035515317}{2652000} - \frac{718314089 \text{ I}}{2652000} & -\frac{5316004819}{54366000} - \frac{2993312711 \text{ I}}{54366000} & & & & & & \\ & & & & & -\frac{16511368357}{26276900000} - \frac{13209804533 \text{ I}}{78830700000} & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{78830700000 \, \mathcal{A}x_{ol}^4} \, ( (-49534105071 + 13209804533 \, \text{I}) \, u_{ol-5} + (-7708206987550 + 4340303430950 \, \text{I}) \, u_{ol-4} - (271103538769400 + 185043614375200 \, \text{I}) \, u_{ol-3} + (1636325890001000 - 1093960913459000 \, \text{I}) \, u_{ol-2} + (-69532498548750 + 1569071010158000 \, \text{I}) \, u_{ol-1} - 125445064448660 \, u_{ol} + (30780692797825$$

$$+ 21351886295525 \, \text{I}) \, u_{ol-4-1} - (3859513931178464 + 2315255069795552 \, \text{I}) \, u_{ol-3-1} + (429348809775240 + 54128571450835680 \, \text{I}) \, u_{ol-2-1} + 45164113359352000 \, u_{ol-1-1} - (69532498548750 + 1569071010158000 \, \text{I}) \, u_{ol-1} + (-1014676803540500 + 713905857672000 \, \text{I}) \, u_{ol-3-21} - 38786410053792000 \, u_{ol-2-21}$$

$$+ (429348809775240 - 54128571450835680 \, \text{I}) \, u_{ol-1-21} + (1636325890001000 + 1093960913459000 \, \text{I}) \, u_{ol-21} - (1014676803540500 + 713905857672000 \, \text{I}) \, u_{ol-2-31} + (-3859513931178464 + 2315255069795552 \, \text{I}) \, u_{ol-1-31} + (-271103538769400 + 185043614375200 \, \text{I}) \, u_{ol-31} + (30780692797825 - 21351886295525 \, \text{I}) \, u_{ol-1-41}$$

$$- (7708206987550 + 4340303430950 \, \text{I}) \, u_{ol-41} - (49534105071 + 13209804533 \, \text{I}) \, u_{ol-51} ), \, O( \, \mathcal{A}x_{ol}^{17} \, )$$

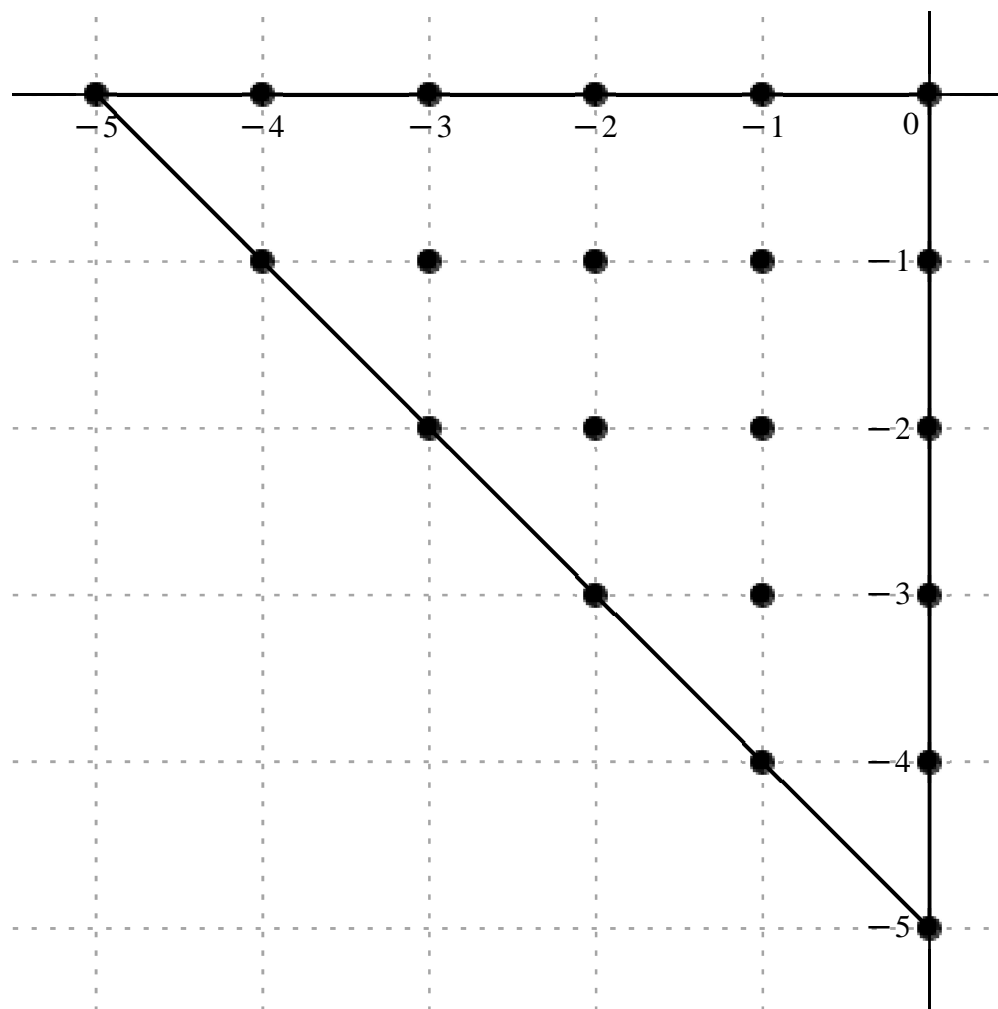
Formula: 561, Var: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order: , 16, Error: 1.5001637003132590848 × 10<sup>-38</sup>, New Error: 1.5188648258136389834 × 10<sup>-54</sup>

*Error order:*, 16, *Error:*,  $1.5188648258136389834 \times 10^{-54}$ , *New Error:*,  $1.5207270279869998894 \times 10^{-70}$   
*Error order:*, 16, *Error:*,  $1.5207270279869998894 \times 10^{-70}$ , *New Error:*,  $1.5209131664918906828 \times 10^{-86}$   
*Error order:*, 16, *Error:*,  $1.5209131664918906828 \times 10^{-86}$ , *New Error:*,  $1.5209317795226290524 \times 10^{-102}$   
*Error order:*, 16, *Error:*,  $1.5209317795226290524 \times 10^{-102}$ , *New Error:*,  $1.5209336408175027543 \times 10^{-118}$

$$c = \left[ \begin{array}{cccccc} -\frac{221626196}{98538375} + \frac{12976206851 \text{ I}}{3153228000} & -\frac{20999008933}{108732000} + \frac{8483331317 \text{ I}}{10873200} & -\frac{6353061859}{221000} + \frac{1450746093 \text{ I}}{221000} & \frac{31953722009}{1281800} - \frac{131575046411 \text{ I}}{769080} & \frac{16605432841}{176800} + \frac{47443205063 \text{ I}}{530400} & -\frac{1116605209}{176800} + \frac{1116605209 \text{ I}}{176800} \\ & \frac{734219829}{221000} - \frac{34936149 \text{ I}}{52000} & -\frac{1891497109}{4875} + \frac{517447753 \text{ I}}{4875} & \frac{8947883163}{2600} + \frac{8471149203 \text{ I}}{2600} & \frac{1149678054}{425} - \frac{1149678054 \text{ I}}{425} & -\frac{47443205063}{530400} - \frac{16605432841 \text{ I}}{176800} \\ & & -\frac{282772819}{15600} + \frac{342293117 \text{ I}}{3120} & -\frac{12627561351}{5200} + \frac{12627561351 \text{ I}}{5200} & -\frac{8471149203}{2600} - \frac{8947883163 \text{ I}}{2600} & \frac{131575046411}{769080} - \frac{31953722009 \text{ I}}{1281800} \\ & & & -\frac{342293117}{3120} + \frac{282772819 \text{ I}}{15600} & -\frac{517447753}{4875} + \frac{1891497109 \text{ I}}{4875} & -\frac{1450746093}{221000} + \frac{6353061859 \text{ I}}{221000} \\ & & & & \frac{34936149}{52000} - \frac{734219829 \text{ I}}{221000} & -\frac{8483331317}{10873200} + \frac{20999008933 \text{ I}}{108732000} \\ & & & & & -\frac{12976206851}{3153228000} + \frac{221626196 \text{ I}}{98538375} \end{array} \right]$$



$$\frac{d^5}{dx_{o1}^5} u(x_{o1}) = \frac{1}{3153228000 \Delta x_{o1}^5} \left( (-7092038272 + 12976206851 \text{ I}) u_{o1-5} + (-608971259057 + 2460166081930 \text{ I}) u_{o1-4} + (-90645486604212 + 20699245254924 \text{ I}) u_{o1-3} + (78606156142140 - 539457690285100 \text{ I}) u_{o1-2} + (296157894719235 + 282049854099535 \text{ I}) u_{o1-1} + (-19914653902515 + 19914653902515 \text{ I}) u_{o1} + (10475848520172 - 2118493139211 \text{ I}) u_{o1-4-1} + (-1223450594054944 + 334693485804448 \text{ I}) u_{o1-3-1} + (10851813742423140 + 10273640330414340 \text{ I}) u_{o1-2-1} + (8529875366725440 - 8529875366725440 \text{ I}) u_{o1-1-1} + (-282049854099535 + 296157894719235 \text{ I}) u_{o1-1} + (-57156869904470 + 345938538696050 \text{ I}) u_{o1-3-21} + (-7657226927632890 + 7657226927632890 \text{ I}) u_{o1-2-21} - (10273640330414340 + 10851813742423140 \text{ I}) u_{o1-1-21} + (539457690285100 - 78606156142140 \text{ I}) u_{o1-21} + (-345938538696050 + 57156869904470 \text{ I}) u_{o1-2-31} + (-334693485804448 + 1223450594054944 \text{ I}) u_{o1-1-31} + (-20699245254924 \right.$$

$$+ 90645486604212 \, \text{I} \, u_{ol-31} + (2118493139211 - 10475848520172 \, \text{I}) \, u_{ol-1-41} + (-2460166081930 + 608971259057 \, \text{I}) \, u_{ol-41} + (-12976206851 + 7092038272 \, \text{I}) \, u_{ol-51}), \, O(\, \Delta x_{ol}^{16} \, )$$

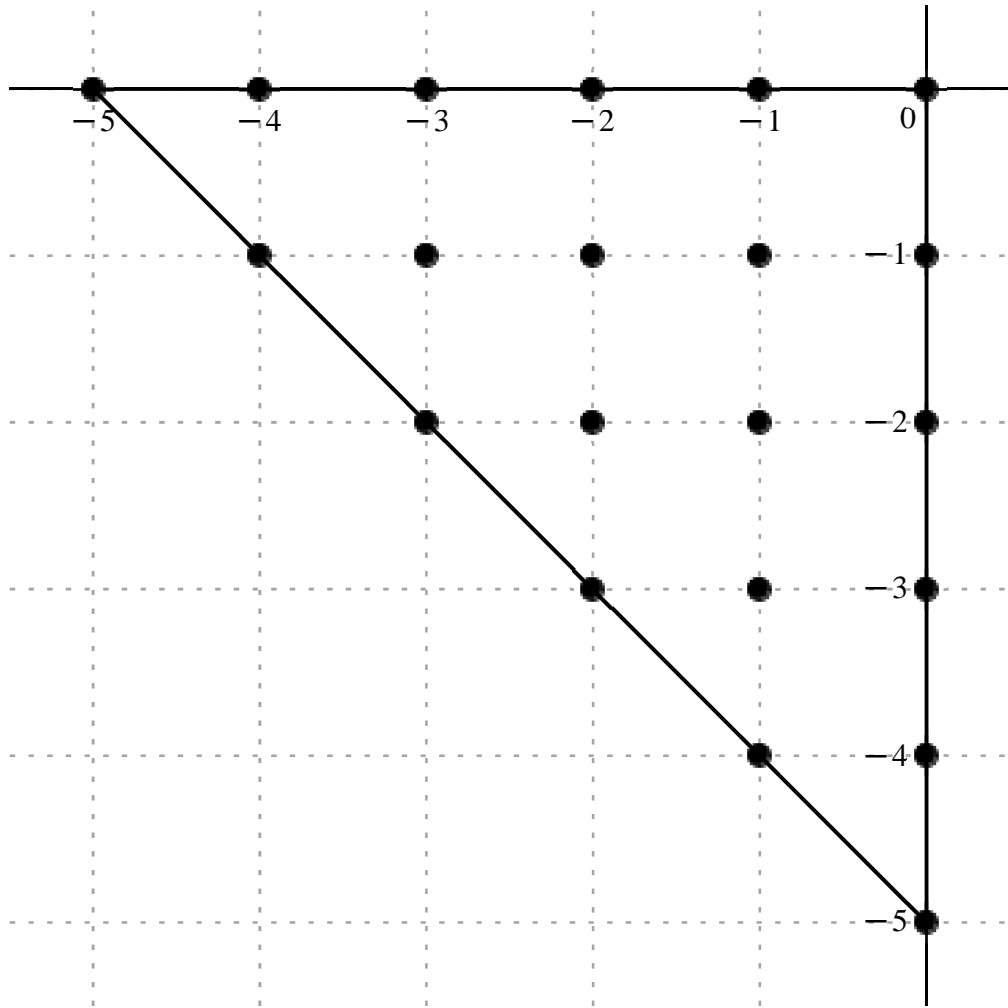
Formula:, 562, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order:, 15, Error:,  $7.7331184999109262092 \times 10^{-36}$ , New Error:,  $7.9343097505856119565 \times 10^{-51}$   
Error order:, 15, Error:,  $7.9343097505856119565 \times 10^{-51}$ , New Error:,  $7.9545630800713205594 \times 10^{-66}$   
Error order:, 15, Error:,  $7.9545630800713205594 \times 10^{-66}$ , New Error:,  $7.9565897512890460184 \times 10^{-81}$   
Error order:, 15, Error:,  $7.9565897512890460184 \times 10^{-81}$ , New Error:,  $7.9567924317896448583 \times 10^{-96}$   
Error order:, 15, Error:,  $7.9567924317896448583 \times 10^{-96}$ , New Error:,  $7.9568126999734891309 \times 10^{-111}$

$$x_o + h \, , \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4 - \text{I} & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -3 - 2 \, \text{I} & -2 - 2 \, \text{I} & -1 - 2 \, \text{I} & -2 \, \text{I} \\ & & & -2 - 3 \, \text{I} & -1 - 3 \, \text{I} & -3 \, \text{I} \\ & & & & -1 - 4 \, \text{I} & -4 \, \text{I} \\ & & & & & -5 \, \text{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} \frac{19742856251}{2102152000} + \frac{61305088937 \, \text{I}}{2102152000} & \frac{102619434209}{36244000} + \frac{31714456207 \, \text{I}}{7248800} & -\frac{2599004069}{27625} + \frac{36179690129 \, \text{I}}{221000} & -\frac{220766959593}{320450} - \frac{21345596317 \, \text{I}}{25636} & \frac{33713624211}{44200} - \frac{11141019451 \, \text{I}}{176800} & \frac{4172831639 \, \text{I}}{88400} & & & & & & \\ & \frac{20698825479}{1768000} - \frac{32703849507 \, \text{I}}{1768000} & -\frac{3966850699}{3250} + \frac{7331984483 \, \text{I}}{3250} & \frac{1922343192}{65} - \frac{3563630163 \, \text{I}}{2600} & -\frac{9851009811 \, \text{I}}{425} & -\frac{33713624211}{44200} - \frac{11141019451 \, \text{I}}{176800} & & & & & & \\ & & \frac{545171747}{1300} + \frac{2988257663 \, \text{I}}{5200} & \frac{56429509581 \, \text{I}}{2600} & -\frac{1922343192}{65} - \frac{3563630163 \, \text{I}}{2600} & \frac{220766959593}{320450} - \frac{21345596317 \, \text{I}}{25636} & & & & & & \\ & & & -\frac{545171747}{1300} + \frac{2988257663 \, \text{I}}{5200} & \frac{3966850699}{3250} + \frac{7331984483 \, \text{I}}{3250} & \frac{2599004069}{27625} + \frac{36179690129 \, \text{I}}{221000} & & & & & & \\ & & & & -\frac{20698825479}{1768000} - \frac{32703849507 \, \text{I}}{1768000} & -\frac{102619434209}{36244000} + \frac{31714456207 \, \text{I}}{7248800} & & & & & & \\ & & & & & -\frac{19742856251}{2102152000} + \frac{61305088937 \, \text{I}}{2102152000} & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}{}^6} \, u\big(x_{ol}\big) = \frac{1}{2102152000 \, \Delta x_{ol}{}^6} \Big( (19742856251 + 61305088937 \, \mathrm{I}) \, u_{ol-5} + (5951927184122 + 9197192300030 \, \mathrm{I}) \, u_{ol-4} + (-197773813634624 + 344141212507048 \, \mathrm{I}) \, u_{ol-3} - (1448231254930080 + 1750338897994000 \, \mathrm{I}) \, u_{ol-2} + (1603419967475160 - 132466721272390 \, \mathrm{I}) \, u_{ol-1} + 99229936375420 \, \mathrm{I} u_{ol} + (24610903494531 - 38884877063823 \, \mathrm{I}) \, u_{ol-4-1} + (-2565822501724384 + 4742444875356128 \, \mathrm{I}) \, u_{ol-3-1} + (62170116703833600 - 2881266259388760 \, \mathrm{I}) \, u_{ol-2-1} - 48725458767560640 \, \mathrm{I} u_{ol-1-1} - (1603419967475160 + 132466721272390 \, \mathrm{I}) \, u_{ol-1} + (881564521768880 + 1208033042844380 \, \mathrm{I}) \, u_{ol-3-21} + 45624387086430120 \, \mathrm{I} u_{ol-2-21} - (62170116703833600 + 2881266259388760 \, \mathrm{I}) \, u_{ol-1-21} + (1448231254930080 - 1750338897994000 \, \mathrm{I}) \, u_{ol-21} + (-881564521768880 + 1208033042844380 \, \mathrm{I}) \, u_{ol-2-31} + (2565822501724384 + 4742444875356128 \, \mathrm{I}) \, u_{ol-1-31} + (197773813634624 + 344141212507048 \, \mathrm{I}) \, u_{ol-31} - (24610903494531 + 38884877063823 \, \mathrm{I}) \, u_{ol-1-41} + (-5951927184122 + 9197192300030 \, \mathrm{I}) \, u_{ol-41} + (-19742856251 + 61305088937 \, \mathrm{I}) \, u_{ol-51} \Big), \, \mathcal{O}(\, \Delta x_{ol}{}^{15} \, )$$

Formula:, 563, Var.:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 7

Error order:., 14, Error:., 5.1494240086613619214 × 10−33, New Error:., 5.2130005993449316894 × 10−47

Error order:., 14, Error:., 5.2130005993449316894 × 10−47, New Error:., 5.2193315904028685275 × 10−61

Error order:., 14, Error:., 5.2193315904028685275 × 10−61, New Error:., 5.2199644141074465769 × 10−75

Error order:., 14, Error:., 5.2199644141074465769 × 10−75, New Error:., 5.2200276937151128061 × 10−89

Error order:., 14, Error:., 5.2200276937151128061 × 10−89, New Error:., 5.2200340216482427280 × 10−103

$$x_o \, + h \, . \, , \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-1 & -3-1 & -2-1 & -1-1 & -1 \\ & & -3-2 \, \mathrm{I} & -2-2 \, \mathrm{I} & -1-2 \, \mathrm{I} & -2 \, \mathrm{I} \\ & & & -2-3 \, \mathrm{I} & -1-3 \, \mathrm{I} & -3 \, \mathrm{I} \\ & & & & -1-4 \, \mathrm{I} & -4 \, \mathrm{I} \\ & & & & & -5 \, \mathrm{I} \end{array} \right]$$

$$c = ,$$

$$\frac{346245716103}{2102152000} + \frac{41344335039 \text{ I}}{525538000} - \frac{549172839789}{18122000} + \frac{1577264857 \text{ I}}{289952} - \frac{145712521031}{442000} + \frac{464040911313 \text{ I}}{442000} - \frac{604841970621}{98600} - \frac{5444548473 \text{ I}}{19720} - \frac{886970084119}{353600} - \frac{1158467693971 \text{ I}}{353600} - \frac{5843779151}{35360} + \frac{5843779151 \text{ I}}{35360}$$

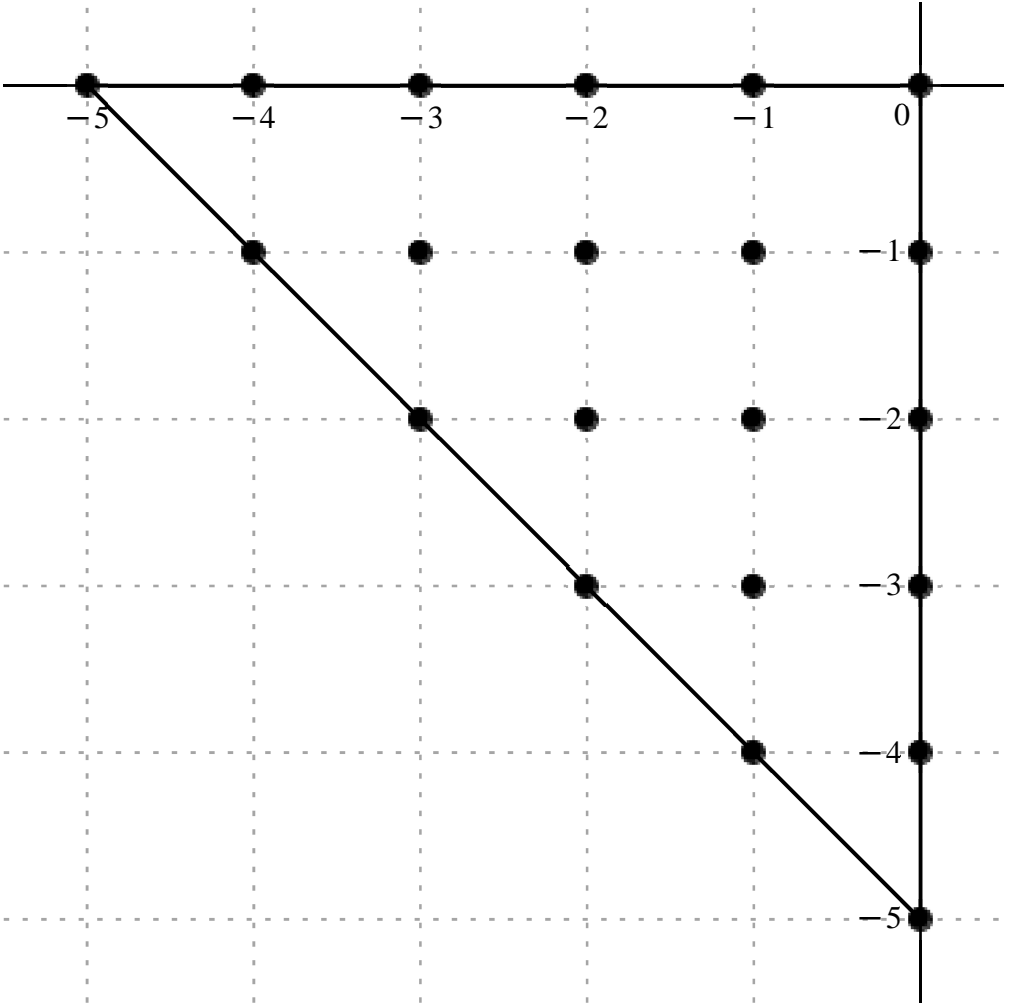
$$- \frac{3234728707}{104000} - \frac{3454982517 \text{ I}}{27625} - \frac{14881925919}{3250} + \frac{46087644337 \text{ I}}{3250} - \frac{23133967353}{208} - \frac{658561770657 \text{ I}}{5200} - \frac{38546019344}{425} - \frac{38546019344 \text{ I}}{425} - \frac{1158467693971}{353600} + \frac{886970084119 \text{ I}}{353600}$$

$$- \frac{656787537}{160} + \frac{6277040091 \text{ I}}{10400} - \frac{459717699609}{5200} + \frac{459717699609 \text{ I}}{5200} - \frac{658561770657}{5200} + \frac{23133967353 \text{ I}}{208} - \frac{5444548473}{19720} - \frac{604841970621 \text{ I}}{98600}$$

$$- \frac{6277040091}{10400} + \frac{656787537 \text{ I}}{160} - \frac{46087644337}{3250} + \frac{14881925919 \text{ I}}{3250} - \frac{464040911313}{442000} + \frac{145712521031 \text{ I}}{442000}$$

$$- \frac{3454982517}{27625} - \frac{3234728707 \text{ I}}{104000} - \frac{1577264857}{289952} + \frac{549172839789 \text{ I}}{18122000}$$

$$+ \frac{41344335039}{525538000} + \frac{346245716103 \text{ I}}{2102152000}$$



$$\frac{\text{d}^7}{\text{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{2102152000 \, \Delta x_{ol}^7} \big( 7 \, \big( (49463673729 + 23625334308 \, \text{I}) \, u_{ol-5} + (9100578487932 + 1633595744750 \, \text{I}) \, u_{ol-4} + (99001250003348 + 315282653457804 \, \text{I}) \, u_{ol-3} - (1842175830519960 + 82912695317400 \, \text{I}) \, u_{ol-2} + (753291021441065 - 983870062951085 \, \text{I}) \, u_{ol-1} + (49630381503850 + 49630381503850 \, \text{I}) \, u_{ol}$$

$$- (9340510193513 + 37558621373376 \, \text{I}) \, u_{ol-4-1} + (1375123970746272 + 4258603679925856 \, \text{I}) \, u_{ol-3-1} + (33400491579013500 - 38032883057971260 \, \text{I}) \, u_{ol-2-1} - (27236837531438080 + 27236837531438080 \, \text{I}) \, u_{ol-1-1} + ( -983870062951085 + 753291021441065 \, \text{I}) \, u_{ol-1} + (1232738602213950 + 181254016227690 \, \text{I}) \, u_{ol-3-21}$$

$$+ (26549353891990620 + 26549353891990620 \, \text{I}) \, u_{ol-2-21} + ( -38032883057971260 + 33400491579013500 \, \text{I}) \, u_{ol-1-21} - (82912695317400 + 1842175830519960 \, \text{I}) \, u_{ol-21} + (181254016227690 + 1232738602213950 \, \text{I}) \, u_{ol-2-31} + (4258603679925856 + 1375123970746272 \, \text{I}) \, u_{ol-1-31} + (315282653457804$$

$$+ 99001250003348 \, \text{I}) \, u_{ol-31} - (37558621373376 + 9340510193513 \, \text{I}) \, u_{ol-1-41} + (1633595744750 + 9100578487932 \, \text{I}) \, u_{ol-41} + (23625334308 + 49463673729 \, \text{I}) \, u_{ol-51} \big) \big) , \, O( \, \Delta x_{ol}^{14} \, )$$

Formula: 564, Var.: 1

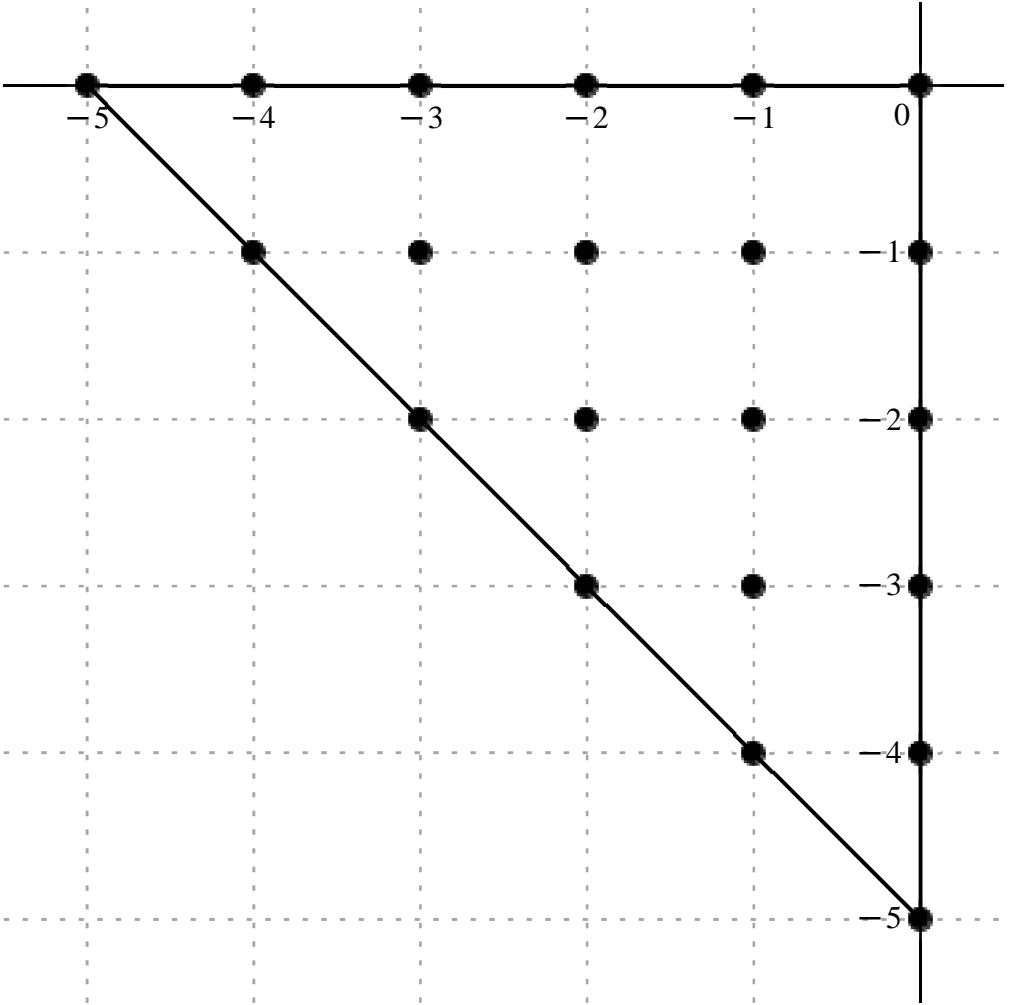
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:., 13, Error:., 2.2305219326936000989 × 10−30, New Error:., 2.2879151373853051425 × 10−43

*Error order:*, 13,    *Error:*,  $2.2879151373853051425 \times 10^{-43}$ ,    *New Error:*,  $2.2936923629700475084 \times 10^{-56}$   
*Error order:*, 13,    *Error:*,  $2.2936923629700475084 \times 10^{-56}$ ,    *New Error:*,  $2.2942704635228779279 \times 10^{-69}$   
*Error order:*, 13,    *Error:*,  $2.2942704635228779279 \times 10^{-69}$ ,    *New Error:*,  $2.2943282773570226969 \times 10^{-82}$   
*Error order:*, 13,    *Error:*,  $2.2943282773570226969 \times 10^{-82}$ ,    *New Error:*,  $2.2943340587782247067 \times 10^{-95}$

$$x_o+h., \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-I & -3-I & -2-I & -1-I & -I \\ & & -3-2\,I & -2-2\,I & -1-2\,I & -2\,I \\ & & & -2-3\,I & -1-3\,I & -3\,I \\ & & & & -1-4\,I & -4\,I \\ & & & & & -5\,I \end{array} \right]$$

$$c=,\left[ \begin{array}{cccccccccccc} \frac{83928634951}{90610000}-\frac{32563844523\,I}{90610000} & \frac{92612377347}{697000}-\frac{36083947473\,I}{362440} & \frac{11242933723}{2125}+\frac{137508653779\,I}{55250} & -\frac{123875615444}{5525}+\frac{24897710873\,I}{1105} & -\frac{39124422561}{11050}-\frac{886855008879\,I}{44200} & \frac{119181167203}{110500} & & & & & & \\ & -\frac{266078520491}{442000}-\frac{151633506577\,I}{442000} & \frac{578224445442}{8125}+\frac{279178109406\,I}{8125} & -\frac{117583267599}{1625}-\frac{2837988387171\,I}{3250} & -\frac{276009760348}{425} & -\frac{39124422561}{11050}+\frac{886855008879\,I}{44200} & & & & & & \\ & & \frac{5724149739}{325}-\frac{17356746001\,I}{1300} & \frac{427566304683}{650} & -\frac{117583267599}{1625}+\frac{2837988387171\,I}{3250} & -\frac{123875615444}{5525}-\frac{24897710873\,I}{1105} & & & & & & \\ & & & \frac{5724149739}{325}+\frac{17356746001\,I}{1300} & \frac{578224445442}{8125}-\frac{279178109406\,I}{8125} & \frac{11242933723}{2125}-\frac{137508653779\,I}{55250} & & & & & & \\ & & & & -\frac{266078520491}{442000}+\frac{151633506577\,I}{442000} & \frac{92612377347}{697000}+\frac{36083947473\,I}{362440} & & & & & & \\ & & & & & \frac{83928634951}{90610000}+\frac{32563844523\,I}{90610000} & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_o^8}u(x_o)=\frac{1}{90610000\Delta x_o^8}\left(7\left((11989804993-4651977789\,I)u_{oI-5}+(1719944150730-1288712409750\,I)u_{oI-4}+(68485527706960+32216313171080\,I)u_{oI-3}+(-290222870468800+291658898798000\,I)u_{oI-2}-(45831466428600+259721824028850\,I)u_{oI-1}+13961222443780u_o-(7792299528665\right.$$

$$+4440695549755\,I)u_{oI-4-1}+(921194145081312+444770610870816\,I)u_{oI-3-1}-(936634714474320+11303302319189640\,I)u_{oI-2-1}-8406468700884800u_{oI-1-1}+(-45831466428600+259721824028850\,I)u_{oI-1}+(227984706747600-172823599467100\,I)u_{oI-3-21}+8514677553258600u_{oI-2-21}+(-936634714474320$$

$$+11303302319189640\,I)u_{oI-1-21}-(290222870468800+291658898798000\,I)u_{oI-21}+(227984706747600+172823599467100\,I)u_{oI-2-31}+(921194145081312-444770610870816\,I)u_{oI-1-31}+(68485527706960-32216313171080\,I)u_{oI-31}+(-7792299528665+4440695549755\,I)u_{oI-1-41}+(1719944150730$$

$+1288712409750 \text{ I}) u_{oI-41} + (11989804993 + 4651977789 \text{ I}) u_{oI-51} \Big) \Big) \cdot O( \Delta x_{oI}^{13} )$

Formula:, 565, Var:, 1

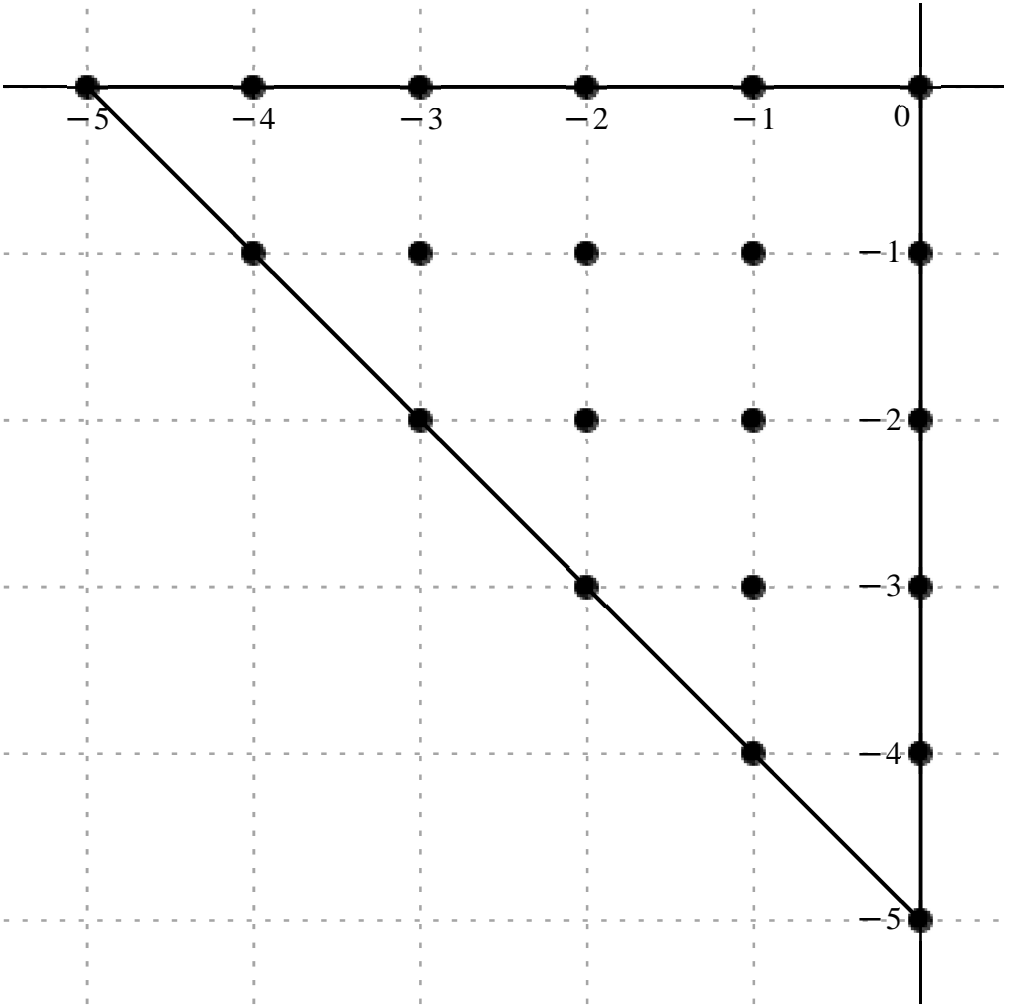
Variavel :,  $x_{oI}$ , Derivada de Ordem :, 9

Error order:, 12, Error:,  $1.2504273005613749834 \times 10^{-27}$ , New Error:,  $1.2656711622089089334 \times 10^{-39}$   
Error order:, 12, Error:,  $1.2656711622089089334 \times 10^{-39}$ , New Error:,  $1.2671892227831326399 \times 10^{-51}$   
Error order:, 12, Error:,  $1.2671892227831326399 \times 10^{-51}$ , New Error:,  $1.2673409635378584520 \times 10^{-63}$   
Error order:, 12, Error:,  $1.2673409635378584520 \times 10^{-63}$ , New Error:,  $1.2673561369582437245 \times 10^{-75}$   
Error order:, 12, Error:,  $1.2673561369582437245 \times 10^{-75}$ , New Error:,  $1.2673576542937293170 \times 10^{-87}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4 - \text{I} & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -3 - 2 \text{ I} & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -2 - 3 \text{ I} & -1 - 3 \text{ I} & -3 \text{ I} \\ & & & & -1 - 4 \text{ I} & -4 \text{ I} \\ & & & & & -5 \text{ I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} \frac{37258058439}{20213000} & - \frac{185074427349 \text{ I}}{40426000} & \frac{7472472147}{87125} & - \frac{14145759369 \text{ I}}{17425} & \frac{222628296933}{8500} & - \frac{90968878791 \text{ I}}{8500} & \frac{88380057528}{12325} & + \frac{368890578252 \text{ I}}{2465} & - \frac{525901239927}{6800} & - \frac{339737648607 \text{ I}}{6800} & \frac{1386315378}{425} & - \frac{1386315378 \text{ I}}{425} \\ & & - \frac{55324159191}{17000} & + \frac{1957578273 \text{ I}}{2000} & \frac{44724737232}{125} & - \frac{16792050744 \text{ I}}{125} & - \frac{321731326161}{100} & - \frac{263031483141 \text{ I}}{100} & - \frac{903217088088}{425} & + \frac{903217088088 \text{ I}}{425} & \frac{339737648607}{6800} & + \frac{525901239927 \text{ I}}{6800} \\ & & & & \frac{2728148031}{200} & - \frac{4262261157 \text{ I}}{40} & \frac{55822863474}{25} & - \frac{55822863474 \text{ I}}{25} & \frac{263031483141}{100} & + \frac{321731326161 \text{ I}}{100} & - \frac{368890578252}{2465} & - \frac{88380057528 \text{ I}}{12325} \\ & & & & & & \frac{4262261157}{40} & - \frac{2728148031 \text{ I}}{200} & \frac{16792050744}{125} & - \frac{44724737232 \text{ I}}{125} & \frac{90968878791}{8500} & - \frac{222628296933 \text{ I}}{8500} \\ & & & & & & & & - \frac{1957578273}{2000} & + \frac{55324159191 \text{ I}}{17000} & \frac{14145759369}{17425} & - \frac{7472472147 \text{ I}}{87125} \\ & & & & & & & & & & \frac{185074427349}{40426000} & - \frac{37258058439 \text{ I}}{20213000} \end{array} \right]$$





$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} u(x_{ol}) = \frac{1}{40426000 \mathcal{A}x_{ol}^9} \left( 63 \left( (1182795506 - 2937689323 \, \mathrm{I}) u_{ol-5} + (55035350416 - 520923202160 \, \mathrm{I}) u_{ol-4} + (16806669527196 - 6867428373492 \, \mathrm{I}) u_{ol-3} + (4601374423680 + 96028658465600 \, \mathrm{I}) u_{ol-2} - (49626712243905 + 32059370174105 \, \mathrm{I}) u_{ol-1} + (2093116170720 - 2093116170720 \, \mathrm{I}) u_{ol} + (-2088267469146 \right.$$
  
$$+ 628071898923 \, \mathrm{I}) u_{ol-4-1} + (229592663789312 - 86201326143104 \, \mathrm{I}) u_{ol-3-1} - (2064493744664220 + 1687827101183820 \, \mathrm{I}) u_{ol-2-1} + (-1363714435221120 + 1363714435221120 \, \mathrm{I}) u_{ol-1-1} + (32059370174105 + 49626712243905 \, \mathrm{I}) u_{ol-1} + (8753024785810 - 68375464100350 \, \mathrm{I}) u_{ol-3-21} + (1432822272253920$$
  
$$- 1432822272253920 \, \mathrm{I}) u_{ol-2-21} + (1687827101183820 + 2064493744664220 \, \mathrm{I}) u_{ol-1-21} - (96028658465600 + 4601374423680 \, \mathrm{I}) u_{ol-21} + (68375464100350 - 8753024785810 \, \mathrm{I}) u_{ol-2-31} + (86201326143104 - 229592663789312 \, \mathrm{I}) u_{ol-1-31} + (6867428373492 - 16806669527196 \, \mathrm{I}) u_{ol-31} + (-628071898923$$
  
$$+ 2088267469146 \, \mathrm{I}) u_{ol-1-41} + (520923202160 - 55035350416 \, \mathrm{I}) u_{ol-41} + (2937689323 - 1182795506 \, \mathrm{I}) u_{ol-51} \Big) \Big), \mathcal{O}(\mathcal{A}x_{ol}^{12})$$

Formula:, 566, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

Error order:., 11, Error:., 4.5498811283802475177 × 10<sup>-25</sup>, New Error:., 4.6652359658308181072 × 10<sup>-36</sup>

Error order:., 11, Error:., 4.6652359658308181072 × 10<sup>-36</sup>, New Error:., 4.6768466510362097165 × 10<sup>-47</sup>

Error order:., 11, Error:., 4.6768466510362097165 × 10<sup>-47</sup>, New Error:., 4.6780084694984764806 × 10<sup>-58</sup>

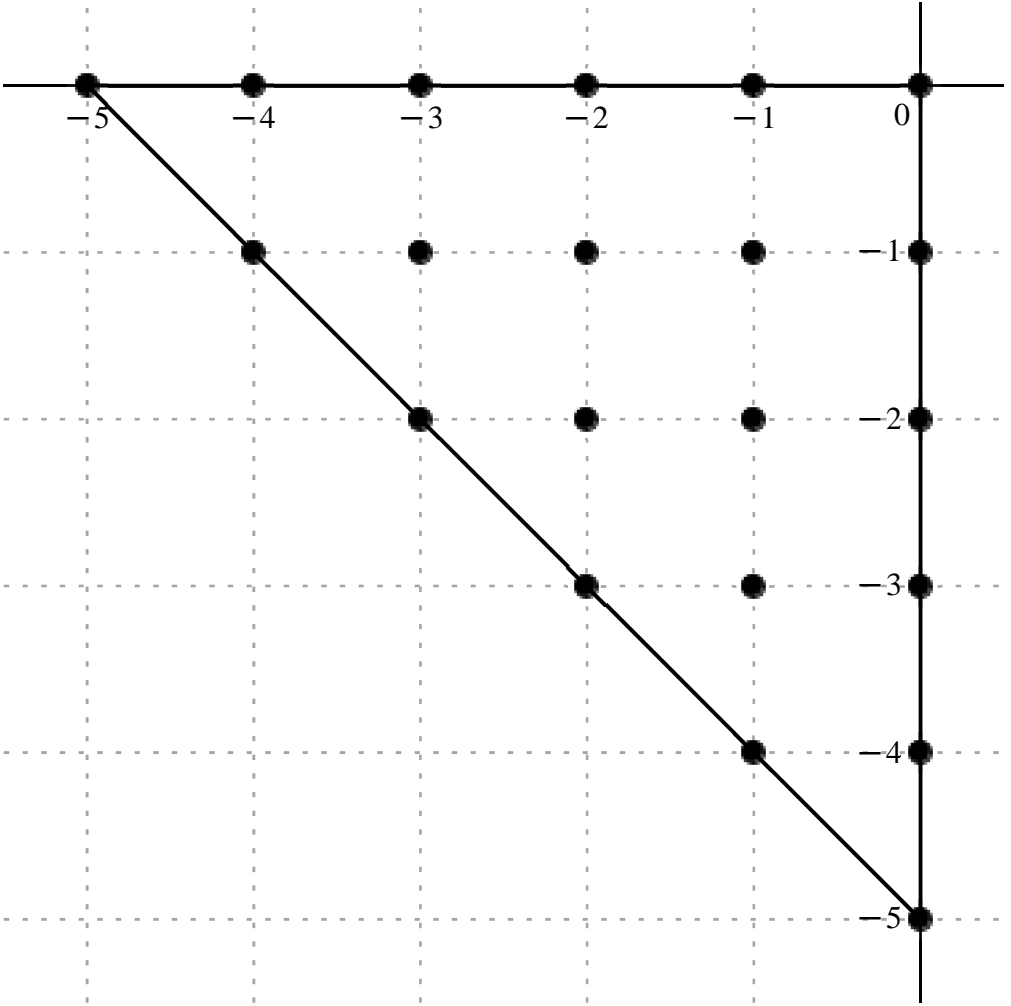
Error order:., 11, Error:., 4.6780084694984764806 × 10<sup>-58</sup>, New Error:., 4.6781246588419989953 × 10<sup>-69</sup>

Error order:., 11, Error:., 4.6781246588419989953 × 10<sup>-69</sup>, New Error:., 4.6781362778513220788 × 10<sup>-80</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4 - \mathrm{I} & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} \\ & & -3 - 2 \, \mathrm{I} & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} \\ & & & -2 - 3 \, \mathrm{I} & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} \\ & & & & -1 - 4 \, \mathrm{I} & -4 \, \mathrm{I} \\ & & & & & -5 \, \mathrm{I} \end{array} \right]$$

$$c = ,$$

$$\begin{aligned}
&-\frac{658505547}{69700}-\frac{2815645203\text{ I}}{139400}-\frac{83719817937}{34850}-\frac{19125809703\text{ I}}{6970}-\frac{36695797929}{850}-\frac{99066475683\text{ I}}{850}-\frac{41888151648}{85}+\frac{6974874396\text{ I}}{17}-\frac{250435371753}{680}+\frac{62474573007\text{ I}}{680}-\frac{1544432967\text{ I}}{85} \\
&-\frac{23220498609}{3400}+\frac{23003227611\text{ I}}{1700}-\frac{16449450696}{25}-\frac{38650541832\text{ I}}{25}-\frac{35606823777}{2}+\frac{20903386581\text{ I}}{10}-\frac{1077101810064\text{ I}}{85}-\frac{250435371753}{680}+\frac{62474573007\text{ I}}{680} \\
&-\frac{5882081751}{20}-\frac{7459048611\text{ I}}{20}-\frac{68945520546\text{ I}}{5}-\frac{35606823777}{2}+\frac{20903386581\text{ I}}{10}-\frac{41888151648}{85}+\frac{6974874396\text{ I}}{17}-\frac{36695797929}{850}-\frac{99066475683\text{ I}}{850} \\
&\frac{5882081751}{20}-\frac{7459048611\text{ I}}{20}-\frac{16449450696}{25}-\frac{38650541832\text{ I}}{25}-\frac{23220498609}{3400}+\frac{23003227611\text{ I}}{1700}-\frac{83719817937}{34850}-\frac{19125809703\text{ I}}{6970} \\
&\frac{658505547}{69700}-\frac{2815645203\text{ I}}{139400}
\end{aligned}$$



$$\begin{aligned}
\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol}) = &\frac{1}{139400\;\Delta x_{ol}^{10}}\left(63\left(-(20904938+44692781\text{ I})\;u_{ol-5}-(5315543996+6071685620\text{ I})\;u_{ol-4}+(95525569212-257887333524\text{ I})\;u_{ol-3}+(1090421725440+907840794400\text{ I})\;u_{ol-2} \right. \\
&-3420879702464\text{ I})\;u_{ol-3-1}+(-39393581226300+4625289030780\text{ I})\;u_{ol-2-1}+28038840769920\text{ I}\;u_{ol-1-1}+(814908749355+203290277245\text{ I})\;u_{ol-1} \\
&-(650763647690+825231251090\text{ I})\;u_{ol-3-21}-30511128774960\text{ I}\;u_{ol-2-21}+(39393581226300+4625289030780\text{ I})\;u_{ol-1-21}+(-1090421725440+907840794400\text{ I})\;u_{ol-21} \\
&\left. +(650763647690-825231251090\text{ I})\;u_{ol-2-31}-(1455906937792+3420879702464\text{ I})\;u_{ol-1-31}-(95525569212+257887333524\text{ I})\;u_{ol-31} \right. \\
&\left. +(15111753063+29940708954\text{ I})\;u_{ol-1-41}+(5315543996-6071685620\text{ I})\;u_{ol-41}+(20904938-44692781\text{ I})\;u_{ol-51}\right),\;O(\;\Delta x_{ol}^{11}\;)
\end{aligned}$$

Formula:, 567, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 11

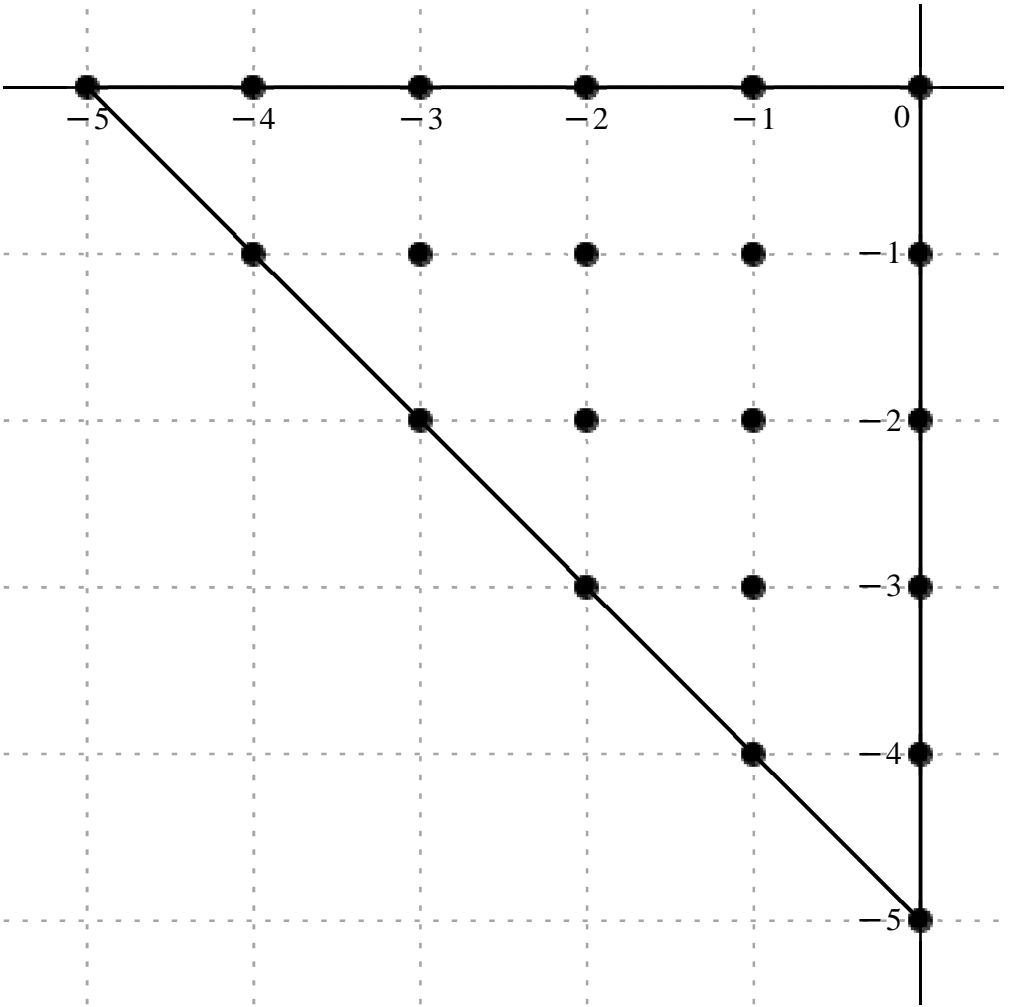
Error order:, 10, Error:., 2.1282738644863103493 × 10<sup>−22</sup>, New Error:., 2.1537745101993681938 × 10<sup>−32</sup>

Error order:, 10, Error:., 2.1537745101993681938 × 10<sup>−32</sup>, New Error:., 2.1563141440647498528 × 10<sup>−42</sup>

*Error order:*, 10,    *Error:*,  $2.1563141440647498528 \times 10^{-42}$ ,    *New Error:*,  $2.1565679998153644225 \times 10^{-52}$   
*Error order:*, 10,    *Error:*,  $2.1565679998153644225 \times 10^{-52}$ ,    *New Error:*,  $2.1565933843107160106 \times 10^{-62}$   
*Error order:*, 10,    *Error:*,  $2.1565933843107160106 \times 10^{-62}$ ,    *New Error:*,  $2.1565959227494507179 \times 10^{-72}$

$$x_o+h., \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-I & -3-I & -2-I & -1-I & -I \\ & & -3-2\,I & -2-2\,I & -1-2\,I & -2\,I \\ & & & -2-3\,I & -1-3\,I & -3\,I \\ & & & & -1-4\,I & -4\,I \\ & & & & & -5\,I \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} -\frac{35088701571}{404260} & -\frac{22513710681\,I}{808520} & -\frac{256514433021}{17425} & -\frac{2617501887\,I}{6970} & -\frac{191180467863}{850} & -\frac{372935970099\,I}{850} & \frac{6060411789894}{2465} & -\frac{161121758490\,I}{493} & -\frac{473075811747}{680} & +\frac{841768334253\,I}{680} & -\frac{7863175089}{170} & -\frac{7863175089\,I}{170} \\ & & \frac{2067787953}{100} & +\frac{195681303279\,I}{3400} & -\frac{13226326344}{5} & -6134441544\,I & -\frac{84933738351}{2} & +\frac{556062310881\,I}{10} & \frac{2910096615888}{85} & +\frac{2910096615888\,I}{85} & \frac{841768334253}{680} & -\frac{473075811747\,I}{680} \\ & & & & -\frac{7557390225}{4} & -\frac{4088063133\,I}{20} & -\frac{192646977831}{5} & -\frac{192646977831\,I}{5} & \frac{556062310881}{10} & -\frac{84933738351\,I}{2} & -\frac{161121758490}{493} & +\frac{6060411789894\,I}{2465} \\ & & & & & & -\frac{4088063133}{20} & -\frac{7557390225\,I}{4} & -6134441544 & -\frac{13226326344\,I}{5} & -\frac{372935970099}{850} & -\frac{191180467863\,I}{850} \\ & & & & & & & & \frac{195681303279}{3400} & +\frac{2067787953\,I}{100} & -\frac{2617501887}{6970} & -\frac{256514433021\,I}{17425} \\ & & & & & & & & & & -\frac{22513710681}{808520} & -\frac{35088701571\,I}{404260} \end{array} \right]$$



$$\frac{d^{11}}{dx_{ol}^{11}}\,u(x_{ol})=\frac{1}{4042600\,\Delta x_{ol}^{11}}\Big(693\,\Big(-(506330470+162436585\,I)\,u_{ol-5}-(85874961704+2190694220\,I)\,u_{ol-4}-(1312055274396+2559427812108\,I)\,u_{ol-3}+(14342100051120-1906491226000\,I)\,u_{ol-2}+(-4058348774655+7221230515345\,I)\,u_{ol-1}-(269821505940+269821505940\,I)\,u_{ol}+(120623947746$$

$$+335736031167\,I)\,u_{ol-4-1}-(15431095780160+35785127540800\,I)\,u_{ol-3-1}+(-247729531499100+324377705334420\,I)\,u_{ol-2-1}+(199717453176960+199717453176960\,I)\,u_{ol-1-1}+(7221230515345-4058348774655\,I)\,u_{ol-1}-(11021466711250+1192381242530\,I)\,u_{ol-3-21}-(224760367266840$$

$$+224760367266840\,I)\,u_{ol-2-21}+(324377705334420-247729531499100\,I)\,u_{ol-1-21}+(-1906491226000+14342100051120\,I)\,u_{ol-21}-(1192381242530+11021466711250\,I)\,u_{ol-2-31}-(35785127540800+15431095780160\,I)\,u_{ol-1-31}-(2559427812108+1312055274396\,I)\,u_{ol-31}+(335736031167$$

$$+ 120623947746 \text{ I}) u_{oI-1-41} - (2190694220 + 85874961704 \text{ I}) u_{oI-41} - (162436585 + 506330470 \text{ I}) u_{oI-51} \Big) \Big), \text{ } O( \Delta x_{oI}^{10} )$$

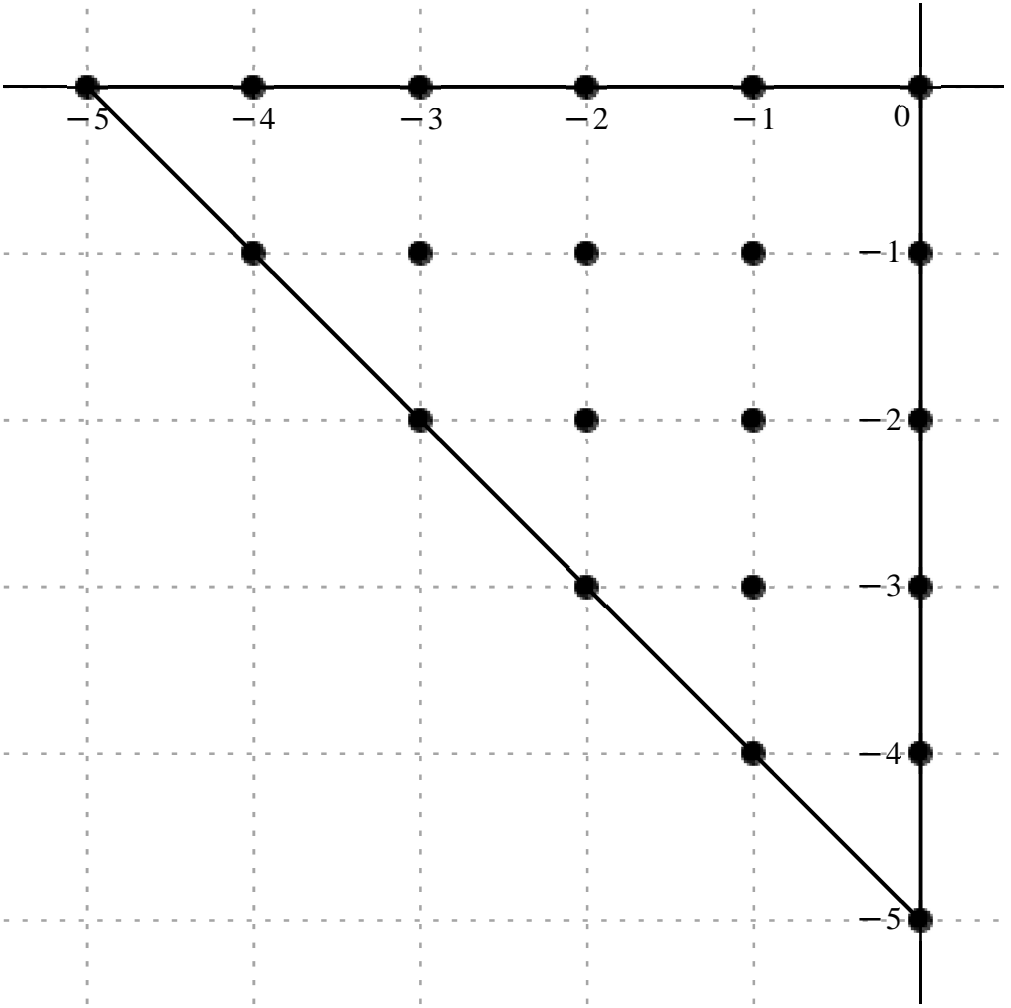
Formula.: 568, Var.: 1

Variavel .:  $x_{oI}$ , Derivada de Ordem .: 12

Error order.: 9, Error.:  $6.4020065063389069630 \times 10^{-20}$ , New Error.:  $6.5609918221214371637 \times 10^{-29}$   
Error order.: 9, Error.:  $6.5609918221214371637 \times 10^{-29}$ , New Error.:  $6.5769921838315125005 \times 10^{-38}$   
Error order.: 9, Error.:  $6.5769921838315125005 \times 10^{-38}$ , New Error.:  $6.5785932355389810976 \times 10^{-47}$   
Error order.: 9, Error.:  $6.5785932355389810976 \times 10^{-47}$ , New Error.:  $6.5787533508622638627 \times 10^{-56}$   
Error order.: 9, Error.:  $6.5787533508622638627 \times 10^{-56}$ , New Error.:  $6.5787693624961146631 \times 10^{-65}$

$$x_o + h . , \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4 - \text{I} & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -3 - 2 \text{ I} & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -2 - 3 \text{ I} & -1 - 3 \text{ I} & -3 \text{ I} \\ & & & & -1 - 4 \text{ I} & -4 \text{ I} \\ & & & & & -5 \text{ I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{1471418156439}{5053250} + \frac{416542845411 \text{ I}}{2526625} & -\frac{645828216957}{17425} + \frac{133668641799 \text{ I}}{3485} & -\frac{718483576734}{425} - \frac{197709070482 \text{ I}}{425} & \frac{12231951310656}{2465} - \frac{3468100199256 \text{ I}}{493} & \frac{239751171891}{170} + \frac{777228534621 \text{ I}}{170} & -\frac{90648919746}{425} \\ & \frac{86275317051}{425} + \frac{75483523269 \text{ I}}{850} & -\frac{2796085652976}{125} - \frac{1033182733968 \text{ I}}{125} & \frac{910427526162}{25} + \frac{6065252491914 \text{ I}}{25} & \frac{14145053164704}{85} & \frac{239751171891}{170} - \frac{777228534621 \text{ I}}{170} \\ & & -\frac{26390370699}{5} + \frac{21681643599 \text{ I}}{5} & -\frac{967175407044}{5} & \frac{910427526162}{25} - \frac{6065252491914 \text{ I}}{25} & \frac{12231951310656}{2465} + \frac{3468100199256 \text{ I}}{493} \\ & & & -\frac{26390370699}{5} - \frac{21681643599 \text{ I}}{5} & -\frac{2796085652976}{125} + \frac{1033182733968 \text{ I}}{125} & -\frac{718483576734}{425} + \frac{197709070482 \text{ I}}{425} \\ & & & & \frac{86275317051}{425} - \frac{75483523269 \text{ I}}{850} & -\frac{645828216957}{17425} - \frac{133668641799 \text{ I}}{3485} \\ & & & & & -\frac{1471418156439}{5053250} - \frac{416542845411 \text{ I}}{2526625} \end{array} \right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\,u(x_{ol})=\frac{1}{5053250\,\Delta x_{ol}^{12}}\left(2079\left((\,-707752841+400714618\,\mathrm{I}\,)\,u_{ol-5}+(\,-90086668070+93227287450\,\mathrm{I}\,)\,u_{ol-4}-(4109076347940+1130717098620\,\mathrm{I}\,)\,u_{ol-3}+(12061327651200-17098618106000\,\mathrm{I}\,)\,u_{ol-2}+(3427899752025+11112610962775\,\mathrm{I}\,)\,u_{ol-1}-518429848860\,u_{ol}+(493416796410+215848747395\,\mathrm{I}\,)\,u_{ol-4-1}\right.\\ \left.-(54369677059744+20090161232992\,\mathrm{I}\,)\,u_{ol-3-1}+(88515976846140+589691912549580\,\mathrm{I}\,)\,u_{ol-2-1}+404484565003200\,u_{ol-1-1}+(3427899752025-11112610962775\,\mathrm{I}\,)\,u_{ol-1}+(\,-12828969767650+10539948582650\,\mathrm{I}\,)\,u_{ol-3-21}-470166342053400\,u_{ol-2-21}+(88515976846140-589691912549580\,\mathrm{I}\,)\,u_{ol-1-21}\right.\\ \left.+(12061327651200+17098618106000\,\mathrm{I}\,)\,u_{ol-21}-(12828969767650+10539948582650\,\mathrm{I}\,)\,u_{ol-2-31}+(\,-54369677059744+20090161232992\,\mathrm{I}\,)\,u_{ol-1-31}+(\,-4109076347940+1130717098620\,\mathrm{I}\,)\,u_{ol-31}+(493416796410-215848747395\,\mathrm{I}\,)\,u_{ol-1-41}-(90086668070+93227287450\,\mathrm{I}\,)\,u_{ol-41}-(707752841\right.\\ \left.+400714618\,\mathrm{I}\,)\,u_{ol-51}\right)\Big),\,\,O(\,\,\Delta x_{ol}^9\,)\,$$

Formula:, 569, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 13

Error order:, 8, Error:; 2.4409410495029675441 × 10<sup>−17</sup>, New Error:; 2.4694653044385809093 × 10<sup>−25</sup>

Error order:, 8, Error:; 2.4694653044385809093 × 10<sup>−25</sup>, New Error:; 2.4723062943665076968 × 10<sup>−33</sup>

Error order:, 8, Error:; 2.4723062943665076968 × 10<sup>−33</sup>, New Error:; 2.4725902754214361392 × 10<sup>−41</sup>

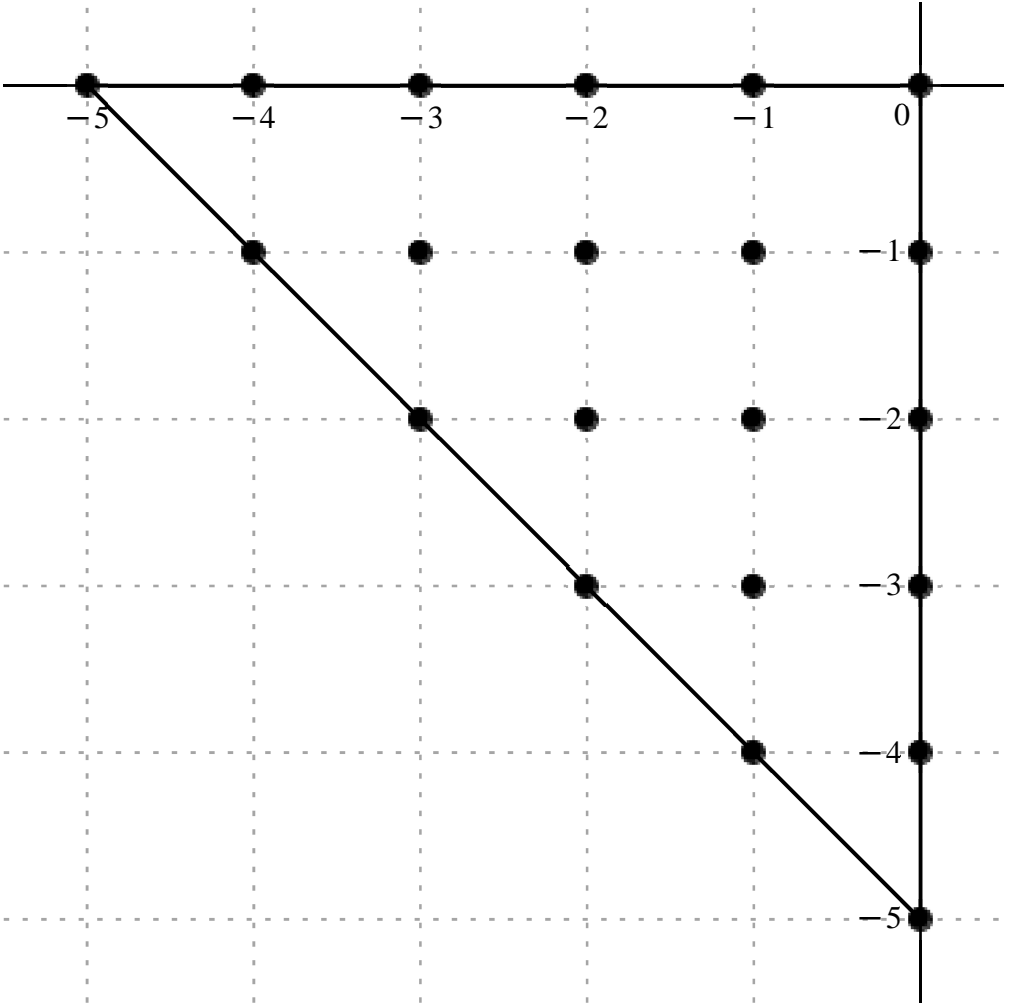
Error order:, 8, Error:; 2.4725902754214361392 × 10<sup>−41</sup>, New Error:; 2.4726186723439450871 × 10<sup>−49</sup>

Error order:, 8, Error:; 2.4726186723439450871 × 10<sup>−49</sup>, New Error:; 2.4726215120243625353 × 10<sup>−57</sup>

$$x_o+h.,\left[\begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-1 & -3-1 & -2-1 & -1-1 & -1 \\ & & -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ & & & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \\ & & & & -1-4\,\mathrm{I} & -4\,\mathrm{I} \\ & & & & & -5\,\mathrm{I} \end{array}\right]$$

$$c = ,$$

$-\frac{124158740706}{505325} + \frac{537596732673 \text{ I}}{505325}$	$\frac{183983275476}{17425} + \frac{596708376264 \text{ I}}{3485}$	$-\frac{1993126979844}{425} + \frac{1249551290988 \text{ I}}{425}$	$-\frac{13515269944176}{2465} - \frac{12810427405776 \text{ I}}{493}$	$\frac{1093098285279}{85} + \frac{545585319279 \text{ I}}{85}$	$-\frac{37433900196}{85} + \frac{37433900196 \text{ I}}{85}$
	$\frac{279125720874}{425} - \frac{6987641661 \text{ I}}{25}$	$-\frac{1698520247424}{25} + \frac{833099275008 \text{ I}}{25}$	$\frac{3111252131988}{5} + \frac{2226061665828 \text{ I}}{5}$	$\frac{30614493926016}{85} - \frac{30614493926016 \text{ I}}{85}$	$-\frac{545585319279}{85} - \frac{1093098285279 \text{ I}}{85}$
		$-\frac{9516634974}{5} + 21759325434 \text{ I}$	$-\frac{2159641732248}{5} + \frac{2159641732248 \text{ I}}{5}$	$-\frac{2226061665828}{5} - \frac{3111252131988 \text{ I}}{5}$	$\frac{12810427405776}{493} + \frac{13515269944176 \text{ I}}{2465}$
			$-21759325434 + \frac{9516634974 \text{ I}}{5}$	$-\frac{833099275008}{25} + \frac{1698520247424 \text{ I}}{25}$	$-\frac{1249551290988}{425} + \frac{1993126979844 \text{ I}}{425}$
				$\frac{6987641661}{25} - \frac{279125720874 \text{ I}}{425}$	$-\frac{596708376264}{3485} - \frac{183983275476 \text{ I}}{17425}$
					$-\frac{537596732673}{505325} + \frac{124158740706 \text{ I}}{505325}$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}} \; u(x_{ol}) = \frac{1}{505325 \; \Delta x_{ol}^{13}} \big( 2079 \; ( (-59720414 + 258584287 \; \text{I}) \; u_{ol-5} + (2566385276 + 41617467320 \; \text{I}) \; u_{ol-4} + (-1139888397804 + 714630343908 \; \text{I}) \; u_{ol-3} - (1332674525520 + 6315867287600 \; \text{I}) \; u_{ol-2} + (3125766861945 + 1560127331945 \; \text{I}) \; u_{ol-1} + (-107044029180 + 107044029180 \; \text{I}) \; u_{ol} + (159634671534$$

$$- 67937085567 \; \text{I}) \; u_{ol-4-1} + (-16513799788928 + 8099776645376 \; \text{I}) \; u_{ol-3-1} + (151245164367180 + 108214007819580 \; \text{I}) \; u_{ol-2-1} + (87543610577280 - 87543610577280 \; \text{I}) \; u_{ol-1-1} - (1560127331945 + 3125766861945 \; \text{I}) \; u_{ol-1} + (-462625643890 + 5288855759950 \; \text{I}) \; u_{ol-3-21} + (-104985181178280$$

$$+ 104985181178280 \; \text{I}) \; u_{ol-2-21} - (108214007819580 + 151245164367180 \; \text{I}) \; u_{ol-1-21} + (6315867287600 + 1332674525520 \; \text{I}) \; u_{ol-21} + (-5288855759950 + 462625643890 \; \text{I}) \; u_{ol-2-31} + (-8099776645376 + 16513799788928 \; \text{I}) \; u_{ol-1-31} + (-714630343908 + 1139888397804 \; \text{I}) \; u_{ol-31} + (67937085567 - 159634671534 \; \text{I}) \; u_{ol-1-41}$$

$$- (41617467320 + 2566385276 \; \text{I}) \; u_{ol-41} + (-258584287 + 59720414 \; \text{I}) \; u_{ol-51} \big) \big) , \; O( \; \Delta x_{ol}^{\; 8} \; )$$

Formula: 570, Var: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 14

Error order: 7, Error: 5.8821110383282271971 × 10<sup>-15</sup>, New Error: 6.0237010875273507616 × 10<sup>-22</sup>

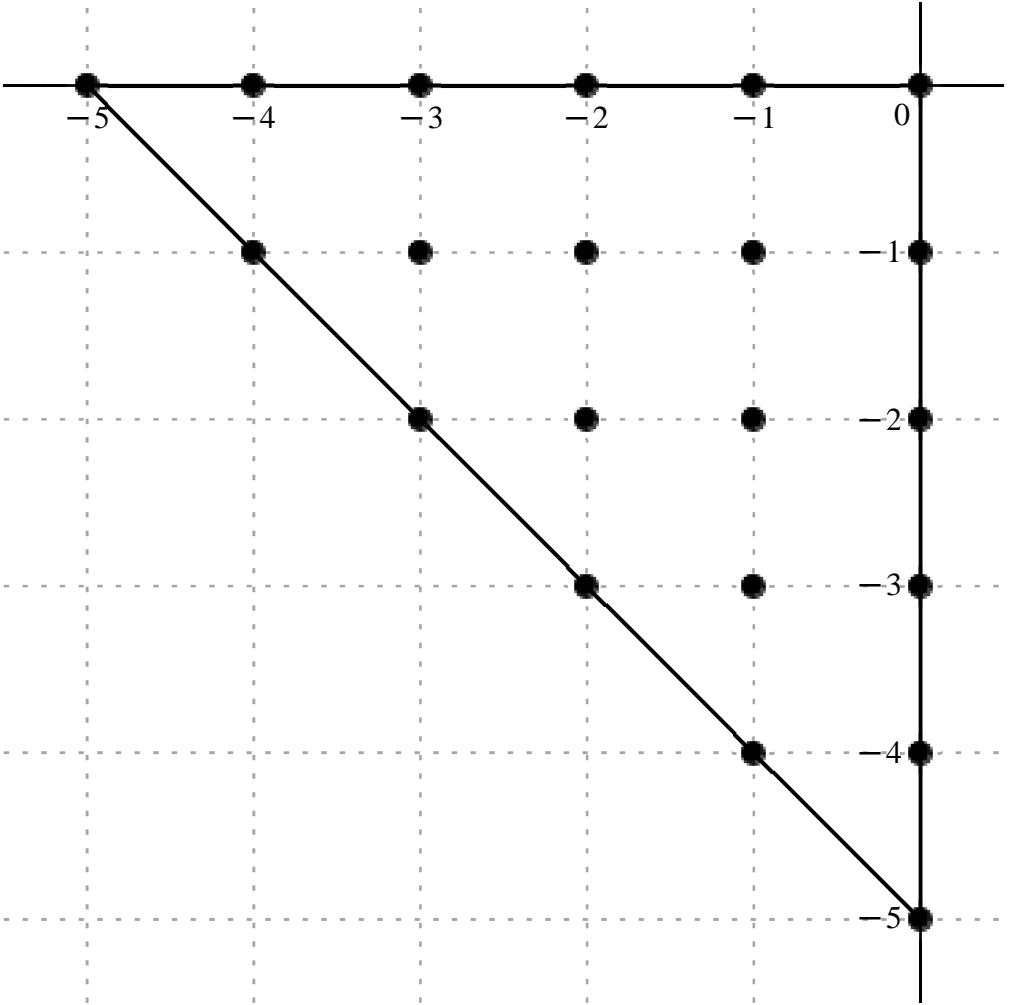
*Error order:*, 7, *Error:*,  $6.0237010875273507616 \times 10^{-22}$ , *New Error:*,  $6.0379485050090302375 \times 10^{-29}$   
*Error order:*, 7, *Error:*,  $6.0379485050090302375 \times 10^{-29}$ , *New Error:*,  $6.0393741285319894076 \times 10^{-36}$   
*Error order:*, 7, *Error:*,  $6.0393741285319894076 \times 10^{-36}$ , *New Error:*,  $6.0395166996996291613 \times 10^{-43}$   
*Error order:*, 7, *Error:*,  $6.0395166996996291613 \times 10^{-43}$ , *New Error:*,  $6.0395309569045441656 \times 10^{-50}$

$$x_o+h.,$$

$$\begin{bmatrix} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-I & -3-I & -2-I & -1-I & -I \\ & & -3-2\,I & -2-2\,I & -1-2\,I & -2\,I \\ & & & -2-3\,I & -1-3\,I & -3\,I \\ & & & & -1-4\,I & -4\,I \\ & & & & & -5\,I \end{bmatrix}$$

$$c=,$$

$$\begin{bmatrix} \frac{897922806858}{505325}+\frac{1298528273196\,I}{505325} & \frac{6562084323564}{17425}+\frac{211193659908\,I}{697} & -\frac{1180232815608}{425}+\frac{6397168039416\,I}{425} & -\frac{151708173680448}{2465}-\frac{18286376324832\,I}{493} & \frac{3039235102134}{85}-\frac{1087261935606\,I}{85} & \frac{136443921768\,I}{85} \\ & \frac{295866040932}{425}-\frac{804615024906\,I}{425} & -\frac{1579228225344}{25}+\frac{5023806435648\,I}{25} & 2060809930872-\frac{1867770789192\,I}{5} & -\frac{116434671889536\,I}{85} & -\frac{3039235102134}{85}-\frac{1087261935606\,I}{85} \\ & & \frac{199549164276}{5}+\frac{232707301596\,I}{5} & \frac{8465864997744\,I}{5} & -2060809930872-\frac{1867770789192\,I}{5} & \frac{151708173680448}{2465}-\frac{18286376324832\,I}{493} \\ & & & -\frac{199549164276}{5}+\frac{232707301596\,I}{5} & \frac{1579228225344}{25}+\frac{5023806435648\,I}{25} & \frac{1180232815608}{425}+\frac{6397168039416\,I}{425} \\ & & & & -\frac{295866040932}{425}-\frac{804615024906\,I}{425} & -\frac{6562084323564}{17425}+\frac{211193659908\,I}{697} \\ & & & & & -\frac{897922806858}{505325}+\frac{1298528273196\,I}{505325} \end{bmatrix}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}}\,u(x_{ol})=\frac{1}{505325\,\Delta x_{ol}^{14}}\big(29106\,\big((30850093+44613766\,I)\,u_{ol-5}+(6538186126+5260613050\,I)\,u_{ol-4}+(-48213317452+261328688204\,I)\,u_{ol-3}-(1068514244640+643974978800\,I)\,u_{ol-2}+(620774159355-222076967195\,I)\,u_{ol-1}+27869137460\,Iu_{ol}+(12086330058-32869073889\,I)\,u_{ol-4-1}+(-1096713396512$$

$$+3488840771104\,I)\,u_{ol-3-1}+(35778835233900-6485475668580\,I)\,u_{ol-2-1}-23782179769920\,Iu_{ol-1-1}-(620774159355+222076967195\,I)\,u_{ol-1}+(692896182490+808031451790\,I)\,u_{ol-3-21}+29396091733560\,Iu_{ol-2-21}-(35778835233900+6485475668580\,I)\,u_{ol-1-21}+(1068514244640-643974978800\,I)\,u_{ol-21}$$

$$+(-692896182490+808031451790\,I)\,u_{ol-2-31}+(1096713396512+3488840771104\,I)\,u_{ol-1-31}+(48213317452+261328688204\,I)\,u_{ol-31}-(12086330058+32869073889\,I)\,u_{ol-1-41}+(-6538186126+5260613050\,I)\,u_{ol-41}+(-30850093+44613766\,I)\,u_{ol-51}\big)\big),\,O(\,\Delta x_{ol}^{\,7}\,)$$

Formula:, 571, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 15

Error order:, 6, Error:,  $1.7526593089384577975 \times 10^{-12}$ , New Error:,  $1.7723449843986447915 \times 10^{-18}$

Error order:, 6, Error:,  $1.7723449843986447915 \times 10^{-18}$ , New Error:,  $1.7743058941051034221 \times 10^{-24}$

Error order:, 6, Error:,  $1.7743058941051034221 \times 10^{-24}$ , New Error:,  $1.7745019061615752642 \times 10^{-30}$

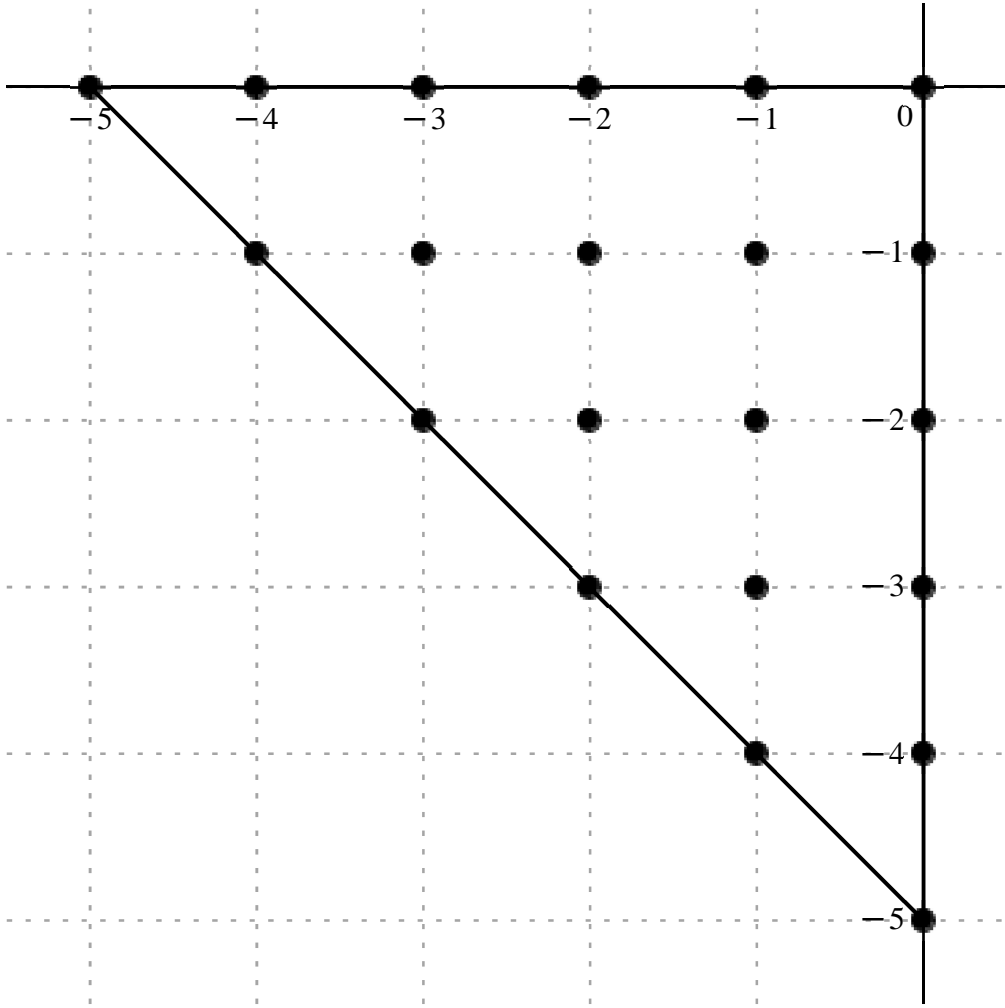
Error order:, 6, Error:,  $1.7745019061615752642 \times 10^{-30}$ , New Error:,  $1.7745215065757302364 \times 10^{-36}$

Error order:, 6, Error:,  $1.7745215065757302364 \times 10^{-36}$ , New Error:,  $1.7745234666092284595 \times 10^{-42}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4 - I & -3 - I & -2 - I & -1 - I & -I \\ & & -3 - 2 I & -2 - 2 I & -1 - 2 I & -2 I \\ & & & -2 - 3 I & -1 - 3 I & -3 I \\ & & & & -1 - 4 I & -4 I \\ & & & & & -5 I \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccccc} \frac{18807511338}{2465} + \frac{2462105646 I}{2465} & \frac{98355344472}{85} - \frac{3092978196 I}{17} & \frac{1862452424448}{85} + \frac{2471686875504 I}{85} & - \frac{79436563457328}{493} + \frac{22534928151120 I}{493} & \frac{603924119568}{17} - \frac{1343196552852 I}{17} & \frac{43062967332}{17} + \frac{43062967332 I}{17} & \\ & - \frac{11014554474}{5} - \frac{373056288066 I}{85} & \frac{1224025121088}{5} + \frac{2209044809664 I}{5} & 2754949261680 - 4101797278656 I & - \frac{38200510123776}{17} - \frac{38200510123776 I}{17} & - \frac{1343196552852}{17} + \frac{603924119568 I}{17} & \\ & & 148035444480 + 9712206504 I & 2860565971032 + 2860565971032 I & -4101797278656 + 2754949261680 I & \frac{22534928151120}{493} - \frac{79436563457328 I}{493} & \\ & & & 9712206504 + 148035444480 I & \frac{2209044809664}{5} + \frac{1224025121088 I}{5} & \frac{2471686875504}{85} + \frac{1862452424448 I}{85} & \\ & & & & - \frac{373056288066}{85} - \frac{11014554474 I}{5} & - \frac{3092978196}{17} + \frac{98355344472 I}{85} & \\ & & & & & \frac{2462105646}{2465} + \frac{18807511338 I}{2465} & \end{array} \right]$$





$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}}\,u(x_{ol})=\frac{1}{2465\,\Delta x_{ol}^{15}}\left(87318\left((215391+28197\,\mathrm{I})\,u_{ol-5}+(32665716-5136190\,\mathrm{I})\,u_{ol-4}+(618556544+820895112\,\mathrm{I})\,u_{ol-3}+(-4548693480+1290394200\,\mathrm{I})\,u_{ol-2}+(1002874520-2230508030\,\mathrm{I})\,u_{ol-1}+(71510230+71510230\,\mathrm{I})\,u_{ol}-(62188499+123899223\,\mathrm{I})\,u_{ol-4-1}+(6910881888+12472332064\,\mathrm{I})\,u_{ol-3-1}\right.\right.\\ \left.\left.+ (77772623400-115794341280\,\mathrm{I})\,u_{ol-2-1}-(63435648640+63435648640\,\mathrm{I})\,u_{ol-1-1}+(-2230508030+1002874520\,\mathrm{I})\,u_{ol-1}+(4179062400+274177020\,\mathrm{I})\,u_{ol-3-21}+(80754198660+80754198660\,\mathrm{I})\,u_{ol-2-21}+(-115794341280+77772623400\,\mathrm{I})\,u_{ol-1-21}+(1290394200-4548693480\,\mathrm{I})\,u_{ol-21}+(274177020\right.\\ \left.+4179062400\,\mathrm{I})\,u_{ol-2-31}+(12472332064+6910881888\,\mathrm{I})\,u_{ol-1-31}+(820895112+618556544\,\mathrm{I})\,u_{ol-31}-(123899223+62188499\,\mathrm{I})\,u_{ol-1-41}+(-5136190+32665716\,\mathrm{I})\,u_{ol-41}+(28197+215391\,\mathrm{I})\,u_{ol-51}\right)\Big),\,O(\,\Delta x_{ol}^6\,)$$

Formula:, 572, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 16

Error order:, 5, Error:,  $3.1998610696305266847\times10^{-10}$ , New Error:,  $3.2729271666548903915\times10^{-15}$

Error order:, 5, Error:,  $3.2729271666548903915\times10^{-15}$ , New Error:,  $3.2802776105555291482\times10^{-20}$

Error order:, 5, Error:,  $3.2802776105555291482\times10^{-20}$ , New Error:,  $3.2810130921578607275\times10^{-25}$

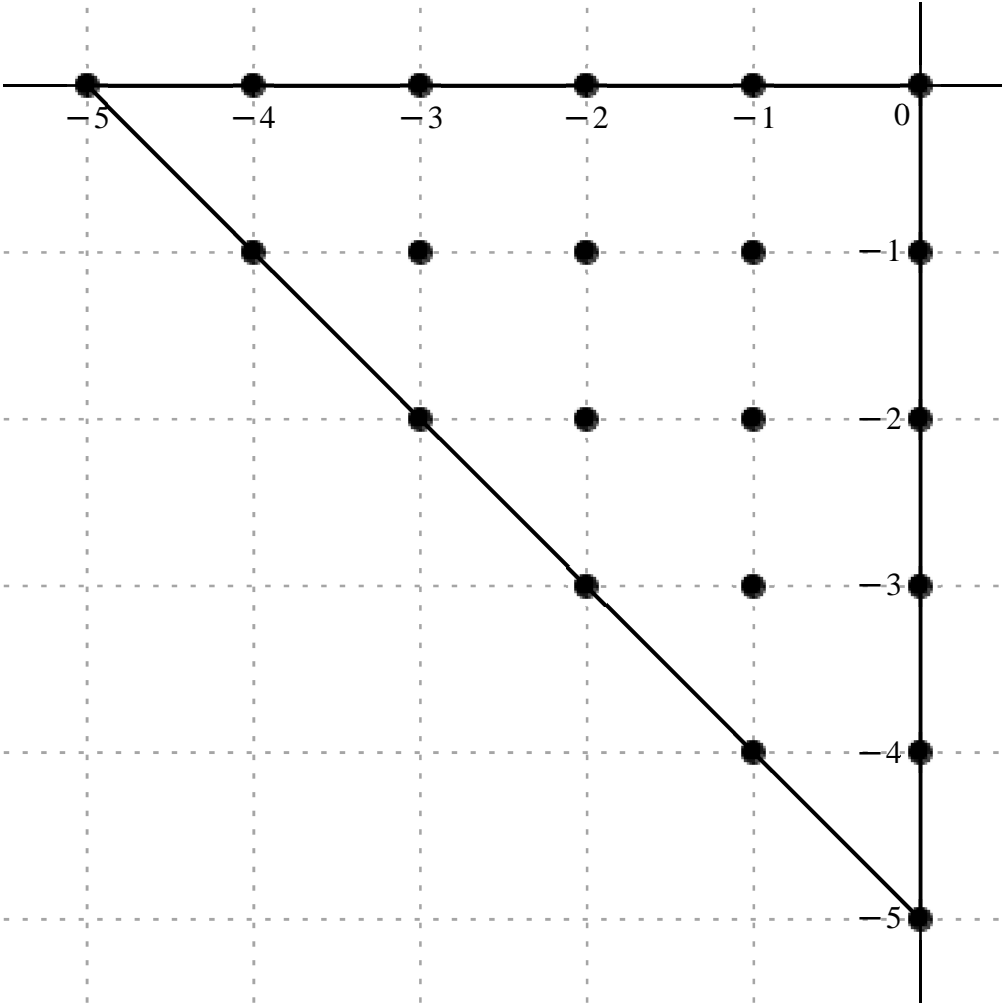
Error order:, 5, Error:,  $3.2810130921578607275\times10^{-25}$ , New Error:,  $3.2810866446890619508\times10^{-30}$

Error order:, 5, Error:,  $3.2810866446890619508\times10^{-30}$ , New Error:,  $3.2810939999858905966\times10^{-35}$

$$x_o+h.,\left[\begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-1 & -3-1 & -2-1 & -1-1 & -1 \\ & & -3-2\,1 & -2-2\,1 & -1-2\,1 & -2\,1 \\ & & & -2-3\,1 & -1-3\,1 & -3\,1 \\ & & & & -1-4\,1 & -4\,1 \\ & & & & & -5\,1 \end{array}\right]$$

$c =$ ,

$$\frac{6093222580368}{505325} - \frac{5232430559664 \text{ I}}{505325} - \frac{4539947825952}{3485} - \frac{1387522138464 \text{ I}}{697} - \frac{6143761540224}{85} + \frac{597819543552 \text{ I}}{85} - \frac{74185193972736}{493} + \frac{143554089127680 \text{ I}}{493} - \frac{1050192446688}{17} - \frac{2624116860288 \text{ I}}{17} - \frac{573026819904}{85} - \frac{1050192446688}{17} + \frac{2624116860288 \text{ I}}{17} - \frac{74185193972736}{493} - \frac{143554089127680 \text{ I}}{493} - \frac{10127485323648}{5} + \frac{47901721545216 \text{ I}}{5} - \frac{105359614424064}{17} - \frac{10127485323648}{5} + \frac{47901721545216 \text{ I}}{5} - \frac{24607816257024}{25} - \frac{6383663903232 \text{ I}}{25} - \frac{818462349936}{85} + \frac{240992790192 \text{ I}}{85} - \frac{4539947825952}{3485} + \frac{1387522138464 \text{ I}}{697} - \frac{6093222580368}{505325} + \frac{5232430559664 \text{ I}}{505325} - \frac{224509247424}{25} - \frac{201471266304 \text{ I}}{25} - \frac{224509247424}{25} + \frac{201471266304 \text{ I}}{25}$$



$$\frac{\mathrm{d}^{16}}{\mathrm{d}x_{ol}^{16}} \, u(x_{ol}) = \frac{1}{505325 \, \Delta x_{ol}^{16}} \Big( 698544 \Big( (8722747 - 7490481 \, \text{I}) \, u_{ol-5} + (942377910 - 1440071850 \, \text{I}) \, u_{ol-4} + (52286845720 + 5087778560 \, \text{I}) \, u_{ol-3} + (-108854737600 + 210642338000 \, \text{I}) \, u_{ol-2} - (44688624450 + 111663508200 \, \text{I}) \, u_{ol-1} + 4876778620 \, u_{ol} - (6965572205 + 2050983385 \, \text{I}) \, u_{ol-4-1} + (712049334048 + 184717066464 \, \text{I}) \, u_{ol-3-1} - (1465239561480 + 6930397352160 \, \text{I}) \, u_{ol-2-1} - 4483346129600 \, u_{ol-1-1} + (-44688624450 + 111663508200 \, \text{I}) \, u_{ol-1} + (162409433700 - 145743815200 \, \text{I}) \, u_{ol-3-21} + 5874572914200 \, u_{ol-2-21} + (-1465239561480 + 6930397352160 \, \text{I}) \, u_{ol-1-21} - (108854737600 + 210642338000 \, \text{I}) \, u_{ol-21} + (162409433700 + 145743815200 \, \text{I}) \, u_{ol-2-31} + (712049334048 - 184717066464 \, \text{I}) \, u_{ol-1-31} + (52286845720 - 5087778560 \, \text{I}) \, u_{ol-31} + (-6965572205 + 2050983385 \, \text{I}) \, u_{ol-1-41} + (942377910 + 1440071850 \, \text{I}) \, u_{ol-41} + (8722747 + 7490481 \, \text{I}) \, u_{ol-51} \Big) \Big) \, O(\, \Delta x_{ol}^{\, 5} \, )$$

Formula.: 573, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 17

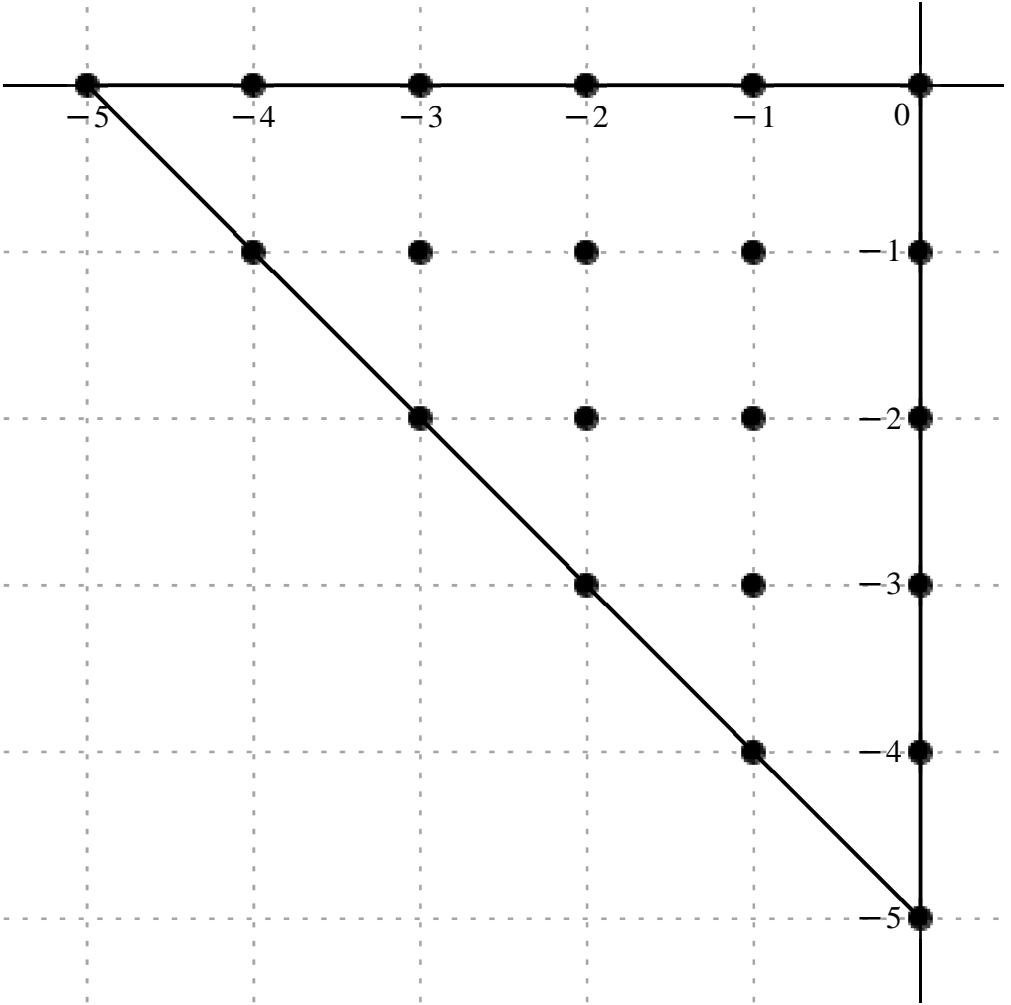
Error order.: 4, Error.: 6.9003143003679601482 × 10−8, New Error.: 6.9723393206255004151 × 10−12

Error order.: 4, Error.: 6.9723393206255004151 × 10−12, New Error.: 6.9795151947692872711 × 10−16

Error order:, 4, Error:; 6.9795151947692872711 × 10<sup>−16</sup>, New Error:; 6.9802325081143676530 × 10<sup>−20</sup>  
Error order:, 4, Error:; 6.9802325081143676530 × 10<sup>−20</sup>, New Error:; 6.9803042367003448226 × 10<sup>−24</sup>  
Error order:, 4, Error:; 6.9803042367003448226 × 10<sup>−24</sup>, New Error:; 6.9803114095314493882 × 10<sup>−28</sup>

$$x_o+h.,\left[\begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-I & -3-I & -2-I & -1-I & -I \\ & & -3-2\text{ I} & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} \\ & & & -2-3\text{ I} & -1-3\text{ I} & -3\text{ I} \\ & & & & -1-4\text{ I} & -4\text{ I} \\ & & & & & -5\text{ I} \end{array}\right]$$

$$c=,\left[\begin{array}{ccccccccc} \frac{2672629344}{5945}-\frac{157439942352\text{ I}}{5945}-\frac{203818374144}{205}-\frac{154517932800\text{ I}}{41}-\frac{435195706176}{5}-\frac{390282121152\text{ I}}{5}-\frac{5003095071744}{29}+\frac{14176978421760\text{ I}}{29} & -239117898096-97760534256\text{ I} & 7276034304-7276034304\text{ I} \\ & -\frac{71331122016}{5}+\frac{42266801808\text{ I}}{5}-\frac{7019506593792}{5}-\frac{4379211454464\text{ I}}{5}-13271159651904-8371907337024\text{ I} & -6914982057984+6914982057984\text{ I} & 97760534256+239117898096\text{ I} \\ & & 20829184992-495791604000\text{ I} & 9323114701824-9323114701824\text{ I} & 8371907337024+13271159651904\text{ I} & -\frac{14176978421760}{29}-\frac{5003095071744\text{ I}}{29} \\ & & & 495791604000-20829184992\text{ I} & \frac{4379211454464}{5}-\frac{7019506593792\text{ I}}{5} & \frac{390282121152}{5}-\frac{435195706176\text{ I}}{5} \\ & & & & -\frac{42266801808}{5}+\frac{71331122016\text{ I}}{5} & \frac{154517932800}{41}+\frac{203818374144\text{ I}}{205} \\ & & & & & \frac{157439942352}{5945}-\frac{2672629344\text{ I}}{5945} \end{array}\right]$$



$$\frac{\mathrm{d}^{17}}{\mathrm{d}x_{ol}^{17}}\;u(x_{ol})=\frac{1}{5945\;\Delta x_{ol}^{17}}\big(698544\big((3826-225383\text{ I})\;u_{ol-5}-(8461504+32074000\text{ I})\;u_{ol-4}+(740751756-664303812\text{ I})\;u_{ol-3}+(1468246080+4160483200\text{ I})\;u_{ol-2}-(2035027005+831996805\text{ I})\;u_{ol-1}+(61923120-61923120\text{ I})\;u_{ol}+(-121413546+71942823\text{ I})\;u_{ol-4-1}+(11947985152-7453907584\text{ I})\;u_{ol-3-1}$$
$$-(112944988620+71249612220\text{ I})\;u_{ol-2-1}+(-58850363520+58850363520\text{ I})\;u_{ol-1-1}+(831996805+2035027005\text{ I})\;u_{ol-1}+(177268010-4219463750\text{ I})\;u_{ol-3-21}+(79344918720-79344918720\text{ I})\;u_{ol-2-21}+(71249612220+112944988620\text{ I})\;u_{ol-1-21}-(4160483200+1468246080\text{ I})\;u_{ol-21}+(4219463750$$
$$-177268010\text{ I})\;u_{ol-2-31}+(7453907584-11947985152\text{ I})\;u_{ol-1-31}+(664303812-740751756\text{ I})\;u_{ol-31}+(-71942823+121413546\text{ I})\;u_{ol-1-41}+(32074000+8461504\text{ I})\;u_{ol-41}+(225383-3826\text{ I})\;u_{ol-51}\big)\big)\;O(\;\Delta x_{ol}^4\;)$$

Formula:, 574, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 18

Error order:, 3, Error:,  $8.5678245216577263610 \times 10^{-6}$ , New Error:,  $8.7428904850459779441 \times 10^{-9}$

Error order:, 3, Error:,  $8.7428904850459779441 \times 10^{-9}$ , New Error:,  $8.7604946468753681853 \times 10^{-12}$

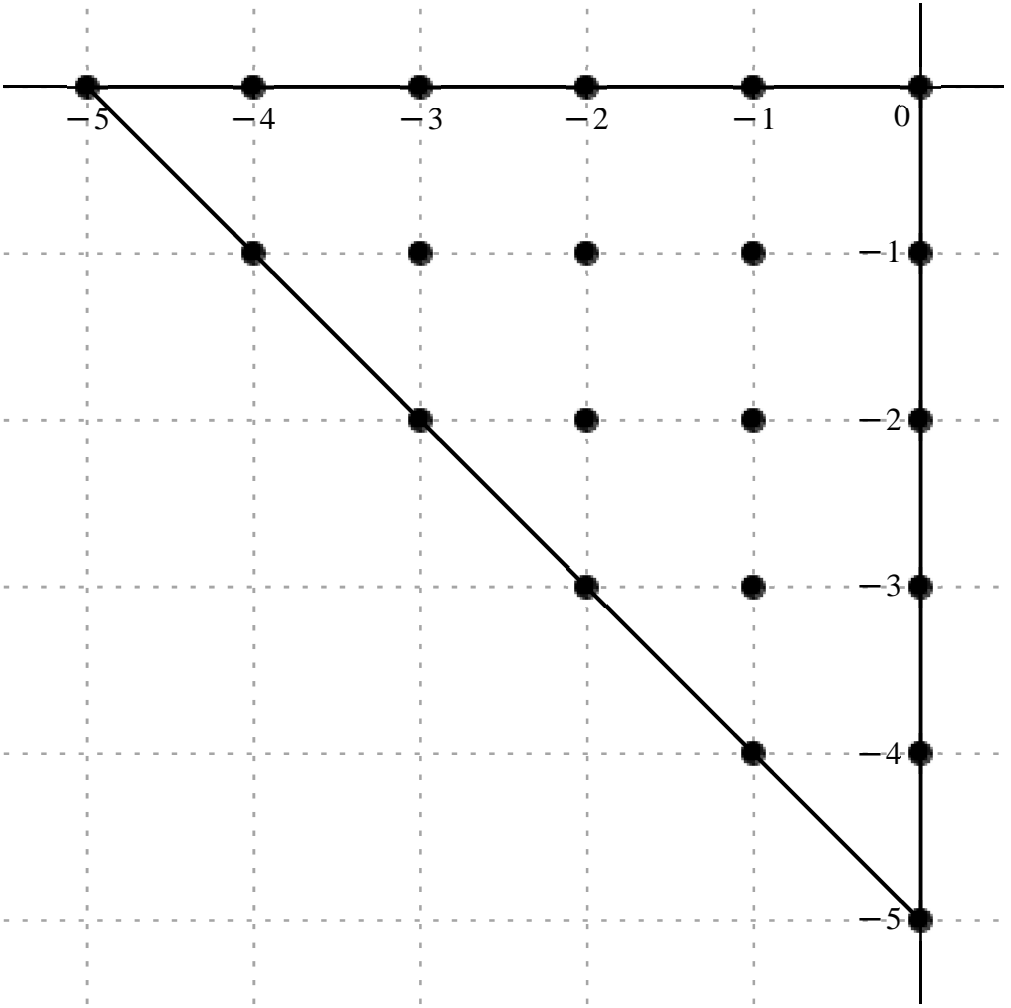
Error order:, 3, Error:,  $8.7604946468753681853 \times 10^{-12}$ , New Error:,  $8.7622560363268485121 \times 10^{-15}$

Error order:, 3, Error:,  $8.7622560363268485121 \times 10^{-15}$ , New Error:,  $8.7624321850022451935 \times 10^{-18}$

Error order:, 3, Error:,  $8.7624321850022451935 \times 10^{-18}$ , New Error:,  $8.7624497999670849063 \times 10^{-21}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4 - I & -3 - I & -2 - I & -1 - I & -I \\ & & -3 - 2 I & -2 - 2 I & -1 - 2 I & -2 I \\ & & & -2 - 3 I & -1 - 3 I & -3 I \\ & & & & -1 - 4 I & -4 I \\ & & & & & -5 I \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccc} -\frac{147138513984}{5945} & -\frac{133898311008 I}{5945} & -\frac{883635806592}{205} & -\frac{90481007232 I}{41} & \frac{8198112384}{5} & -\frac{714241680768 I}{5} & \frac{16527394566144}{29} & +\frac{7304870200320 I}{29} & -279779445792 + 122581898208 I & -11970249984 I \\ & & -\frac{21916119456}{5} & +\frac{101772272448 I}{5} & \frac{2038362568704}{5} & -\frac{10027649415168 I}{5} & -18583813100160 + 4486278690432 I & 11737685127168 I & 279779445792 + 122581898208 I & \\ & & & & -426226401216 - 451876936896 I & -16282960049664 I & 18583813100160 + 4486278690432 I & -\frac{16527394566144}{29} & +\frac{7304870200320 I}{29} & \\ & & & & & 426226401216 - 451876936896 I & -\frac{2038362568704}{5} & -\frac{10027649415168 I}{5} & -\frac{8198112384}{5} & -\frac{714241680768 I}{5} \\ & & & & & & \frac{21916119456}{5} & +\frac{101772272448 I}{5} & \frac{883635806592}{205} & -\frac{90481007232 I}{41} \\ & & & & & & & & \frac{147138513984}{5945} & -\frac{133898311008 I}{5945} \end{array} \right]$$



$$\frac{\mathrm{d}^{18}}{\mathrm{d}x_{ol}^{18}}\;u(x_{ol})=\frac{1}{5945\,\Delta x_{ol}^{18}}\left(12573792\left(-(11702+10649\,\mathrm{I})\,u_{ol-5}-(2038004+1043420\,\mathrm{I})\,u_{ol-4}+(775228-67539956\,\mathrm{I})\,u_{ol-3}+(269458560+119096800\,\mathrm{I})\,u_{ol-2}+(-132282195+57957805\,\mathrm{I})\,u_{ol-1}-5659640\,\mathrm{I}u_{ol}+(-2072427+9623766\,\mathrm{I})\,u_{ol-4-1}+(192751168-948232256\,\mathrm{I})\,u_{ol-3-1}+(-8786591100\right.$$
  
$$\left.+2121152220\,\mathrm{I})\,u_{ol-2-1}+5549681280\,\mathrm{I}u_{ol-1-1}+(132282195+57957805\,\mathrm{I})\,u_{ol-1}-(201523610+213651410\,\mathrm{I})\,u_{ol-3-21}-7698727440\,\mathrm{I}u_{ol-2-21}+(8786591100+2121152220\,\mathrm{I})\,u_{ol-1-21}+(-269458560+119096800\,\mathrm{I})\,u_{ol-21}+(201523610-213651410\,\mathrm{I})\,u_{ol-2-31}-(192751168+948232256\,\mathrm{I})\,u_{ol-1-31}-(775228\right.$$
  
$$\left.+67539956\,\mathrm{I})\,u_{ol-31}+(2072427+9623766\,\mathrm{I})\,u_{ol-1-41}+(2038004-1043420\,\mathrm{I})\,u_{ol-41}+(11702-10649\,\mathrm{I})\,u_{ol-51}\right)\Big),\;O(\,\Delta x_{ol}^3\,)$$

Formula:, 575, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 19

Error order:, 2, Error:, 0.0011339457683989081065, New Error:, 0.000011437457009519488333

Error order:, 2, Error:, 0.000011437457009519488333, New Error:,  $1.1447224394332679085\times 10^{-7}$

Error order:, 2, Error:,  $1.1447224394332679085\times 10^{-7}$ , New Error:,  $1.1448200798512413183\times 10^{-9}$

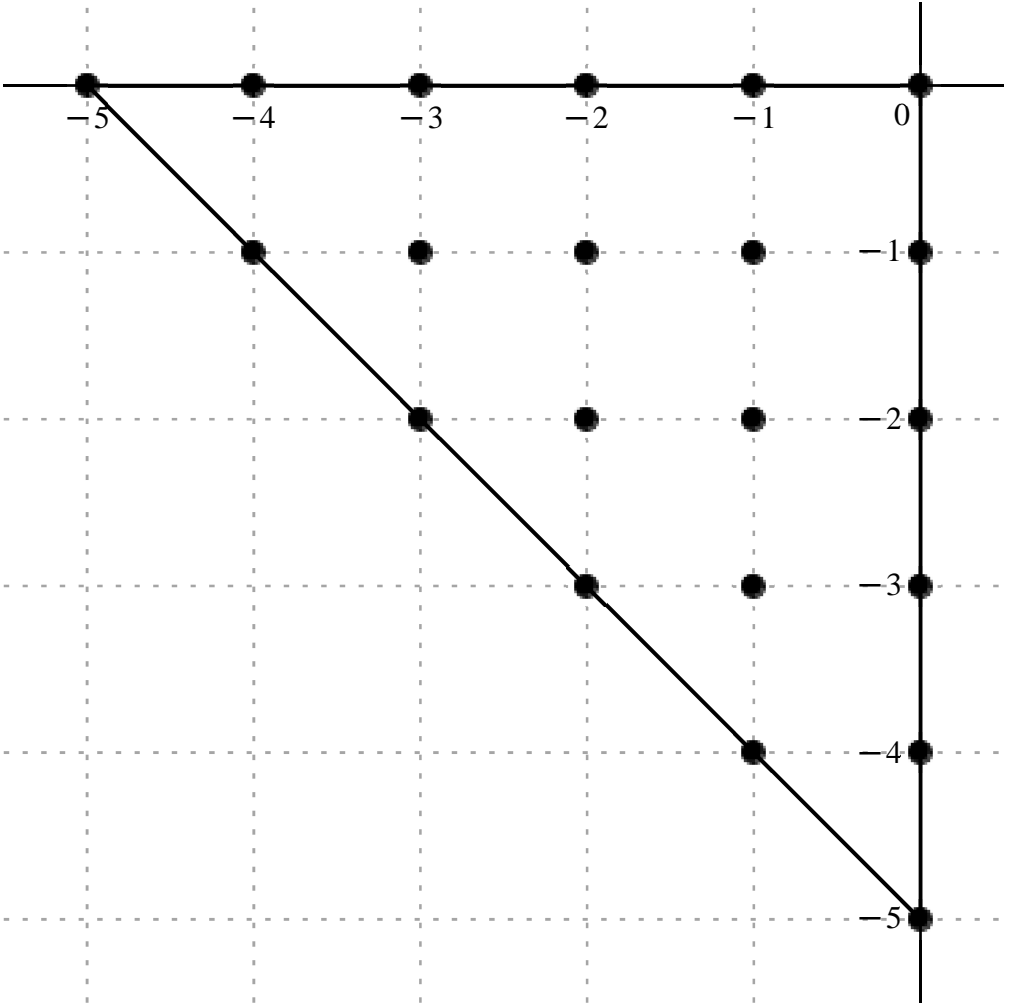
Error order:, 2, Error:,  $1.1448200798512413183\times 10^{-9}$ , New Error:,  $1.1448298435578495736\times 10^{-11}$

Error order:, 2, Error:,  $1.1448298435578495736\times 10^{-11}$ , New Error:,  $1.1448308199251576203\times 10^{-13}$

$$x_o+h\,,\left[\begin{array}{cccccc} -5 & -4 & -3 & -2 & -1 & 0 \\ & -4-{\rm I} & -3-{\rm I} & -2-{\rm I} & -1-{\rm I} & -{\rm I} \\ & & -3-2\,{\rm I} & -2-2\,{\rm I} & -1-2\,{\rm I} & -2\,{\rm I} \\ & & & -2-3\,{\rm I} & -1-3\,{\rm I} & -3\,{\rm I} \\ & & & & -1-4\,{\rm I} & -4\,{\rm I} \\ & & & & & -5\,{\rm I} \end{array}\right]$$

$$c = ,$$

$-\frac{168664845888}{5945} + \frac{19828869984 \text{ I}}{5945}$	$-\frac{777865068288}{205} + \frac{60203316096 \text{ I}}{41}$	$-\frac{430979294592}{5} - \frac{404222265216 \text{ I}}{5}$	$\frac{13565813893632}{29} - \frac{5714536988160 \text{ I}}{29}$	$-85765835232 + 229584868128 \text{ I}$	$-6689257344 - 6689257344 \text{ I}$
	$\frac{51125038272}{5} + \frac{72387320544 \text{ I}}{5}$	$-\frac{4938583136256}{5} - \frac{7017986562048 \text{ I}}{5}$	$-8041442935680 + 13597348963968 \text{ I}$	$6758061133824 + 6758061133824 \text{ I}$	$229584868128 - 85765835232 \text{ I}$
		$-527973526080 - 8122669632 \text{ I}$	$-9649731522816 - 9649731522816 \text{ I}$	$13597348963968 - 8041442935680 \text{ I}$	$-\frac{5714536988160}{29} + \frac{13565813893632 \text{ I}}{29}$
			$-8122669632 - 527973526080 \text{ I}$	$-\frac{7017986562048}{5} - \frac{4938583136256 \text{ I}}{5}$	$-\frac{404222265216}{5} - \frac{430979294592 \text{ I}}{5}$
				$\frac{72387320544}{5} + \frac{51125038272 \text{ I}}{5}$	$\frac{60203316096}{41} - \frac{777865068288 \text{ I}}{205}$
					$\frac{19828869984}{5945} - \frac{168664845888 \text{ I}}{5945}$



$$\frac{\mathrm{d}^{19}}{\mathrm{d}x_{ol}^{19}} \; u(x_{ol}) = \frac{1}{5945 \; \Delta x_{ol}^{19}} \left( 238902048 \left( (-706 + 83 \text{ I}) \; u_{ol-5} + (-94424 + 36540 \text{ I}) \; u_{ol-4} - (2144956 + 2011788 \text{ I}) \; u_{ol-3} + (11640720 - 4903600 \text{ I}) \; u_{ol-2} + (-2134255 + 5713145 \text{ I}) \; u_{ol-1} - (166460 + 166460 \text{ I}) \; u_{ol} + (254446 + 360267 \text{ I}) \; u_{ol-4-1} - (24579008 + 34928064 \text{ I}) \; u_{ol-3-1} + (-200108700 + 338365620 \text{ I}) \; u_{ol-2-1} \right. \\ \left. + (168172160 + 168172160 \text{ I}) \; u_{ol-1-1} + (5713145 - 2134255 \text{ I}) \; u_{ol-1} - (13138450 + 202130 \text{ I}) \; u_{ol-3-21} - (240130440 + 240130440 \text{ I}) \; u_{ol-2-21} + (338365620 - 200108700 \text{ I}) \; u_{ol-1-21} + (-4903600 + 11640720 \text{ I}) \; u_{ol-21} - (202130 + 13138450 \text{ I}) \; u_{ol-2-31} - (34928064 + 24579008 \text{ I}) \; u_{ol-1-31} - (2011788 + 2144956 \text{ I}) \; u_{ol-31} \right. \\ \left. + (360267 + 254446 \text{ I}) \; u_{ol-1-41} + (36540 - 94424 \text{ I}) \; u_{ol-41} + (83 - 706 \text{ I}) \; u_{ol-51} \right), \; O( \; \Delta x_{ol}^2 \; )$$

Formula.: 576, Var.: 1

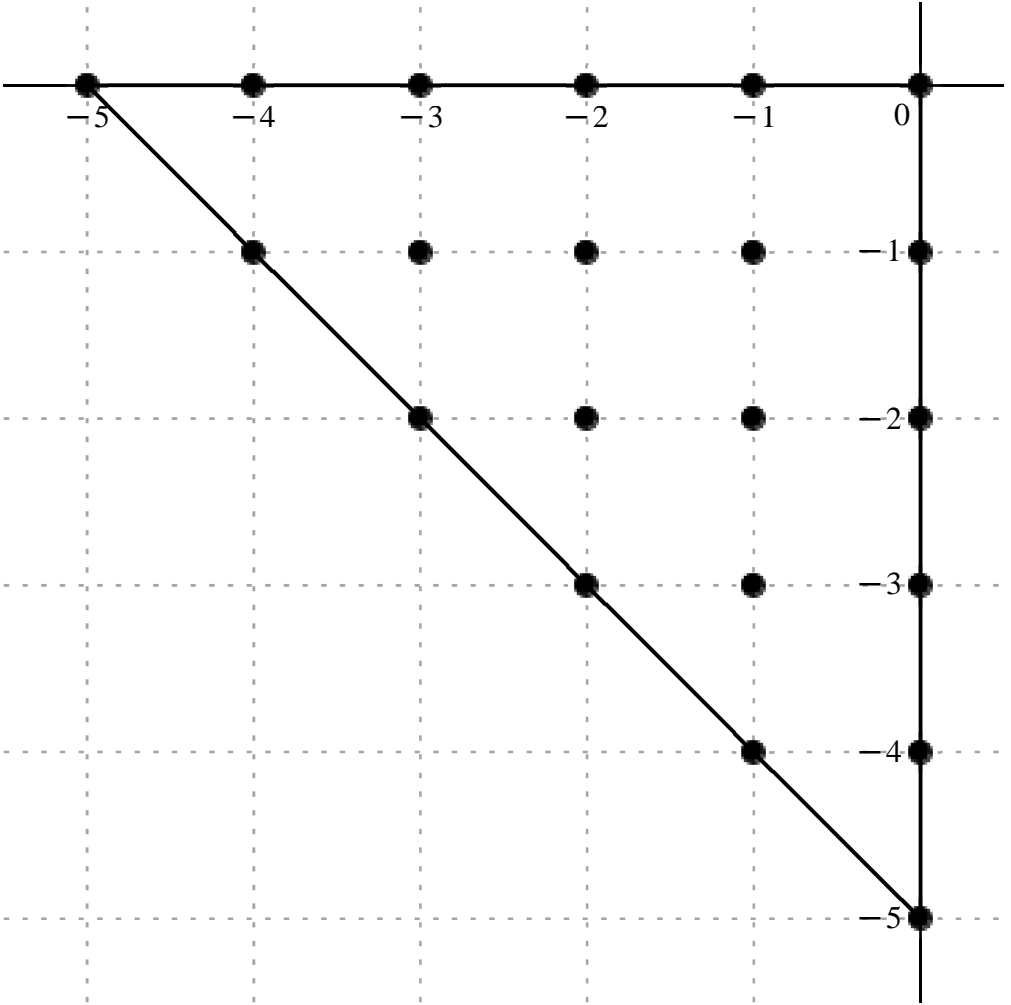
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 20

Error order.: 1, Error.: 0.072882899894242723379, New Error.: 0.0073864711926262461657

Error order.: 1, Error.: 0.0073864711926262461657, New Error.: 0.00073963346146816351095

*Error order:*, 1, *Error:*, 0.00073963346146816351095, *New Error:*, 0.000073973214089111542746  
*Error order:*, 1, *Error:*, 0.000073973214089111542746, *New Error:*, 7.397420092853332006 × 10<sup>−6</sup>  
*Error order:*, 1, *Error:*, 7.397420092853332006 × 10<sup>−6</sup>, *New Error:*, 7.3974299612927423485 × 10<sup>−7</sup>

$$c = \left[ \begin{array}{cccccc} -\frac{41091152256}{5945} + \frac{61158924288 \text{ I}}{5945} & -\frac{24845812992}{41} + \frac{66892573440 \text{ I}}{41} & -\frac{49691625984 + 3822432768 \text{ I}}{29} & \frac{2140562350080}{29} - \frac{5733649152000 \text{ I}}{29} & 43002368640 + 90782778240 \text{ I} & -3822432768 \\ & 7644865536 + 955608192 \text{ I} & -\frac{3638955995136}{5} - \frac{519850856448 \text{ I}}{5} & 1754496640512 + 6433154348544 \text{ I} & 3975330078720 & 43002368640 - 90782778240 \text{ I} \\ & & -162453392640 + 162453392640 \text{ I} & -5848322135040 & 1754496640512 - 6433154348544 \text{ I} & \frac{2140562350080}{29} + \frac{5733649152000 \text{ I}}{29} \\ & & & -162453392640 - 162453392640 \text{ I} & -\frac{3638955995136}{5} + \frac{519850856448 \text{ I}}{5} & -49691625984 - 3822432768 \text{ I} \\ & & & & 7644865536 - 955608192 \text{ I} & -\frac{24845812992}{41} - \frac{66892573440 \text{ I}}{41} \\ & & & & & -\frac{41091152256}{5945} - \frac{61158924288 \text{ I}}{5945} \end{array} \right]$$



$$\frac{\mathbb{d}^{20}}{\mathbb{d}x_{ol}^{20}}\,u(x_{ol})=\frac{1}{5945\,\Delta x_{ol}^{20}}\Big( (955608192\,((\,-43+64\,\text{I})\,u_{ol-5}+(\,-3770+10150\,\text{I})\,u_{ol-4}+(\,-309140+23780\,\text{I})\,u_{ol-3}+(459200-1230000\,\text{I})\,u_{ol-2}+(267525+564775\,\text{I})\,u_{ol-1}-23780\,u_{ol}+(47560+5945\,\text{I})\,u_{ol-4-1}-(4527712+646816\,\text{I})\,u_{ol-3-1}+(10915020+40021740\,\text{I})\,u_{ol-2-1}+24731200\,u_{ol-1-1}+(267525-564775\,\text{I})\,u_{ol-1}+(\,-1010650+1010650\,\text{I})\,u_{ol-3-21}-36383400\,u_{ol-2-21}+(10915020-40021740\,\text{I})\,u_{ol-1-21}+(459200+1230000\,\text{I})\,u_{ol-21}-(1010650+1010650\,\text{I})\,u_{ol-2-31}+(-4527712+646816\,\text{I})\,u_{ol-1-31}-(309140+23780\,\text{I})\,u_{ol-31}+(47560-5945\,\text{I})\,u_{ol-1-41}-(3770+10150\,\text{I})\,u_{ol-41}-(43+64\,\text{I})\,u_{ol-51})),$$

$$O(\,\Delta x_{ol}\,)$$

Not square - Triangle: Interval , 6

Formula:, 577, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 1

Error order:, 27, Error:,  $6.2001900391631285059 \times 10^{-69}$ , New Error:,  $6.0099176140043345134 \times 10^{-96}$

Error order:, 27, Error:,  $6.0099176140043345134 \times 10^{-96}$ , New Error:,  $5.9910440797083190313 \times 10^{-123}$

Error order:, 27, Error:,  $5.9910440797083190313 \times 10^{-123}$ , New Error:,  $5.9891582691180247912 \times 10^{-150}$

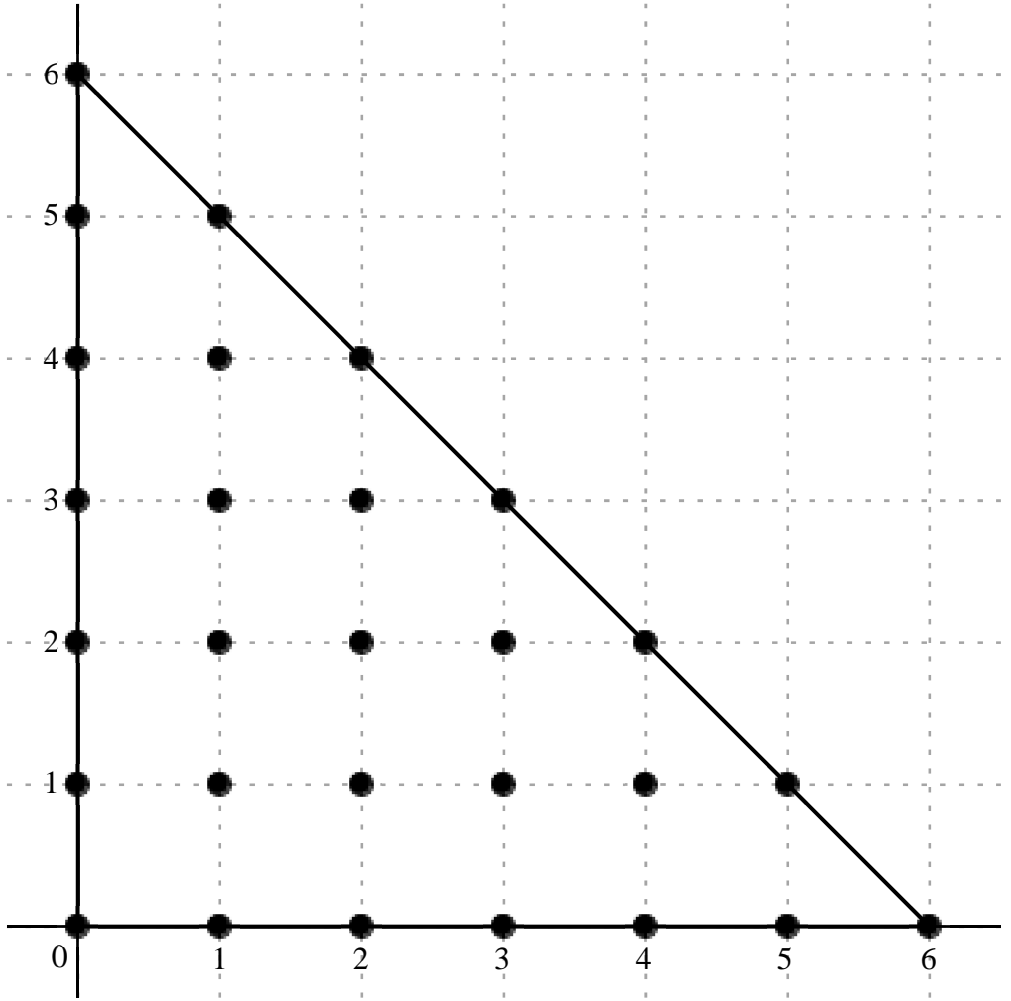
Error order:, 27, Error:,  $5.9891582691180247912 \times 10^{-150}$ , New Error:,  $5.9889697034929803726 \times 10^{-177}$

Error order:, 27, Error:,  $5.9889697034929803726 \times 10^{-177}$ , New Error:,  $5.9889508470848213564 \times 10^{-204}$

$$x_o + h \cdot \begin{bmatrix} 6 \text{ I} \\ 5 \text{ I} \quad 1 + 5 \text{ I} \\ 4 \text{ I} \quad 1 + 4 \text{ I} \quad 2 + 4 \text{ I} \\ 3 \text{ I} \quad 1 + 3 \text{ I} \quad 2 + 3 \text{ I} \quad 3 + 3 \text{ I} \\ 2 \text{ I} \quad 1 + 2 \text{ I} \quad 2 + 2 \text{ I} \quad 3 + 2 \text{ I} \quad 4 + 2 \text{ I} \\ 1 \quad 1 + 1 \quad 2 + 1 \quad 3 + 1 \quad 4 + 1 \quad 5 + 1 \\ 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \end{bmatrix}$$

$$c = , \left[ \begin{array}{cccccccc} -\frac{17749}{322028760} & -\frac{1939 \text{ I}}{107342920} & & & & & & \\ & -\frac{46008}{1813225} & -\frac{216 \text{ I}}{72529} & \frac{222912}{1313845} + \frac{10746 \text{ I}}{1313845} & & & & \\ & \frac{189}{5576} + \frac{14985 \text{ I}}{5576} & -\frac{221832}{3485} + \frac{75816 \text{ I}}{3485} & \frac{3159}{200} - \frac{4563 \text{ I}}{200} & & & & \\ & \frac{1664}{87} - \frac{4160 \text{ I}}{87} & -\frac{30888}{25} - \frac{75816 \text{ I}}{25} & -\frac{88128}{65} - \frac{249696 \text{ I}}{65} & \frac{340}{3} - \frac{340 \text{ I}}{3} & & & \\ & -\frac{702}{29} + \frac{17199 \text{ I}}{116} & \frac{696384}{145} - \frac{2066688 \text{ I}}{145} & -\frac{53703}{2} + \frac{53703 \text{ I}}{2} & \frac{249696}{65} + \frac{88128 \text{ I}}{65} & \frac{4563}{200} - \frac{3159 \text{ I}}{200} & & \\ & -\frac{6912}{629} - \frac{38448 \text{ I}}{629} & 3510 - 3510 \text{ I} & \frac{2066688}{145} - \frac{696384 \text{ I}}{145} & \frac{75816}{25} + \frac{30888 \text{ I}}{25} & -\frac{75816}{3485} + \frac{221832 \text{ I}}{3485} & -\frac{10746}{1313845} - \frac{222912 \text{ I}}{1313845} & \\ & -\frac{3697}{663} + \frac{3697 \text{ I}}{663} & \frac{38448}{629} + \frac{6912 \text{ I}}{629} & -\frac{17199}{116} + \frac{702 \text{ I}}{29} & \frac{4160}{87} - \frac{1664 \text{ I}}{87} & -\frac{14985}{5576} - \frac{189 \text{ I}}{5576} & \frac{216}{72529} + \frac{46008 \text{ I}}{1813225} & \frac{1939}{107342920} + \frac{17749 \text{ I}}{322028760} \end{array} \right]$$





$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{355841779800\,\Delta x_{ol}}\,(- (19612645+6427785\,\mathrm{I})\,u_{ol+6\mathrm{I}}-(9028977984+1059739200\,\mathrm{I})\,u_{ol+5\mathrm{I}}+(60373486080+2910446640\,\mathrm{I})\,u_{ol+1+5\mathrm{I}}+(12061351575+956292874875\,\mathrm{I})\,u_{ol+4\mathrm{I}}+(-22650529037760+7741320050880\,\mathrm{I})\,u_{ol+1+4\mathrm{I}}+(5620520911941-8118530206137\,\mathrm{I})\,u_{ol+2+4\mathrm{I}}+(6805985305600-17014963264000\,\mathrm{I})\,u_{ol+3\mathrm{I}}-(439649635778496+1079140015092672\,\mathrm{I})\,u_{ol+1+3\mathrm{I}}-(482455759541760+1366957985368320\,\mathrm{I})\,u_{ol+2+3\mathrm{I}}+(40328735044000-40328735044000\,\mathrm{I})\,u_{ol+3+3\mathrm{I}}+(-8613825152400+52759679058450\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(1708982910236160-5071820249733120\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+(-9554885550299700+9554885550299700\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}+(1366957985368320+482455759541760\,\mathrm{I})\,u_{ol+3+2\mathrm{I}}+(8118530206137-5620520911941\,\mathrm{I})\,u_{ol+4+2\mathrm{I}}-(3910299494400+21751040937600\,\mathrm{I})\,u_{ol+1\mathrm{I}}+(1249004647098000-1249004647098000\,\mathrm{I})\,u_{ol+1+1\mathrm{I}}+(5071820249733120-1708982910236160\,\mathrm{I})\,u_{ol+2+1\mathrm{I}}+(1079140015092672+439649635778496\,\mathrm{I})\,u_{ol+3+1\mathrm{I}}+(-7741320050880+22650529037760\,\mathrm{I})\,u_{ol+4+1\mathrm{I}}-(2910446640+60373486080\,\mathrm{I})\,u_{ol+5+1\mathrm{I}}+(-1984233876200+1984233876200\,\mathrm{I})\,u_{ol\mathrm{I}}+(21751040937600+3910299494400\,\mathrm{I})\,u_{ol+1\mathrm{I}}+(-52759679058450+8613825152400\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(17014963264000-6805985305600\,\mathrm{I})\,u_{ol+3\mathrm{I}}-(956292874875+12061351575\,\mathrm{I})\,u_{ol+4\mathrm{I}}+(1059739200+9028977984\,\mathrm{I})\,u_{ol+5\mathrm{I}}+(6427785+19612645\,\mathrm{I})\,u_{ol+6\mathrm{I}}),\,O(\,\Delta x_{ol}^{27}\,)$$

Formula.: 578, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 2

Error order.: 26, Error.: 1.0217091529541894669 × 10<sup>−65</sup>, New Error.: 1.0066932864902027688 × 10<sup>−91</sup>

Error order.: 26, Error.: 1.0066932864902027688 × 10<sup>−91</sup>, New Error.: 1.0051831248464392847 × 10<sup>−117</sup>

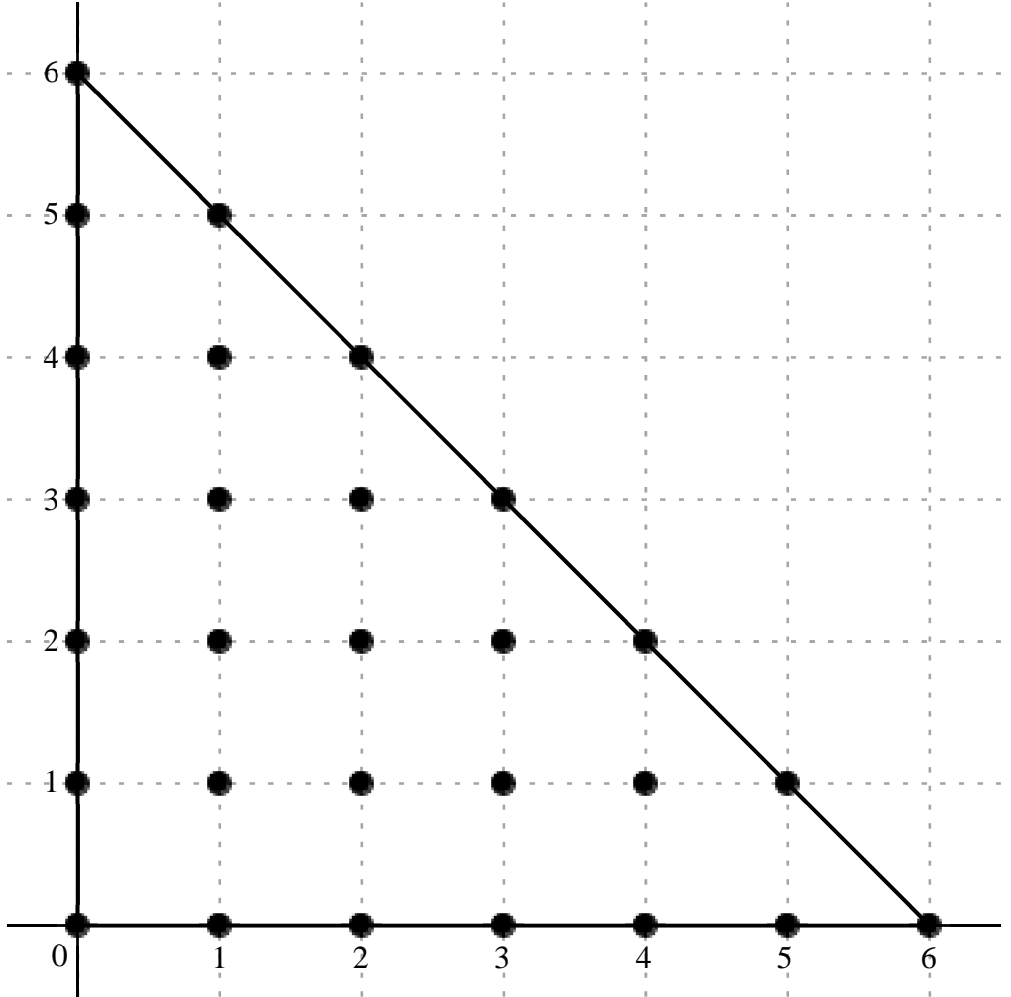
Error order.: 26, Error.: 1.0051831248464392847 × 10<sup>−117</sup>, New Error.: 1.0050320262251858050 × 10<sup>−143</sup>

Error order.: 26, Error.: 1.0050320262251858050 × 10<sup>−143</sup>, New Error.: 1.0050169155417573368 × 10<sup>−169</sup>

Error order.: 26, Error.: 1.0050169155417573368 × 10<sup>−169</sup>, New Error.: 1.0050154044652047217 × 10<sup>−195</sup>

$$x_o+h.,\left[\begin{array}{cccccc}6\,\mathrm{I}\\5\,\mathrm{I}\,\,1+5\,\mathrm{I}\\4\,\mathrm{I}\,\,1+4\,\mathrm{I}\,\,2+4\,\mathrm{I}\\3\,\mathrm{I}\,\,1+3\,\mathrm{I}\,\,2+3\,\mathrm{I}\,\,3+3\,\mathrm{I}\\2\,\mathrm{I}\,\,1+2\,\mathrm{I}\,\,2+2\,\mathrm{I}\,\,3+2\,\mathrm{I}\,\,4+2\,\mathrm{I}\\1\,\,\,1+\mathrm{I}\,\,\,2+\mathrm{I}\,\,\,3+\mathrm{I}\,\,\,4+\mathrm{I}\,\,\,5+\mathrm{I}\\0\,\,\,\,1\,\,\,\,\,2\,\,\,\,\,3\,\,\,\,\,4\,\,\,\,\,5\,\,\,\,\,6\end{array}\right]$$

$$c = , \left[ \begin{array}{cccccccc} \frac{172961447}{213505067880} - \frac{28100893 \text{ I}}{71168355960} & & & & & & & \\ \frac{7425072}{23571925} - \frac{480090384 \text{ I}}{2003613625} & - \frac{2786274}{1416389} + \frac{2459286 \text{ I}}{1416389} & & & & & & \\ - \frac{71486019}{2464592} - \frac{72976185 \text{ I}}{2464592} & \frac{327600}{697} - \frac{641232 \text{ I}}{697} & \frac{1229481}{17000} + \frac{7135083 \text{ I}}{17000} & & & & & \\ \frac{1278208}{4437} + \frac{1085312 \text{ I}}{1479} & \frac{96758208}{2125} + \frac{42875856 \text{ I}}{2125} & \frac{47127168}{845} + \frac{22954176 \text{ I}}{845} & \frac{31880 \text{ I}}{13} & & & & \\ - \frac{2436003}{1972} - \frac{1872693 \text{ I}}{986} & \frac{1182120192}{12325} + \frac{2501629056 \text{ I}}{12325} & - \frac{1144125 \text{ I}}{2} & - \frac{47127168}{845} + \frac{22954176 \text{ I}}{845} & - \frac{1229481}{17000} + \frac{7135083 \text{ I}}{17000} & & & \\ \frac{94803264}{139009} + \frac{80780832 \text{ I}}{139009} & \frac{1211580 \text{ I}}{17} & - \frac{1182120192}{12325} + \frac{2501629056 \text{ I}}{12325} & - \frac{96758208}{2125} + \frac{42875856 \text{ I}}{2125} & - \frac{327600}{697} - \frac{641232 \text{ I}}{697} & \frac{2786274}{1416389} + \frac{2459286 \text{ I}}{1416389} & & \\ - \frac{34912583 \text{ I}}{574600} & - \frac{94803264}{139009} + \frac{80780832 \text{ I}}{139009} & \frac{2436003}{1972} - \frac{1872693 \text{ I}}{986} & - \frac{1278208}{4437} + \frac{1085312 \text{ I}}{1479} & \frac{71486019}{2464592} - \frac{72976185 \text{ I}}{2464592} & - \frac{7425072}{23571925} - \frac{480090384 \text{ I}}{2003613625} & - \frac{172961447}{213505067880} - \frac{28100893 \text{ I}}{71168355960} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{2359231000074000 \, \mathcal{A} x_{ol}^2} \big( (1911223989350 - 931544602950 \, \mathrm{I}) \, u_{ol+6\mathrm{I}} + (743149320226560 - 565300666075392 \, \mathrm{I}) \, u_{ol+5\mathrm{I}} + (-4641001868484000 + 4096349074476000 \, \mathrm{I}) \, u_{ol+1+5\mathrm{I}} - (68430000623502375 + 69856462213273125 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (1108872418399200000 - 2170465441376544000 \, \mathrm{I}) \, u_{ol+1+4\mathrm{I}}$$

$$+ (170625275835410682 + 990194647158882126 \, \mathrm{I}) \, u_{ol+2+4\mathrm{I}} + (679645692617216000 + 1731238482185472000 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (107423512388333227008 + 47601905237604147456 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (131578551113959065600 + 64087814911662259200 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} + 5785560329412240000 \, \mathrm{I} u_{ol+3+3\mathrm{I}} - (2914347765655813500$$

$$+ 4480847240589837000 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (226279480955767050240 + 478857672989943736320 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} - 1349627583979832625000 \, \mathrm{I} u_{ol+2+2\mathrm{I}} + (-131578551113959065600 + 64087814911662259200 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} + (-170625275835410682 + 990194647158882126 \, \mathrm{I}) \, u_{ol+4+2\mathrm{I}} + (1608980708709504000$$

$$+ 1370994993605952000 \, \mathrm{I}) \, u_{ol+1} + 168141005592332760000 \, \mathrm{I} u_{ol+1+\mathrm{I}} + (-226279480955767050240 + 478857672989943736320 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} + (-107423512388333227008 + 47601905237604147456 \, \mathrm{I}) \, u_{ol+3+\mathrm{I}} - (1108872418399200000 + 2170465441376544000 \, \mathrm{I}) \, u_{ol+4+\mathrm{I}} + (4641001868484000 + 4096349074476000 \, \mathrm{I}) \, u_{ol+5+\mathrm{I}}$$

$$- 143346411601560270 \, \mathrm{I} u_{ol} + (-1608980708709504000 + 1370994993605952000 \, \mathrm{I}) \, u_{ol+1} + (2914347765655813500 - 4480847240589837000 \, \mathrm{I}) \, u_{ol+2} + (-679645692617216000 + 1731238482185472000 \, \mathrm{I}) \, u_{ol+3} + (68430000623502375 - 69856462213273125 \, \mathrm{I}) \, u_{ol+4} - (743149320226560 + 565300666075392 \, \mathrm{I}) \, u_{ol+5}$$

$$- (1911223989350 + 931544602950 \, \mathrm{I}) \, u_{ol+6}), \, O(\mathcal{A} x_{ol}^{26})$$

*Formula:*, 579, *Var.*: 1

*Variavel* :,  $x_{oi}$ , *Derivada de Ordem* :, 3

*Error order:*, 25, *Error:*,  $9.3391718823638245513 \times 10^{-63}$ , *New Error:*,  $9.0534851185194226790 \times 10^{-88}$

*Error order:*, 25, *Error:*,  $9.0534851185194226790 \times 10^{-88}$ , *New Error:*,  $9.0251465151565808208 \times 10^{-113}$

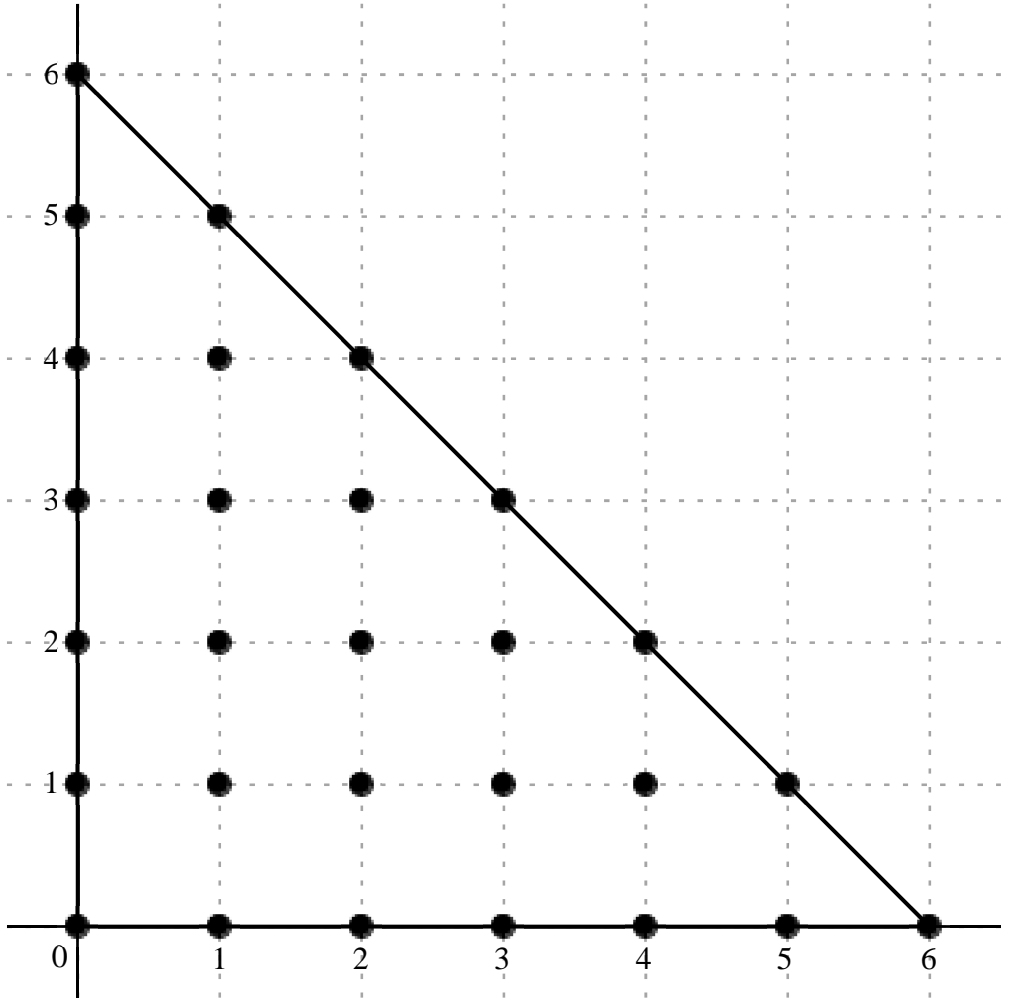
*Error order:*, 25, *Error:*,  $9.0251465151565808208 \times 10^{-113}$ , *New Error:*,  $9.0223149641408787745 \times 10^{-138}$

*Error order*., 25, *Error*.,  $9.0223149641408787745 \times 10^{-138}$ , *New Error*.,  $9.0220318321408589998 \times 10^{-163}$

*Error order*., 25, *Error*.,  $9.0220318321408589998 \times 10^{-163}$ , *New Error*.,  $9.0220035191718808468 \times 10^{-188}$

$$x_o \neq h. , \left[ \begin{array}{cccccc} 6I & & & & & \\ 5I & 1+5I & & & & \\ 4I & 1+4I & 2+4I & & & \\ 3I & 1+3I & 2+3I & 3+3I & & \\ 2I & 1+2I & 2+2I & 3+2I & 4+2I & \\ I & 1+I & 2+I & 3+I & 4+I & 5+I \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 \end{array} \right]$$

$$c = \begin{array}{l} -\frac{645790646833}{185037725496000} + \frac{5352121039903 \text{ I}}{555113176488000} \\ -\frac{89421505551}{130234885625} + \frac{577732680819 \text{ I}}{130234885625} \quad \frac{65784094029}{29035974500} - \frac{214800728472 \text{ I}}{7258993625} \\ \frac{149834338839}{320396960} + \frac{12475858491 \text{ I}}{800992400} \quad \frac{3849814413}{1132625} + \frac{12581847801 \text{ I}}{1132625} \quad -\frac{2641923459}{680000} - \frac{24721798131 \text{ I}}{8840000} \\ -\frac{767356712}{96135} - \frac{5442829552 \text{ I}}{1442025} \quad -\frac{71958796389}{138125} + \frac{26282835477 \text{ I}}{138125} \quad -\frac{13851134028}{21125} + \frac{4669967304 \text{ I}}{21125} \quad -\frac{32840383}{1690} - \frac{32840383 \text{ I}}{1690} \\ \frac{123961036527}{5127200} + \frac{8030941371 \text{ I}}{1281800} \quad -\frac{108242282016}{47125} - \frac{695965809096 \text{ I}}{801125} \quad \frac{23220229257}{5200} + \frac{23220229257 \text{ I}}{5200} \quad \frac{4669967304}{21125} - \frac{13851134028 \text{ I}}{21125} \quad -\frac{24721798131}{8840000} - \frac{2641923459 \text{ I}}{680000} \\ -\frac{424608310494}{45177925} - \frac{1939767264 \text{ I}}{45177925} \quad -\frac{138553119}{260} - \frac{138553119 \text{ I}}{260} \quad -\frac{695965809096}{801125} - \frac{108242282016 \text{ I}}{47125} \quad \frac{26282835477}{138125} - \frac{71958796389 \text{ I}}{138125} \quad \frac{12581847801}{1132625} + \frac{3849814413 \text{ I}}{1132625} \quad -\frac{214800728472}{7258993625} + \frac{65784094029 \text{ I}}{29035974500} \\ \frac{11077454347}{34476000} + \frac{11077454347 \text{ I}}{34476000} \quad -\frac{1939767264}{45177925} - \frac{424608310494 \text{ I}}{45177925} \quad \frac{8030941371}{1281800} + \frac{123961036527 \text{ I}}{5127200} \quad -\frac{5442829552}{1442025} - \frac{767356712 \text{ I}}{96135} \quad \frac{12475858491}{800992400} + \frac{149834338839 \text{ I}}{320396960} \quad \frac{577732680819}{130234885625} - \frac{89421505551 \text{ I}}{130234885625} \quad \frac{5352121039903}{555113176488000} - \frac{645790646833 \text{ I}}{185037725496000} \end{array}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{47184620001480000 \, \Delta x_{ol}^3} \Big( (-164676614942415 + 454930288391755 \, \mathrm{I}) \, u_{ol+6\mathrm{I}} + (-32397769147149504 + 209314861191446976 \, \mathrm{I}) \, u_{ol+5\mathrm{I}} + (106901784160886160 - 1396239103184555520 \, \mathrm{I}) \, u_{ol+1+5\mathrm{I}} + (22065990705065400750 + 734924129230280700 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (160381441477652166720 + 524153808547967557440 \, \mathrm{I}) \, u_{ol+1+4\mathrm{I}} - (183320815420456803999 + 131955729701870303307 \, \mathrm{I}) \, u_{ol+2+4\mathrm{I}} - (376631142261456576000 + 178095278614410726400 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (-24581708332154470216512 + 8978429716153211486016 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (-30937774944414155662080 + 10430799179104190845440 \, \mathrm{I}) \, u_{ol+2+3\mathrm{I}} - (916899995596487436000 + 916899995596487436000 \, \mathrm{I}) \, u_{ol+3+3\mathrm{I}} + (1140789203369495450550 + 295628738371664700600 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} - (108379224297464031774720 + 40990959258813959016960 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (210699556507460246019300 + 210699556507460246019300 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (10430799179104190845440 - 30937774944414155662080 \, \mathrm{I}) \, u_{ol+3+2\mathrm{I}} - (131955729701870303307 + 183320815420456803999 \, \mathrm{I}) \, u_{ol+4+2\mathrm{I}} - (443468392586198294400 + 2025927070425446400 \, \mathrm{I}) \, u_{ol+\mathrm{I}} - (25144524115518610062000 + 25144524115518610062000 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} - (40990959258813959016960 + 108379224297464031774720 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} + (8978429716153211486016 - 24581708332154470216512 \, \mathrm{I}) \, u_{ol+3+\mathrm{I}} + (524153808547967557440 + 160381441477652166720 \, \mathrm{I}) \, u_{ol+4+\mathrm{I}} + (-1396239103184555520 + 106901784160886160 \, \mathrm{I}) \, u_{ol+5+\mathrm{I}} + (15160850271114333810 + 15160850271114333810 \, \mathrm{I}) \, u_{ol} - (2025927070425446400 + 443468392586198294400 \, \mathrm{I}) \, u_{ol+1} + (295628738371664700600 + 1140789203369495450550 \, \mathrm{I}) \, u_{ol+2} - (178095278614410726400 + 376631142261456576000 \, \mathrm{I}) \, u_{ol+3} + (734924129230280700 + 22065990705065400750 \, \mathrm{I}) \, u_{ol+4} + (209314861191446976 - 32397769147149504 \, \mathrm{I}) \, u_{ol+5} + (454930288391755 - 164676614942415 \, \mathrm{I}) \, u_{ol+6} \Big), \, O(\, \Delta x_{ol}^{25} \, )$$

Formula:, 580, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:., 27, Error:., 5.9436005458101855854 × 10<sup>−69</sup>, New Error:., 5.9845668789552527868 × 10<sup>−96</sup>

Error order:., 27, Error:., 5.9845668789552527868 × 10<sup>−96</sup>, New Error:., 5.9885121207095684993 × 10<sup>−123</sup>

Error order:., 27, Error:., 5.9885121207095684993 × 10<sup>−123</sup>, New Error:., 5.9889051043955731510 × 10<sup>−150</sup>

Error order:., 27, Error:., 5.9889051043955731510 × 10<sup>−150</sup>, New Error:., 5.9889443873325418046 × 10<sup>−177</sup>

Error order:., 27, Error:., 5.9889443873325418046 × 10<sup>−177</sup>, New Error:., 5.9889483154718955979 × 10<sup>−204</sup>

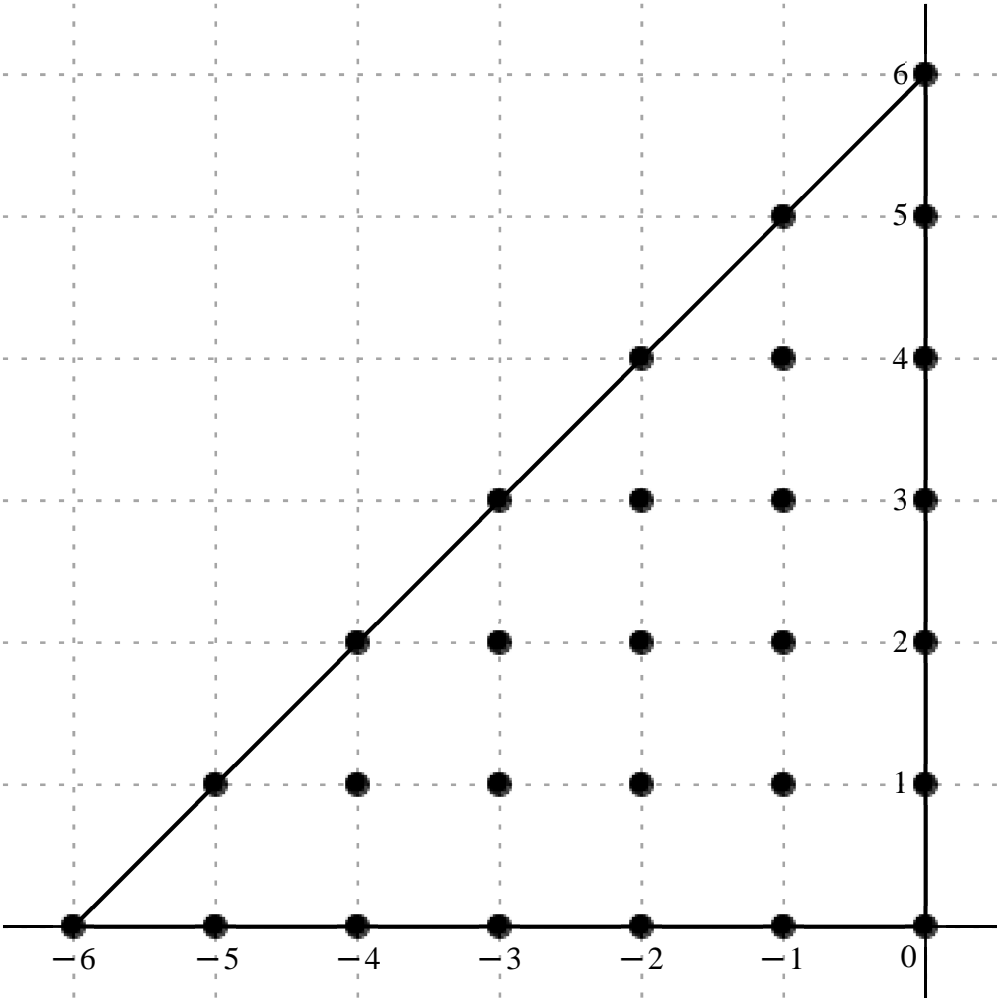
$$x_o \neq h.$$

$$c = ,$$



$$\frac{d}{dx_{ol}}$$





$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{2359231000074000 \, \mathcal{A}x_{ol}^2} \big( (1911223989350 + 931544602950 \, \mathrm{I}) \, u_{ol+6\mathrm{I}} - (4641001868484000 + 4096349074476000 \, \mathrm{I}) \, u_{ol-1+5\mathrm{I}} + (743149320226560 + 565300666075392 \, \mathrm{I}) \, u_{ol+5\mathrm{I}} + (170625275835410682 - 990194647158882126 \, \mathrm{I}) \, u_{ol-2+4\mathrm{I}} + (1108872418399200000 + 2170465441376544000 \, \mathrm{I}) \, u_{ol-1+4\mathrm{I}}$$
$$+ (-68430000623502375 + 69856462213273125 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} - 5785560329412240000 \, \mathrm{I} u_{ol-3+3\mathrm{I}} + (131578551113959065600 - 64087814911662259200 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (107423512388333227008 - 47601905237604147456 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (679645692617216000 - 1731238482185472000 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (170625275835410682$$
$$+ 990194647158882126 \, \mathrm{I}) \, u_{ol-4+2\mathrm{I}} - (131578551113959065600 + 64087814911662259200 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + 1349627583979832625000 \, \mathrm{I} u_{ol-2+2\mathrm{I}} + (226279480955767050240 - 478857672989943736320 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (-2914347765655813500 + 4480847240589837000 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (4641001868484000 - 4096349074476000 \, \mathrm{I}) \, u_{ol-5+1\mathrm{I}}$$
$$+ (-1108872418399200000 + 2170465441376544000 \, \mathrm{I}) \, u_{ol-4+1\mathrm{I}} - (107423512388333227008 + 47601905237604147456 \, \mathrm{I}) \, u_{ol-3+1\mathrm{I}} - (226279480955767050240 + 478857672989943736320 \, \mathrm{I}) \, u_{ol-2+1\mathrm{I}} - 168141005592332760000 \, \mathrm{I} u_{ol-1+1\mathrm{I}} + (1608980708709504000 - 1370994993605952000 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} + (-1911223989350$$
$$+ 931544602950 \, \mathrm{I}) \, u_{ol-6} + (-743149320226560 + 565300666075392 \, \mathrm{I}) \, u_{ol-5} + (68430000623502375 + 69856462213273125 \, \mathrm{I}) \, u_{ol-4} - (679645692617216000 + 1731238482185472000 \, \mathrm{I}) \, u_{ol-3} + (2914347765655813500 + 4480847240589837000 \, \mathrm{I}) \, u_{ol-2} - (1608980708709504000 + 1370994993605952000 \, \mathrm{I}) \, u_{ol-1}$$
$$+ 143346411601560270 \, \mathrm{I} u_{ol} \big), \, O( \, \mathcal{A}x_{ol}^{26} \, )$$

Formula: 582, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 3

Error order: 25, Error: 8.9539177461353089091 × 10<sup>-63</sup>, New Error: 9.0154210554898923392 × 10<sup>-88</sup>

Error order: 25, Error: 9.0154210554898923392 × 10<sup>-88</sup>, New Error: 9.0213447706544138536 × 10<sup>-113</sup>

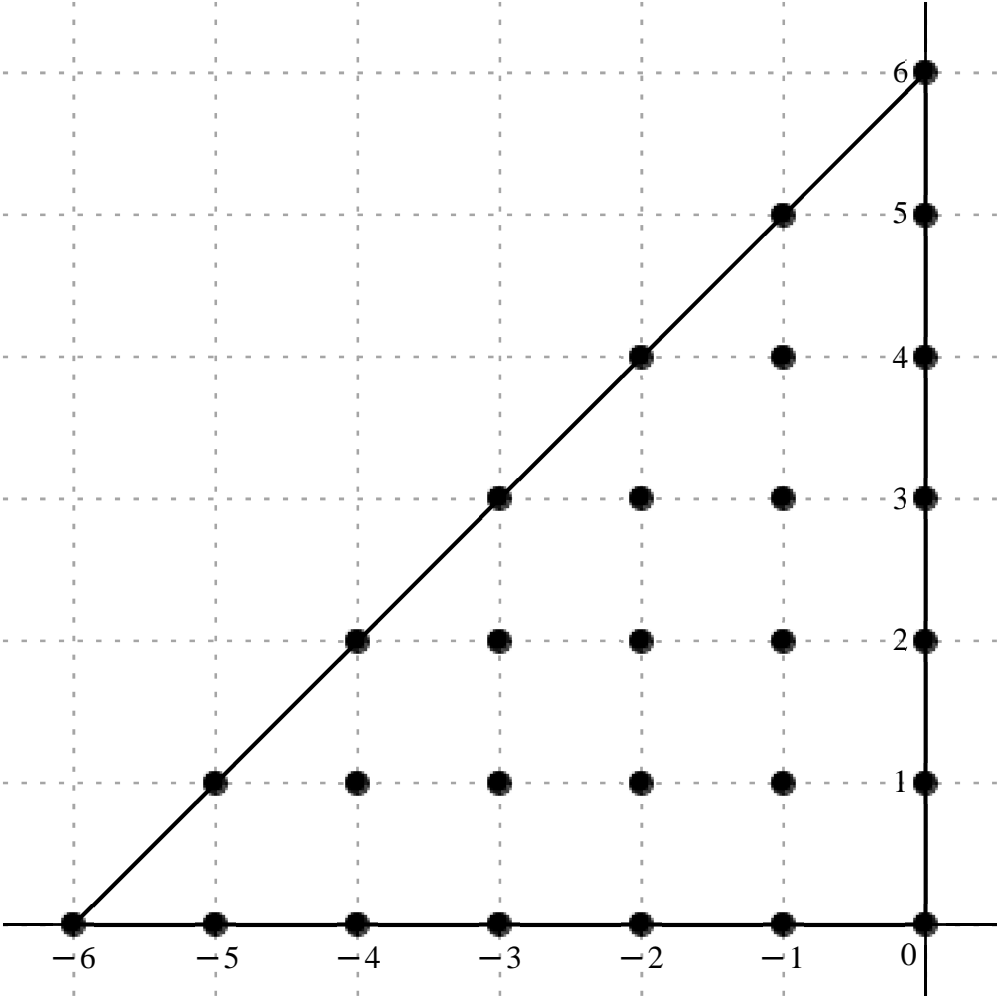
Error order: 25, Error: 9.0213447706544138536 × 10<sup>-113</sup>, New Error: 9.0219348363569626270 × 10<sup>-138</sup>

Error order: 25, Error: 9.0219348363569626270 × 10<sup>-138</sup>, New Error: 9.0219938198291786832 × 10<sup>-163</sup>

Error order: 25, Error: 9.0219938198291786832 × 10<sup>-163</sup>, New Error: 9.0219997179453799764 × 10<sup>-188</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccccc} & & & & & 6 \text{ I} \\ & & & & -1 + 5 \text{ I} & 5 \text{ I} \\ & & & -2 + 4 \text{ I} & -1 + 4 \text{ I} & 4 \text{ I} \\ & & -3 + 3 \text{ I} & -2 + 3 \text{ I} & -1 + 3 \text{ I} & 3 \text{ I} \\ & -4 + 2 \text{ I} & -3 + 2 \text{ I} & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -5 + \text{I} & -4 + \text{I} & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -6 & -5 & -4 & -3 & -2 & -1 & 0 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} & & & & & & & \frac{645790646833}{185037725496000} + \frac{5352121039903 \text{ I}}{555113176488000} \\ & & & & & & -\frac{65784094029}{29035974500} - \frac{214800728472 \text{ I}}{7258993625} & -\frac{89421505551}{130234885625} + \frac{577732680819 \text{ I}}{130234885625} \\ & & & & & \frac{2641923459}{680000} - \frac{24721798131 \text{ I}}{8840000} & -\frac{3849814413}{1132625} + \frac{12581847801 \text{ I}}{1132625} & -\frac{149834338839}{320396960} + \frac{12475858491 \text{ I}}{800992400} \\ & & \frac{32840383}{1690} - \frac{32840383 \text{ I}}{1690} & \frac{13851134028}{21125} + \frac{4669967304 \text{ I}}{21125} & \frac{71958796389}{138125} + \frac{26282835477 \text{ I}}{138125} & \frac{767356712}{96135} - \frac{5442829552 \text{ I}}{1442025} \\ & \frac{24721798131}{8840000} - \frac{2641923459 \text{ I}}{680000} & -\frac{4669967304}{21125} - \frac{13851134028 \text{ I}}{21125} & -\frac{23220229257}{5200} + \frac{23220229257 \text{ I}}{5200} & \frac{108242282016}{47125} - \frac{695965809096 \text{ I}}{801125} & -\frac{123961036527}{5127200} + \frac{8030941371 \text{ I}}{1281800} \\ & \frac{214800728472}{7258993625} + \frac{65784094029 \text{ I}}{29035974500} & -\frac{12581847801}{1132625} + \frac{3849814413 \text{ I}}{1132625} & -\frac{26282835477}{138125} - \frac{71958796389 \text{ I}}{138125} & \frac{695965809096}{801125} - \frac{108242282016 \text{ I}}{47125} & \frac{138553119}{260} - \frac{138553119 \text{ I}}{260} & \frac{424608310494}{45177925} - \frac{1939767264 \text{ I}}{45177925} \\ -\frac{5352121039903}{555113176488000} - \frac{645790646833 \text{ I}}{185037725496000} & -\frac{577732680819}{130234885625} - \frac{89421505551 \text{ I}}{130234885625} & -\frac{12475858491}{800992400} + \frac{149834338839 \text{ I}}{320396960} & \frac{5442829552}{1442025} - \frac{767356712 \text{ I}}{96135} & -\frac{8030941371}{1281800} + \frac{123961036527 \text{ I}}{5127200} & \frac{1939767264}{45177925} - \frac{424608310494 \text{ I}}{45177925} & -\frac{11077454347}{34476000} + \frac{11077454347 \text{ I}}{34476000} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{47184620001480000 \, \Delta x_{ol}^3} \Big( (164676614942415 + 454930288391755 \, \mathrm{I}) \, u_{ol+6\mathrm{I}} - (106901784160886160 + 1396239103184555520 \, \mathrm{I}) \, u_{ol-1+5\mathrm{I}} + (32397769147149504 + 209314861191446976 \, \mathrm{I}) \, u_{ol+5\mathrm{I}} + (183320815420456803999 - 131955729701870303307 \, \mathrm{I}) \, u_{ol-2+4\mathrm{I}} + (-160381441477652166720$$

$$+ 524153808547967557440 \, \mathrm{I}) \, u_{ol-1+4\mathrm{I}} + (-22065990705065400750 + 734924129230280700 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (916899995596487436000 - 916899995596487436000 \, \mathrm{I}) \, u_{ol-3+3\mathrm{I}} + (30937774944414155662080 + 10430799179104190845440 \, \mathrm{I}) \, u_{ol-2+3\mathrm{I}} + (24581708332154470216512 + 8978429716153211486016 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}}$$

$$+ (376631142261456576000 - 178095278614410726400 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (131955729701870303307 - 183320815420456803999 \, \mathrm{I}) \, u_{ol-4+2\mathrm{I}} - (10430799179104190845440 + 30937774944414155662080 \, \mathrm{I}) \, u_{ol-3+2\mathrm{I}} + (-210699556507460246019300 + 210699556507460246019300 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (108379224297464031774720$$

$$- 40990959258813959016960 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (-1140789203369495450550 + 295628738371664700600 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (1396239103184555520 + 106901784160886160 \, \mathrm{I}) \, u_{ol-5+\mathrm{I}} + (-524153808547967557440 + 160381441477652166720 \, \mathrm{I}) \, u_{ol-4+\mathrm{I}} - (8978429716153211486016 + 24581708332154470216512 \, \mathrm{I}) \, u_{ol-3+\mathrm{I}}$$



$$\begin{aligned}
 &+ (40990959258813959016960 - 108379224297464031774720 \, \text{I}) \, u_{ol-2+1} + (25144524115518610062000 - 25144524115518610062000 \, \text{I}) \, u_{ol-1+1} + (443468392586198294400 - 2025927070425446400 \, \text{I}) \, u_{ol+1} - (454930288391755 + 164676614942415 \, \text{I}) \, u_{ol-6} - (209314861191446976 + 32397769147149504 \, \text{I}) \, u_{ol-5} \\
 &+ (-734924129230280700 + 22065990705065400750 \, \text{I}) \, u_{ol-4} + (178095278614410726400 - 376631142261456576000 \, \text{I}) \, u_{ol-3} + (-295628738371664700600 + 1140789203369495450550 \, \text{I}) \, u_{ol-2} + (2025927070425446400 - 443468392586198294400 \, \text{I}) \, u_{ol-1} + (-15160850271114333810 + 15160850271114333810 \, \text{I}) \, u_{ol}), \\
 &O(\Delta x_{ol}^{25})
 \end{aligned}$$

Formula.: 583, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 1

Error order.: 27, Error.: 6.0308320319048311514 × 10<sup>−69</sup>, New Error.: 5.9932959792912269549 × 10<sup>−96</sup>

Error order.: 27, Error.: 5.9932959792912269549 × 10<sup>−96</sup>, New Error.: 5.9893850366948422919 × 10<sup>−123</sup>

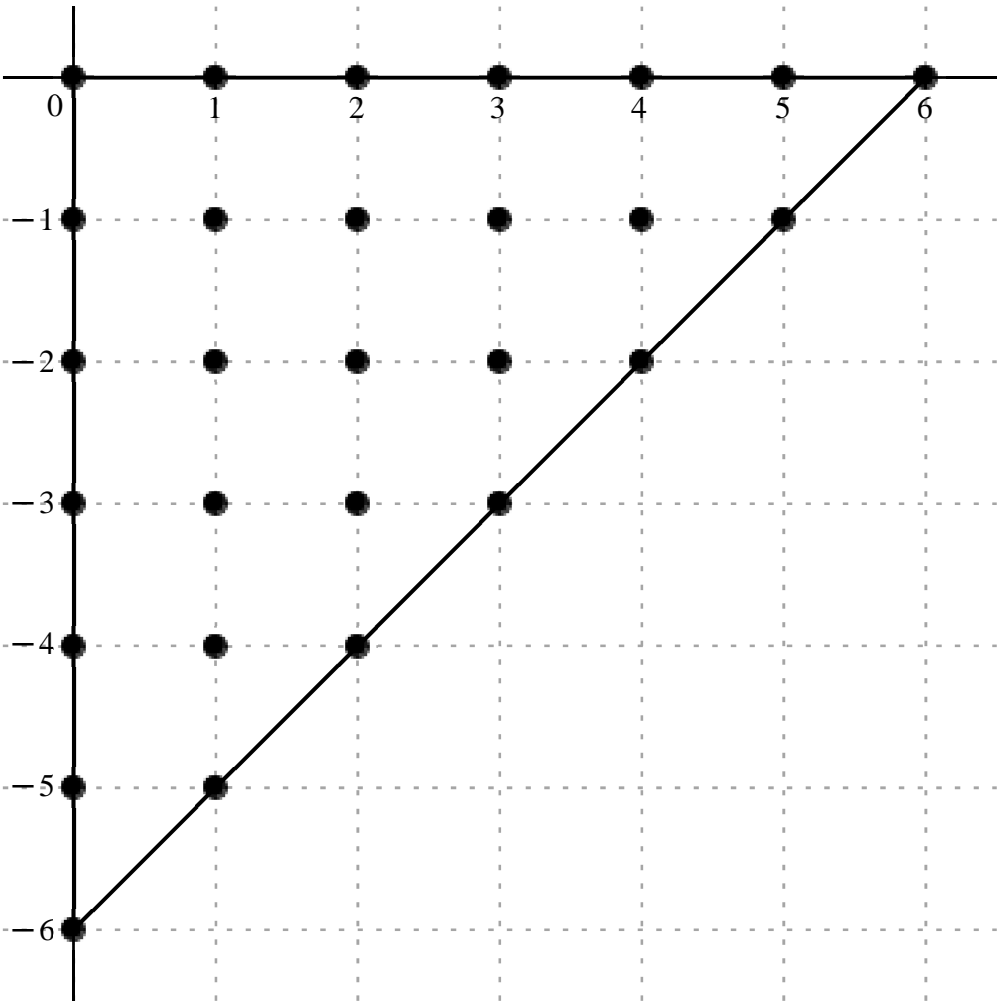
Error order.: 27, Error.: 5.9893850366948422919 × 10<sup>−123</sup>, New Error.: 5.9889923960000522061 × 10<sup>−150</sup>

Error order.: 27, Error.: 5.9889923960000522061 × 10<sup>−150</sup>, New Error.: 5.9889531164929956618 × 10<sup>−177</sup>

Error order.: 27, Error.: 5.9889531164929956618 × 10<sup>−177</sup>, New Error.: 5.9889491883879409895 × 10<sup>−204</sup>

$$x_o+h.\, , \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 & 6 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} & 4-\text{I} & 5-\text{I} & \\ -2\,\text{I} & 1-2\,\text{I} & 2-2\,\text{I} & 3-2\,\text{I} & 4-2\,\text{I} & & \\ -3\,\text{I} & 1-3\,\text{I} & 2-3\,\text{I} & 3-3\,\text{I} & & & \\ -4\,\text{I} & 1-4\,\text{I} & 2-4\,\text{I} & & & & \\ -5\,\text{I} & 1-5\,\text{I} & & & & & \\ -6\,\text{I} & & & & & & \end{array} \right]$$

$$c=,\left[ \begin{array}{cccccccc} -\frac{3697}{663}-\frac{3697\,\text{I}}{663} & \frac{38448}{629}-\frac{6912\,\text{I}}{629} & -\frac{17199}{116}-\frac{702\,\text{I}}{29} & \frac{4160}{87}+\frac{1664\,\text{I}}{87} & -\frac{14985}{5576}+\frac{189\,\text{I}}{5576} & \frac{216}{72529}-\frac{46008\,\text{I}}{1813225} & \frac{1939}{107342920}-\frac{17749\,\text{I}}{322028760} & \\ -\frac{6912}{629}+\frac{38448\,\text{I}}{629} & 3510+3510\,\text{I} & \frac{2066688}{145}+\frac{696384\,\text{I}}{145} & \frac{75816}{25}-\frac{30888\,\text{I}}{25} & -\frac{75816}{3485}-\frac{221832\,\text{I}}{3485} & -\frac{10746}{1313845}+\frac{222912\,\text{I}}{1313845} & & \\ -\frac{702}{29}-\frac{17199\,\text{I}}{116} & \frac{696384}{145}+\frac{2066688\,\text{I}}{145} & -\frac{53703}{2}-\frac{53703\,\text{I}}{2} & \frac{249696}{65}-\frac{88128\,\text{I}}{65} & \frac{4563}{200}+\frac{3159\,\text{I}}{200} & & & \\ \frac{1664}{87}+\frac{4160\,\text{I}}{87} & -\frac{30888}{25}+\frac{75816\,\text{I}}{25} & -\frac{88128}{65}+\frac{249696\,\text{I}}{65} & \frac{340}{3}+\frac{340\,\text{I}}{3} & & & & \\ \frac{189}{5576}-\frac{14985\,\text{I}}{5576} & -\frac{221832}{3485}-\frac{75816\,\text{I}}{3485} & \frac{3159}{200}+\frac{4563\,\text{I}}{200} & & & & & \\ -\frac{46008}{1813225}+\frac{216\,\text{I}}{72529} & \frac{222912}{1313845}-\frac{10746\,\text{I}}{1313845} & & & & & & \\ -\frac{17749}{322028760}+\frac{1939\,\text{I}}{107342920} & & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{1}{355841779800\, \Delta x_{ol}} \left( \begin{aligned} & -(1984233876200 + 1984233876200\, \mathrm{I})\, u_{ol} + (21751040937600 - 3910299494400\, \mathrm{I})\, u_{ol+1} - (52759679058450 + 8613825152400\, \mathrm{I})\, u_{ol+2} + (17014963264000 + 6805985305600\, \mathrm{I})\, u_{ol+3} + (-956292874875 + 12061351575\, \mathrm{I})\, u_{ol+4} + (1059739200 - 9028977984\, \mathrm{I})\, u_{ol+5} + (6427785 \\ & - 19612645\, \mathrm{I})\, u_{ol+6} + (-3910299494400 + 21751040937600\, \mathrm{I})\, u_{ol-1} + (1249004647098000 + 1249004647098000\, \mathrm{I})\, u_{ol+1-1} + (5071820249733120 + 1708982910236160\, \mathrm{I})\, u_{ol+2-1} + (1079140015092672 - 439649635778496\, \mathrm{I})\, u_{ol+3-1} - (7741320050880 + 22650529037760\, \mathrm{I})\, u_{ol+4-1} + (-2910446640 + 60373486080\, \mathrm{I})\, u_{ol+5-1} \\ & - (8613825152400 + 52759679058450\, \mathrm{I})\, u_{ol-2\mathrm{I}} + (1708982910236160 + 5071820249733120\, \mathrm{I})\, u_{ol+1-2\mathrm{I}} - (9554885550299700 + 9554885550299700\, \mathrm{I})\, u_{ol+2-2\mathrm{I}} + (1366957985368320 - 482455759541760\, \mathrm{I})\, u_{ol+3-2\mathrm{I}} + (8118530206137 + 5620520911941\, \mathrm{I})\, u_{ol+4-2\mathrm{I}} + (6805985305600 + 17014963264000\, \mathrm{I})\, u_{ol-3\mathrm{I}} \\ & + (-439649635778496 + 1079140015092672\, \mathrm{I})\, u_{ol+1-3\mathrm{I}} + (-482455759541760 + 1366957985368320\, \mathrm{I})\, u_{ol+2-3\mathrm{I}} + (40328735044000 + 40328735044000\, \mathrm{I})\, u_{ol+3-3\mathrm{I}} + (12061351575 - 956292874875\, \mathrm{I})\, u_{ol-4\mathrm{I}} - (22650529037760 + 7741320050880\, \mathrm{I})\, u_{ol+1-4\mathrm{I}} + (5620520911941 + 8118530206137\, \mathrm{I})\, u_{ol+2-4\mathrm{I}} + (-9028977984 \\ & + 1059739200\, \mathrm{I})\, u_{ol-5\mathrm{I}} + (60373486080 - 2910446640\, \mathrm{I})\, u_{ol+1-5\mathrm{I}} + (-19612645 + 6427785\, \mathrm{I})\, u_{ol-6\mathrm{I}} \end{aligned} \right), \, O(\, \Delta x_{ol}^{27} \, )$$

Formula.: 584, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 2

Error order.: 26, Error.: 1.0307305697133387610 × 10<sup>−65</sup>, New Error.: 1.0075787183914443100 × 10<sup>−91</sup>

Error order.: 26, Error.: 1.0075787183914443100 × 10<sup>−91</sup>, New Error.: 1.0052715020648605590 × 10<sup>−117</sup>

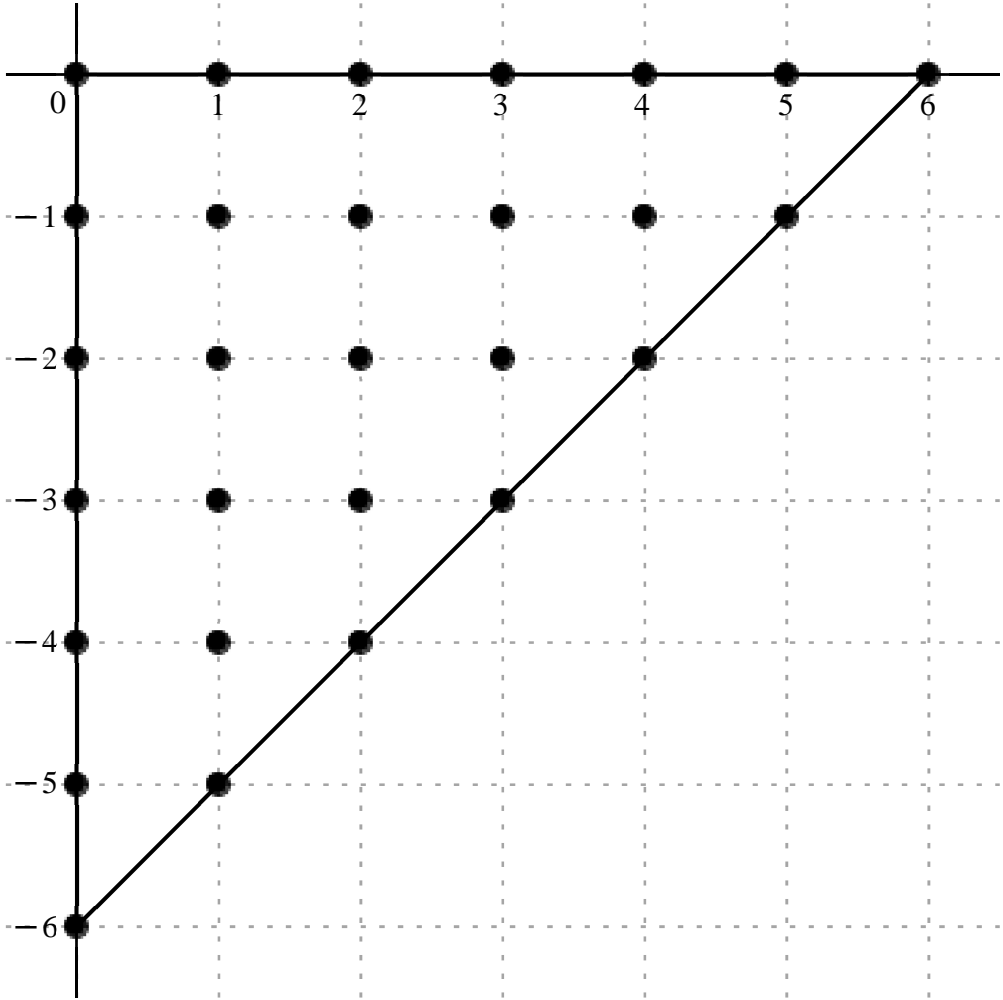
Error order.: 26, Error.: 1.0052715020648605590 × 10<sup>−117</sup>, New Error.: 1.0050408622884369983 × 10<sup>−143</sup>

Error order.: 26, Error.: 1.0050408622884369983 × 10<sup>−143</sup>, New Error.: 1.0050177991314976729 × 10<sup>−169</sup>

Error order.: 26, Error.: 1.0050177991314976729 × 10<sup>−169</sup>, New Error.: 1.0050154928240129086 × 10<sup>−195</sup>

$$x_o \neq h. , \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 & 6 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & 4-\mathrm{I} & 5-\mathrm{I} & \\ -2\, \mathrm{I} & 1-2\, \mathrm{I} & 2-2\, \mathrm{I} & 3-2\, \mathrm{I} & 4-2\, \mathrm{I} & & \\ -3\, \mathrm{I} & 1-3\, \mathrm{I} & 2-3\, \mathrm{I} & 3-3\, \mathrm{I} & & & \\ -4\, \mathrm{I} & 1-4\, \mathrm{I} & 2-4\, \mathrm{I} & & & & \\ -5\, \mathrm{I} & 1-5\, \mathrm{I} & & & & & \\ -6\, \mathrm{I} & & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} \frac{34912583 \text{ I}}{574600} & -\frac{94803264}{139009} - \frac{80780832 \text{ I}}{139009} & \frac{2436003}{1972} + \frac{1872693 \text{ I}}{986} & -\frac{1278208}{4437} - \frac{1085312 \text{ I}}{1479} & \frac{71486019}{2464592} + \frac{72976185 \text{ I}}{2464592} & -\frac{7425072}{23571925} + \frac{480090384 \text{ I}}{2003613625} & -\frac{172961447}{213505067880} + \frac{28100893 \text{ I}}{71168355960} \\ \frac{94803264}{139009} - \frac{80780832 \text{ I}}{139009} & -\frac{1211580 \text{ I}}{17} & -\frac{1182120192}{12325} - \frac{2501629056 \text{ I}}{12325} & -\frac{96758208}{2125} - \frac{42875856 \text{ I}}{2125} & -\frac{327600}{697} + \frac{641232 \text{ I}}{697} & \frac{2786274}{1416389} - \frac{2459286 \text{ I}}{1416389} & \\ -\frac{2436003}{1972} + \frac{1872693 \text{ I}}{986} & \frac{1182120192}{12325} - \frac{2501629056 \text{ I}}{12325} & \frac{1144125 \text{ I}}{2} & -\frac{47127168}{845} - \frac{22954176 \text{ I}}{845} & -\frac{1229481}{17000} - \frac{7135083 \text{ I}}{17000} & & \\ \frac{1278208}{4437} - \frac{1085312 \text{ I}}{1479} & \frac{96758208}{2125} - \frac{42875856 \text{ I}}{2125} & \frac{47127168}{845} - \frac{22954176 \text{ I}}{845} & -\frac{31880 \text{ I}}{13} & & & \\ -\frac{71486019}{2464592} + \frac{72976185 \text{ I}}{2464592} & \frac{327600}{697} + \frac{641232 \text{ I}}{697} & \frac{1229481}{17000} - \frac{7135083 \text{ I}}{17000} & & & & \\ \frac{7425072}{23571925} + \frac{480090384 \text{ I}}{2003613625} & -\frac{2786274}{1416389} - \frac{2459286 \text{ I}}{1416389} & & & & & \\ \frac{172961447}{213505067880} + \frac{28100893 \text{ I}}{71168355960} & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{2359231000074000 \, \Delta x_{ol}^2} \big( 143346411601560270 \, \mathrm{I} \, u_{ol} - (1608980708709504000 + 1370994993605952000 \, \mathrm{I}) \, u_{ol+1} + (2914347765655813500 + 4480847240589837000 \, \mathrm{I}) \, u_{ol+2} - (679645692617216000 + 1731238482185472000 \, \mathrm{I}) \, u_{ol+3} + (68430000623502375 + 69856462213273125 \, \mathrm{I}) \, u_{ol+4} + (-743149320226560 + 565300666075392 \, \mathrm{I}) \, u_{ol+5} + (-1911223989350 + 931544602950 \, \mathrm{I}) \, u_{ol+6} + (1608980708709504000 - 1370994993605952000 \, \mathrm{I}) \, u_{ol-1} - 168141005592332760000 \, \mathrm{I} \, u_{ol+1-1} - (226279480955767050240 + 478857672989943736320 \, \mathrm{I}) \, u_{ol+2-1} - (107423512388333227008 + 47601905237604147456 \, \mathrm{I}) \, u_{ol+3-1} + (-1108872418399200000 + 2170465441376544000 \, \mathrm{I}) \, u_{ol+4-1} + (4641001868484000 - 4096349074476000 \, \mathrm{I}) \, u_{ol+5-1} + (-2914347765655813500 + 4480847240589837000 \, \mathrm{I}) \, u_{ol-21} + (226279480955767050240 - 478857672989943736320 \, \mathrm{I}) \, u_{ol+1-21} + 1349627583979832625000 \, \mathrm{I} \, u_{ol+2-21} - (131578551113959065600 + 64087814911662259200 \, \mathrm{I}) \, u_{ol+3-21} - (170625275835410682 + 990194647158882126 \, \mathrm{I}) \, u_{ol+4-21} + (679645692617216000 - 1731238482185472000 \, \mathrm{I}) \, u_{ol-31} + (107423512388333227008 - 47601905237604147456 \, \mathrm{I}) \, u_{ol+1-31} + (131578551113959065600 - 64087814911662259200 \, \mathrm{I}) \, u_{ol+2-31} - 5785560329412240000 \, \mathrm{I} \, u_{ol+3-31} + (-68430000623502375 + 69856462213273125 \, \mathrm{I}) \, u_{ol-41} + (1108872418399200000 + 2170465441376544000 \, \mathrm{I}) \, u_{ol+1-41} + (170625275835410682 - 990194647158882126 \, \mathrm{I}) \, u_{ol+2-41} + (743149320226560 + 565300666075392 \, \mathrm{I}) \, u_{ol-51} - (4641001868484000 + 4096349074476000 \, \mathrm{I}) \, u_{ol+1-51} + (1911223989350 + 931544602950 \, \mathrm{I}) \, u_{ol-61} \big), \, O(\, \Delta x_{ol}^{26} \, )$$

Formula:, 585, Var.: 1

Variavel :,  $x_{oi}$  , Derivada de Ordem :, 3

Error order:., 25, Error:., 9.0848967115071611532 × 10<sup>−63</sup>, New Error:., 9.0285278336262353906 × 10<sup>−88</sup>

Error order:., 25, Error:., 9.0285278336262353906 × 10<sup>−88</sup>, New Error:., 9.0226554573495729393 × 10<sup>−113</sup>

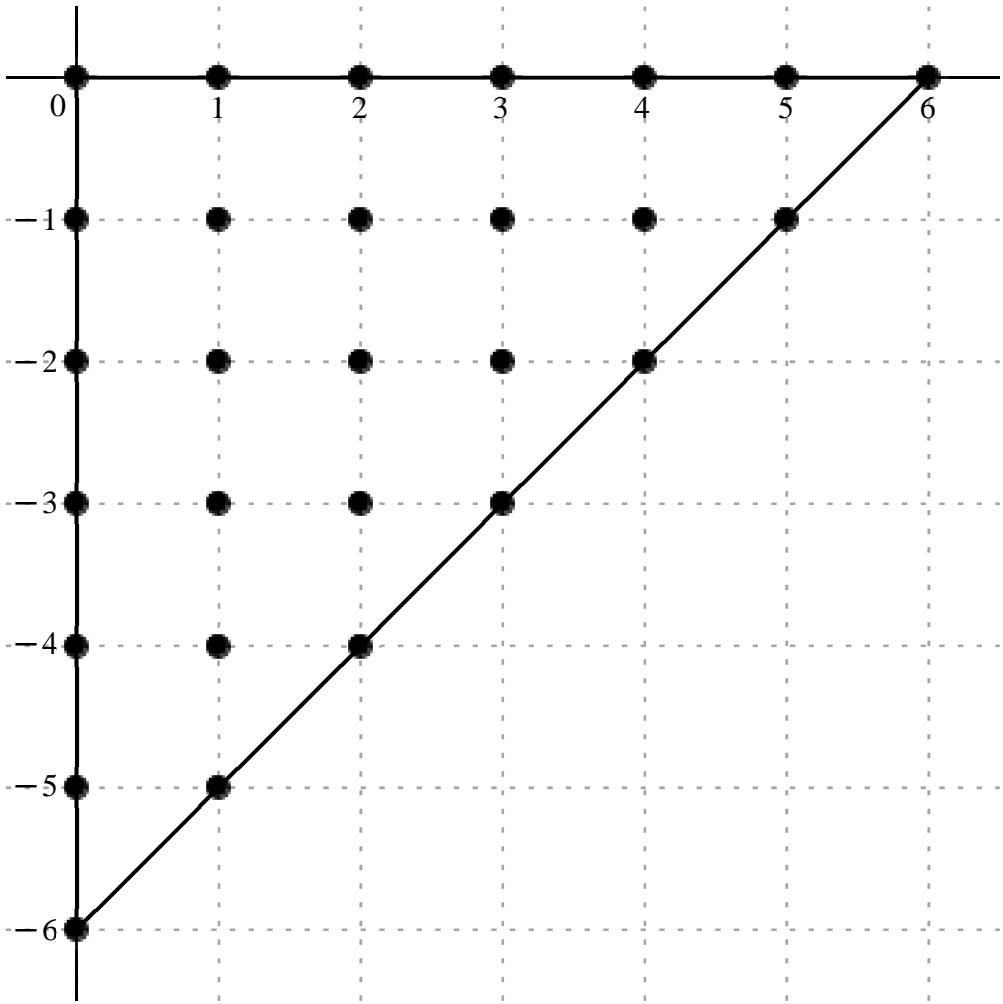
Error order:., 25, Error:., 9.0226554573495729393 × 10<sup>−113</sup>, New Error:., 9.0220659050353600596 × 10<sup>−138</sup>

Error order:., 25, Error:., 9.0220659050353600596 × 10<sup>−138</sup>, New Error:., 9.0220069266970273080 × 10<sup>−163</sup>

Error order:., 25, Error:., 9.0220069266970273080 × 10<sup>−163</sup>, New Error:., 9.0220010286321648478 × 10<sup>−188</sup>

$$x_o + h . , \left[ \begin{array}{cccccc} 0 & 1 & 2 & 3 & 4 & 5 & 6 \\ -1 & 1-1 & 2-1 & 3-1 & 4-1 & 5-1 & \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & 3-2\text{ I} & 4-2\text{ I} & & \\ -3\text{ I} & 1-3\text{ I} & 2-3\text{ I} & 3-3\text{ I} & & & \\ -4\text{ I} & 1-4\text{ I} & 2-4\text{ I} & & & & \\ -5\text{ I} & 1-5\text{ I} & & & & & \\ -6\text{ I} & & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} \frac{11077454347}{34476000} - \frac{11077454347\text{ I}}{34476000} & - \frac{1939767264}{45177925} + \frac{424608310494\text{ I}}{45177925} & \frac{8030941371}{1281800} - \frac{123961036527\text{ I}}{5127200} & - \frac{5442829552}{1442025} + \frac{767356712\text{ I}}{96135} & \frac{12475858491}{800992400} - \frac{149834338839\text{ I}}{320396960} & \frac{577732680819}{130234885625} + \frac{89421505551\text{ I}}{130234885625} & \frac{5352121039903}{555113176488000} + \frac{645790646833\text{ I}}{185037725496000} \\ - \frac{424608310494}{45177925} + \frac{1939767264\text{ I}}{45177925} & - \frac{138553119}{260} + \frac{138553119\text{ I}}{260} & - \frac{695965809096}{801125} + \frac{108242282016\text{ I}}{47125} & \frac{26282835477}{138125} + \frac{71958796389\text{ I}}{138125} & \frac{12581847801}{1132625} - \frac{3849814413\text{ I}}{1132625} & - \frac{214800728472}{7258993625} - \frac{65784094029\text{ I}}{29035974500} \\ \frac{123961036527}{5127200} - \frac{8030941371\text{ I}}{1281800} & - \frac{108242282016}{47125} + \frac{695965809096\text{ I}}{801125} & \frac{23220229257}{5200} - \frac{23220229257\text{ I}}{5200} & \frac{4669967304}{21125} + \frac{13851134028\text{ I}}{21125} & - \frac{24721798131}{8840000} + \frac{2641923459\text{ I}}{680000} \\ - \frac{767356712}{96135} + \frac{5442829552\text{ I}}{1442025} & - \frac{71958796389}{138125} - \frac{26282835477\text{ I}}{138125} & - \frac{13851134028}{21125} - \frac{4669967304\text{ I}}{21125} & - \frac{32840383}{1690} + \frac{32840383\text{ I}}{1690} \\ \frac{149834338839}{320396960} - \frac{12475858491\text{ I}}{800992400} & \frac{3849814413}{1132625} - \frac{12581847801\text{ I}}{1132625} & - \frac{2641923459}{680000} + \frac{24721798131\text{ I}}{8840000} \\ - \frac{89421505551}{130234885625} - \frac{577732680819\text{ I}}{130234885625} & \frac{65784094029}{29035974500} + \frac{214800728472\text{ I}}{7258993625} \\ - \frac{645790646833}{185037725496000} - \frac{5352121039903\text{ I}}{555113176488000} \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{1}{47184620001480000 \Delta x_{ol}^3} \big( (15160850271114333810 - 15160850271114333810 \, \mathrm{I}) \, u_{ol} + ( -2025927070425446400 + 443468392586198294400 \, \mathrm{I}) \, u_{ol+1} + (295628738371664700600 - 1140789203369495450550 \, \mathrm{I}) \, u_{ol+2} + ( -178095278614410726400 + 376631142261456576000 \, \mathrm{I}) \, u_{ol+3} + (734924129230280700 - 22065990705065400750 \, \mathrm{I}) \, u_{ol+4} + (209314861191446976 + 32397769147149504 \, \mathrm{I}) \, u_{ol+5} + (454930288391755 + 164676614942415 \, \mathrm{I}) \, u_{ol+6} + ( -443468392586198294400 + 2025927070425446400 \, \mathrm{I}) \, u_{ol-1} + ( -25144524115518610062000 + 25144524115518610062000 \, \mathrm{I}) \, u_{ol+1-1} + ( -40990959258813959016960 + 108379224297464031774720 \, \mathrm{I}) \, u_{ol+2-1} + (8978429716153211486016 + 24581708332154470216512 \, \mathrm{I}) \, u_{ol+3-1} + (524153808547967557440 - 160381441477652166720 \, \mathrm{I}) \, u_{ol+4-1} - (1396239103184555520 + 106901784160886160 \, \mathrm{I}) \, u_{ol+5-1} + (1140789203369495450550 - 295628738371664700600 \, \mathrm{I}) \, u_{ol-21} + ( -108379224297464031774720 + 40990959258813959016960 \, \mathrm{I}) \, u_{ol+1-21} + (210699556507460246019300 - 210699556507460246019300 \, \mathrm{I}) \, u_{ol+2-21} + (10430799179104190845440 + 30937774944414155662080 \, \mathrm{I}) \, u_{ol+3-21} + ( -131955729701870303307 + 183320815420456803999 \, \mathrm{I}) \, u_{ol+4-21} + ( -376631142261456576000 + 178095278614410726400 \, \mathrm{I}) \, u_{ol-31} - (24581708332154470216512 + 8978429716153211486016 \, \mathrm{I}) \, u_{ol+1-31} - (30937774944414155662080 + 10430799179104190845440 \, \mathrm{I}) \, u_{ol+2-31} + ( -916899995596487436000 + 916899995596487436000 \, \mathrm{I}) \, u_{ol+3-31} + (22065990705065400750 - 734924129230280700 \, \mathrm{I}) \, u_{ol-41} + (160381441477652166720 - 524153808547967557440 \, \mathrm{I}) \, u_{ol+1-41} + ( -183320815420456803999 + 131955729701870303307 \, \mathrm{I}) \, u_{ol+2-41} - (32397769147149504 + 209314861191446976 \, \mathrm{I}) \, u_{ol-51} + (106901784160886160 + 1396239103184555520 \, \mathrm{I}) \, u_{ol+1-51} - (164676614942415 + 454930288391755 \, \mathrm{I}) \, u_{ol-61} \big), \, O( \Delta x_{ol}^{25} )$$

Formula: 586, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 1

Error order: 27, Error:  $5.7811716539107028079 \times 10^{-69}$ , New Error:  $5.9680145353958586795 \times 10^{-96}$

Error order: 27, Error:  $5.9680145353958586795 \times 10^{-96}$ , New Error:  $5.9868537706076288945 \times 10^{-123}$

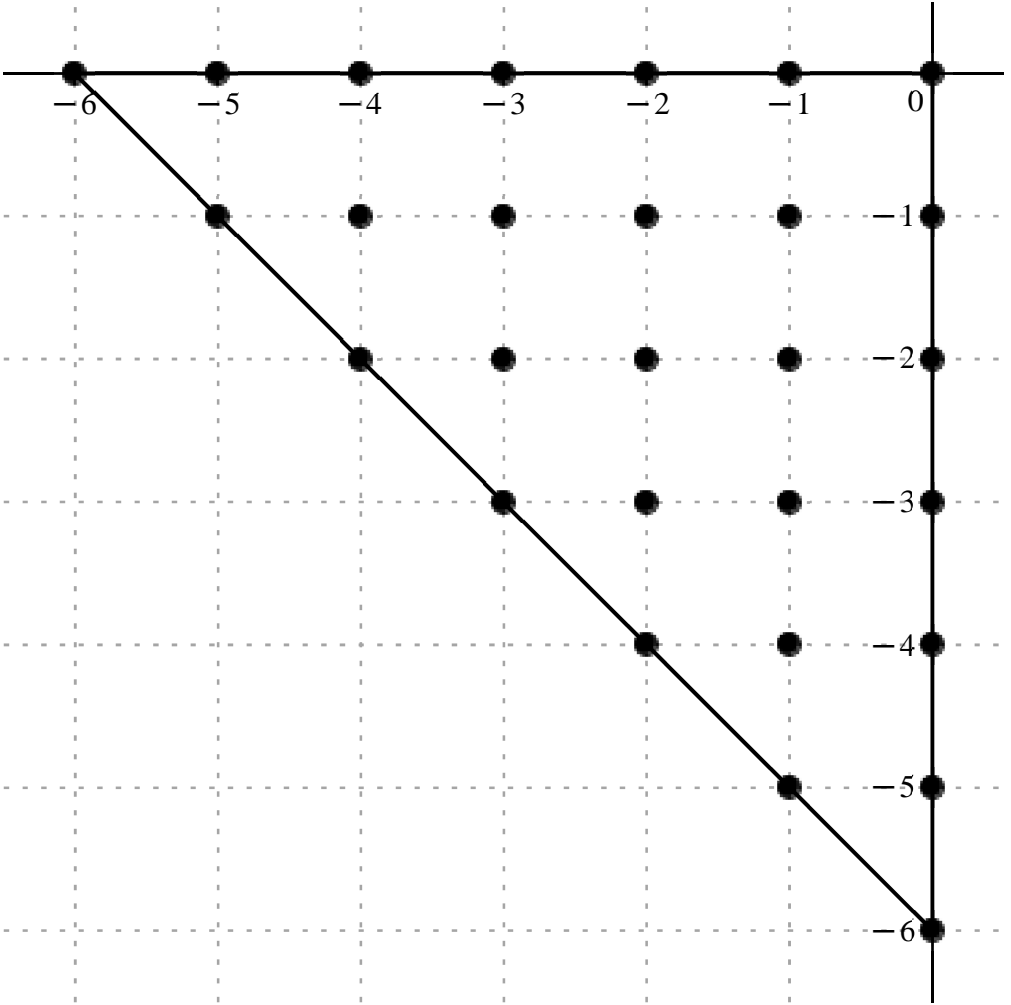
Error order: 27, Error:  $5.9868537706076288945 \times 10^{-123}$ , New Error:  $5.9887392382067159373 \times 10^{-150}$

Error order: 27, Error:  $5.9887392382067159373 \times 10^{-150}$ , New Error:  $5.9889278004018482474 \times 10^{-177}$

Error order: 27, Error:  $5.9889278004018482474 \times 10^{-177}$ , New Error:  $5.9889466567757081426 \times 10^{-204}$

$$x_o + h., \left[ \begin{array}{ccccccc} -6 & -5 & -4 & -3 & -2 & -1 & 0 \\ & -5 - I & -4 - I & -3 - I & -2 - I & -1 - I & -I \\ & & -4 - 2 I & -3 - 2 I & -2 - 2 I & -1 - 2 I & -2 I \\ & & & -3 - 3 I & -2 - 3 I & -1 - 3 I & -3 I \\ & & & & -2 - 4 I & -1 - 4 I & -4 I \\ & & & & & -1 - 5 I & -5 I \\ & & & & & & -6 I \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccccccc} -\frac{1939}{107342920} - \frac{17749 I}{322028760} & -\frac{216}{72529} - \frac{46008 I}{1813225} & \frac{14985}{5576} + \frac{189 I}{5576} & -\frac{4160}{87} + \frac{1664 I}{87} & \frac{17199}{116} - \frac{702 I}{29} & -\frac{38448}{629} - \frac{6912 I}{629} & \frac{3697}{663} - \frac{3697 I}{663} \\ & \frac{10746}{1313845} + \frac{222912 I}{1313845} & \frac{75816}{3485} - \frac{221832 I}{3485} & -\frac{75816}{25} - \frac{30888 I}{25} & -\frac{2066688}{145} + \frac{696384 I}{145} & -3510 + 3510 I & \frac{6912}{629} + \frac{38448 I}{629} \\ & & -\frac{4563}{200} + \frac{3159 I}{200} & -\frac{249696}{65} - \frac{88128 I}{65} & \frac{53703}{2} - \frac{53703 I}{2} & -\frac{696384}{145} + \frac{2066688 I}{145} & \frac{702}{29} - \frac{17199 I}{116} \\ & & & -\frac{340}{3} + \frac{340 I}{3} & \frac{88128}{65} + \frac{249696 I}{65} & \frac{30888}{25} + \frac{75816 I}{25} & -\frac{1664}{87} + \frac{4160 I}{87} \\ & & & & -\frac{3159}{200} + \frac{4563 I}{200} & \frac{221832}{3485} - \frac{75816 I}{3485} & -\frac{189}{5576} - \frac{14985 I}{5576} \\ & & & & & -\frac{222912}{1313845} - \frac{10746 I}{1313845} & \frac{46008}{1813225} + \frac{216 I}{72529} \\ & & & & & & \frac{17749}{322028760} + \frac{1939 I}{107342920} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{355841779800\,\mathcal{A}\mathfrak{x}_{ol}}\left(\begin{aligned} &(-6427785+19612645\,\mathrm{I})\,u_{ol-6}-(1059739200+9028977984\,\mathrm{I})\,u_{ol-5}+(956292874875+12061351575\,\mathrm{I})\,u_{ol-4}+(-17014963264000+6805985305600\,\mathrm{I})\,u_{ol-3} \\ &+(52759679058450-8613825152400\,\mathrm{I})\,u_{ol-2}-(21751040937600+3910299494400\,\mathrm{I})\,u_{ol-1}+(1984233876200-1984233876200\,\mathrm{I})\,u_{ol} \\ &+(2910446640+60373486080\,\mathrm{I})\,u_{ol-5-1}+(7741320050880-22650529037760\,\mathrm{I})\,u_{ol-4-1}-(1079140015092672+439649635778496\,\mathrm{I})\,u_{ol-3-1} \\ &+(-5071820249733120+1708982910236160\,\mathrm{I})\,u_{ol-2-1}+(-1249004647098000+1249004647098000\,\mathrm{I})\,u_{ol-1-1}+(3910299494400+21751040937600\,\mathrm{I})\,u_{ol-1} \\ &+(-8118530206137+5620520911941\,\mathrm{I})\,u_{ol-4-21}-(1366957985368320+482455759541760\,\mathrm{I})\,u_{ol-3-21}+(9554885550299700-9554885550299700\,\mathrm{I})\,u_{ol-2-21} \\ &+(-1708982910236160+5071820249733120\,\mathrm{I})\,u_{ol-1-21}+(8613825152400-52759679058450\,\mathrm{I})\,u_{ol-21}+(-40328735044000+40328735044000\,\mathrm{I})\,u_{ol-3-31} \\ &+(482455759541760+1366957985368320\,\mathrm{I})\,u_{ol-2-31}+(439649635778496+1079140015092672\,\mathrm{I})\,u_{ol-1-31}+(-6805985305600+17014963264000\,\mathrm{I})\,u_{ol-31} \\ &+(-5620520911941+8118530206137\,\mathrm{I})\,u_{ol-2-41}+(22650529037760-7741320050880\,\mathrm{I})\,u_{ol-1-41}-(12061351575 \end{aligned}\right)$$

$$+ 956292874875 \, \text{I} \, u_{oI - 41} - (60373486080 + 2910446640 \, \text{I}) \, u_{oI - 1 - 51} + (9028977984 + 1059739200 \, \text{I}) \, u_{oI - 51} + (19612645 + 6427785 \, \text{I}) \, u_{oI - 61} \Big), \, O( \, \mathcal{A}_{oI}^{27} \, )$$

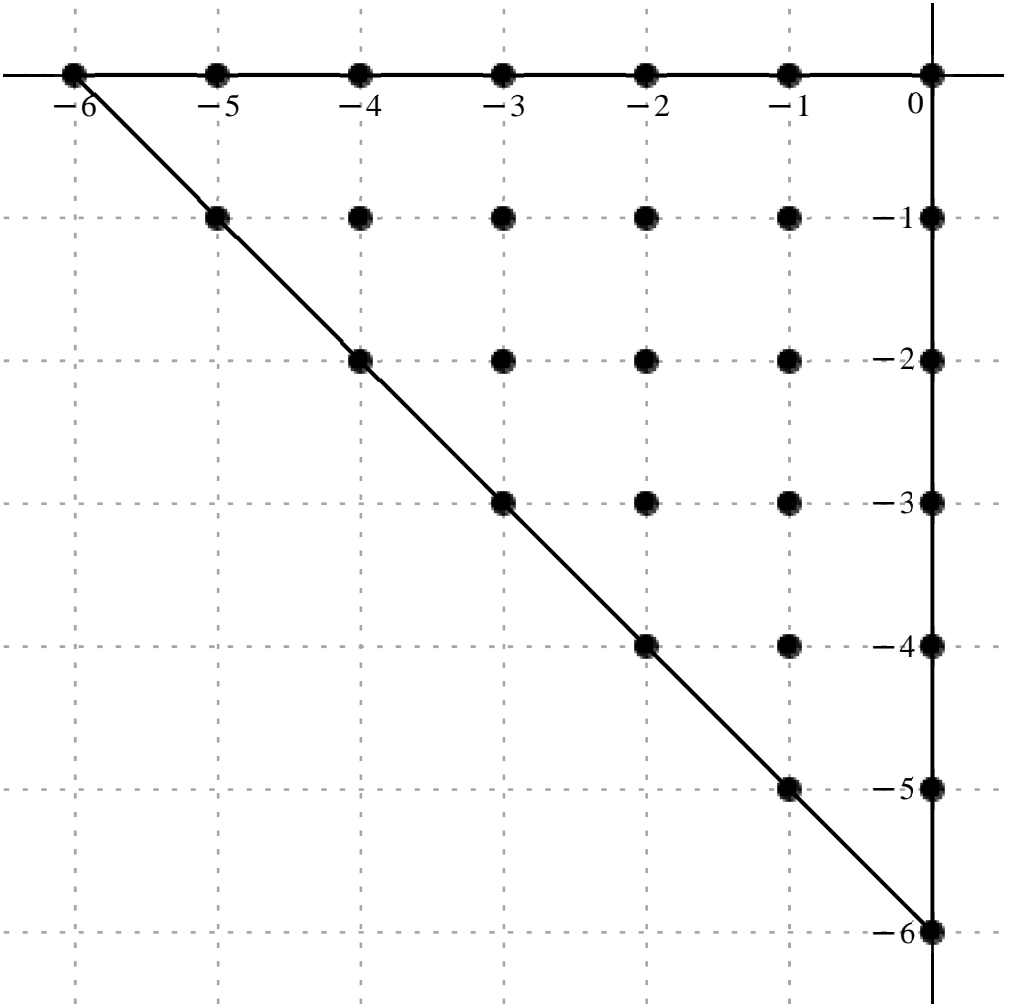
Formula.: 587, Var.: 1

Variavel .:  $x_{oI}$ , Derivada de Ordem .: 2

Error order.: 26, Error.:  $9.8813698474343646840 \times 10^{-66}$ , New Error.:  $1.0033353438992953308 \times 10^{-91}$   
Error order.: 26, Error.:  $1.0033353438992953308 \times 10^{-91}$ , New Error.:  $1.0048473298615978823 \times 10^{-117}$   
Error order.: 26, Error.:  $1.0048473298615978823 \times 10^{-117}$ , New Error.:  $1.0049984467259759143 \times 10^{-143}$   
Error order.: 26, Error.:  $1.0049984467259759143 \times 10^{-143}$ , New Error.:  $1.0050135575918356220 \times 10^{-169}$   
Error order.: 26, Error.:  $1.0050135575918356220 \times 10^{-169}$ , New Error.:  $1.0050150686702125495 \times 10^{-195}$

$$x_o + h, , \left[ \begin{array}{ccccccc} -6 & -5 & -4 & -3 & -2 & -1 & 0 \\ & -5 - \text{I} & -4 - \text{I} & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -4 - 2 \, \text{I} & -3 - 2 \, \text{I} & -2 - 2 \, \text{I} & -1 - 2 \, \text{I} & -2 \, \text{I} \\ & & & -3 - 3 \, \text{I} & -2 - 3 \, \text{I} & -1 - 3 \, \text{I} & -3 \, \text{I} \\ & & & & -2 - 4 \, \text{I} & -1 - 4 \, \text{I} & -4 \, \text{I} \\ & & & & & -1 - 5 \, \text{I} & -5 \, \text{I} \\ & & & & & & -6 \, \text{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} -\frac{172961447}{213505067880} & -\frac{28100893 \, \text{I}}{71168355960} & -\frac{7425072}{23571925} & -\frac{480090384 \, \text{I}}{2003613625} & \frac{71486019}{2464592} & -\frac{72976185 \, \text{I}}{2464592} & -\frac{1278208}{4437} & +\frac{1085312 \, \text{I}}{1479} & \frac{2436003}{1972} & -\frac{1872693 \, \text{I}}{986} & -\frac{94803264}{139009} & +\frac{80780832 \, \text{I}}{139009} & -\frac{34912583 \, \text{I}}{574600} \\ & & \frac{2786274}{1416389} & +\frac{2459286 \, \text{I}}{1416389} & -\frac{327600}{697} & -\frac{641232 \, \text{I}}{697} & -\frac{96758208}{2125} & +\frac{42875856 \, \text{I}}{2125} & -\frac{1182120192}{12325} & +\frac{2501629056 \, \text{I}}{12325} & \frac{1211580 \, \text{I}}{17} & \frac{94803264}{139009} & +\frac{80780832 \, \text{I}}{139009} \\ & & & & -\frac{1229481}{17000} & +\frac{7135083 \, \text{I}}{17000} & -\frac{47127168}{845} & +\frac{22954176 \, \text{I}}{845} & -\frac{1144125 \, \text{I}}{2} & \frac{1182120192}{12325} & +\frac{2501629056 \, \text{I}}{12325} & -\frac{2436003}{1972} & -\frac{1872693 \, \text{I}}{986} \\ & & & & & & \frac{31880 \, \text{I}}{13} & \frac{47127168}{845} & +\frac{22954176 \, \text{I}}{845} & \frac{96758208}{2125} & +\frac{42875856 \, \text{I}}{2125} & \frac{1278208}{4437} & +\frac{1085312 \, \text{I}}{1479} \\ & & & & & & & \frac{1229481}{17000} & +\frac{7135083 \, \text{I}}{17000} & \frac{327600}{697} & -\frac{641232 \, \text{I}}{697} & -\frac{71486019}{2464592} & -\frac{72976185 \, \text{I}}{2464592} \\ & & & & & & & & & -\frac{2786274}{1416389} & +\frac{2459286 \, \text{I}}{1416389} & \frac{7425072}{23571925} & -\frac{480090384 \, \text{I}}{2003613625} \\ & & & & & & & & & & & \frac{172961447}{213505067880} & -\frac{28100893 \, \text{I}}{71168355960} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{1}{2359231000074000 \Delta x_{ol}^2} \big( -(1911223989350 + 931544602950 \, \mathrm{I}) \, u_{ol-6} - (743149320226560 + 565300666075392 \, \mathrm{I}) \, u_{ol-5} + (68430000623502375 - 69856462213273125 \, \mathrm{I}) \, u_{ol-4} + (-679645692617216000 + 1731238482185472000 \, \mathrm{I}) \, u_{ol-3} + (2914347765655813500 - 4480847240589837000 \, \mathrm{I}) \, u_{ol-2} \\ + (-1608980708709504000 + 1370994993605952000 \, \mathrm{I}) \, u_{ol-1} - 143346411601560270 \, \mathrm{I} u_{ol} + (4641001868484000 + 4096349074476000 \, \mathrm{I}) \, u_{ol-5-1} - (1108872418399200000 + 2170465441376544000 \, \mathrm{I}) \, u_{ol-4-1} + (-107423512388333227008 + 47601905237604147456 \, \mathrm{I}) \, u_{ol-3-1} + (-226279480955767050240 \\ + 478857672989943736320 \, \mathrm{I}) \, u_{ol-2-1} + 168141005592332760000 \, \mathrm{I} u_{ol-1-1} + (1608980708709504000 + 1370994993605952000 \, \mathrm{I}) \, u_{ol-1} + (-170625275835410682 + 990194647158882126 \, \mathrm{I}) \, u_{ol-4-21} + (-131578551113959065600 + 64087814911662259200 \, \mathrm{I}) \, u_{ol-3-21} - 1349627583979832625000 \, \mathrm{I} u_{ol-2-21} \\ + (226279480955767050240 + 478857672989943736320 \, \mathrm{I}) \, u_{ol-1-21} - (2914347765655813500 + 4480847240589837000 \, \mathrm{I}) \, u_{ol-21} + 5785560329412240000 \, \mathrm{I} u_{ol-3-31} + (131578551113959065600 + 64087814911662259200 \, \mathrm{I}) \, u_{ol-2-31} + (107423512388333227008 + 47601905237604147456 \, \mathrm{I}) \, u_{ol-1-31} + (679645692617216000 \\ + 1731238482185472000 \, \mathrm{I}) \, u_{ol-31} + (170625275835410682 + 990194647158882126 \, \mathrm{I}) \, u_{ol-2-41} + (1108872418399200000 - 2170465441376544000 \, \mathrm{I}) \, u_{ol-1-41} - (68430000623502375 + 69856462213273125 \, \mathrm{I}) \, u_{ol-41} + (-4641001868484000 + 4096349074476000 \, \mathrm{I}) \, u_{ol-1-51} + (743149320226560 - 565300666075392 \, \mathrm{I}) \, u_{ol-51} \\ + (1911223989350 - 931544602950 \, \mathrm{I}) \, u_{ol-61} \big), \quad O(\Delta x_{ol}^{26})$$

Formula:, 588, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:., 25, Error:.,  $8.7100140566825701478 \times 10^{-63}$ , New Error:.,  $8.9905674854109296616 \times 10^{-88}$

Error order:., 25, Error:.,  $8.9905674854109296616 \times 10^{-88}$ , New Error:.,  $9.0188547499955482184 \times 10^{-113}$

Error order:., 25, Error:.,  $9.0188547499955482184 \times 10^{-113}$ , New Error:.,  $9.0216857876229253345 \times 10^{-138}$

Error order:., 25, Error:.,  $9.0216857876229253345 \times 10^{-138}$ , New Error:.,  $9.0219689144890618056 \times 10^{-163}$

Error order:., 25, Error:.,  $9.0219689144890618056 \times 10^{-163}$ , New Error:.,  $9.0219972274067011256 \times 10^{-188}$

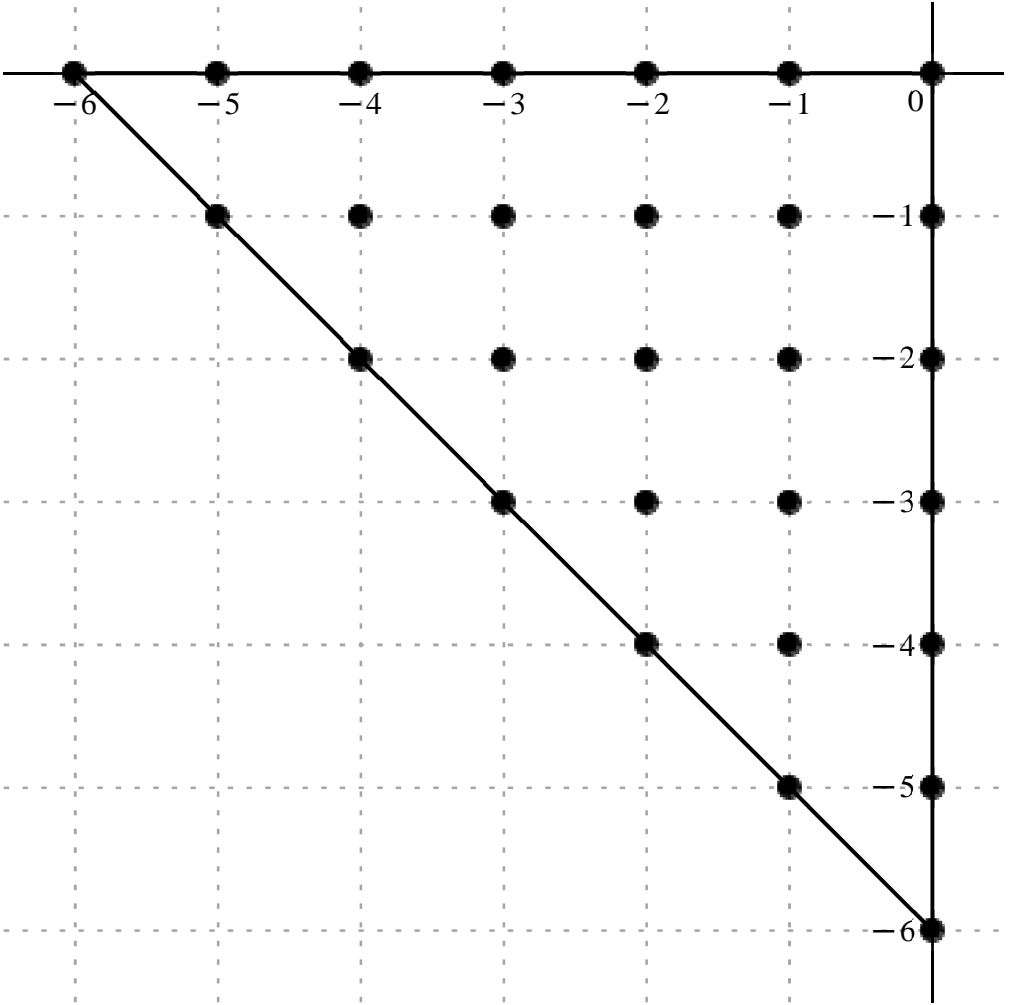


$$x_o + h.$$

−6	−5	−4	−3	−2	−1	0
	−5 −1	−4 −1	−3 −1	−2 −1	−1 −1	−1
		−4 −2 I	−3 −2 I	−2 −2 I	−1 −2 I	−2 I
			−3 −3 I	−2 −3 I	−1 −3 I	−3 I
				−2 −4 I	−1 −4 I	−4 I
					−1 −5 I	−5 I
						−6 I

$$c =,$$

$-\frac{5352121039903}{555113176488000} + \frac{645790646833 \text{ I}}{185037725496000}$	$-\frac{577732680819}{130234885625} + \frac{89421505551 \text{ I}}{130234885625}$	$-\frac{12475858491}{800992400} - \frac{149834338839 \text{ I}}{320396960}$	$\frac{5442829552}{1442025} + \frac{767356712 \text{ I}}{96135}$	$-\frac{8030941371}{1281800} - \frac{123961036527 \text{ I}}{5127200}$	$\frac{1939767264}{45177925} + \frac{424608310494 \text{ I}}{45177925}$	$-\frac{11077454347}{34476000} - \frac{11077454347 \text{ I}}{34476000}$
	$\frac{214800728472}{7258993625} - \frac{65784094029 \text{ I}}{29035974500}$	$-\frac{12581847801}{1132625} - \frac{3849814413 \text{ I}}{1132625}$	$-\frac{26282835477}{138125} + \frac{71958796389 \text{ I}}{138125}$	$\frac{695965809096}{801125} + \frac{108242282016 \text{ I}}{47125}$	$\frac{138553119}{260} + \frac{138553119 \text{ I}}{260}$	$\frac{424608310494}{45177925} + \frac{1939767264 \text{ I}}{45177925}$
		$\frac{24721798131}{8840000} + \frac{2641923459 \text{ I}}{680000}$	$-\frac{4669967304}{21125} + \frac{13851134028 \text{ I}}{21125}$	$-\frac{23220229257}{5200} - \frac{23220229257 \text{ I}}{5200}$	$\frac{108242282016}{47125} + \frac{695965809096 \text{ I}}{801125}$	$-\frac{123961036527}{5127200} - \frac{8030941371 \text{ I}}{1281800}$
			$\frac{32840383}{1690} + \frac{32840383 \text{ I}}{1690}$	$\frac{13851134028}{21125} - \frac{4669967304 \text{ I}}{21125}$	$\frac{71958796389}{138125} - \frac{26282835477 \text{ I}}{138125}$	$\frac{767356712}{96135} + \frac{5442829552 \text{ I}}{1442025}$
				$\frac{2641923459}{680000} + \frac{24721798131 \text{ I}}{8840000}$	$-\frac{3849814413}{1132625} - \frac{12581847801 \text{ I}}{1132625}$	$-\frac{149834338839}{320396960} - \frac{12475858491 \text{ I}}{800992400}$
					$-\frac{65784094029}{29035974500} + \frac{214800728472 \text{ I}}{7258993625}$	$\frac{89421505551}{130234885625} - \frac{577732680819 \text{ I}}{130234885625}$
						$\frac{645790646833}{185037725496000} - \frac{5352121039903 \text{ I}}{555113176488000}$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{1}{47184620001480000 \Delta x_{ol}^3} \big( (-454930288391755 + 164676614942415 \text{ I}) u_{ol-6} + (-209314861191446976 + 32397769147149504 \text{ I}) u_{ol-5} - (734924129230280700 + 22065990705065400750 \text{ I}) u_{ol-4} + (178095278614410726400 + 376631142261456576000 \text{ I}) u_{ol-3} - (295628738371664700600$$

$$+ 1140789203369495450550 \text{ I}) u_{ol-2} + (2025927070425446400 + 443468392586198294400 \text{ I}) u_{ol-1} - (15160850271114333810 + 15160850271114333810 \text{ I}) u_{ol} + (1396239103184555520 - 106901784160886160 \text{ I}) u_{ol-5-1} - (524153808547967557440 + 160381441477652166720 \text{ I}) u_{ol-4-1} + (-8978429716153211486016$$

$$+ 24581708332154470216512 \text{ I}) u_{ol-3-1} + (40990959258813959016960 + 108379224297464031774720 \text{ I}) u_{ol-2-1} + (25144524115518610062000 + 25144524115518610062000 \text{ I}) u_{ol-1-1} + (443468392586198294400 + 2025927070425446400 \text{ I}) u_{ol-1} + (131955729701870303307 + 183320815420456803999 \text{ I}) u_{ol-4-21}$$

$$+ (-10430799179104190845440 + 30937774944414155662080 \text{ I}) u_{ol-3-21} - (210699556507460246019300 + 210699556507460246019300 \text{ I}) u_{ol-2-21} + (108379224297464031774720 + 40990959258813959016960 \text{ I}) u_{ol-1-21} - (1140789203369495450550 + 295628738371664700600 \text{ I}) u_{ol-21} + (916899995596487436000$$

$$+ 916899995596487436000 \, \text{I}) \, u_{oI-3-31} + (30937774944414155662080 - 10430799179104190845440 \, \text{I}) \, u_{oI-2-31} + (24581708332154470216512 - 8978429716153211486016 \, \text{I}) \, u_{oI-1-31} + (376631142261456576000 + 178095278614410726400 \, \text{I}) \, u_{oI-31} + (183320815420456803999 + 131955729701870303307 \, \text{I}) \, u_{oI-2-41} \\ - (160381441477652166720 + 524153808547967557440 \, \text{I}) \, u_{oI-1-41} - (22065990705065400750 + 734924129230280700 \, \text{I}) \, u_{oI-41} + (-106901784160886160 + 1396239103184555520 \, \text{I}) \, u_{oI-1-51} + (32397769147149504 - 209314861191446976 \, \text{I}) \, u_{oI-51} + (164676614942415 - 454930288391755 \, \text{I}) \, u_{oI-61}), \, O(\, \Delta x_{oI}^{25} \, )$$

Formula:, 589, Var:, 1

Variavel :, x\_oI, Derivada de Ordem :, 1

Error order:, 15, Error:, 7.4489578368581898820 × 10−39, New Error:, 7.3888100325965961848 × 10−54

Error order:, 15, Error:, 7.3888100325965961848 × 10−54, New Error:, 7.3828187455324732985 × 10−69

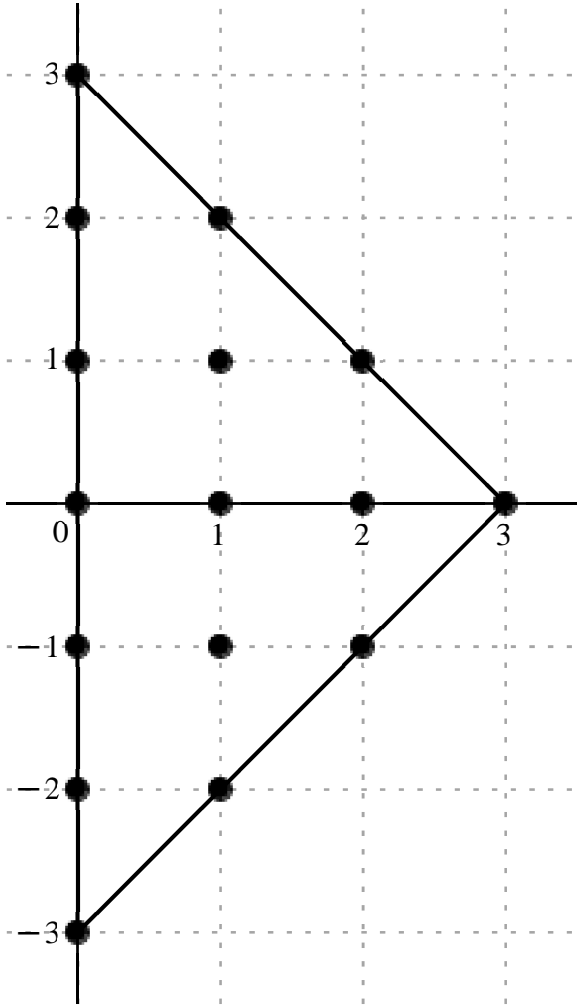
Error order:, 15, Error:, 7.3828187455324732985 × 10−69, New Error:, 7.3822198512192899901 × 10−84

Error order:, 15, Error:, 7.3822198512192899901 × 10−84, New Error:, 7.3821599641313644260 × 10−99

Error order:, 15, Error:, 7.3821599641313644260 × 10−99, New Error:, 7.3821539754460052578 × 10−114

$$x_o \, + h \, . \, , \left[ \begin{array}{cccc} 3 \, \text{I} & & & \\ 2 \, \text{I} & 1 + 2 \, \text{I} & & \\ \text{I} & 1 + \text{I} & 2 + \text{I} & \\ 0 & 1 & 2 & 3 \\ -\text{I} & 1 - \text{I} & 2 - \text{I} & \\ -2 \, \text{I} & 1 - 2 \, \text{I} & & \\ -3 \, \text{I} & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} -\frac{1}{106080} + \frac{\text{I}}{8160} & & & \\ -\frac{99}{8840} + \frac{63 \, \text{I}}{8840} & -\frac{261}{17680} - \frac{333 \, \text{I}}{17680} & & \\ -\frac{9}{32} + \frac{9 \, \text{I}}{32} & -\frac{63}{85} + \frac{99 \, \text{I}}{85} & -\frac{27}{520} + \frac{81 \, \text{I}}{1040} & \\ -\frac{121}{30} & \frac{27}{4} & -\frac{27}{52} & \frac{1}{312} \\ -\frac{9}{32} - \frac{9 \, \text{I}}{32} & -\frac{63}{85} - \frac{99 \, \text{I}}{85} & -\frac{27}{520} - \frac{81 \, \text{I}}{1040} & \\ -\frac{99}{8840} - \frac{63 \, \text{I}}{8840} & -\frac{261}{17680} + \frac{333 \, \text{I}}{17680} & & \\ -\frac{1}{106080} - \frac{\text{I}}{8160} & & & \end{array} \right]$$



$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{106080 \Delta x_{ol}} \big( (-1 + 13 \, \text{I}) \, u_{ol+31} + (-1188 + 756 \, \text{I}) \, u_{ol+21} - (1566 + 1998 \, \text{I}) \, u_{ol+1+21} + (-29835 + 29835 \, \text{I}) \, u_{ol+1} + (-78624 + 123552 \, \text{I}) \, u_{ol+1+1} + (-5508 + 8262 \, \text{I}) \, u_{ol+2+1} - 427856 \, u_{ol} + 716040 \, u_{ol+1} - 55080 \, u_{ol+2} + 340 \, u_{ol+3} - (29835 + 29835 \, \text{I}) \, u_{ol-1} - (78624 + 123552 \, \text{I}) \, u_{ol+1-1} - (5508 + 8262 \, \text{I}) \, u_{ol+2-1} - (1188 + 756 \, \text{I}) \, u_{ol-21} + (-1566 + 1998 \, \text{I}) \, u_{ol+1-21} - (1 + 13 \, \text{I}) \, u_{ol-31} \big), \, O( \Delta x_{ol}^{15} )$$

Formula:, 590, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 14, Error:,  $5.4616975283177472524 \times 10^{-36}$ , New Error:,  $5.4183742001981841357 \times 10^{-50}$

Error order:, 14, Error:,  $5.4183742001981841357 \times 10^{-50}$ , New Error:,  $5.4140584376435965015 \times 10^{-64}$

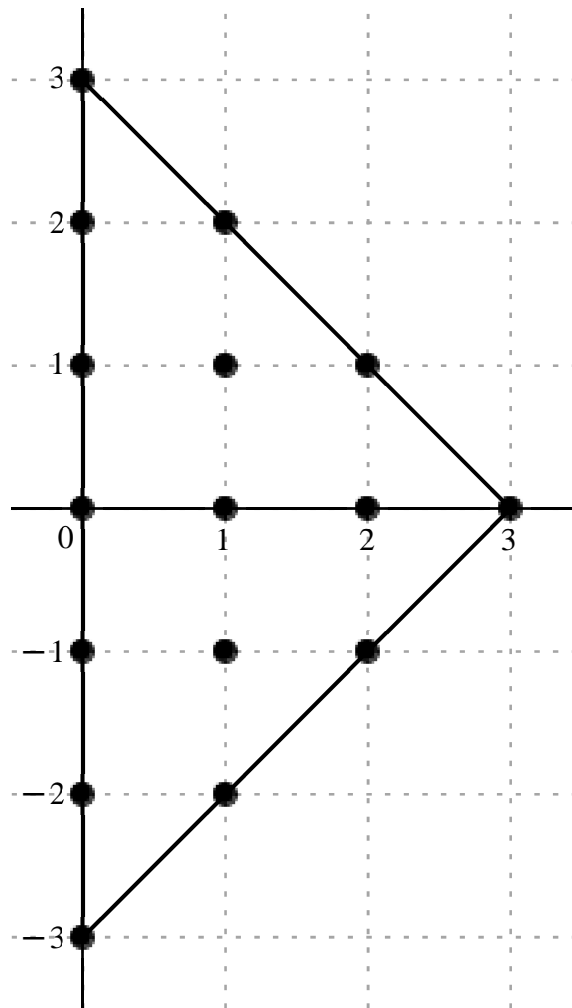
Error order:, 14, Error:,  $5.4140584376435965015 \times 10^{-64}$ , New Error:,  $5.4136270267190035316 \times 10^{-78}$

Error order:, 14, Error:,  $5.4136270267190035316 \times 10^{-78}$ , New Error:,  $5.4135838872794817677 \times 10^{-92}$

Error order:, 14, Error:,  $5.4135838872794817677 \times 10^{-92}$ , New Error:,  $5.4135795733520585956 \times 10^{-106}$

$$x_o + h. , \left[ \begin{array}{cccc} 3 \, \text{I} & & & \\ 2 \, \text{I} & 1 + 2 \, \text{I} & & \\ \text{I} & 1 + \text{I} & 2 + \text{I} & \\ 0 & 1 & 2 & 3 \\ -\text{I} & 1 - \text{I} & 2 - \text{I} & \\ -2 \, \text{I} & 1 - 2 \, \text{I} & & \\ -3 \, \text{I} & & & \end{array} \right]$$

$$c = , \quad \begin{array}{ccccccc} \frac{251}{1591200} & - & \frac{521 \text{ I}}{530400} & & & & \\ \frac{1077}{11050} & - & \frac{1023 \text{ I}}{22100} & & \frac{8673}{88400} & + & \frac{13809 \text{ I}}{88400} \\ \frac{453}{160} & - & \frac{273 \text{ I}}{160} & & \frac{2721}{425} & - & \frac{3183 \text{ I}}{425} & & \frac{531}{1300} & - & \frac{567 \text{ I}}{1040} \\ & & \frac{7933}{450} & & - & \frac{819}{20} & & & \frac{477}{130} & & - & \frac{37}{1560} \\ \frac{453}{160} & + & \frac{273 \text{ I}}{160} & & \frac{2721}{425} & + & \frac{3183 \text{ I}}{425} & & \frac{531}{1300} & + & \frac{567 \text{ I}}{1040} \\ \frac{1077}{11050} & + & \frac{1023 \text{ I}}{22100} & & \frac{8673}{88400} & - & \frac{13809 \text{ I}}{88400} & & & & \\ \frac{251}{1591200} & + & \frac{521 \text{ I}}{530400} & & & & & & & & \end{array}$$



$$\frac{d^2}{dx_{ol}^2} u(x_{ol}) = \frac{1}{1591200 \Delta x_{ol}^2} \left( (251 - 1563 \text{ I}) u_{ol+3\text{I}} + (155088 - 73656 \text{ I}) u_{ol+2\text{I}} + (156114 + 248562 \text{ I}) u_{ol+1+2\text{I}} + (4505085 - 2714985 \text{ I}) u_{ol+1\text{I}} + (10187424 - 11917152 \text{ I}) u_{ol+1+1\text{I}} + (649944 - 867510 \text{ I}) u_{ol+2+1\text{I}} + 28051088 u_{ol\text{I}} - 65159640 u_{ol+1\text{I}} + 5838480 u_{ol+2\text{I}} - 37740 u_{ol+3\text{I}} + (4505085 + 2714985 \text{ I}) u_{ol-1\text{I}} + (10187424 + 11917152 \text{ I}) u_{ol+1-1\text{I}} + (649944 + 867510 \text{ I}) u_{ol+2-1\text{I}} + (155088 + 73656 \text{ I}) u_{ol-2\text{I}} + (156114 - 248562 \text{ I}) u_{ol+1-2\text{I}} + (251 + 1563 \text{ I}) u_{ol-3\text{I}} \right), \quad O(\Delta x_{ol}^{14})$$

*Formula:*, 591, *Var:*, 1

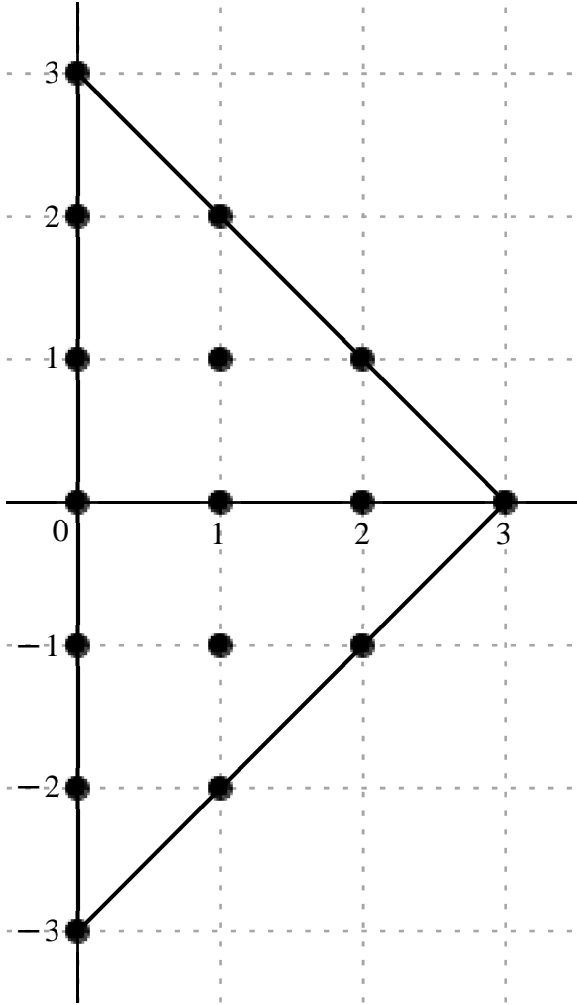
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

*Error order:*, 13, *Error:*,  $3.2548311077340845136 \times 10^{-33}$ , *New Error:*,  $3.2294051368777291830 \times 10^{-46}$

*Error order*:, 13,    *Error*:,  $3.2294051368777291830 \times 10^{-46}$ ,    *New Error*:,  $3.2268720971230140192 \times 10^{-59}$   
*Error order*:, 13,    *Error*:,  $3.2268720971230140192 \times 10^{-59}$ ,    *New Error*:,  $3.2266188885106616738 \times 10^{-72}$   
*Error order*:, 13,    *Error*:,  $3.2266188885106616738 \times 10^{-72}$ ,    *New Error*:,  $3.2265935686028477649 \times 10^{-85}$   
*Error order*:, 13,    *Error*:,  $3.2265935686028477649 \times 10^{-85}$ ,    *New Error*:,  $3.2265910366216003775 \times 10^{-98}$

$$x_o \neq h., \left[ \begin{array}{cccc} 3 \text{ I} & & & \\ 2 \text{ I} & 1+2 \text{ I} & & \\ \text{I} & 1+\text{I} & 2+\text{I} & \\ 0 & 1 & 2 & 3 \\ -\text{I} & 1-\text{I} & 2-\text{I} & \\ -2 \text{ I} & 1-2 \text{ I} & & \\ -3 \text{ I} & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccc} -\frac{23563}{15912000} + \frac{100619 \text{ I}}{15912000} & & & \\ -\frac{292479}{442000} + \frac{101973 \text{ I}}{442000} & -\frac{18897}{35360} - \frac{180357 \text{ I}}{176800} & & \\ -\frac{31989}{1600} + \frac{10209 \text{ I}}{1600} & -\frac{173523}{4250} + \frac{173229 \text{ I}}{4250} & -\frac{2583}{1000} + \frac{12879 \text{ I}}{4000} & \\ & -\frac{74807}{900} & \frac{46827}{200} & -\frac{57087}{2600} \quad \frac{6823}{46800} \\ -\frac{31989}{1600} - \frac{10209 \text{ I}}{1600} & -\frac{173523}{4250} - \frac{173229 \text{ I}}{4250} & -\frac{2583}{1000} - \frac{12879 \text{ I}}{4000} & \\ -\frac{292479}{442000} - \frac{101973 \text{ I}}{442000} & -\frac{18897}{35360} + \frac{180357 \text{ I}}{176800} & & \\ -\frac{23563}{15912000} - \frac{100619 \text{ I}}{15912000} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{15912000 \, \Delta x_{ol}^3} \big( (-23563 + 100619 \, \mathrm{I}) \, u_{ol+31} + (-10529244 + 3671028 \, \mathrm{I}) \, u_{ol+21} - (8503650 + 16232130 \, \mathrm{I}) \, u_{ol+1+21} + (-318130605 + 101528505 \, \mathrm{I}) \, u_{ol+1} + (-649670112 + 648569376 \, \mathrm{I}) \, u_{ol+1+1} + (-41100696 + 51232662 \, \mathrm{I}) \, u_{ol+2+1} - 1322587760 \, u_{ol} + 3725556120 \, u_{ol+1} - 349372440 \, u_{ol+2} + 2319820 \, u_{ol+3} \\ - (318130605 + 101528505 \, \mathrm{I}) \, u_{ol-1} - (649670112 + 648569376 \, \mathrm{I}) \, u_{ol+1-1} - (41100696 + 51232662 \, \mathrm{I}) \, u_{ol+2-1} - (10529244 + 3671028 \, \mathrm{I}) \, u_{ol-21} + (-8503650 + 16232130 \, \mathrm{I}) \, u_{ol+1-21} - (23563 + 100619 \, \mathrm{I}) \, u_{ol-31} \big), \quad O(\Delta x_{ol}^{13})$$

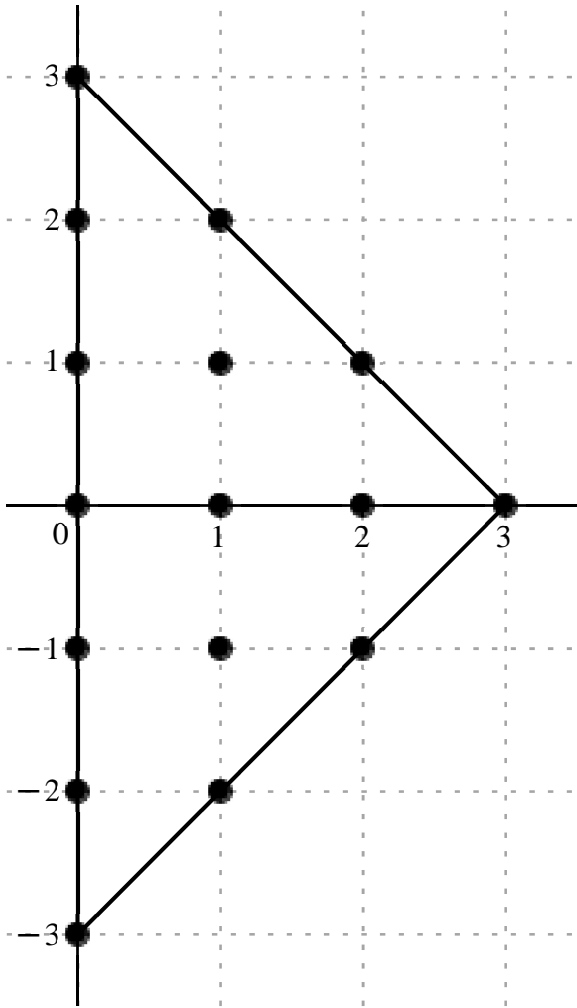
Formula.: 592, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 4

Error order.: 12, Error.:  $1.8599418636301599094 \times 10^{-30}$ , New Error.:  $1.8456033742724856351 \times 10^{-42}$   
 Error order.: 12, Error.:  $1.8456033742724856351 \times 10^{-42}$ , New Error.:  $1.8441748373471638762 \times 10^{-54}$   
 Error order.: 12, Error.:  $1.8441748373471638762 \times 10^{-54}$ , New Error.:  $1.8440320366597479045 \times 10^{-66}$   
 Error order.: 12, Error.:  $1.8440320366597479045 \times 10^{-66}$ , New Error.:  $1.8440177571209426562 \times 10^{-78}$   
 Error order.: 12, Error.:  $1.8440177571209426562 \times 10^{-78}$ , New Error.:  $1.8440163291723613801 \times 10^{-90}$

$$x_o + h. , \left[ \begin{array}{cccc} 3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} \frac{18403}{1591200} - \frac{61691 \, \mathrm{I}}{1591200} & & & \\ \frac{18497}{4420} - \frac{23117 \, \mathrm{I}}{22100} & \frac{251801}{88400} + \frac{557017 \, \mathrm{I}}{88400} & & \\ \frac{3809}{32} - \frac{10829 \, \mathrm{I}}{800} & \frac{104671}{425} - \frac{3809 \, \mathrm{I}}{17} & \frac{10209}{650} - \frac{97119 \, \mathrm{I}}{5200} & \\ \frac{18166}{45} & - \frac{130767}{100} & \frac{83667}{650} & - \frac{20387}{23400} \\ \frac{3809}{32} + \frac{10829 \, \mathrm{I}}{800} & \frac{104671}{425} + \frac{3809 \, \mathrm{I}}{17} & \frac{10209}{650} + \frac{97119 \, \mathrm{I}}{5200} & \\ \frac{18497}{4420} + \frac{23117 \, \mathrm{I}}{22100} & \frac{251801}{88400} - \frac{557017 \, \mathrm{I}}{88400} & & \\ \frac{18403}{1591200} + \frac{61691 \, \mathrm{I}}{1591200} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \; u(x_{ol}) = \frac{1}{1591200 \; \Delta x_{ol}^4} \Big( (18403 - 61691 \; \mathrm{I}) \; u_{ol+3\mathrm{I}} + (6658920 - 1664424 \; \mathrm{I}) \; u_{ol+2\mathrm{I}} + (4532418 + 10026306 \; \mathrm{I}) \; u_{ol+1+2\mathrm{I}} + (189402525 - 21538881 \; \mathrm{I}) \; u_{ol+1\mathrm{I}} + (391888224 - 356522400 \; \mathrm{I}) \; u_{ol+1+1\mathrm{I}} + (24991632 - 29718414 \; \mathrm{I}) \; u_{ol+2+1\mathrm{I}} + 642349760 \; u_{ol} - 2080764504 \; u_{ol+1\mathrm{I}} + 204816816 \; u_{ol+2\mathrm{I}} - 1386316 \; u_{ol+3\mathrm{I}} + (189402525 + 21538881 \; \mathrm{I}) \; u_{ol-1\mathrm{I}} + (391888224 + 356522400 \; \mathrm{I}) \; u_{ol+1-1\mathrm{I}} + (24991632 + 29718414 \; \mathrm{I}) \; u_{ol+2-1\mathrm{I}} + (6658920 + 1664424 \; \mathrm{I}) \; u_{ol-2\mathrm{I}} + (4532418 - 10026306 \; \mathrm{I}) \; u_{ol+1-2\mathrm{I}} + (18403 + 61691 \; \mathrm{I}) \; u_{ol-3\mathrm{I}} \Big), \; O( \; \Delta x_{ol}^{12} \; )$$

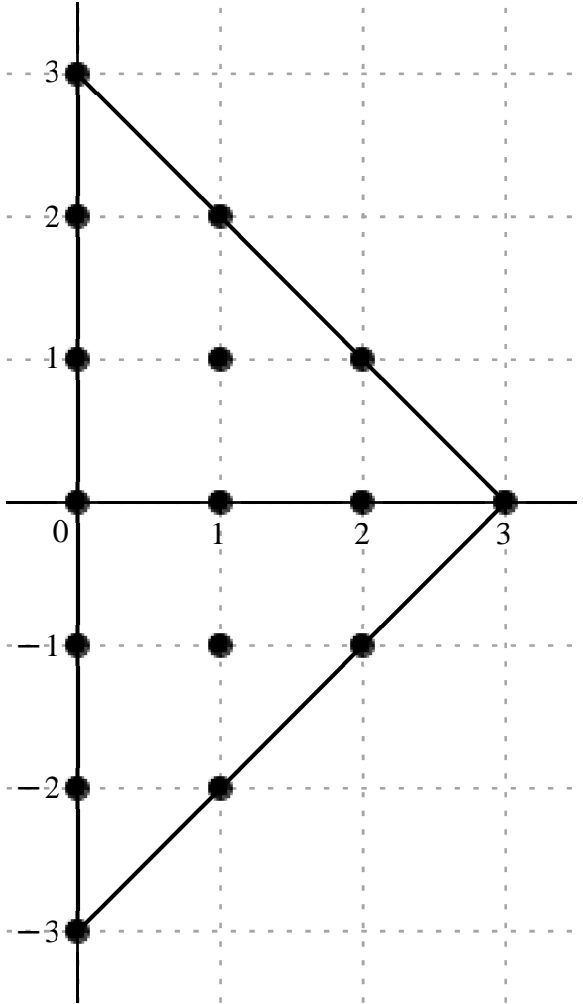
Formula: 593, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 5

Error order: 11, Error: 1.0263876767620177443 × 10<sup>−27</sup>, New Error: 1.0185856023317619885 × 10<sup>−38</sup>  
Error order: 11, Error: 1.0185856023317619885 × 10<sup>−38</sup>, New Error: 1.0178082414662088239 × 10<sup>−49</sup>  
Error order: 11, Error: 1.0178082414662088239 × 10<sup>−49</sup>, New Error: 1.0177305337848224135 × 10<sup>−60</sup>  
Error order: 11, Error: 1.0177305337848224135 × 10<sup>−60</sup>, New Error: 1.0177227633006749468 × 10<sup>−71</sup>  
Error order: 11, Error: 1.0177227633006749468 × 10<sup>−71</sup>, New Error: 1.0177219862551000514 × 10<sup>−82</sup>

$$x_o \; \neq h. \; , \; \left[ \begin{array}{cccc} 3 \; \mathrm{I} & & & \\ 2 \; \mathrm{I} & 1 + 2 \; \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ -2 \; \mathrm{I} & 1 - 2 \; \mathrm{I} & & \\ -3 \; \mathrm{I} & & & \end{array} \right]$$

$$c =, \begin{bmatrix} -\frac{8873}{106080} + \frac{1613 \text{ I}}{7072} & & & & \\ -\frac{222943}{8840} + \frac{34677 \text{ I}}{8840} & -\frac{253647}{17680} - \frac{661459 \text{ I}}{17680} & & & \\ -\frac{101659}{160} - \frac{879 \text{ I}}{32} & -\frac{122439}{85} + \frac{99878 \text{ I}}{85} & -\frac{95751}{1040} + \frac{13539 \text{ I}}{130} & & \\ -\frac{11699}{6} & \frac{141723}{20} & -\frac{188823}{260} & \frac{2609}{520} & \\ -\frac{101659}{160} + \frac{879 \text{ I}}{32} & -\frac{122439}{85} - \frac{99878 \text{ I}}{85} & -\frac{95751}{1040} - \frac{13539 \text{ I}}{130} & & \\ -\frac{222943}{8840} - \frac{34677 \text{ I}}{8840} & -\frac{253647}{17680} + \frac{661459 \text{ I}}{17680} & & & \\ -\frac{8873}{106080} - \frac{1613 \text{ I}}{7072} & & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \; u(x_{ol}) = \frac{1}{106080 \; \Delta x_{ol}^5} \big( (-8873 + 24195 \text{ I}) \; u_{ol+3\text{I}} + (-2675316 + 416124 \text{ I}) \; u_{ol+2\text{I}} - (1521882 + 3968754 \text{ I}) \; u_{ol+1+2\text{I}} - (67399917 + 2913885 \text{ I}) \; u_{ol+1} + (-152803872 + 124647744 \text{ I}) \; u_{ol+1+1\text{I}} + (-9766602 + 11047824 \text{ I}) \; u_{ol+2+1\text{I}} - 206838320 \; u_{ol} + 751698792 \; u_{ol+1} - 77039784 \; u_{ol+2} + 532236 \; u_{ol+3} + (-67399917 + 2913885 \text{ I}) \; u_{ol-1} - (152803872 + 124647744 \text{ I}) \; u_{ol+1-1\text{I}} - (9766602 + 11047824 \text{ I}) \; u_{ol+2-1\text{I}} - (2675316 + 416124 \text{ I}) \; u_{ol-2\text{I}} + (-1521882 + 3968754 \text{ I}) \; u_{ol+1-2\text{I}} - (8873 + 24195 \text{ I}) \; u_{ol-3\text{I}} \big), \; O(\; \Delta x_{ol}^{11} \; )$$

Formula.: 594, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 6

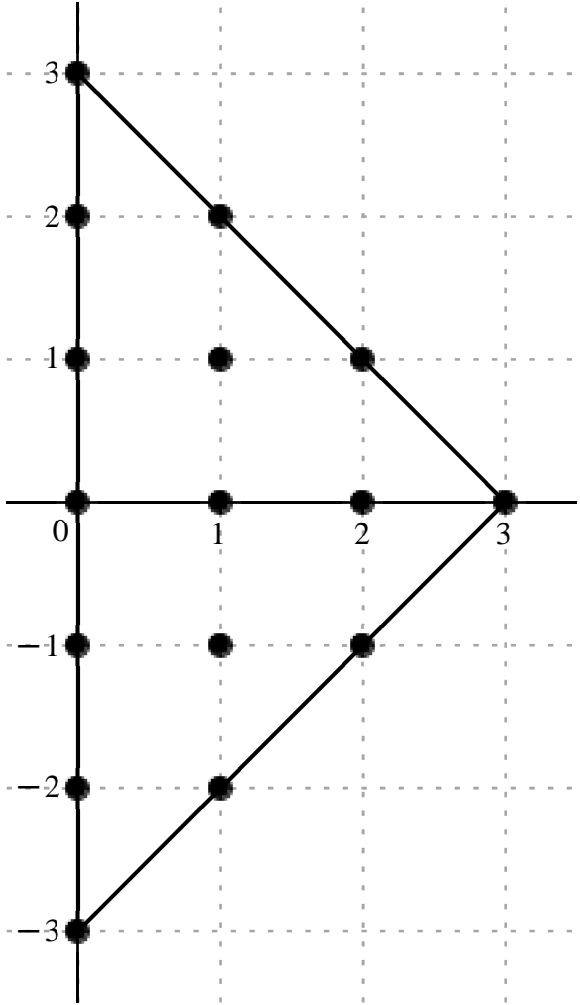
Error order.: 10, Error.: 5.4074382564027876320 × 10<sup>−25</sup>, New Error.: 5.3669910681358864689 × 10<sup>−35</sup>



*Error order*:, 10,    *Error*:,  $5.3669910681358864689 \times 10^{-35}$ ,    *New Error*:,  $5.3629608538428148141 \times 10^{-45}$   
*Error order*:, 10,    *Error*:,  $5.3629608538428148141 \times 10^{-45}$ ,    *New Error*:,  $5.3625579771556398139 \times 10^{-55}$   
*Error order*:, 10,    *Error*:,  $5.3625579771556398139 \times 10^{-55}$ ,    *New Error*:,  $5.3625176909340408814 \times 10^{-65}$   
*Error order*:, 10,    *Error*:,  $5.3625176909340408814 \times 10^{-65}$ ,    *New Error*:,  $5.3625136623263518711 \times 10^{-75}$

$$x_o + h. , \begin{bmatrix} 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} \\ \text{I} & 1 + \text{I} & 2 + \text{I} \\ 0 & 1 & 2 & 3 \\ -\text{I} & 1 - \text{I} & 2 - \text{I} \\ -2 \text{ I} & 1 - 2 \text{ I} \\ -3 \text{ I} \end{bmatrix}$$

$$c = , \begin{bmatrix} \frac{60089}{106080} - \frac{134341 \text{ I}}{106080} \\ \frac{157779}{1105} - \frac{8526 \text{ I}}{1105} & \frac{1161561}{17680} + \frac{3710769 \text{ I}}{17680} \\ \frac{100017}{32} + \frac{83499 \text{ I}}{160} & \frac{669354}{85} - \frac{98250 \text{ I}}{17} & \frac{265959}{520} - \frac{572769 \text{ I}}{1040} \\ \frac{137122}{15} & -\frac{729027}{20} & \frac{253224}{65} & -\frac{42841}{1560} \\ \frac{100017}{32} - \frac{83499 \text{ I}}{160} & \frac{669354}{85} + \frac{98250 \text{ I}}{17} & \frac{265959}{520} + \frac{572769 \text{ I}}{1040} \\ \frac{157779}{1105} + \frac{8526 \text{ I}}{1105} & \frac{1161561}{17680} - \frac{3710769 \text{ I}}{17680} \\ \frac{60089}{106080} + \frac{134341 \text{ I}}{106080} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{106080 \, \mathcal{A}\mathfrak{x}_{ol}^6} \big( (60089 - 134341 \, \mathrm{I}) \, u_{ol+31} + (15146784 - 818496 \, \mathrm{I}) \, u_{ol+21} + (6969366 + 22264614 \, \mathrm{I}) \, u_{ol+1+21} + (331556355 + 55359837 \, \mathrm{I}) \, u_{ol+1} + (835353792 - 613080000 \, \mathrm{I}) \, u_{ol+1+1} + (54255636 - 58422438 \, \mathrm{I}) \, u_{ol+2+1} + 969726784 \, u_{ol} - 3866759208 \, u_{ol+1} + 413261568 \, u_{ol+2} - 2913188 \, u_{ol+3} + (331556355 - 55359837 \, \mathrm{I}) \, u_{ol-1} + (835353792 + 613080000 \, \mathrm{I}) \, u_{ol+1-1} + (54255636 + 58422438 \, \mathrm{I}) \, u_{ol+2-1} + (15146784 + 818496 \, \mathrm{I}) \, u_{ol-21} + (6969366 - 22264614 \, \mathrm{I}) \, u_{ol+1-21} + (60089 + 134341 \, \mathrm{I}) \, u_{ol-31} \big), \, \, O(\, \mathcal{A}\mathfrak{x}_{ol}^{10} \, )$$

Formula:, 595, Var.:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 7

Error order:., 9, Error:., 2.6884114528359620701 × 10−22, New Error:., 2.6686801669751158756 × 10−31

Error order:., 9, Error:., 2.6686801669751158756 × 10−31, New Error:., 2.6667139751910332324 × 10−40

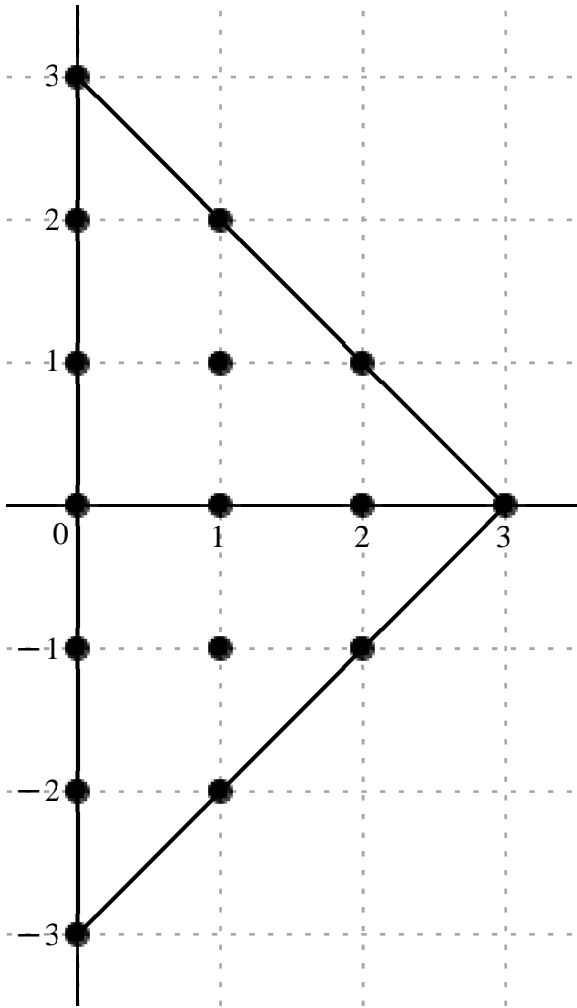
Error order:., 9, Error:., 2.6667139751910332324 × 10−40, New Error:., 2.6665174252385637483 × 10−49

Error order:., 9, Error:., 2.6665174252385637483 × 10−49, New Error:., 2.6664977709354343145 × 10−58

Error order:., 9, Error:., 2.6664977709354343145 × 10−58, New Error:., 2.6664958055120424045 × 10−67

$$x_o \neq h. \, , \qquad \left[ \begin{array}{cccc} 3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} -\frac{1887263}{530400} + \frac{3458329 \, \mathrm{I}}{530400} & & & \\ -\frac{16434411}{22100} - \frac{966063 \, \mathrm{I}}{22100} & -\frac{4685121}{17680} - \frac{19366053 \, \mathrm{I}}{17680} & & \\ -\frac{2295069}{160} - \frac{621033 \, \mathrm{I}}{160} & -\frac{17040114}{425} + \frac{11364612 \, \mathrm{I}}{425} & -\frac{13839903}{5200} + \frac{7086933 \, \mathrm{I}}{2600} & \\ -\frac{616511}{15} & \frac{3535497}{20} & -\frac{509355}{26} & \frac{219989}{1560} \\ -\frac{2295069}{160} + \frac{621033 \, \mathrm{I}}{160} & -\frac{17040114}{425} - \frac{11364612 \, \mathrm{I}}{425} & -\frac{13839903}{5200} - \frac{7086933 \, \mathrm{I}}{2600} & \\ -\frac{16434411}{22100} + \frac{966063 \, \mathrm{I}}{22100} & -\frac{4685121}{17680} + \frac{19366053 \, \mathrm{I}}{17680} & & \\ -\frac{1887263}{530400} - \frac{3458329 \, \mathrm{I}}{530400} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} \, u(x_{ol}) = \frac{1}{530400 \, \Delta x_{ol}^7} \Big( 7 \, \big( (-269609 + 494047 \, \mathrm{I}) \, u_{ol+31} - (56346552 + 3312216 \, \mathrm{I}) \, u_{ol+21} - (20079090 + 82997370 \, \mathrm{I}) \, u_{ol+1+21} - (1086879105 + 294103485 \, \mathrm{I}) \, u_{ol+1} + (-3038008896 + 2026147968 \, \mathrm{I}) \, u_{ol+1+1} + (-201667158 + 206533476 \, \mathrm{I}) \, u_{ol+2+1} - 3114261280 \, u_{ol} + 13394482920 \, u_{ol+1} - 1484406000 \, u_{ol+2} + 10685180 \, u_{ol+3} \\ + (-1086879105 + 294103485 \, \mathrm{I}) \, u_{ol-1} - (3038008896 + 2026147968 \, \mathrm{I}) \, u_{ol+1-1} - (201667158 + 206533476 \, \mathrm{I}) \, u_{ol+2-1} + (-56346552 + 3312216 \, \mathrm{I}) \, u_{ol-21} + (-20079090 + 82997370 \, \mathrm{I}) \, u_{ol+1-21} - (269609 + 494047 \, \mathrm{I}) \, u_{ol-31} \big) \Big), \, O(\, \Delta x_{ol}^9 \, )$$

Formula.: 596, Var.: 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 8

Error order.: 8, Error.: 1.2555999162925452750 × 10<sup>−19</sup>, New Error.: 1.2465845275865790482 × 10<sup>−27</sup>

Error order.: 8, Error.: 1.2465845275865790482 × 10<sup>−27</sup>, New Error.: 1.2456860890284049245 × 10<sup>−35</sup>

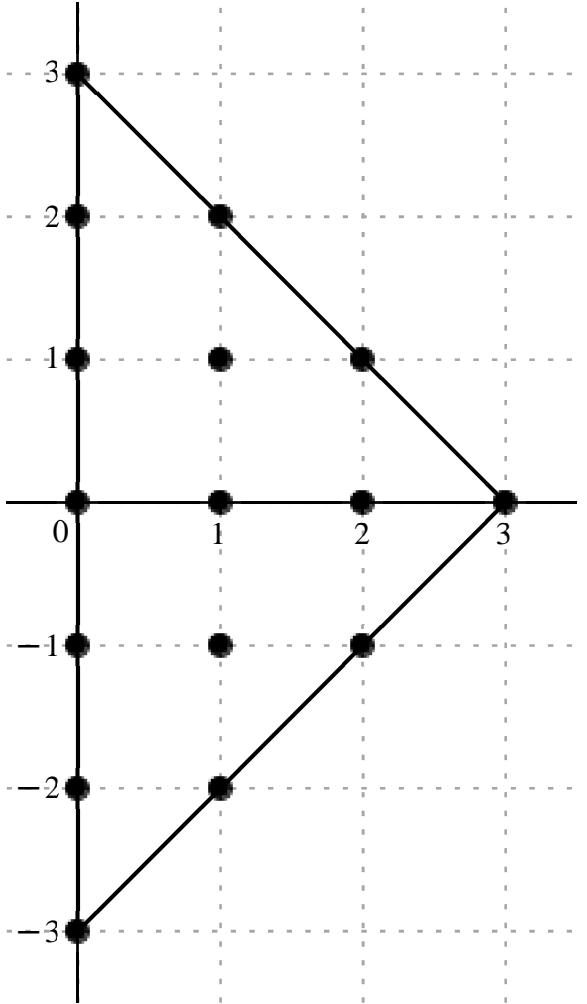
Error order.: 8, Error.: 1.2456860890284049245 × 10<sup>−35</sup>, New Error.: 1.2455962761135617857 × 10<sup>−43</sup>

Error order.: 8, Error.: 1.2455962761135617857 × 10<sup>−43</sup>, New Error.: 1.2455872951314251546 × 10<sup>−51</sup>

Error order.: 8, Error.: 1.2455872951314251546 × 10<sup>−51</sup>, New Error.: 1.2455863970363049063 × 10<sup>−59</sup>

$$x_o \, + h. \, , \left[ \begin{array}{cccc} 3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} \frac{22638}{1105} - \frac{34041 \text{ I}}{1105} & & & \\ \frac{775152}{221} + \frac{697536 \text{ I}}{1105} & \frac{1021923}{1105} + \frac{5843691 \text{ I}}{1105} & & \\ 61425 + \frac{111384 \text{ I}}{5} & \frac{16174368}{85} - \frac{1965600 \text{ I}}{17} & \frac{839601}{65} - \frac{820827 \text{ I}}{65} & \\ 175392 & - \frac{4026204}{5} & \frac{6003648}{65} & - \frac{44058}{65} \\ 61425 - \frac{111384 \text{ I}}{5} & \frac{16174368}{85} + \frac{1965600 \text{ I}}{17} & \frac{839601}{65} + \frac{820827 \text{ I}}{65} & \\ \frac{775152}{221} - \frac{697536 \text{ I}}{1105} & \frac{1021923}{1105} - \frac{5843691 \text{ I}}{1105} & & \\ \frac{22638}{1105} + \frac{34041 \text{ I}}{1105} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \; u(x_{ol}) = \frac{1}{1105 \; \Delta x_{ol}^8} \Big( 21 \; \Big( (1078 - 1621 \; \text{I}) \; u_{ol+3\text{I}} + (184560 + 33216 \; \text{I}) \; u_{ol+2\text{I}} + (48663 + 278271 \; \text{I}) \; u_{ol+1+2\text{I}} + (3232125 + 1172184 \; \text{I}) \; u_{ol+1} + (10012704 - 6084000 \; \text{I}) \; u_{ol+1+1\text{I}} + (679677 - 664479 \; \text{I}) \; u_{ol+2+1\text{I}} + 9228960 \; u_{ol} - 42371004 \; u_{ol+1} + 4860096 \; u_{ol+2} - 35666 \; u_{ol+3} + (3232125 - 1172184 \; \text{I}) \; u_{ol-1} + (10012704 + 6084000 \; \text{I}) \; u_{ol+1-1\text{I}} + (679677 + 664479 \; \text{I}) \; u_{ol+2-1\text{I}} + (184560 - 33216 \; \text{I}) \; u_{ol-2\text{I}} + (48663 - 278271 \; \text{I}) \; u_{ol+1-2\text{I}} + (1078 + 1621 \; \text{I}) \; u_{ol-3\text{I}} \Big) \Big), \; O(\; \Delta x_{ol}^8 \; )$$

Formula.: 597, Var.: 1

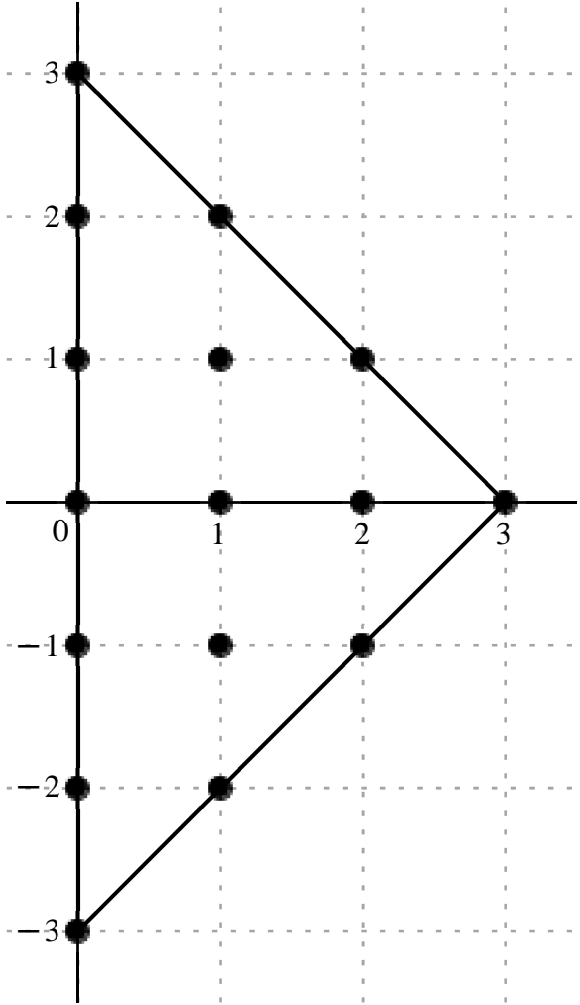
Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 9

Error order.: 7, Error.: 5.4787637393208254487 × 10<sup>−17</sup>, New Error.: 5.4404258382756057005 × 10<sup>−24</sup>

*Error order:*, 7, *Error:*,  $5.4404258382756057005 \times 10^{-24}$ , *New Error:*,  $5.4366049088975242933 \times 10^{-31}$   
*Error order:*, 7, *Error:*,  $5.4366049088975242933 \times 10^{-31}$ , *New Error:*,  $5.4362229443150032132 \times 10^{-38}$   
*Error order:*, 7, *Error:*,  $5.4362229443150032132 \times 10^{-38}$ , *New Error:*,  $5.4361847491400523597 \times 10^{-45}$   
*Error order:*, 7, *Error:*,  $5.4361847491400523597 \times 10^{-45}$ , *New Error:*,  $5.4361809296353900353 \times 10^{-52}$

$$x_o \neq h. , \left[ \begin{array}{cccc} 3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} -\frac{118566}{1105} + \frac{29169 \, \mathrm{I}}{221} & & & \\ -\frac{16395372}{1105} - \frac{5010012 \, \mathrm{I}}{1105} & -\frac{2872989}{1105} - \frac{26013393 \, \mathrm{I}}{1105} & & \\ -\frac{1217349}{5} - 108864 \, \mathrm{I} & -\frac{70888608}{85} + \frac{39263616 \, \mathrm{I}}{85} & -\frac{3782457}{65} + \frac{3525039 \, \mathrm{I}}{65} & \\ -700560 & \frac{17039484}{5} & -\frac{26258904}{65} & \frac{196686}{65} \\ -\frac{1217349}{5} + 108864 \, \mathrm{I} & -\frac{70888608}{85} - \frac{39263616 \, \mathrm{I}}{85} & -\frac{3782457}{65} - \frac{3525039 \, \mathrm{I}}{65} & \\ -\frac{16395372}{1105} + \frac{5010012 \, \mathrm{I}}{1105} & -\frac{2872989}{1105} + \frac{26013393 \, \mathrm{I}}{1105} & & \\ -\frac{118566}{1105} - \frac{29169 \, \mathrm{I}}{221} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{1105 \, \Delta x_{ol}^9} \Big( 63 \, \Big( (-1882 + 2315 \, \mathrm{I}) \, u_{ol+31} - (260244 + 79524 \, \mathrm{I}) \, u_{ol+21} - (45603 + 412911 \, \mathrm{I}) \, u_{ol+1+21} - (4270383 + 1909440 \, \mathrm{I}) \, u_{ol+1} + (-14627808 + 8102016 \, \mathrm{I}) \, u_{ol+1+1} + (-1020663 + 951201 \, \mathrm{I}) \, u_{ol+2+1} - 12287600 \, u_{ol} + 59773428 \, u_{ol+1} - 7085736 \, u_{ol+2} + 53074 \, u_{ol+3} + (-4270383 + 1909440 \, \mathrm{I}) \, u_{ol-1} - (14627808 + 8102016 \, \mathrm{I}) \, u_{ol+1-1} - (1020663 + 951201 \, \mathrm{I}) \, u_{ol+2-1} + (-260244 + 79524 \, \mathrm{I}) \, u_{ol-21} + (-45603 + 412911 \, \mathrm{I}) \, u_{ol+1-21} - (1882 + 2315 \, \mathrm{I}) \, u_{ol-31} \Big) \Big), \, O(\, \Delta x_{ol}^7 \, )$$

Formula:, 598, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 10

Error order:, 6, Error:, 2.2099234028674069522 × 10−14, New Error:, 2.1949401000985389968 × 10−20

Error order:, 6, Error:, 2.1949401000985389968 × 10−20, New Error:, 2.1934466520872340854 × 10−26

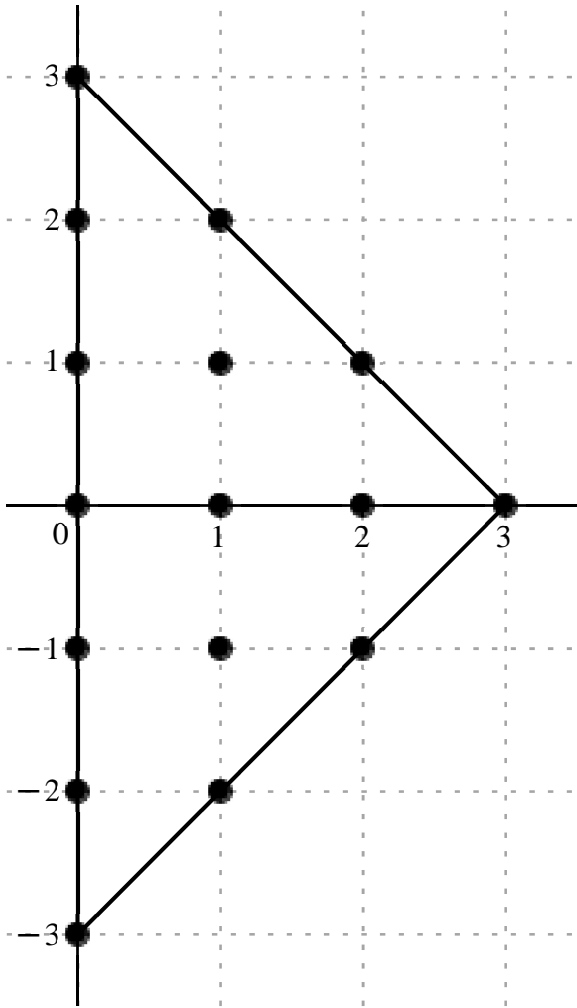
Error order:, 6, Error:, 2.1934466520872340854 × 10−26, New Error:, 2.1932973560154827028 × 10−32

Error order:, 6, Error:, 2.1932973560154827028 × 10−32, New Error:, 2.1932824268955082116 × 10−38

Error order:, 6, Error:, 2.1932824268955082116 × 10−38, New Error:, 2.1932809339883826758 × 10−44

$$x_o \neq h \, , \qquad \left[ \begin{array}{cccc} 3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} \frac{111825}{221} - \frac{110691 \, \mathrm{I}}{221} & & & \\ \frac{12328848}{221} + \frac{5361552 \, \mathrm{I}}{221} & \frac{895860}{221} + \frac{21053844 \, \mathrm{I}}{221} & & \\ 881685 + 464373 \, \mathrm{I} & \frac{56645568}{17} - \frac{28558656 \, \mathrm{I}}{17} & \frac{3112830}{13} - \frac{2760156 \, \mathrm{I}}{13} & \\ 2576448 & -13208832 & \frac{21028896}{13} & - \frac{160776}{13} \\ 881685 - 464373 \, \mathrm{I} & \frac{56645568}{17} + \frac{28558656 \, \mathrm{I}}{17} & \frac{3112830}{13} + \frac{2760156 \, \mathrm{I}}{13} & \\ \frac{12328848}{221} - \frac{5361552 \, \mathrm{I}}{221} & \frac{895860}{221} - \frac{21053844 \, \mathrm{I}}{221} & & \\ \frac{111825}{221} + \frac{110691 \, \mathrm{I}}{221} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\; u(x_{ol}) = \frac{1}{221\; \Delta x_{ol}^{10}}\; \Big( 63\; \Big( (1775 - 1757\; \mathrm{I})\; u_{ol+31} + (195696 + 85104\; \mathrm{I})\; u_{ol+21} + (14220 + 334188\; \mathrm{I})\; u_{ol+1+21} + (3092895 + 1628991\; \mathrm{I})\; u_{ol+1} + (11688768 - 5893056\; \mathrm{I})\; u_{ol+1+1} + (839970 - 744804\; \mathrm{I})\; u_{ol+2+1} + 9038016\; u_{ol} - 46335744\; u_{ol+1} + 5674464\; u_{ol+2} - 43384\; u_{ol+3} + (3092895 - 1628991\; \mathrm{I})\; u_{ol-1} + (11688768 + 5893056\; \mathrm{I})\; u_{ol+1-1} + (839970 + 744804\; \mathrm{I})\; u_{ol+2-1} + (195696 - 85104\; \mathrm{I})\; u_{ol-21} + (14220 - 334188\; \mathrm{I})\; u_{ol+1-21} + (1775 + 1757\; \mathrm{I})\; u_{ol-31} \Big) \Big),\; O(\; \Delta x_{ol}^6 \; )$$

Formula: 599, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 11

Error order: 5, Error: 8.1249965541381339125 × 10<sup>-12</sup>, New Error: 8.0720843879585727954 × 10<sup>-17</sup>

Error order: 5, Error: 8.0720843879585727954 × 10<sup>-17</sup>, New Error: 8.0668098233668825211 × 10<sup>-22</sup>

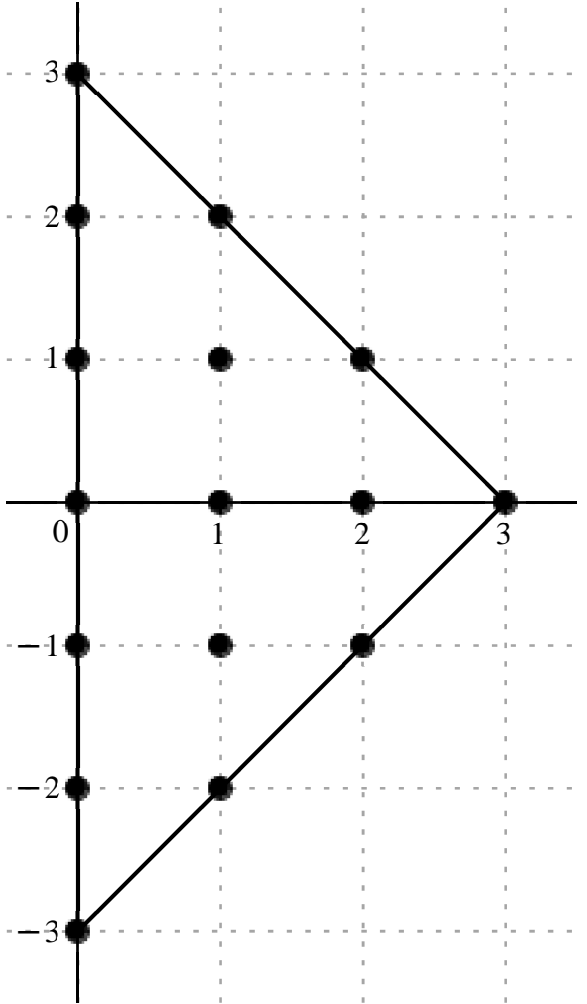
Error order: 5, Error: 8.0668098233668825211 × 10<sup>-22</sup>, New Error: 8.0662825331184497783 × 10<sup>-27</sup>

Error order: 5, Error: 8.0662825331184497783 × 10<sup>-27</sup>, New Error: 8.0662298057554047789 × 10<sup>-32</sup>

Error order: 5, Error: 8.0662298057554047789 × 10<sup>-32</sup>, New Error: 8.0662245330357179526 × 10<sup>-37</sup>

$$x_o + h. , \left[ \begin{array}{cccc} 3\; \mathrm{I} & & & \\ 2\; \mathrm{I} & 1+2\; \mathrm{I} & & \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & \\ -2\; \mathrm{I} & 1-2\; \mathrm{I} & & \\ -3\; \mathrm{I} & & & \end{array} \right]$$

$$c = \begin{bmatrix} -\frac{2324553}{1105} + \frac{1787709 \, \text{I}}{1105} & & & & \\ -\frac{203276304}{1105} - \frac{115858512 \, \text{I}}{1105} & \frac{2145528}{221} - \frac{75592440 \, \text{I}}{221} & & & \\ -2862783 - 1727649 \, \text{I} & -\frac{1013088384}{85} + \frac{462635712 \, \text{I}}{85} & -\frac{57530088}{65} + \frac{48511386 \, \text{I}}{65} & & \\ & -8545152 & 46004112 & -\frac{75642336}{13} & \frac{591360}{13} \\ -2862783 + 1727649 \, \text{I} & -\frac{1013088384}{85} - \frac{462635712 \, \text{I}}{85} & -\frac{57530088}{65} - \frac{48511386 \, \text{I}}{65} & & \\ -\frac{203276304}{1105} + \frac{115858512 \, \text{I}}{1105} & \frac{2145528}{221} + \frac{75592440 \, \text{I}}{221} & & & \\ -\frac{2324553}{1105} - \frac{1787709 \, \text{I}}{1105} & & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d} x_{o l}^{11}} \; u(x_{o l}) = \frac{1}{1105 \, \Delta x_{o l}^{11}} \Big( 231 \Big( ( -10063 + 7739 \, \text{I} ) \, u_{o l + 31} - ( 879984 + 501552 \, \text{I} ) \, u_{o l + 21} + ( 46440 - 1636200 \, \text{I} ) \, u_{o l + 1 + 21} - ( 13694265 + 8264295 \, \text{I} ) \, u_{o l + 1} + ( -57013632 + 26035776 \, \text{I} ) \, u_{o l + 1 + 1} + ( -4233816 + 3570102 \, \text{I} ) \, u_{o l + 2 + 1} - 40876160 \, u_{o l} + 220062960 \, u_{o l + 1} - 27833760 \, u_{o l + 2} + 217600 \, u_{o l + 3} + ( -13694265 + 8264295 \, \text{I} ) \, u_{o l - 1} \\ - ( 57013632 + 26035776 \, \text{I} ) \, u_{o l + 1 - 1} - ( 4233816 + 3570102 \, \text{I} ) \, u_{o l + 2 - 1} + ( -879984 + 501552 \, \text{I} ) \, u_{o l - 21} + ( 46440 + 1636200 \, \text{I} ) \, u_{o l + 1 - 21} - ( 10063 + 7739 \, \text{I} ) \, u_{o l - 31} \Big) \Big) , \; O( \, \Delta x_{o l}^{5} \, )$$

Formula.: 600, Var.: 1

Variavel :, x\_{o l}, Derivada de Ordem :, 12

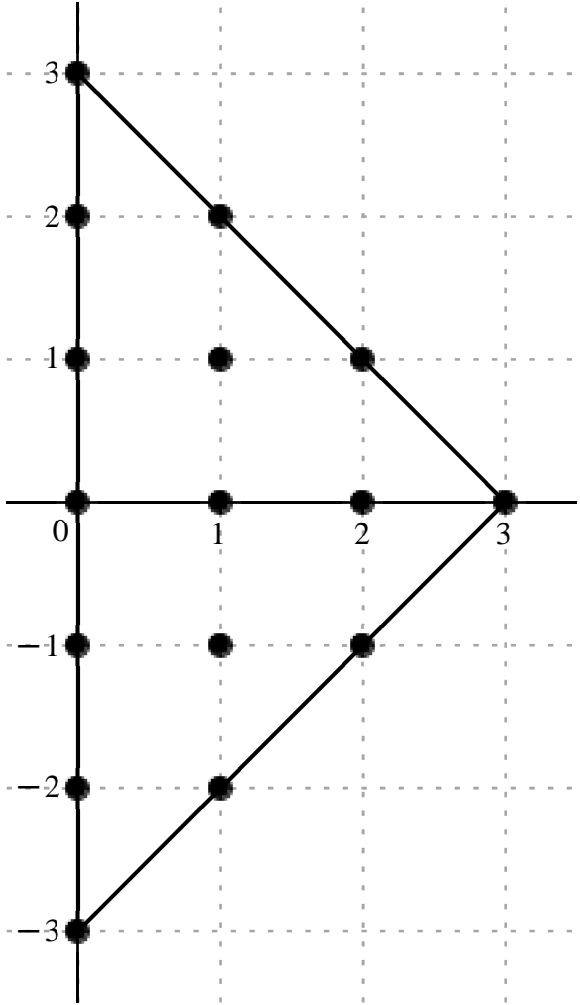
Error order.: 4, Error.: 2.6714721252400943942 × 10−9, New Error.: 2.6549923552158541308 × 10−13



*Error order:*, 4, *Error:*,  $2.6549923552158541308 \times 10^{-13}$ , *New Error:*,  $2.6533493475014229582 \times 10^{-17}$   
*Error order:*, 4, *Error:*,  $2.6533493475014229582 \times 10^{-17}$ , *New Error:*,  $2.6531850963331737566 \times 10^{-21}$   
*Error order:*, 4, *Error:*,  $2.6531850963331737566 \times 10^{-21}$ , *New Error:*,  $2.6531686717122912168 \times 10^{-25}$   
*Error order:*, 4, *Error:*,  $2.6531686717122912168 \times 10^{-25}$ , *New Error:*,  $2.6531670292551622971 \times 10^{-29}$

$$x_o \neq h. , \left[ \begin{array}{cccc} 3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & \\ 0 & 1 & 2 & 3 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccc} \frac{1643796}{221} - \frac{917532 \, \mathrm{I}}{221} & & & & & & \\ \frac{114760800}{221} + \frac{82428192 \, \mathrm{I}}{221} & - \frac{23151744}{221} + \frac{235109952 \, \mathrm{I}}{221} & & & & & \\ 8108100 + 5513508 \, \mathrm{I} & \frac{631483776}{17} - \frac{259459200 \, \mathrm{I}}{17} & \frac{37272312}{13} - \frac{29638224 \, \mathrm{I}}{13} & & & & \\ & 24837120 & -140107968 & \frac{238303296}{13} & - \frac{1907136}{13} & & \\ & 8108100 - 5513508 \, \mathrm{I} & \frac{631483776}{17} + \frac{259459200 \, \mathrm{I}}{17} & \frac{37272312}{13} + \frac{29638224 \, \mathrm{I}}{13} & & & \\ \frac{114760800}{221} - \frac{82428192 \, \mathrm{I}}{221} & - \frac{23151744}{221} - \frac{235109952 \, \mathrm{I}}{221} & & & & & \\ \frac{1643796}{221} + \frac{917532 \, \mathrm{I}}{221} & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\,u(x_{ol})=\frac{1}{221\,\mathcal{A}_{ol}^{12}}\left(2772\left((593-331\,\mathrm{I})\,u_{ol+31}+(41400+29736\,\mathrm{I})\,u_{ol+21}+(\,-8352+84816\,\mathrm{I})\,u_{ol+1+21}+(646425+439569\,\mathrm{I})\,u_{ol+1}+(2961504-1216800\,\mathrm{I})\,u_{ol+1+1}+(228582-181764\,\mathrm{I})\,u_{ol+2+1}+1980160\,u_{ol}-11170224\,u_{ol+1}+1461456\,u_{ol+2}-11696\,u_{ol+3}+(646425-439569\,\mathrm{I})\,u_{ol-1}+(2961504+1216800\,\mathrm{I})\,u_{ol+1-1}+(228582+181764\,\mathrm{I})\,u_{ol+2-1}+(41400-29736\,\mathrm{I})\,u_{ol-21}-(8352+84816\,\mathrm{I})\,u_{ol+1-21}+(593+331\,\mathrm{I})\,u_{ol-31}\right)\right),\,O(\,\mathcal{A}_{ol}^4\,)$$

Formula:, 601, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 13

Error order:, 3, Error:, 7.6431932018502091526 × 10−7, New Error:, 7.5996123386760957111 × 10−10

Error order:, 3, Error:, 7.5996123386760957111 × 10−10, New Error:, 7.5952666997267481172 × 10−13

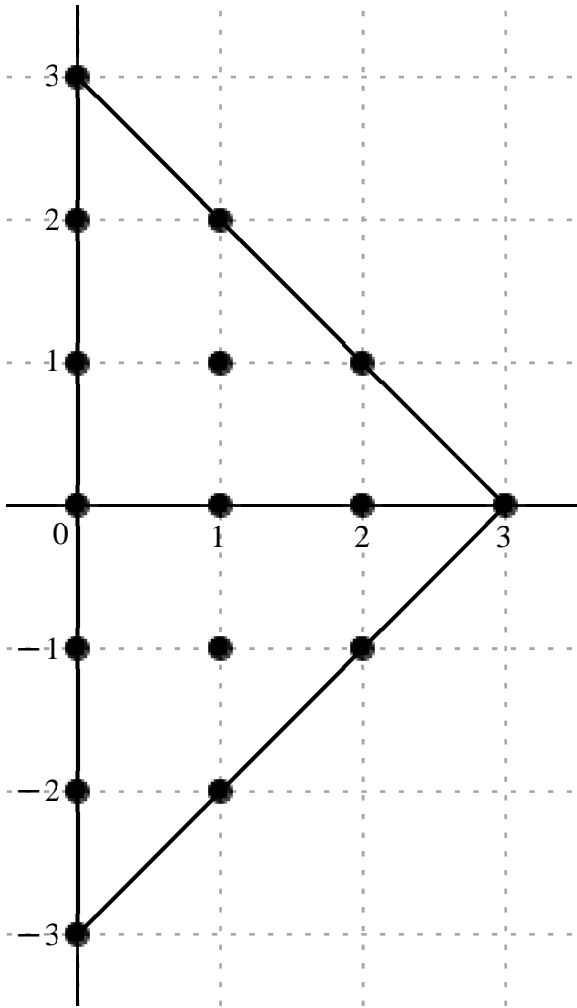
Error order:, 3, Error:, 7.5952666997267481172 × 10−13, New Error:, 7.5948322600874782276 × 10−16

Error order:, 3, Error:, 7.5948322600874782276 × 10−16, New Error:, 7.5947888173658901850 × 10−19

Error order:, 3, Error:, 7.5947888173658901850 × 10−19, New Error:, 7.5947844731061545525 × 10−22

$$x_o\neq h\, ,\,\left[\begin{array}{cccc}3\,\mathrm{I}&&&\\2\,\mathrm{I}&1+2\,\mathrm{I}&&\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&\\0&1&2&3\\-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}&\\-2\,\mathrm{I}&1-2\,\mathrm{I}&&\\-3\,\mathrm{I}&&&\end{array}\right]$$

$$c=,\left[\begin{array}{cccc} -\frac{357588}{17}+\frac{124740\,\mathrm{I}}{17}&&&\\-\frac{20257776}{17}-\frac{18261936\,\mathrm{I}}{17}&\frac{8382528}{17}-\frac{47101824\,\mathrm{I}}{17}&&\\-19135116-14594580\,\mathrm{I}&-\frac{1650160512}{17}+\frac{601945344\,\mathrm{I}}{17}&-7783776+5837832\,\mathrm{I}&\\-60540480&358053696&-48498912&399168\\-19135116+14594580\,\mathrm{I}&-\frac{1650160512}{17}-\frac{601945344\,\mathrm{I}}{17}&-7783776-5837832\,\mathrm{I}&\\-\frac{20257776}{17}+\frac{18261936\,\mathrm{I}}{17}&\frac{8382528}{17}+\frac{47101824\,\mathrm{I}}{17}&&\\-\frac{357588}{17}-\frac{124740\,\mathrm{I}}{17}&&&\end{array}\right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\;u(x_{ol})=\frac{1}{17\,\mathcal{A}_{ol}^{13}}\Big(8316\left((\,-43+15\,\mathrm{I}\,)\,u_{ol+3\mathrm{I}}-(2436+2196\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(1008-5664\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}-(39117+29835\,\mathrm{I})\,u_{ol+1}+(-198432+72384\,\mathrm{I})\,u_{ol+1+\mathrm{I}}+(-15912+11934\,\mathrm{I})\,u_{ol+2+\mathrm{I}}-123760\,u_{ol}+731952\,u_{ol+1}-99144\,u_{ol+2}+816\,u_{ol+3}+(\,-39117+29835\,\mathrm{I}\,)\,u_{ol-1}-(198432+72384\,\mathrm{I})\,u_{ol+1-\mathrm{I}}-(15912\right.\\ \left.+11934\,\mathrm{I})\,u_{ol+2-\mathrm{I}}+(-2436+2196\,\mathrm{I})\,u_{ol-2\mathrm{I}}+(1008+5664\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}-(43+15\,\mathrm{I})\,u_{ol-3\mathrm{I}}\right)\Big),\;O(\,\mathcal{A}_{ol}^3\,)$$

Formula.: 602, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 14

Error order.: 2, Error.: 0.00018225319364620855836, New Error.: 1.8134032105290532137 × 10<sup>−6</sup>

Error order.: 2, Error.: 1.8134032105290532137 × 10<sup>−6</sup>, New Error.: 1.8124927672243750382 × 10<sup>−8</sup>

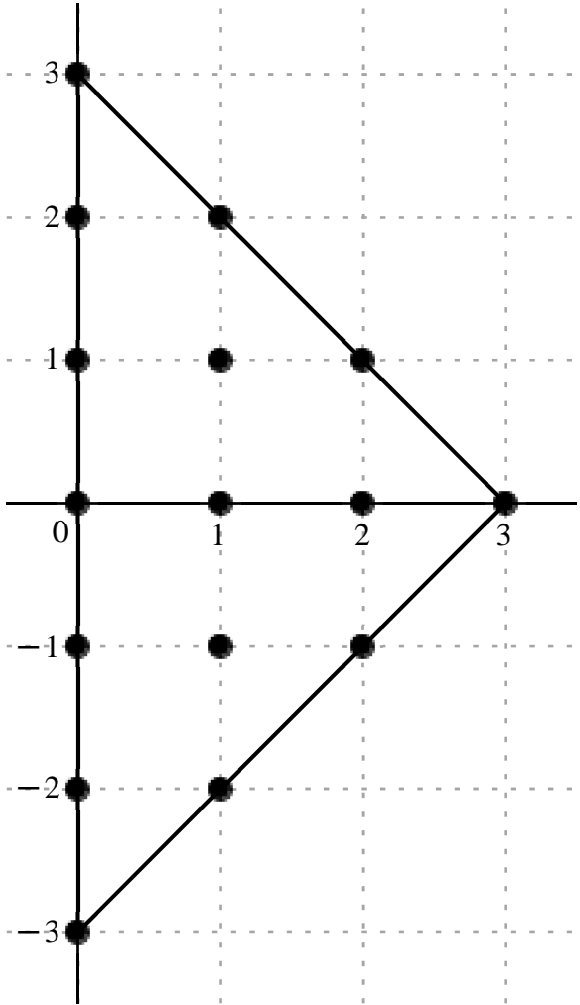
Error order.: 2, Error.: 1.8124927672243750382 × 10<sup>−8</sup>, New Error.: 1.8124017471452831950 × 10<sup>−10</sup>

Error order.: 2, Error.: 1.8124017471452831950 × 10<sup>−10</sup>, New Error.: 1.8123926453798463215 × 10<sup>−12</sup>

Error order.: 2, Error.: 1.8123926453798463215 × 10<sup>−12</sup>, New Error.: 1.8123917352057273158 × 10<sup>−14</sup>

$$x_o\neq h.,\left[\begin{array}{cccc}3\,\mathrm{I}&&&\\2\,\mathrm{I}&1+2\,\mathrm{I}&&\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&\\0&1&2&3\\-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}&\\-2\,\mathrm{I}&1-2\,\mathrm{I}&&\\-3\,\mathrm{I}&&&\end{array}\right]$$

$$c = , \begin{bmatrix} \frac{717948}{17} - \frac{97020 \text{ I}}{17} \\ \frac{33530112}{17} + \frac{39118464 \text{ I}}{17} & -\frac{27592488}{17} + \frac{92557080 \text{ I}}{17} & \\ 34054020 + 29513484 \text{ I} & \frac{3341834496}{17} - \frac{1017080064 \text{ I}}{17} & 16765056 - 11525976 \text{ I} \\ 113008896 & -708323616 & 100590336 & -853776 \\ 34054020 - 29513484 \text{ I} & \frac{3341834496}{17} + \frac{1017080064 \text{ I}}{17} & 16765056 + 11525976 \text{ I} & \\ \frac{33530112}{17} - \frac{39118464 \text{ I}}{17} & -\frac{27592488}{17} - \frac{92557080 \text{ I}}{17} & \\ \frac{717948}{17} + \frac{97020 \text{ I}}{17} \end{bmatrix}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d} x_{o l}^{14}} \; u(x_{o l}) = \frac{1}{17 \; \Delta x_{o l}^{14}} \Big( 19404 \; \Big( (37 - 5 \; \text{I}) \; u_{o l + 3 \text{ I}} + (1728 + 2016 \; \text{I}) \; u_{o l + 2 \text{ I}} + (-1422 + 4770 \; \text{I}) \; u_{o l + 1 + 2 \text{ I}} + (29835 + 25857 \; \text{I}) \; u_{o l + 1 \; \text{I}} + (172224 - 52416 \; \text{I}) \; u_{o l + 1 + 1 \; \text{I}} + (14688 - 10098 \; \text{I}) \; u_{o l + 2 + 1 \; \text{I}} + 99008 \; u_{o l} - 620568 \; u_{o l + 1} + 88128 \; u_{o l + 2} - 748 \; u_{o l + 3} + (29835 - 25857 \; \text{I}) \; u_{o l - 1 \; \text{I}} + (172224 + 52416 \; \text{I}) \; u_{o l + 1 - 1 \; \text{I}} + (14688 + 10098 \; \text{I}) \; u_{o l + 2 - 1 \; \text{I}} \\ + (1728 - 2016 \; \text{I}) \; u_{o l - 2 \text{ I}} - (1422 + 4770 \; \text{I}) \; u_{o l + 1 - 2 \text{ I}} + (37 + 5 \; \text{I}) \; u_{o l - 3 \text{ I}} \Big) \Big), \; O( \; \Delta x_{o l}^2 \; )$$

Formula:; 603, Var.:; 1

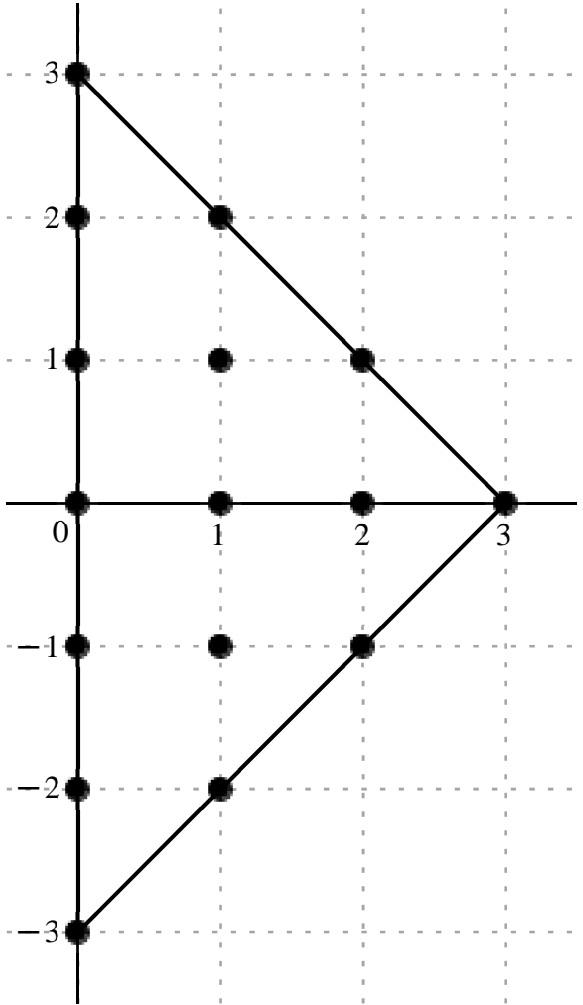
Variavel :; x\_{o l}, Derivada de Ordem :; 15

Error order:; 1, Error:; 0.033090816286382504183, New Error:; 0.0032966369032688681611

Error order:; 1, Error:; 0.0032966369032688681611, New Error:; 0.00032953954249835663684

*Error order*., 1, *Error*., 0.00032953954249835663684, *New Error*., 0.000032952713070469549183  
*Error order*., 1, *Error*., 0.000032952713070469549183, *New Error*.,  $3.2952588955521624408 \times 10^{-6}$   
*Error order*., 1, *Error*.,  $3.2952588955521624408 \times 10^{-6}$ , *New Error*.,  $3.2952576544056718292 \times 10^{-7}$

$$\begin{aligned}
 & x_o \neq h., \left[ \begin{array}{cccc} 3 \operatorname{I} & & & \\ 2 \operatorname{I} & 1+2 \operatorname{I} & & \\ \operatorname{I} & 1+\operatorname{I} & 2+\operatorname{I} & \\ 0 & 1 & 2 & 3 \\ -\operatorname{I} & 1-\operatorname{I} & 2-\operatorname{I} & \\ -2 \operatorname{I} & 1-2 \operatorname{I} & & \\ -3 \operatorname{I} & & & \end{array} \right] \\
 & c =, \left[ \begin{array}{cccc} -\frac{756756}{17} - \frac{58212 \operatorname{I}}{17} & & & \\ -\frac{29338848}{17} - \frac{46103904 \operatorname{I}}{17} & \frac{47151720}{17} - \frac{99542520 \operatorname{I}}{17} & & \\ -34054020 - 34054020 \operatorname{I} & -\frac{3923023104}{17} + \frac{871782912 \operatorname{I}}{17} & -22004136 + 12573792 \operatorname{I} & \\ -121080960 & 817296480 & -125737920 & 1164240 \\ -34054020 + 34054020 \operatorname{I} & -\frac{3923023104}{17} - \frac{871782912 \operatorname{I}}{17} & -22004136 - 12573792 \operatorname{I} & \\ -\frac{29338848}{17} + \frac{46103904 \operatorname{I}}{17} & \frac{47151720}{17} + \frac{99542520 \operatorname{I}}{17} & & \\ -\frac{756756}{17} + \frac{58212 \operatorname{I}}{17} & & & \end{array} \right]
 \end{aligned}$$



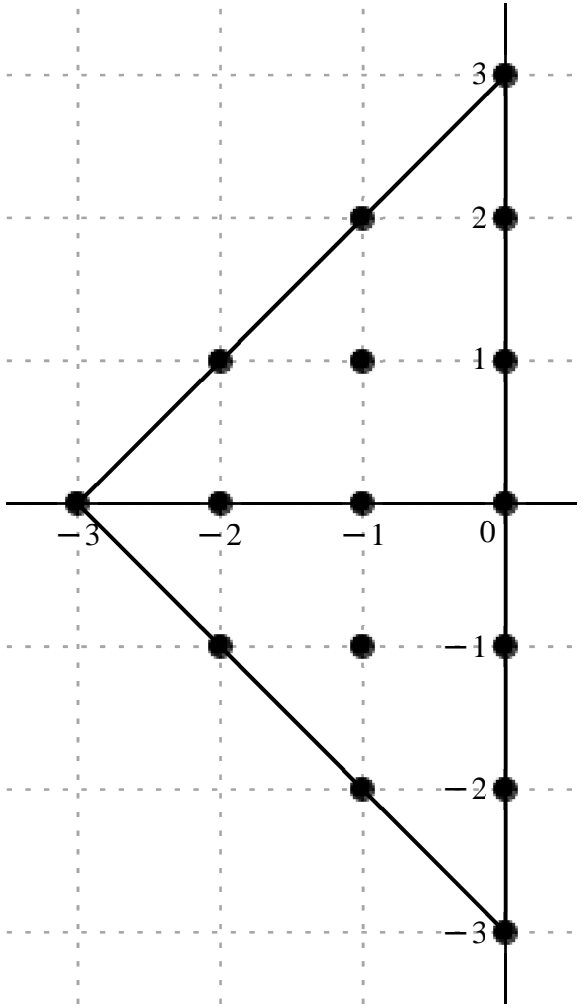
$$\begin{aligned}
 \frac{\mathrm{d}^{15}}{\mathrm{d} x_{o l}^{15}} u\left(x_{o l}\right) &= \frac{1}{17 \Delta x_{o l}^{15}}\left(58212\left(-(13+\operatorname{I}) u_{o l+31}-(504+792 \operatorname{I}) u_{o l+21}+(810-1710 \operatorname{I}) u_{o l+1+21}-(9945+9945 \operatorname{I}) u_{o l+1}+\right.\right. \\
 &\quad \left.\left.(-67392+14976 \operatorname{I}) u_{o l+1+1}+(-6426+3672 \operatorname{I}) u_{o l+2+1}-35360 u_{o l}+238680 u_{o l+1}-36720 u_{o l+2}+340 u_{o l+3}+\right.\right. \\
 &\quad \left.\left.(-9945+9945 \operatorname{I}) u_{o l-1}-(67392+14976 \operatorname{I}) u_{o l+1-1}-(6426+3672 \operatorname{I}) u_{o l+2-1}+(-504\right.\right. \\
 &\quad \left.\left.+792 \operatorname{I}) u_{o l-21}+(810+1710 \operatorname{I}) u_{o l+1-21}+(-13+\operatorname{I}) u_{o l-31}\right)\right), O\left(\Delta x_{o l}\right)
 \end{aligned}$$

Formula:, 604, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 1

Error order:, 15, Error:,  $7.3158747857985126830 \times 10^{-39}$ , New Error:,  $7.3755018474835175831 \times 10^{-54}$   
Error order:, 15, Error:,  $7.3755018474835175831 \times 10^{-54}$ , New Error:,  $7.3814879271411580448 \times 10^{-69}$   
Error order:, 15, Error:,  $7.3814879271411580448 \times 10^{-69}$ , New Error:,  $7.3820867693802784573 \times 10^{-84}$   
Error order:, 15, Error:,  $7.3820867693802784573 \times 10^{-84}$ , New Error:,  $7.3821466559474633927 \times 10^{-99}$   
Error order:, 15, Error:,  $7.3821466559474633927 \times 10^{-99}$ , New Error:,  $7.3821526446276151546 \times 10^{-114}$

$$x_o + h \cdot \begin{bmatrix} & & & 3 \text{ I} \\ & & -1 + 2 \text{ I} & 2 \text{ I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -3 \text{ I} \end{bmatrix}$$
$$c =, \begin{bmatrix} & & & \frac{1}{106080} + \frac{\text{I}}{8160} \\ & & \frac{261}{17680} - \frac{333 \text{ I}}{17680} & \frac{99}{8840} + \frac{63 \text{ I}}{8840} \\ \frac{27}{520} + \frac{81 \text{ I}}{1040} & \frac{63}{85} + \frac{99 \text{ I}}{85} & \frac{9}{32} + \frac{9 \text{ I}}{32} & \\ -\frac{1}{312} & \frac{27}{52} & -\frac{27}{4} & \frac{121}{30} \\ \frac{27}{520} - \frac{81 \text{ I}}{1040} & \frac{63}{85} - \frac{99 \text{ I}}{85} & \frac{9}{32} - \frac{9 \text{ I}}{32} & \\ & \frac{261}{17680} + \frac{333 \text{ I}}{17680} & \frac{99}{8840} - \frac{63 \text{ I}}{8840} & \\ & & \frac{1}{106080} - \frac{\text{I}}{8160} & \end{bmatrix}$$



$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{106080 \Delta x_{ol}} \left( (1 + 13 I) u_{ol+3I} + (1566 - 1998 I) u_{ol-1+2I} + (1188 + 756 I) u_{ol+2I} + (5508 + 8262 I) u_{ol-2+1} + (78624 + 123552 I) u_{ol-1+1} + (29835 + 29835 I) u_{ol+1} - 340 u_{ol-3} + 55080 u_{ol-2} - 716040 u_{ol-1} + 427856 u_{ol} + (5508 - 8262 I) u_{ol-2-1} + (78624 - 123552 I) u_{ol-1-1} + (29835 - 29835 I) u_{ol-1} + (1566 + 1998 I) u_{ol-1-2I} + (1188 - 756 I) u_{ol-2I} + (1 - 13 I) u_{ol-3I} \right), \quad O(\Delta x_{ol}^{15})$$

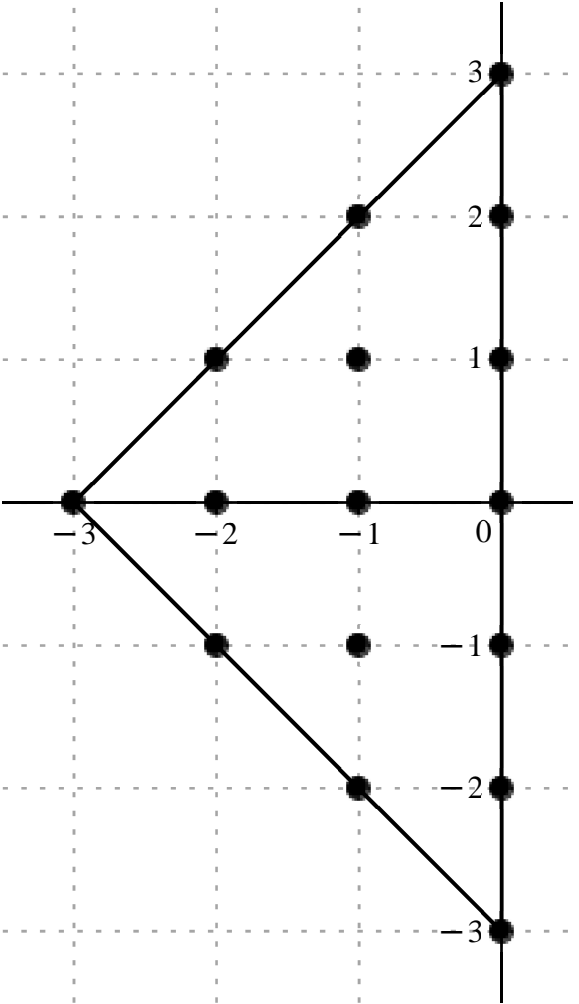
Formula:, 605, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 14, Error:,  $5.3658316815387539754 \times 10^{-36}$ , New Error:,  $5.4087876980608424464 \times 10^{-50}$   
Error order:, 14, Error:,  $5.4087876980608424464 \times 10^{-50}$ , New Error:,  $5.4130997875124027012 \times 10^{-64}$   
Error order:, 14, Error:,  $5.4130997875124027012 \times 10^{-64}$ , New Error:,  $5.4135311617059666920 \times 10^{-78}$   
Error order:, 14, Error:,  $5.4135311617059666920 \times 10^{-78}$ , New Error:,  $5.4135743007781781663 \times 10^{-92}$   
Error order:, 14, Error:,  $5.4135743007781781663 \times 10^{-92}$ , New Error:,  $5.4135786147019282355 \times 10^{-106}$

$$x_o \neq h., \left[ \begin{array}{cccc} & & & 3 I \\ & & -1 + 2 I & 2 I \\ -2 + I & -1 + I & I & \\ -3 & -2 & -1 & 0 \\ -2 - I & -1 - I & -I & \\ & -1 - 2 I & -2 I & \\ & & & -3 I \end{array} \right]$$

$$c = , \begin{bmatrix} & & & \frac{251}{1591200} + \frac{521 \text{ I}}{530400} \\ & & \frac{8673}{88400} - \frac{13809 \text{ I}}{88400} & \frac{1077}{11050} + \frac{1023 \text{ I}}{22100} \\ & \frac{531}{1300} + \frac{567 \text{ I}}{1040} & \frac{2721}{425} + \frac{3183 \text{ I}}{425} & \frac{453}{160} + \frac{273 \text{ I}}{160} \\ -\frac{37}{1560} & \frac{477}{130} & -\frac{819}{20} & \frac{7933}{450} \\ \frac{531}{1300} - \frac{567 \text{ I}}{1040} & \frac{2721}{425} - \frac{3183 \text{ I}}{425} & \frac{453}{160} - \frac{273 \text{ I}}{160} & \\ & \frac{8673}{88400} + \frac{13809 \text{ I}}{88400} & \frac{1077}{11050} - \frac{1023 \text{ I}}{22100} & \\ & & \frac{251}{1591200} - \frac{521 \text{ I}}{530400} & \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \; u(x_{ol}) = \frac{1}{1591200 \; \Delta x_{ol}^2} \Big( (251 + 1563 \text{ I}) \; u_{ol+3\text{I}} + (156114 - 248562 \text{ I}) \; u_{ol-1+2\text{I}} + (155088 + 73656 \text{ I}) \; u_{ol+2\text{I}} + (649944 + 867510 \text{ I}) \; u_{ol-2+1} + (10187424 + 11917152 \text{ I}) \; u_{ol-1+1} + (4505085 + 2714985 \text{ I}) \; u_{ol+1} - 37740 \; u_{ol-3} + 5838480 \; u_{ol-2} - 65159640 \; u_{ol-1} + 28051088 \; u_{ol} + (649944 - 867510 \text{ I}) \; u_{ol-2-1} + (10187424 - 11917152 \text{ I}) \; u_{ol-1-1} + (4505085 - 2714985 \text{ I}) \; u_{ol-1} + (156114 + 248562 \text{ I}) \; u_{ol-1-2\text{I}} + (155088 - 73656 \text{ I}) \; u_{ol-2\text{I}} + (251 - 1563 \text{ I}) \; u_{ol-3\text{I}} \Big), \; O( \; \Delta x_{ol}^{14} \; )$$

Formula.: 606, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 3

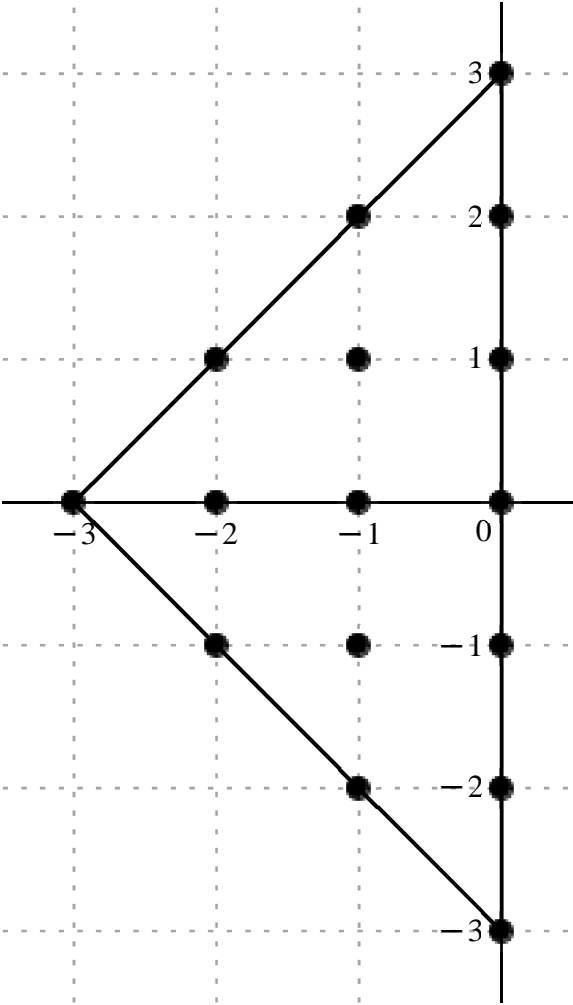
Error order.: 13, Error.: 3.1985644098613543158 × 10<sup>−33</sup>, New Error.: 3.2237785137661340852 × 10<sup>−46</sup>



*Error order*:, 13,    *Error*:,  $3.2237785137661340852 \times 10^{-46}$ ,    *New Error*:,  $3.2263094348585300822 \times 10^{-59}$   
*Error order*:, 13,    *Error*:,  $3.2263094348585300822 \times 10^{-59}$ ,    *New Error*:,  $3.2265626222842599556 \times 10^{-72}$   
*Error order*:, 13,    *Error*:,  $3.2265626222842599556 \times 10^{-72}$ ,    *New Error*:,  $3.2265879419802076398 \times 10^{-85}$   
*Error order*:, 13,    *Error*:,  $3.2265879419802076398 \times 10^{-85}$ ,    *New Error*:,  $3.2265904739593363650 \times 10^{-98}$

$$x_o + h \cdot , \left[ \begin{array}{cccc} & & & 3 \text{ I} \\ & & -1 + 2 \text{ I} & 2 \text{ I} \\ -2 + \text{I} & & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \\ -2 - \text{I} & -1 - \text{I} & -1 & -1 \\ & -1 - 2 \text{ I} & -2 \text{ I} & \\ & & & -3 \text{ I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} & & & \frac{23563}{15912000} + \frac{100619 \text{ I}}{15912000} \\ & & \frac{18897}{35360} - \frac{180357 \text{ I}}{176800} & \frac{292479}{442000} + \frac{101973 \text{ I}}{442000} \\ \frac{2583}{1000} + \frac{12879 \text{ I}}{4000} & \frac{173523}{4250} + \frac{173229 \text{ I}}{4250} & \frac{31989}{1600} + \frac{10209 \text{ I}}{1600} & \\ -\frac{6823}{46800} & \frac{57087}{2600} & -\frac{46827}{200} & \frac{74807}{900} \\ \frac{2583}{1000} - \frac{12879 \text{ I}}{4000} & \frac{173523}{4250} - \frac{173229 \text{ I}}{4250} & \frac{31989}{1600} - \frac{10209 \text{ I}}{1600} & \\ & \frac{18897}{35360} + \frac{180357 \text{ I}}{176800} & \frac{292479}{442000} - \frac{101973 \text{ I}}{442000} & \\ & & \frac{23563}{15912000} - \frac{100619 \text{ I}}{15912000} & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{15912000 \, \mathcal{A}x_{ol}^3} \big( (23563 + 100619 \, \mathrm{I}) \, u_{ol+31} + (8503650 - 16232130 \, \mathrm{I}) \, u_{ol-1+21} + (10529244 + 3671028 \, \mathrm{I}) \, u_{ol+21} + (41100696 + 51232662 \, \mathrm{I}) \, u_{ol-2+1} + (649670112 + 648569376 \, \mathrm{I}) \, u_{ol-1+1} + (318130605 + 101528505 \, \mathrm{I}) \, u_{ol+1} - 2319820 \, u_{ol-3} + 349372440 \, u_{ol-2} - 3725556120 \, u_{ol-1} + 1322587760 \, u_{ol} + (41100696 - 51232662 \, \mathrm{I}) \, u_{ol-2-1} + (649670112 - 648569376 \, \mathrm{I}) \, u_{ol-1-1} + (318130605 - 101528505 \, \mathrm{I}) \, u_{ol-1} + (8503650 + 16232130 \, \mathrm{I}) \, u_{ol-1-21} + (10529244 - 3671028 \, \mathrm{I}) \, u_{ol-21} + (23563 - 100619 \, \mathrm{I}) \, u_{ol-31} \big), \, O(\, \mathcal{A}x_{ol}^{13} \, )$$

Formula.: 607, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 4

Error order.: 12, Error.:  $1.8282094280871931096 \times 10^{-30}$ , New Error.:  $1.8424301562535048053 \times 10^{-42}$

Error order.: 12, Error.:  $1.8424301562535048053 \times 10^{-42}$ , New Error.:  $1.8438575155708010521 \times 10^{-54}$

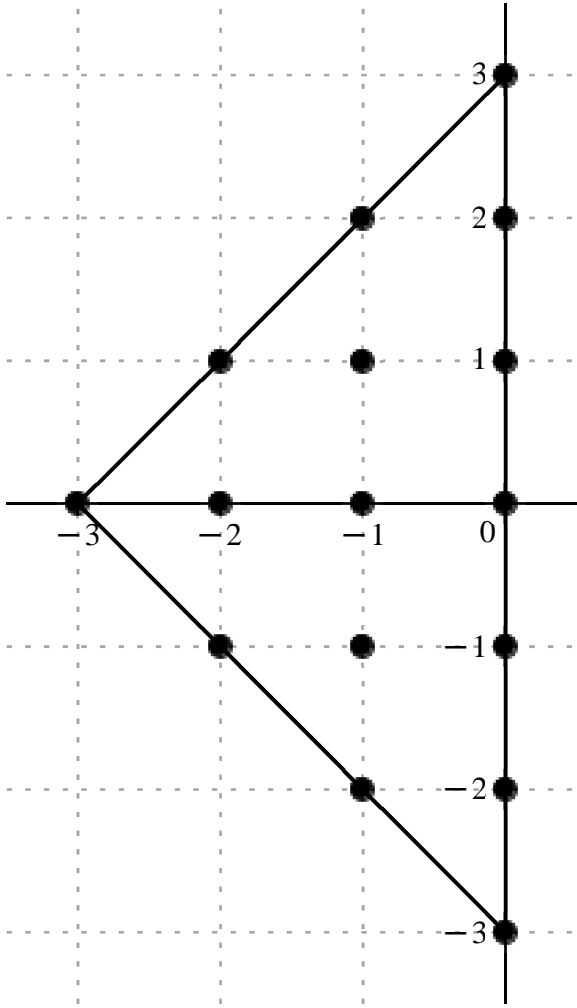
Error order.: 12, Error.:  $1.8438575155708010521 \times 10^{-54}$ , New Error.:  $1.8440003044821371574 \times 10^{-66}$

Error order.: 12, Error.:  $1.8440003044821371574 \times 10^{-66}$ , New Error.:  $1.8440145839031816071 \times 10^{-78}$

Error order.: 12, Error.:  $1.8440145839031816071 \times 10^{-78}$ , New Error.:  $1.8440160118505852752 \times 10^{-90}$

$$x_o \neq h. , \left[ \begin{array}{cccc} & & & 3 \, \mathrm{I} \\ & & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -2 + \mathrm{I} & & -1 + \mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & \\ & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & \\ & & & -3 \, \mathrm{I} \end{array} \right]$$

$$c = , -\frac{20387}{23400} \left[ \begin{array}{cccc} & & & \frac{18403}{1591200} + \frac{61691 \, \mathrm{I}}{1591200} \\ & & \frac{251801}{88400} - \frac{557017 \, \mathrm{I}}{88400} & \frac{18497}{4420} + \frac{23117 \, \mathrm{I}}{22100} \\ \frac{10209}{650} + \frac{97119 \, \mathrm{I}}{5200} & \frac{104671}{425} + \frac{3809 \, \mathrm{I}}{17} & \frac{3809}{32} + \frac{10829 \, \mathrm{I}}{800} & \\ -\frac{20387}{23400} & \frac{83667}{650} & -\frac{130767}{100} & \frac{18166}{45} \\ \frac{10209}{650} - \frac{97119 \, \mathrm{I}}{5200} & \frac{104671}{425} - \frac{3809 \, \mathrm{I}}{17} & \frac{3809}{32} - \frac{10829 \, \mathrm{I}}{800} & \\ & \frac{251801}{88400} + \frac{557017 \, \mathrm{I}}{88400} & \frac{18497}{4420} - \frac{23117 \, \mathrm{I}}{22100} & \\ & & \frac{18403}{1591200} - \frac{61691 \, \mathrm{I}}{1591200} & \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{1591200 \, \Delta x_{ol}^4} \Big( (18403 + 61691 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (4532418 - 10026306 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (6658920 + 1664424 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (24991632 + 29718414 \, \mathrm{I}) \, u_{ol-2+1} + (391888224 + 356522400 \, \mathrm{I}) \, u_{ol-1+1} + (189402525 + 21538881 \, \mathrm{I}) \, u_{ol+1} - 1386316 \, u_{ol-3} + 204816816 \, u_{ol-2} - 2080764504 \, u_{ol-1} + 642349760 \, u_{ol} + (24991632 - 29718414 \, \mathrm{I}) \, u_{ol-2-1} + (391888224 - 356522400 \, \mathrm{I}) \, u_{ol-1-1} + (189402525 - 21538881 \, \mathrm{I}) \, u_{ol-1} + (4532418 + 10026306 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + (6658920 - 1664424 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (18403 - 61691 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} \Big), \, O(\, \Delta x_{ol}^{12} \, )$$

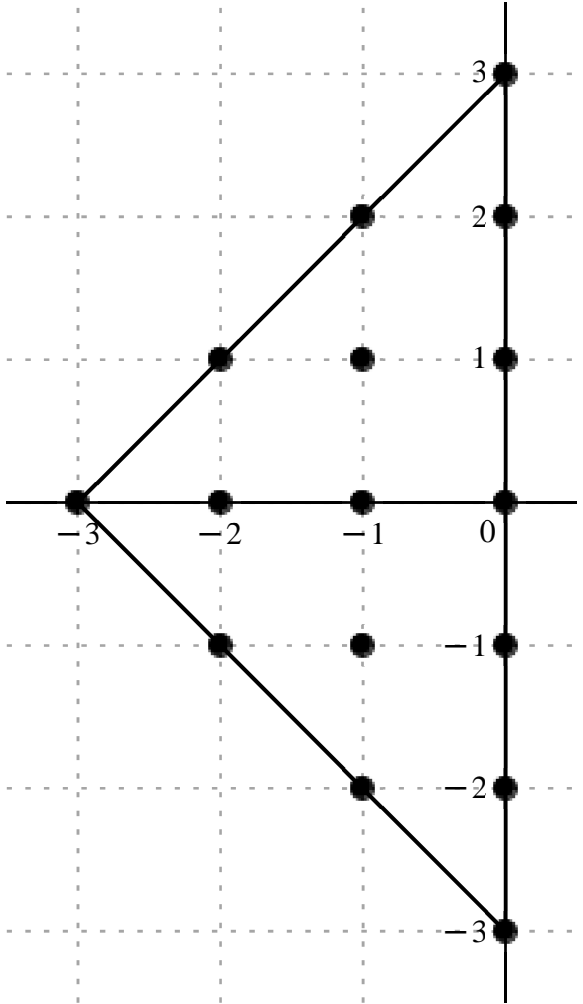
Formula:, 608, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 11, Error:,  $1.0091198683828096500 \times 10^{-27}$ , New Error:,  $1.0168588349527974928 \times 10^{-38}$   
Error order:, 11, Error:,  $1.0168588349527974928 \times 10^{-38}$ , New Error:,  $1.0176355647417713009 \times 10^{-49}$   
Error order:, 11, Error:,  $1.0176355647417713009 \times 10^{-49}$ , New Error:,  $1.0177132661123921201 \times 10^{-60}$   
Error order:, 11, Error:,  $1.0177132661123921201 \times 10^{-60}$ , New Error:,  $1.0177210365334319309 \times 10^{-71}$   
Error order:, 11, Error:,  $1.0177210365334319309 \times 10^{-71}$ , New Error:,  $1.0177218135783757498 \times 10^{-82}$

$$x_o \neq h. , \left[ \begin{array}{cccc} & & & 3 \, \mathrm{I} \\ & & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} & \\ -3 & -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & \\ & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & \\ & & & -3 \, \mathrm{I} \end{array} \right]$$

$$c =, \begin{bmatrix} -\frac{2609}{520} & \frac{95751}{1040} + \frac{13539 \text{ I}}{130} & \frac{188823}{260} & \frac{122439}{85} + \frac{99878 \text{ I}}{85} & -\frac{141723}{20} & \frac{11699}{6} \\ \frac{95751}{1040} - \frac{13539 \text{ I}}{130} & \frac{122439}{85} - \frac{99878 \text{ I}}{85} & \frac{122439}{85} + \frac{99878 \text{ I}}{85} & \frac{101659}{160} + \frac{879 \text{ I}}{32} & \frac{222943}{8840} - \frac{34677 \text{ I}}{8840} & \frac{8873}{106080} - \frac{1613 \text{ I}}{7072} \end{bmatrix}$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{106080 \, \Delta x_{ol}^5} \big( (8873 + 24195 \, \text{I}) \, u_{ol+3\text{I}} + (1521882 - 3968754 \, \text{I}) \, u_{ol-1+2\text{I}} + (2675316 + 416124 \, \text{I}) \, u_{ol+2\text{I}} + (9766602 + 11047824 \, \text{I}) \, u_{ol-2+1} + (152803872 + 124647744 \, \text{I}) \, u_{ol-1+1} + (67399917 - 2913885 \, \text{I}) \, u_{ol+1} - 532236 \, u_{ol-3} + 77039784 \, u_{ol-2} - 751698792 \, u_{ol-1} + 206838320 \, u_{ol} + (9766602 - 11047824 \, \text{I}) \, u_{ol-2-1} \\ + (152803872 - 124647744 \, \text{I}) \, u_{ol-1-1} + (67399917 + 2913885 \, \text{I}) \, u_{ol-1} + (1521882 + 3968754 \, \text{I}) \, u_{ol-1-2\text{I}} + (2675316 - 416124 \, \text{I}) \, u_{ol-2\text{I}} + (8873 - 24195 \, \text{I}) \, u_{ol-3\text{I}} \big), \, O(\, \Delta x_{ol}^{11} \, )$$

Formula.: 609, Var.: 1

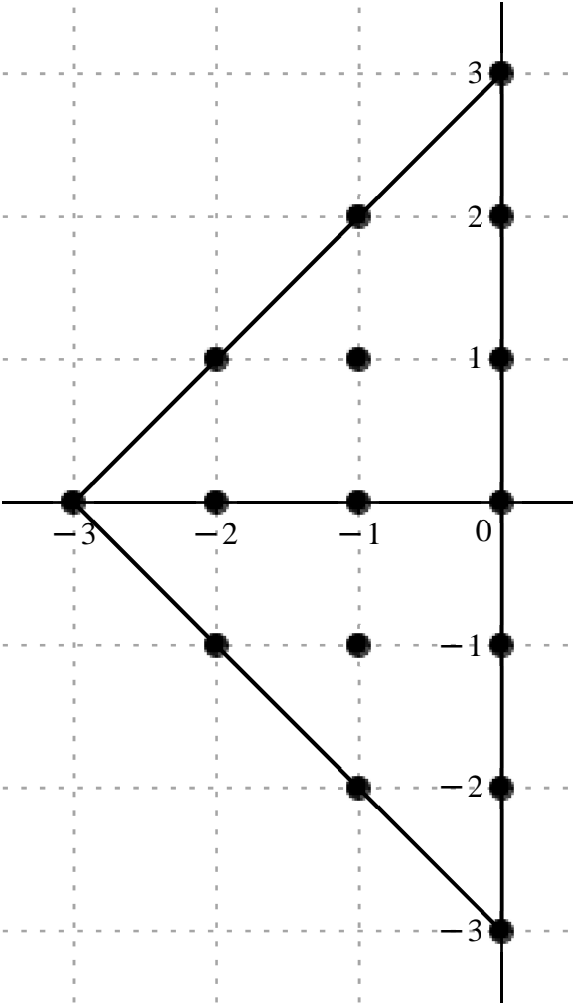
Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 6

Error order.: 10, Error.: 5.3179129966695016976 × 10<sup>−25</sup>, New Error.: 5.3580386094976515052 × 10<sup>−35</sup>

Error order:, 10, Error:, 5.3580386094976515052 × 10<sup>−35</sup>, New Error:, 5.3620656080463262636 × 10<sup>−45</sup>  
Error order:, 10, Error:, 5.3620656080463262636 × 10<sup>−45</sup>, New Error:, 5.3624684525760582938 × 10<sup>−55</sup>  
Error order:, 10, Error:, 5.3624684525760582938 × 10<sup>−55</sup>, New Error:, 5.3625087384760827967 × 10<sup>−65</sup>  
Error order:, 10, Error:, 5.3625087384760827967 × 10<sup>−65</sup>, New Error:, 5.3625127670805560627 × 10<sup>−75</sup>

$$x_o + h., \begin{bmatrix} & & & 3\text{ I} \\ & & -1 + 2\text{ I} & 2\text{ I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -1 - 2\text{ I} & -2\text{ I} \\ & & & -3\text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} & & & \frac{60089}{106080} + \frac{134341\text{ I}}{106080} \\ & & \frac{1161561}{17680} - \frac{3710769\text{ I}}{17680} & \frac{157779}{1105} + \frac{8526\text{ I}}{1105} \\ & \frac{265959}{520} + \frac{572769\text{ I}}{1040} & \frac{669354}{85} + \frac{98250\text{ I}}{17} & \frac{100017}{32} - \frac{83499\text{ I}}{160} \\ -\frac{42841}{1560} & \frac{253224}{65} & -\frac{729027}{20} & \frac{137122}{15} \\ & \frac{265959}{520} - \frac{572769\text{ I}}{1040} & \frac{669354}{85} - \frac{98250\text{ I}}{17} & \frac{100017}{32} + \frac{83499\text{ I}}{160} \\ & & \frac{1161561}{17680} + \frac{3710769\text{ I}}{17680} & \frac{157779}{1105} - \frac{8526\text{ I}}{1105} \\ & & & \frac{60089}{106080} - \frac{134341\text{ I}}{106080} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{106080 \, \Delta x_{ol}^6} \Big( (60089 + 134341 \, \mathrm{I}) \, u_{ol+31} + (6969366 - 22264614 \, \mathrm{I}) \, u_{ol-1+21} + (15146784 + 818496 \, \mathrm{I}) \, u_{ol+21} + (54255636 + 58422438 \, \mathrm{I}) \, u_{ol-2+1} + (835353792 + 613080000 \, \mathrm{I}) \, u_{ol-1+1} + (331556355 - 55359837 \, \mathrm{I}) \, u_{ol+1} - 2913188 \, u_{ol-3} + 413261568 \, u_{ol-2} - 3866759208 \, u_{ol-1} + 969726784 \, u_{ol} + (54255636 - 58422438 \, \mathrm{I}) \, u_{ol-2-1} + (835353792 - 613080000 \, \mathrm{I}) \, u_{ol-1-1} + (331556355 + 55359837 \, \mathrm{I}) \, u_{ol-1} + (6969366 + 22264614 \, \mathrm{I}) \, u_{ol-1-21} + (15146784 - 818496 \, \mathrm{I}) \, u_{ol-21} + (60089 - 134341 \, \mathrm{I}) \, u_{ol-31} \Big), \, O( \, \Delta x_{ol}^{10} \, )$$

Formula:, 610, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 7

Error order:, 9, Error:, 2.6447350758232009720 × 10−22, New Error:, 2.6643125608277062536 × 10−31

Error order:, 9, Error:, 2.6643125608277062536 × 10−31, New Error:, 2.6662772146078460678 × 10−40

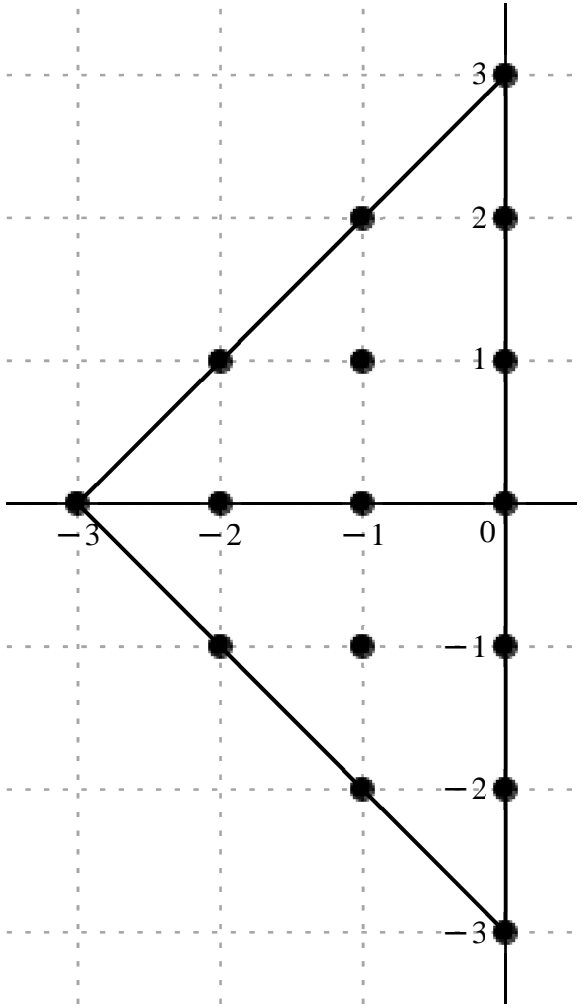
Error order:, 9, Error:, 2.6662772146078460678 × 10−40, New Error:, 2.6664737491802765857 × 10−49

Error order:, 9, Error:, 2.6664737491802765857 × 10−49, New Error:, 2.6664934033296056298 × 10−58

Error order:, 9, Error:, 2.6664934033296056298 × 10−58, New Error:, 2.6664953687514595360 × 10−67

$$x_o \neq h \, , \qquad \left[ \begin{array}{cccc} & & & 3 \, \mathrm{I} \\ & & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} & \\ -3 & -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & \\ & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & \\ & & & -3 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} & & & \frac{1887263}{530400} + \frac{3458329 \, \mathrm{I}}{530400} \\ & & \frac{4685121}{17680} - \frac{19366053 \, \mathrm{I}}{17680} & \frac{16434411}{22100} - \frac{966063 \, \mathrm{I}}{22100} \\ \frac{13839903}{5200} + \frac{7086933 \, \mathrm{I}}{2600} & \frac{17040114}{425} + \frac{11364612 \, \mathrm{I}}{425} & \frac{2295069}{160} - \frac{621033 \, \mathrm{I}}{160} & \\ -\frac{219989}{1560} & \frac{509355}{26} & -\frac{3535497}{20} & \frac{616511}{15} \\ \frac{13839903}{5200} - \frac{7086933 \, \mathrm{I}}{2600} & \frac{17040114}{425} - \frac{11364612 \, \mathrm{I}}{425} & \frac{2295069}{160} + \frac{621033 \, \mathrm{I}}{160} & \\ & \frac{4685121}{17680} + \frac{19366053 \, \mathrm{I}}{17680} & \frac{16434411}{22100} + \frac{966063 \, \mathrm{I}}{22100} & \\ & & \frac{1887263}{530400} - \frac{3458329 \, \mathrm{I}}{530400} & \end{array} \right]$$



$$\frac{d^7}{dx_{ol}^7} u(x_{ol}) = \frac{1}{530400 \Delta x_{ol}^7} \Big( 7 \Big( (269609 + 494047 \, \text{I}) \, u_{ol+31} + (20079090 - 82997370 \, \text{I}) \, u_{ol-1+21} + (56346552 - 3312216 \, \text{I}) \, u_{ol+21} + (201667158 + 206533476 \, \text{I}) \, u_{ol-2+1} + (3038008896 + 2026147968 \, \text{I}) \, u_{ol-1+1} + (1086879105 - 294103485 \, \text{I}) \, u_{ol+1} - 10685180 \, u_{ol-3} + 1484406000 \, u_{ol-2} - 13394482920 \, u_{ol-1} + 3114261280 \, u_{ol} \\ + (201667158 - 206533476 \, \text{I}) \, u_{ol-2-1} + (3038008896 - 2026147968 \, \text{I}) \, u_{ol-1-1} + (1086879105 + 294103485 \, \text{I}) \, u_{ol-1} + (20079090 + 82997370 \, \text{I}) \, u_{ol-1-21} + (56346552 + 3312216 \, \text{I}) \, u_{ol-21} + (269609 - 494047 \, \text{I}) \, u_{ol-31} \Big) \Big), \, O(\Delta x_{ol}^9)$$

Formula: 611, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 8

Error order: 8, Error: 1.2356421151703024155 × 10<sup>-19</sup>, New Error: 1.2445887612770772933 × 10<sup>-27</sup>

Error order: 8, Error: 1.2445887612770772933 × 10<sup>-27</sup>, New Error: 1.2454865124112574413 × 10<sup>-35</sup>

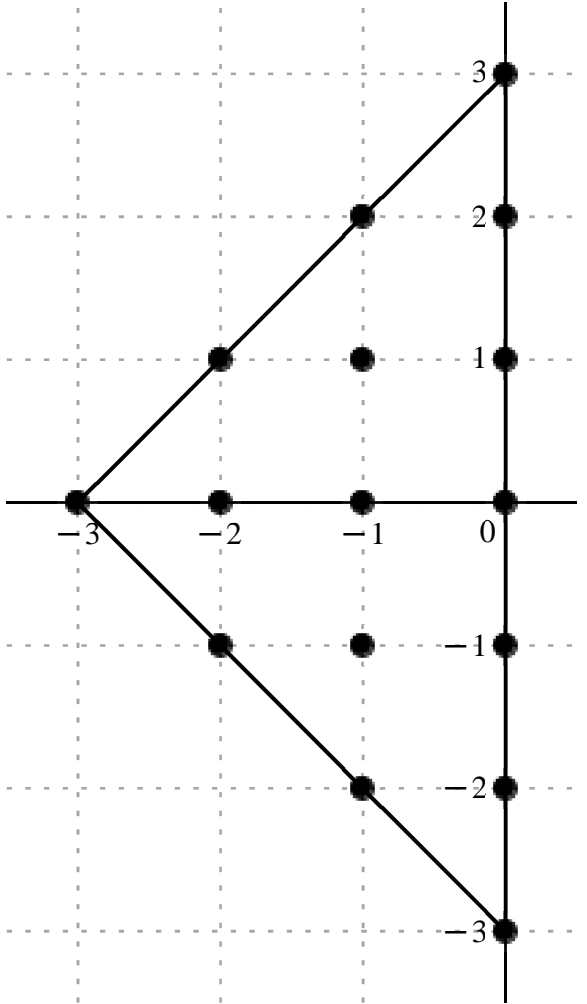
Error order: 8, Error: 1.2454865124112574413 × 10<sup>-35</sup>, New Error: 1.2455763184518608401 × 10<sup>-43</sup>

Error order: 8, Error: 1.2455763184518608401 × 10<sup>-43</sup>, New Error: 1.2455852993652550738 × 10<sup>-51</sup>

Error order: 8, Error: 1.2455852993652550738 × 10<sup>-51</sup>, New Error: 1.2455861974596878982 × 10<sup>-59</sup>

$$x_o \neq h., \left[ \begin{array}{cccc} & & & 3 \, \text{I} \\ & & -1 + 2 \, \text{I} & 2 \, \text{I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -1 - 2 \, \text{I} & -2 \, \text{I} \\ & & & -3 \, \text{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} & & & \frac{22638}{1105} + \frac{34041 \text{ I}}{1105} \\ & & \frac{1021923}{1105} - \frac{5843691 \text{ I}}{1105} & \frac{775152}{221} - \frac{697536 \text{ I}}{1105} \\ & \frac{839601}{65} + \frac{820827 \text{ I}}{65} & \frac{16174368}{85} + \frac{1965600 \text{ I}}{17} & 61425 - \frac{111384 \text{ I}}{5} \\ -\frac{44058}{65} & \frac{6003648}{65} & -\frac{4026204}{5} & 175392 \\ \frac{839601}{65} - \frac{820827 \text{ I}}{65} & \frac{16174368}{85} - \frac{1965600 \text{ I}}{17} & & 61425 + \frac{111384 \text{ I}}{5} \\ & \frac{1021923}{1105} + \frac{5843691 \text{ I}}{1105} & \frac{775152}{221} + \frac{697536 \text{ I}}{1105} & \\ & & \frac{22638}{1105} - \frac{34041 \text{ I}}{1105} & \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \; u(x_{ol}) = \frac{1}{1105 \; \Delta x_{ol}^8} \Big( 21 \; \Big( (1078 + 1621 \; \text{I}) \; u_{ol+3\text{I}} + (48663 - 278271 \; \text{I}) \; u_{ol-1+2\text{I}} + (184560 - 33216 \; \text{I}) \; u_{ol+2\text{I}} + (679677 + 664479 \; \text{I}) \; u_{ol-2+1\text{I}} + (10012704 + 6084000 \; \text{I}) \; u_{ol-1+1\text{I}} + (3232125 - 1172184 \; \text{I}) \; u_{ol+1\text{I}} - 35666 \; u_{ol-3} + 4860096 \; u_{ol-2} - 42371004 \; u_{ol-1} + 9228960 \; u_{ol} + (679677 - 664479 \; \text{I}) \; u_{ol-2-1\text{I}} + (10012704 - 6084000 \; \text{I}) \; u_{ol-1-1\text{I}} + (3232125 + 1172184 \; \text{I}) \; u_{ol-1\text{I}} + (48663 + 278271 \; \text{I}) \; u_{ol-1-2\text{I}} + (184560 + 33216 \; \text{I}) \; u_{ol-2\text{I}} + (1078 - 1621 \; \text{I}) \; u_{ol-3\text{I}} \Big) \Big) , \; O( \; \Delta x_{ol}^8 \; )$$

Formula.: 612, Var.: 1

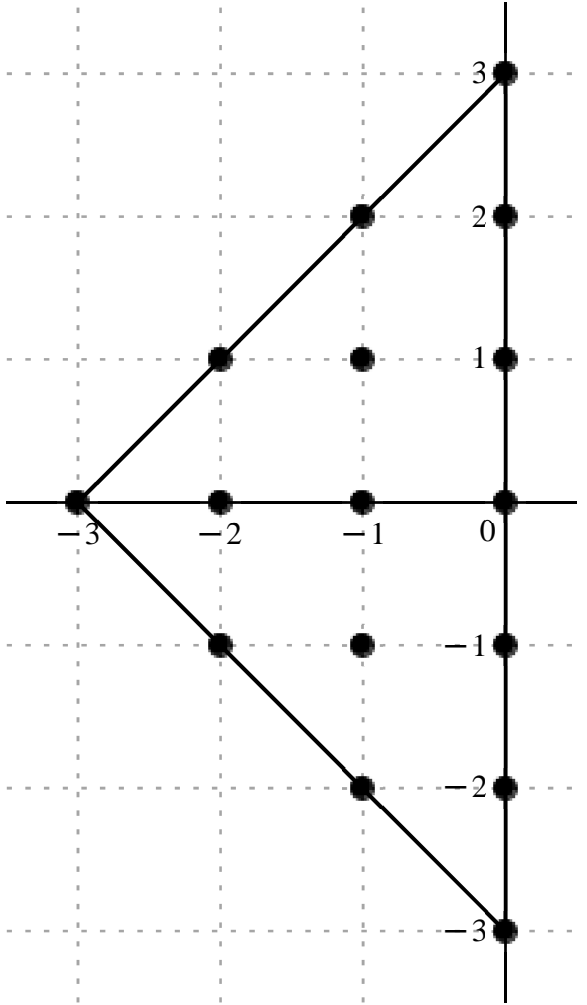
Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 9

Error order.: 7, Error.: 5.3938853243500459499 × 10<sup>−17</sup>, New Error.: 5.4319380527404134008 × 10<sup>−24</sup>



*Error order:*, 7, *Error:*,  $5.4319380527404134008 \times 10^{-24}$ , *New Error:*,  $5.4357561303999668260 \times 10^{-31}$   
*Error order:*, 7, *Error:*,  $5.4357561303999668260 \times 10^{-31}$ , *New Error:*,  $5.4361380664653034283 \times 10^{-38}$   
*Error order:*, 7, *Error:*,  $5.4361380664653034283 \times 10^{-38}$ , *New Error:*,  $5.4361762613550824371 \times 10^{-45}$   
*Error order:*, 7, *Error:*,  $5.4361762613550824371 \times 10^{-45}$ , *New Error:*,  $5.4361800808568930431 \times 10^{-52}$

$$\begin{aligned}
 & x_o + h \cdot, \begin{bmatrix} & & & 3 \text{ I} \\ & -1 + 2 \text{ I} & 2 \text{ I} & \\ -2 + \text{I} & -1 + \text{I} & \text{I} & \\ -3 & -2 & -1 & 0 \\ -2 - \text{I} & -1 - \text{I} & -\text{I} & \\ & -1 - 2 \text{ I} & -2 \text{ I} & \\ & & & -3 \text{ I} \end{bmatrix} \\
 & c =, \begin{bmatrix} & & & \frac{118566}{1105} + \frac{29169 \text{ I}}{221} \\ & & \frac{2872989}{1105} - \frac{26013393 \text{ I}}{1105} & \frac{16395372}{1105} - \frac{5010012 \text{ I}}{1105} \\ \frac{3782457}{65} + \frac{3525039 \text{ I}}{65} & \frac{70888608}{85} + \frac{39263616 \text{ I}}{85} & \frac{1217349}{5} - 108864 \text{ I} & \\ -\frac{196686}{65} & \frac{26258904}{65} & -\frac{17039484}{5} & 700560 \\ \frac{3782457}{65} - \frac{3525039 \text{ I}}{65} & \frac{70888608}{85} - \frac{39263616 \text{ I}}{85} & \frac{1217349}{5} + 108864 \text{ I} & \\ & \frac{2872989}{1105} + \frac{26013393 \text{ I}}{1105} & \frac{16395372}{1105} + \frac{5010012 \text{ I}}{1105} & \\ & & \frac{118566}{1105} - \frac{29169 \text{ I}}{221} & \end{bmatrix}
 \end{aligned}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{1105 \, \Delta x_{ol}^9} \Big( 63 \, \Big( (1882 + 2315 \, \mathrm{I}) \, u_{ol+31} + (45603 - 412911 \, \mathrm{I}) \, u_{ol-1+21} + (260244 - 79524 \, \mathrm{I}) \, u_{ol+21} + (1020663 + 951201 \, \mathrm{I}) \, u_{ol-2+1} + (14627808 + 8102016 \, \mathrm{I}) \, u_{ol-1+1} + (4270383 - 1909440 \, \mathrm{I}) \, u_{ol+1} - 53074 \, u_{ol-3} + 7085736 \, u_{ol-2} - 59773428 \, u_{ol-1} + 12287600 \, u_{ol} + (1020663 - 951201 \, \mathrm{I}) \, u_{ol-2-1} + (14627808 - 8102016 \, \mathrm{I}) \, u_{ol-1-1} + (4270383 + 1909440 \, \mathrm{I}) \, u_{ol-1} + (45603 + 412911 \, \mathrm{I}) \, u_{ol-1-21} + (260244 + 79524 \, \mathrm{I}) \, u_{ol-21} + (1882 - 2315 \, \mathrm{I}) \, u_{ol-31} \Big) \Big), \, O(\, \Delta x_{ol}^7 \, )$$

Formula:, 613, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 10

Error order:., 6, Error:., 2.1767474917417094349 × 10−14, New Error:., 2.1916225297021448823 × 10−20

Error order:., 6, Error:., 2.1916225297021448823 × 10−20, New Error:., 2.1931148950683108036 × 10−26

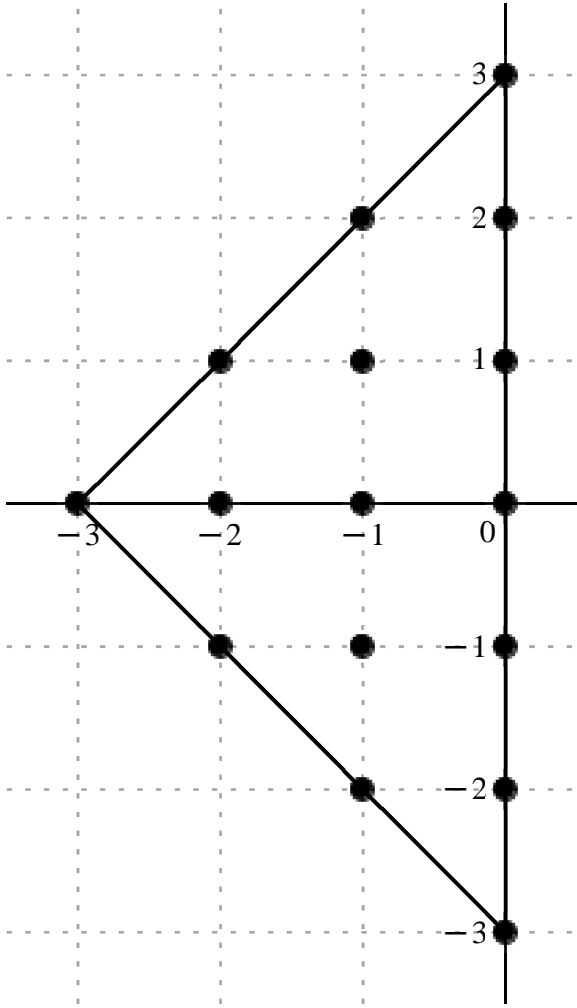
Error order:., 6, Error:., 2.1931148950683108036 × 10−26, New Error:., 2.1932641803136110908 × 10−32

Error order:., 6, Error:., 2.1932641803136110908 × 10−32, New Error:., 2.1932791093253210711 × 10−38

Error order:., 6, Error:., 2.1932791093253210711 × 10−38, New Error:., 2.1932806022313639618 × 10−44

$$x_o \neq h \, . \, , \left[ \begin{array}{cccc} & & & 3 \, \mathrm{I} \\ & & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -2 + \mathrm{I} & & -1 + \mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & \\ & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & \\ & & & -3 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccc} & & & \frac{111825}{221} + \frac{110691 \, \mathrm{I}}{221} \\ & & \frac{895860}{221} - \frac{21053844 \, \mathrm{I}}{221} & \frac{12328848}{221} - \frac{5361552 \, \mathrm{I}}{221} \\ \frac{3112830}{13} + \frac{2760156 \, \mathrm{I}}{13} & \frac{56645568}{17} + \frac{28558656 \, \mathrm{I}}{17} & & 881685 - 464373 \, \mathrm{I} \\ -\frac{160776}{13} & \frac{21028896}{13} & -13208832 & 2576448 \\ \frac{3112830}{13} - \frac{2760156 \, \mathrm{I}}{13} & \frac{56645568}{17} - \frac{28558656 \, \mathrm{I}}{17} & & 881685 + 464373 \, \mathrm{I} \\ & \frac{895860}{221} + \frac{21053844 \, \mathrm{I}}{221} & \frac{12328848}{221} + \frac{5361552 \, \mathrm{I}}{221} & \\ & & \frac{111825}{221} - \frac{110691 \, \mathrm{I}}{221} & \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{221\,\Delta x_{ol}^{10}}\left(63\left((1775+1757\,\mathrm{I})\,u_{ol+31}+(14220-334188\,\mathrm{I})\,u_{ol-1+21}+(195696-85104\,\mathrm{I})\,u_{ol+21}+(839970+744804\,\mathrm{I})\,u_{ol-2+1}+(11688768+5893056\,\mathrm{I})\,u_{ol-1+1}+(3092895-1628991\,\mathrm{I})\,u_{ol+1}-43384\,u_{ol-3}+5674464\,u_{ol-2}-46335744\,u_{ol-1}+9038016\,u_{ol}+(839970-744804\,\mathrm{I})\,u_{ol-2-1}+(11688768-5893056\,\mathrm{I})\,u_{ol-1-1}+(3092895+1628991\,\mathrm{I})\,u_{ol-1}+(14220+334188\,\mathrm{I})\,u_{ol-1-21}+(195696+85104\,\mathrm{I})\,u_{ol-21}+(1775-1757\,\mathrm{I})\,u_{ol-31}\right)\right),\;O(\,\Delta x_{ol}^6\,)$$

Formula: 614, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 11

Error order: 5, Error: 8.0078243521862089376 × 10<sup>-12</sup>, New Error: 8.0603672365076950851 × 10<sup>-17</sup>

Error order: 5, Error: 8.0603672365076950851 × 10<sup>-17</sup>, New Error: 8.0656381082905389096 × 10<sup>-22</sup>

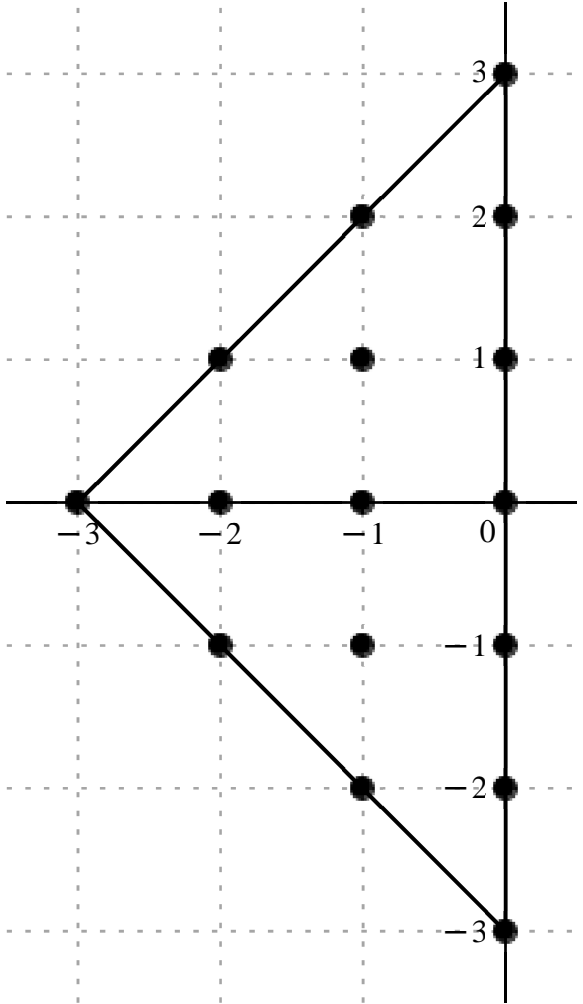
Error order: 5, Error: 8.0656381082905389096 × 10<sup>-22</sup>, New Error: 8.0661653616108841613 × 10<sup>-27</sup>

Error order: 5, Error: 8.0661653616108841613 × 10<sup>-27</sup>, New Error: 8.0662180886046482859 × 10<sup>-32</sup>

Error order: 5, Error: 8.0662180886046482859 × 10<sup>-32</sup>, New Error: 8.0662233613206423034 × 10<sup>-37</sup>

$$x_o \neq h., \left[ \begin{array}{cccc} & & & 3\,\mathrm{I} \\ & & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -2+\mathrm{I} & -1+\mathrm{I} & & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ -2-\mathrm{I} & -1-\mathrm{I} & & -\mathrm{I} \\ & -1-2\,\mathrm{I} & -2\,\mathrm{I} & \\ & & & -3\,\mathrm{I} \end{array} \right]$$

$$c =, \left[ \begin{array}{cccc} & & & \frac{2324553}{1105} + \frac{1787709 \text{ I}}{1105} \\ & & -\frac{2145528}{221} - \frac{75592440 \text{ I}}{221} & \frac{203276304}{1105} - \frac{115858512 \text{ I}}{1105} \\ \frac{57530088}{65} + \frac{48511386 \text{ I}}{65} & \frac{1013088384}{85} + \frac{462635712 \text{ I}}{85} & & 2862783 - 1727649 \text{ I} \\ -\frac{591360}{13} & \frac{75642336}{13} & -46004112 & 8545152 \\ \frac{57530088}{65} - \frac{48511386 \text{ I}}{65} & \frac{1013088384}{85} - \frac{462635712 \text{ I}}{85} & & 2862783 + 1727649 \text{ I} \\ & -\frac{2145528}{221} + \frac{75592440 \text{ I}}{221} & \frac{203276304}{1105} + \frac{115858512 \text{ I}}{1105} & \\ & & \frac{2324553}{1105} - \frac{1787709 \text{ I}}{1105} & \end{array} \right]$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d} x_{o l}^{11}} \; u(x_{o l}) = \frac{1}{1105 \; \Delta x_{o l}^{11}} \Big( 231 \Big( (10063 + 7739 \; \text{I}) \; u_{o l + 3 \text{I}} - (46440 + 1636200 \; \text{I}) \; u_{o l - 1 + 2 \text{I}} + (879984 - 501552 \; \text{I}) \; u_{o l + 2 \text{I}} + (4233816 + 3570102 \; \text{I}) \; u_{o l - 2 + 1} + (57013632 + 26035776 \; \text{I}) \; u_{o l - 1 + 1} + (13694265 - 8264295 \; \text{I}) \; u_{o l + 1} - 217600 \; u_{o l - 3} + 27833760 \; u_{o l - 2} - 220062960 \; u_{o l - 1} + 40876160 \; u_{o l} + (4233816 - 3570102 \; \text{I}) \; u_{o l - 2 - 1} \\ + (57013632 - 26035776 \; \text{I}) \; u_{o l - 1 - 1} + (13694265 + 8264295 \; \text{I}) \; u_{o l - 1} + (-46440 + 1636200 \; \text{I}) \; u_{o l - 1 - 2 \text{I}} + (879984 + 501552 \; \text{I}) \; u_{o l - 2 \text{I}} + (10063 - 7739 \; \text{I}) \; u_{o l - 3 \text{I}} \Big) \Big), \; O( \; \Delta x_{o l}^5 \; )$$

Formula.: 615, Var.: 1

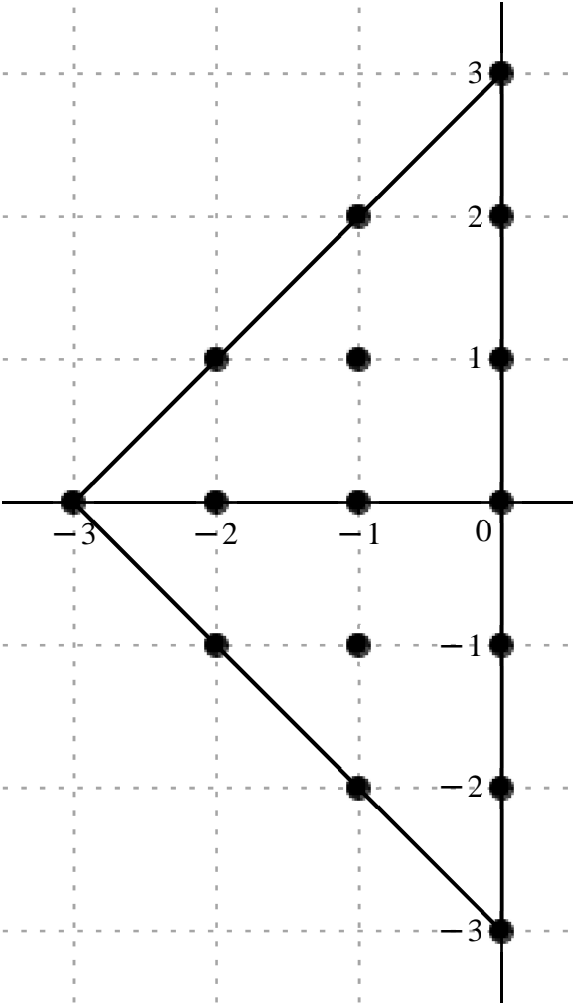
Variavel :, x\_{o l}, Derivada de Ordem :, 12

Error order.: 4, Error.: 2.6349728889764120240 × 10−9, New Error.: 2.6513424515082470394 × 10−13

Error order:, 4, Error:,  $2.6513424515082470394 \times 10^{-13}$ , New Error:,  $2.6529843571505809640 \times 10^{-17}$   
Error order:, 4, Error:,  $2.6529843571505809640 \times 10^{-17}$ , New Error:,  $2.6531485972981094758 \times 10^{-21}$   
Error order:, 4, Error:,  $2.6531485972981094758 \times 10^{-21}$ , New Error:,  $2.6531650218087848087 \times 10^{-25}$   
Error order:, 4, Error:,  $2.6531650218087848087 \times 10^{-25}$ , New Error:,  $2.6531666642648116563 \times 10^{-29}$

$$x_o + h \cdot , \begin{bmatrix} & & & 3 \text{ I} \\ & & -1 + 2 \text{ I} & 2 \text{ I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -3 \text{ I} \end{bmatrix}$$

$$c = , \begin{bmatrix} & & & \frac{1643796}{221} + \frac{917532 \text{ I}}{221} \\ & & -\frac{23151744}{221} - \frac{235109952 \text{ I}}{221} & \frac{114760800}{221} - \frac{82428192 \text{ I}}{221} \\ \frac{37272312}{13} + \frac{29638224 \text{ I}}{13} & \frac{631483776}{17} + \frac{259459200 \text{ I}}{17} & & 8108100 - 5513508 \text{ I} \\ -\frac{1907136}{13} & \frac{238303296}{13} & -140107968 & 24837120 \\ \frac{37272312}{13} - \frac{29638224 \text{ I}}{13} & \frac{631483776}{17} - \frac{259459200 \text{ I}}{17} & & 8108100 + 5513508 \text{ I} \\ & -\frac{23151744}{221} + \frac{235109952 \text{ I}}{221} & \frac{114760800}{221} + \frac{82428192 \text{ I}}{221} & \\ & & \frac{1643796}{221} - \frac{917532 \text{ I}}{221} & \end{bmatrix}$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\,u(x_{ol})=\frac{1}{221\,\mathbb{A}x_{ol}^{12}}\big(2772\, \big((593+331\,\mathrm{I})\,u_{ol+31}- (8352+84816\,\mathrm{I})\,u_{ol-1+21}+(41400-29736\,\mathrm{I})\,u_{ol+21}+(228582+181764\,\mathrm{I})\,u_{ol-2+1}+(2961504+1216800\,\mathrm{I})\,u_{ol-1+1}+(646425-439569\,\mathrm{I})\,u_{ol+1}-11696\,u_{ol-3}+1461456\,u_{ol-2}-11170224\,u_{ol-1}+1980160\,u_{ol}+(228582-181764\,\mathrm{I})\,u_{ol-2-1}+(2961504-1216800\,\mathrm{I})\,u_{ol-1-1}+(646425+439569\,\mathrm{I})\,u_{ol-1}+(-8352+84816\,\mathrm{I})\,u_{ol-1-21}+(41400+29736\,\mathrm{I})\,u_{ol-21}+(593-331\,\mathrm{I})\,u_{ol-31})\big),\,O(\,\mathbb{A}x_{ol}^4\,)$$

Formula:, 616, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 13

Error order:, 3, Error:, 7.5466536382062941813 × 10−7, New Error:, 7.5899584307308314695 × 10−10

Error order:, 3, Error:, 7.5899584307308314695 × 10−10, New Error:, 7.5943013089806407036 × 10−13

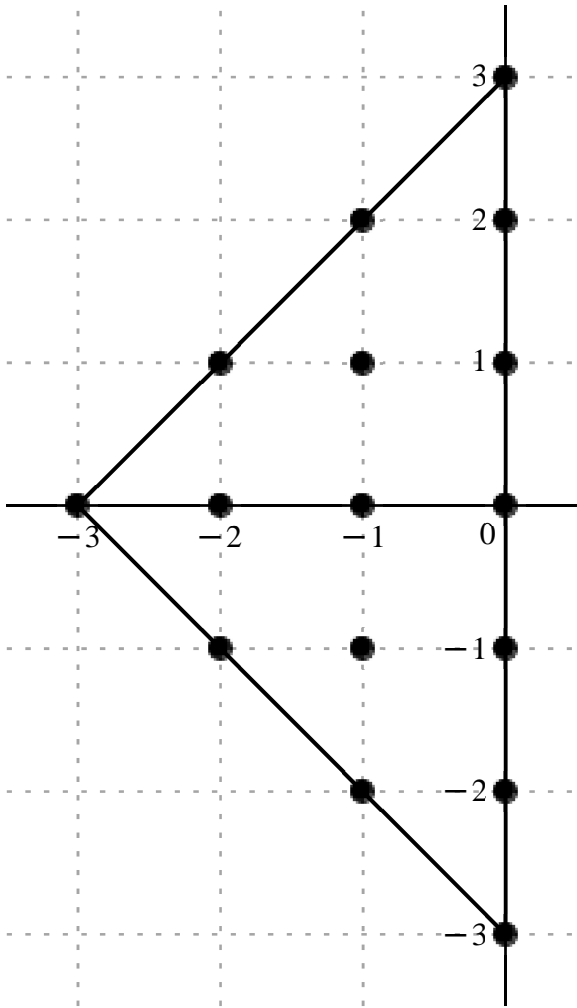
Error order:, 3, Error:, 7.5943013089806407036 × 10−13, New Error:, 7.5947357210129159053 × 10−16

Error order:, 3, Error:, 7.5947357210129159053 × 10−16, New Error:, 7.5947791634584340011 × 10−19

Error order:, 3, Error:, 7.5947791634584340011 × 10−19, New Error:, 7.5947835077154089342 × 10−22

$$x_o\neq h\, , \left[\begin{array}{cccc} & & & 3\,\mathrm{I} \\ & & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} \\ -3 & -2 & -1 & 0 \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} \\ & & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ & & & -3\,\mathrm{I} \end{array}\right]$$

$$c=,\left[\begin{array}{cccc} & & & \frac{357588}{17}+\frac{124740\,\mathrm{I}}{17} \\ & & -\frac{8382528}{17}-\frac{47101824\,\mathrm{I}}{17} & \frac{20257776}{17}-\frac{18261936\,\mathrm{I}}{17} \\ 7783776+5837832\,\mathrm{I} & \frac{1650160512}{17}+\frac{601945344\,\mathrm{I}}{17} & & 19135116-14594580\,\mathrm{I} \\ -399168 & 48498912 & -358053696 & 60540480 \\ 7783776-5837832\,\mathrm{I} & \frac{1650160512}{17}-\frac{601945344\,\mathrm{I}}{17} & & 19135116+14594580\,\mathrm{I} \\ & -\frac{8382528}{17}+\frac{47101824\,\mathrm{I}}{17} & \frac{20257776}{17}+\frac{18261936\,\mathrm{I}}{17} & \\ & & \frac{357588}{17}-\frac{124740\,\mathrm{I}}{17} & \end{array}\right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\;u(x_{ol})=\frac{1}{17\,\mathcal{A}\mathfrak{x}_{ol}^{13}}\Big(8316\left((43+15\,\mathrm{I})\,u_{ol+3\mathrm{I}}-(1008+5664\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+(2436-2196\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(15912+11934\,\mathrm{I})\,u_{ol-2+1}+(198432+72384\,\mathrm{I})\,u_{ol-1+1}+(39117-29835\,\mathrm{I})\,u_{ol+1}-816\,u_{ol-3}+99144\,u_{ol-2}-731952\,u_{ol-1}+123760\,u_{ol}+(15912-11934\,\mathrm{I})\,u_{ol-2-1}+(198432-72384\,\mathrm{I})\,u_{ol-1-1}+(39117+29835\,\mathrm{I})\,u_{ol-1}\right.\\ \left.+(-1008+5664\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}+(2436+2196\,\mathrm{I})\,u_{ol-2\mathrm{I}}+(43-15\,\mathrm{I})\,u_{ol-3\mathrm{I}}\right)\Big),\;O(\,\mathcal{A}\mathfrak{x}_{ol}^3\,)$$

Formula: 617, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 14

Error order.: 2, Error.: 0.00018023057577982937298, New Error.:  $1.8113806018812760865\times 10^{-6}$

Error order.: 2, Error.:  $1.8113806018812760865\times 10^{-6}$ , New Error.:  $1.8122905063688159043\times 10^{-8}$

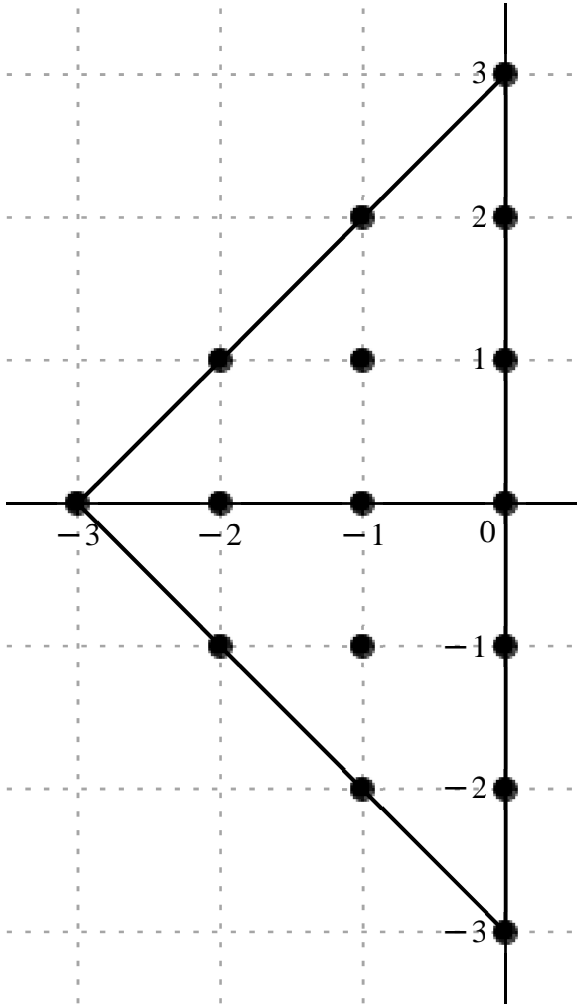
Error order.: 2, Error.:  $1.8122905063688159043\times 10^{-8}$ , New Error.:  $1.8123815210597365001\times 10^{-10}$

Error order.: 2, Error.:  $1.8123815210597365001\times 10^{-10}$ , New Error.:  $1.8123906227712916612\times 10^{-12}$

Error order.: 2, Error.:  $1.8123906227712916612\times 10^{-12}$ , New Error.:  $1.8123915329448718497\times 10^{-14}$

$$x_o\neq h.,\left[\begin{array}{cccc} & & & 3\,\mathrm{I}\\ & & -1+2\,\mathrm{I} & 2\,\mathrm{I}\\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I}\\ -3 & -2 & -1 & 0\\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I}\\ & & -1-2\,\mathrm{I} & -2\,\mathrm{I}\\ & & & -3\,\mathrm{I}\end{array}\right]$$

$$c = \begin{pmatrix} -853776 & 100590336 & 16765056 + 11525976 \, \text{I} & -\frac{27592488}{17} - \frac{92557080 \, \text{I}}{17} & \frac{717948}{17} + \frac{97020 \, \text{I}}{17} \\ -853776 & 100590336 & 16765056 - 11525976 \, \text{I} & -\frac{27592488}{17} + \frac{92557080 \, \text{I}}{17} & \frac{717948}{17} - \frac{97020 \, \text{I}}{17} \end{pmatrix}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}} \; u(x_{ol}) = \frac{1}{17 \, \Delta x_{ol}^{14}} \Big( 19404 \, \Big( (37 + 5 \, \text{I}) \, u_{ol+31} - (1422 + 4770 \, \text{I}) \, u_{ol-1+21} + (1728 - 2016 \, \text{I}) \, u_{ol+21} + (14688 + 10098 \, \text{I}) \, u_{ol-2+1} + (172224 + 52416 \, \text{I}) \, u_{ol-1+1} + (29835 - 25857 \, \text{I}) \, u_{ol+1} - 748 \, u_{ol-3} + 88128 \, u_{ol-2} - 620568 \, u_{ol-1} + 99008 \, u_{ol} + (14688 - 10098 \, \text{I}) \, u_{ol-2-1} + (172224 - 52416 \, \text{I}) \, u_{ol-1-1} + (29835 + 25857 \, \text{I}) \, u_{ol-1} \\ + (-1422 + 4770 \, \text{I}) \, u_{ol-1-21} + (1728 + 2016 \, \text{I}) \, u_{ol-21} + (37 - 5 \, \text{I}) \, u_{ol-31} \Big) \Big), \; O(\Delta x_{ol}^2)$$

Formula: 618, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 15

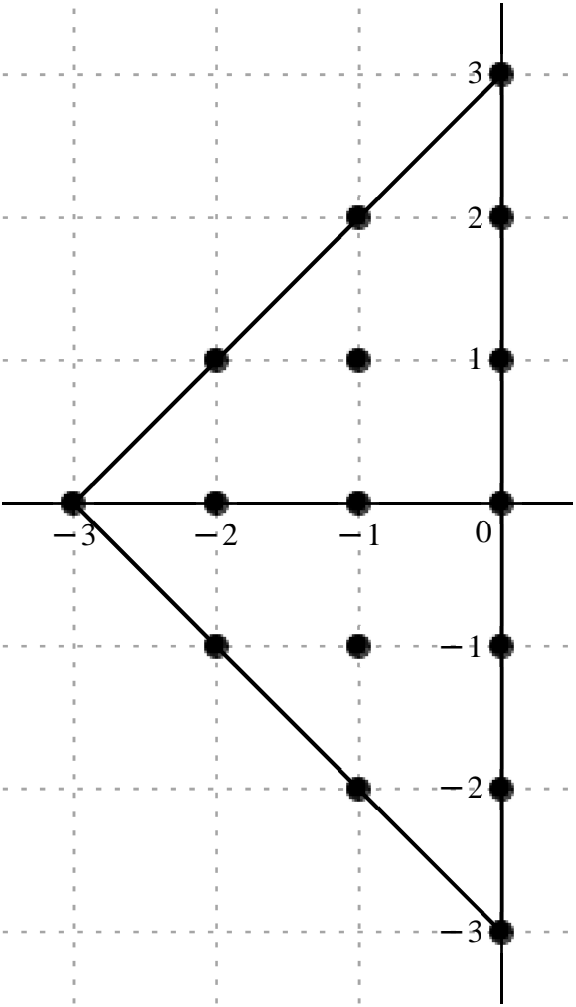
Error order.: 1, Error.: 0.032815004893983359327, New Error.: 0.0032938788005808373115

Error order.: 1, Error.: 0.0032938788005808373115, New Error.: 0.00032951196147259992147



*Error order*., 1,   *Error*., 0.00032951196147259992147,   *New Error*., 0.000032952437260212094388  
*Error order*., 1,   *Error*., 0.000032952437260212094388,   *New Error*.,  $3.2952561374495879041 \times 10^{-6}$   
*Error order*., 1,   *Error*.,  $3.2952561374495879041 \times 10^{-6}$ ,   *New Error*.,  $3.2952573785954143755 \times 10^{-7}$

$$\begin{aligned}
 & x_o \neq h., \left[ \begin{array}{cccc} & & & 3 \text{ I} \\ & & -1 + 2 \text{ I} & 2 \text{ I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} \\ -3 & -2 & -1 & 0 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -1 - 2 \text{ I} & -2 \text{ I} \\ & & & -3 \text{ I} \end{array} \right] \\
 & c =, \left[ \begin{array}{cccc} & & & \frac{756756}{17} - \frac{58212 \text{ I}}{17} \\ & & -\frac{47151720}{17} - \frac{99542520 \text{ I}}{17} & \frac{29338848}{17} - \frac{46103904 \text{ I}}{17} \\ 22004136 + 12573792 \text{ I} & \frac{3923023104}{17} + \frac{871782912 \text{ I}}{17} & & 34054020 - 34054020 \text{ I} \\ -1164240 & 125737920 & -817296480 & 121080960 \\ 22004136 - 12573792 \text{ I} & \frac{3923023104}{17} - \frac{871782912 \text{ I}}{17} & & 34054020 + 34054020 \text{ I} \\ & -\frac{47151720}{17} + \frac{99542520 \text{ I}}{17} & \frac{29338848}{17} + \frac{46103904 \text{ I}}{17} & \\ & & \frac{756756}{17} + \frac{58212 \text{ I}}{17} & \end{array} \right]
 \end{aligned}$$



$$\begin{aligned}
 \frac{\mathrm{d}^{15}}{\mathrm{d} x_{o l}^{15}} u\left(x_{o l}\right) &= \frac{1}{17 \Delta x_{o l}^{15}}\left(58212\left((13-\text{I}) u_{o l+3 \text{ I}}-(810+1710 \text{ I}) u_{o l-1+2 \text{ I}}+(504-792 \text{ I}) u_{o l+2 \text{ I}}+(6426+3672 \text{ I}) u_{o l-2+1}+(67392+14976 \text{ I}) u_{o l-1+1}+(9945-9945 \text{ I}) u_{o l+1}-340 u_{o l-3}+36720 u_{o l-2}-238680 u_{o l-1}+35360 u_{o l}+(6426-3672 \text{ I}) u_{o l-2-1}+(67392-14976 \text{ I}) u_{o l-1-1}+(9945+9945 \text{ I}) u_{o l-1}+(-810\right. \\
 &\quad \left.+1710 \text{ I}) u_{o l-1-2 \text{ I}}+(504+792 \text{ I}) u_{o l-2 \text{ I}}+(13+\text{I}) u_{o l-3 \text{ I}}\right)), O\left(\Delta x_{o l}\right)
 \end{aligned}$$

Formula:, 619, Var:, 1

Variavel :,  $x_o$  , Derivada de Ordem :, 1

Error order:, 15, Error:,  $7.3680287778717413974 \times 10^{-39}$ , New Error:,  $7.3807645142532878802 \times 10^{-54}$

Error order:, 15, Error:,  $7.3807645142532878802 \times 10^{-54}$ , New Error:,  $7.3820146671462120768 \times 10^{-69}$

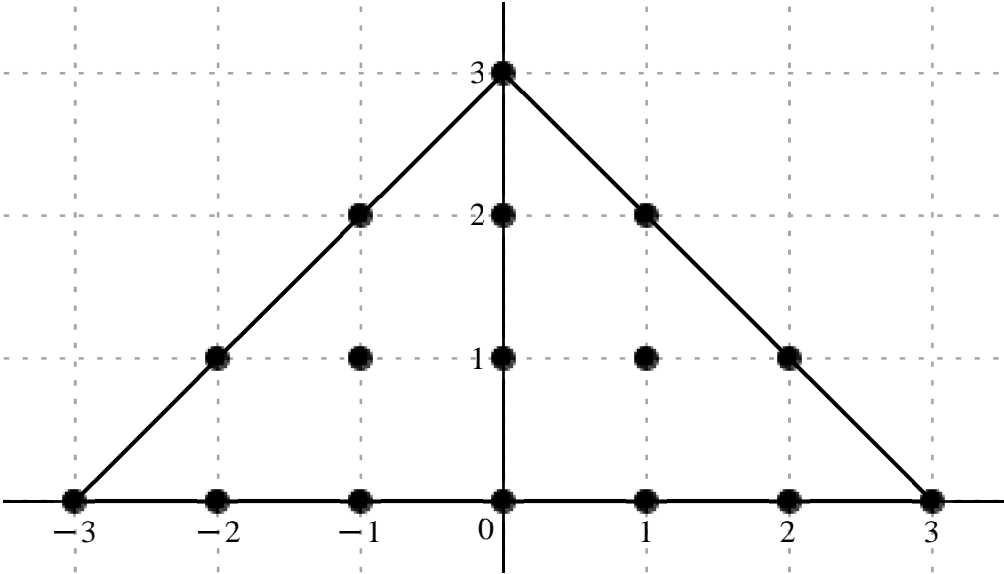
Error order:, 15, Error:,  $7.3820146671462120768 \times 10^{-69}$ , New Error:,  $7.3821394481147170820 \times 10^{-84}$

Error order:, 15, Error:,  $7.3821394481147170820 \times 10^{-84}$ , New Error:,  $7.3821519238682472398 \times 10^{-99}$

Error order:, 15, Error:,  $7.3821519238682472398 \times 10^{-99}$ , New Error:,  $7.3821531714201669398 \times 10^{-114}$

$$x_o+h., \left[ \begin{array}{cccccc} & & & 3\text{ I} & & \\ & & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & \\ & -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c=,\left[ \begin{array}{cccccccc} & & & & & & & -\frac{\text{ I}}{312} \\ & & & \frac{81}{1040}+\frac{27\text{ I}}{520} & \frac{27\text{ I}}{52} & -\frac{81}{1040}+\frac{27\text{ I}}{520} & & \\ & & -\frac{333}{17680}+\frac{261\text{ I}}{17680} & \frac{99}{85}+\frac{63\text{ I}}{85} & -\frac{27\text{ I}}{4} & -\frac{99}{85}+\frac{63\text{ I}}{85} & \frac{333}{17680}+\frac{261\text{ I}}{17680} & \\ \frac{1}{8160}+\frac{\text{ I}}{106080} & \frac{63}{8840}+\frac{99\text{ I}}{8840} & \frac{9}{32}+\frac{9\text{ I}}{32} & \frac{121\text{ I}}{30} & -\frac{9}{32}+\frac{9\text{ I}}{32} & -\frac{63}{8840}+\frac{99\text{ I}}{8840} & -\frac{1}{8160}+\frac{\text{ I}}{106080} & \end{array} \right]$$



$$\left| \frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{106080 \Delta x_{ol}} \left( -340 I_{u_{ol+31}} + (8262 + 5508 I) u_{ol-1+21} + 55080 I_{u_{ol+21}} + (-8262 + 5508 I) u_{ol+1+21} + (-1998 + 1566 I) u_{ol-2+1} + (123552 + 78624 I) u_{ol-1+1} - 716040 I_{u_{ol+1}} + (-123552 + 78624 I) u_{ol+1+1} + (1998 + 1566 I) u_{ol+2+1} + (13 + I) u_{ol-3} + (756 + 1188 I) u_{ol-2} + (29835 + 29835 I) u_{ol-1} + 427856 I_{u_{ol}} \right. \right.$$

*Formula:*, 620, *Var:*, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

*Error order*., 14, *Error*.,  $5.4034084761724590687 \times 10^{-36}$ , *New Error*.,  $5.4125787195011543710 \times 10^{-50}$

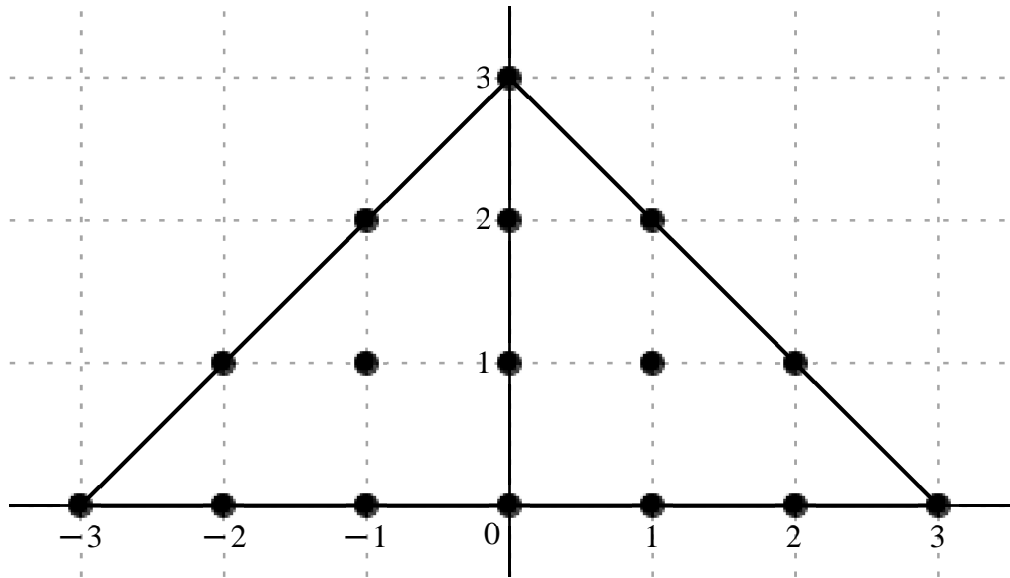
*Error order*., 14, *Error*.,  $5.4125787195011543710 \times 10^{-50}$ , *New Error*.,  $5.4134792235250115403 \times 10^{-64}$

*Error order*., 14, *Error*.,  $5.4134792235250115403 \times 10^{-64}$ , *New Error*.,  $5.4135691086463621598 \times 10^{-78}$

*Error order*., 14, *Error*.,  $5.4135691086463621598 \times 10^{-78}$ , *New Error*.,  $5.4135780955056095077 \times 10^{-92}$

*Error order:*, 14, *Error:*,  $5.4135780955056095077 \times 10^{-92}$ , *New Error:*,  $5.4135789941750052880 \times 10^{-106}$

$$c =, \left[ \begin{array}{cccccccc} & & & & \frac{37}{1560} & & & \\ & & & & -\frac{477}{130} & & & \\ & & -\frac{531}{1300} + \frac{567 \text{ I}}{1040} & & -\frac{531}{1300} - \frac{567 \text{ I}}{1040} & & & \\ & -\frac{8673}{88400} - \frac{13809 \text{ I}}{88400} & -\frac{2721}{425} + \frac{3183 \text{ I}}{425} & \frac{819}{20} & -\frac{2721}{425} - \frac{3183 \text{ I}}{425} & -\frac{8673}{88400} + \frac{13809 \text{ I}}{88400} & & \\ -\frac{251}{1591200} + \frac{521 \text{ I}}{530400} & -\frac{1077}{11050} + \frac{1023 \text{ I}}{22100} & -\frac{453}{160} + \frac{273 \text{ I}}{160} & -\frac{7933}{450} & -\frac{453}{160} - \frac{273 \text{ I}}{160} & -\frac{1077}{11050} - \frac{1023 \text{ I}}{22100} & -\frac{251}{1591200} - \frac{521 \text{ I}}{530400} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{1591200 \, \Delta x_{ol}^2} \Big( 37740 \, u_{ol+3I} + ( -649944 + 867510 \, I) \, u_{ol-1+2I} - 5838480 \, u_{ol+2I} - ( 649944 + 867510 \, I) \, u_{ol+1+2I} - ( 156114 + 248562 \, I) \, u_{ol-2+1} + ( -10187424 + 11917152 \, I) \, u_{ol-1+1} + 65159640 \, u_{ol+1} - ( 10187424 + 11917152 \, I) \, u_{ol+1+1} + ( -156114 + 248562 \, I) \, u_{ol+2+1} + ( -251 + 1563 \, I) \, u_{ol-3} + ( -155088 + 73656 \, I) \, u_{ol-2} + ( -4505085 + 2714985 \, I) \, u_{ol-1} - 28051088 \, u_{ol} - ( 4505085 + 2714985 \, I) \, u_{ol+1} - ( 155088 + 73656 \, I) \, u_{ol+2} - ( 251 + 1563 \, I) \, u_{ol+3} \Big), \, O( \, \Delta x_{ol}^{14} \, )$$

Formula:, 621, Var.:, 1

Variavel :, x\_{ol} , Derivada de Ordem :, 3

Error order:., 13, Error:., 3.2206231729014923603 × 10<sup>−33</sup>, New Error:., 3.2260036224365206058 × 10<sup>−46</sup>

Error order:., 13, Error:., 3.2260036224365206058 × 10<sup>−46</sup>, New Error:., 3.2265321383030280418 × 10<sup>−59</sup>

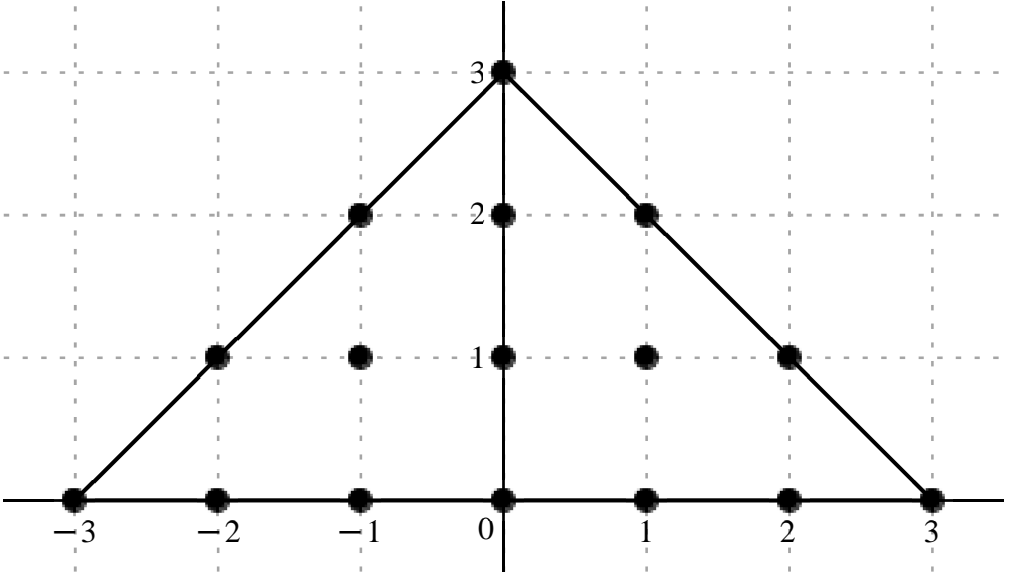
Error order:., 13, Error:., 3.2265321383030280418 × 10<sup>−59</sup>, New Error:., 3.2265848945547381398 × 10<sup>−72</sup>

Error order:., 13, Error:., 3.2265848945547381398 × 10<sup>−72</sup>, New Error:., 3.2265901692265159959 × 10<sup>−85</sup>

Error order:., 13, Error:., 3.2265901692265159959 × 10<sup>−85</sup>, New Error:., 3.2265906966841598063 × 10<sup>−98</sup>

$$x_o + h. , \left[ \begin{array}{cccccc} & & & 3 \, I & & \\ & & -1 + 2 \, I & 2 \, I & 1 + 2 \, I & \\ & -2 + I & -1 + I & I & 1 + I & 2 + I \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c =, \begin{bmatrix} & & & & & & \frac{6823 \text{ I}}{46800} \\ & & & & -\frac{12879}{4000} - \frac{2583 \text{ I}}{1000} & -\frac{57087 \text{ I}}{2600} & \frac{12879}{4000} - \frac{2583 \text{ I}}{1000} \\ & & \frac{180357}{176800} - \frac{18897 \text{ I}}{35360} & -\frac{173229}{4250} - \frac{173523 \text{ I}}{4250} & \frac{46827 \text{ I}}{200} & \frac{173229}{4250} - \frac{173523 \text{ I}}{4250} & -\frac{180357}{176800} - \frac{18897 \text{ I}}{35360} \\ -\frac{100619}{15912000} - \frac{23563 \text{ I}}{15912000} & -\frac{101973}{442000} - \frac{292479 \text{ I}}{442000} & -\frac{10209}{1600} - \frac{31989 \text{ I}}{1600} & -\frac{74807 \text{ I}}{900} & \frac{10209}{1600} - \frac{31989 \text{ I}}{1600} & \frac{101973}{442000} - \frac{292479 \text{ I}}{442000} & \frac{100619}{15912000} - \frac{23563 \text{ I}}{15912000} \end{bmatrix}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{15912000 \, \Delta x_{ol}^3} \, (2319820 \, \mathrm{I} u_{ol+3\mathrm{I}} - (51232662 + 41100696 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 349372440 \, \mathrm{I} u_{ol+2\mathrm{I}} + (51232662 - 41100696 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (16232130 - 8503650 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} - (648569376 + 649670112 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} + 3725556120 \, \mathrm{I} u_{ol+\mathrm{I}} + (648569376 - 649670112 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} - (16232130 + 8503650 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} - (100619 + 23563 \, \mathrm{I}) \, u_{ol-3} - (3671028 + 10529244 \, \mathrm{I}) \, u_{ol-2} - (101528505 + 318130605 \, \mathrm{I}) \, u_{ol-1} - 1322587760 \, \mathrm{I} u_{ol} + (101528505 - 318130605 \, \mathrm{I}) \, u_{ol+\mathrm{I}} + (3671028 - 10529244 \, \mathrm{I}) \, u_{ol+2} + (100619 - 23563 \, \mathrm{I}) \, u_{ol+3}), \, O(\, \Delta x_{ol}^{\, 13} \, )$$

Formula:, 622, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 4

Error order:, 12, Error:, 1.8406515334448088828 × 10−30, New Error:, 1.8436850568890375390 × 10−42

Error order:, 12, Error:, 1.8436850568890375390 × 10−42, New Error:, 1.8439831126741984476 × 10−54

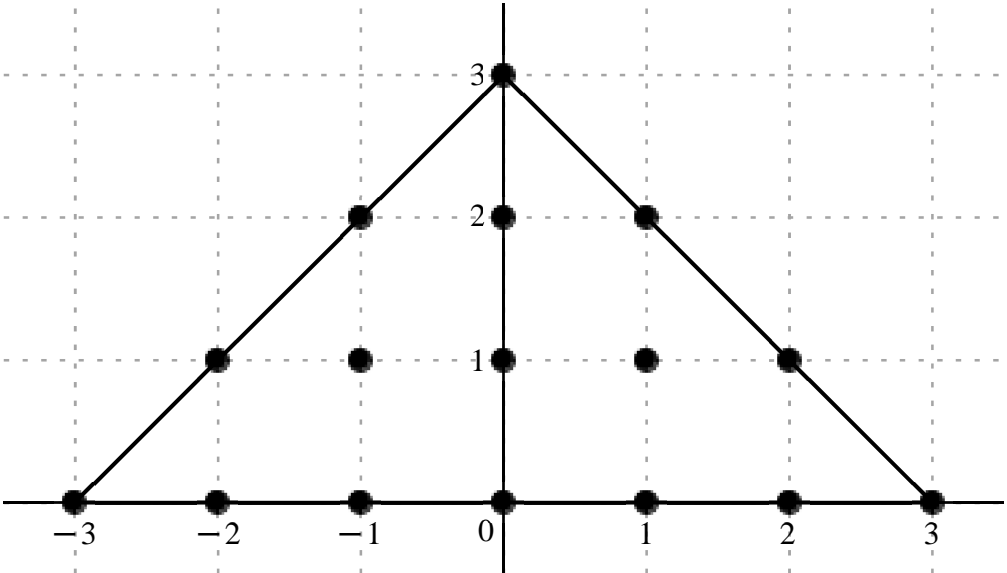
Error order:, 12, Error:, 1.8439831126741984476 × 10−54, New Error:, 1.8440128652630141843 × 10−66

Error order:, 12, Error:, 1.8440128652630141843 × 10−66, New Error:, 1.8440158399919748215 × 10−78

Error order:, 12, Error:, 1.8440158399919748215 × 10−78, New Error:, 1.8440161374595716519 × 10−90

$$x_o \neq h, , \left[ \begin{array}{cccccc} & & & 3 \text{ I} & & \\ & & -1+2 \text{ I} & 2 \text{ I} & 1+2 \text{ I} & \\ & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} & & & & & & -\frac{20387}{23400} & & & & & \\ & & & & & & & & & & & \\ & & & & & & & & & & & \\ & & & & & & \frac{10209}{650} - \frac{97119 \text{ I}}{5200} & \frac{83667}{650} & \frac{10209}{650} + \frac{97119 \text{ I}}{5200} & & & \\ & & & & & & & & & & & \\ & & & & & & \frac{251801}{88400} + \frac{557017 \text{ I}}{88400} & \frac{104671}{425} - \frac{3809 \text{ I}}{17} & -\frac{130767}{100} & \frac{104671}{425} + \frac{3809 \text{ I}}{17} & \frac{251801}{88400} - \frac{557017 \text{ I}}{88400} & \\ \frac{18403}{1591200} - \frac{61691 \text{ I}}{1591200} & \frac{18497}{4420} - \frac{23117 \text{ I}}{22100} & \frac{3809}{32} - \frac{10829 \text{ I}}{800} & \frac{18166}{45} & \frac{3809}{32} + \frac{10829 \text{ I}}{800} & \frac{18497}{4420} + \frac{23117 \text{ I}}{22100} & \frac{18403}{1591200} + \frac{61691 \text{ I}}{1591200} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{1591200 \, \Delta x_{ol}^4} \, \big( (-1386316 \, u_{ol+3 \text{ I}} + (24991632 - 29718414 \, \text{I}) \, u_{ol-1+2 \text{ I}} + 204816816 \, u_{ol+2 \text{ I}} + (24991632 + 29718414 \, \text{I}) \, u_{ol+1+2 \text{ I}} + (4532418 + 10026306 \, \text{I}) \, u_{ol-2+1} + (391888224 - 356522400 \, \text{I}) \, u_{ol-1+1} - 2080764504 \, u_{ol+1} + (391888224 + 356522400 \, \text{I}) \, u_{ol+1+1} + (4532418 - 10026306 \, \text{I}) \, u_{ol+2+1} + (18403$$

$$- 61691 \, \text{I}) \, u_{ol-3} + (6658920 - 1664424 \, \text{I}) \, u_{ol-2} + (189402525 - 21538881 \, \text{I}) \, u_{ol-1} + 642349760 \, u_{ol} + (189402525 + 21538881 \, \text{I}) \, u_{ol+1} + (6658920 + 1664424 \, \text{I}) \, u_{ol+2} + (18403 + 61691 \, \text{I}) \, u_{ol+3} \big), \, O( \, \Delta x_{ol}^{12} \, )$$

Formula.: 623, Var.: 1

Variavel .:, x<sub>ol</sub> , Derivada de Ordem .:, 5

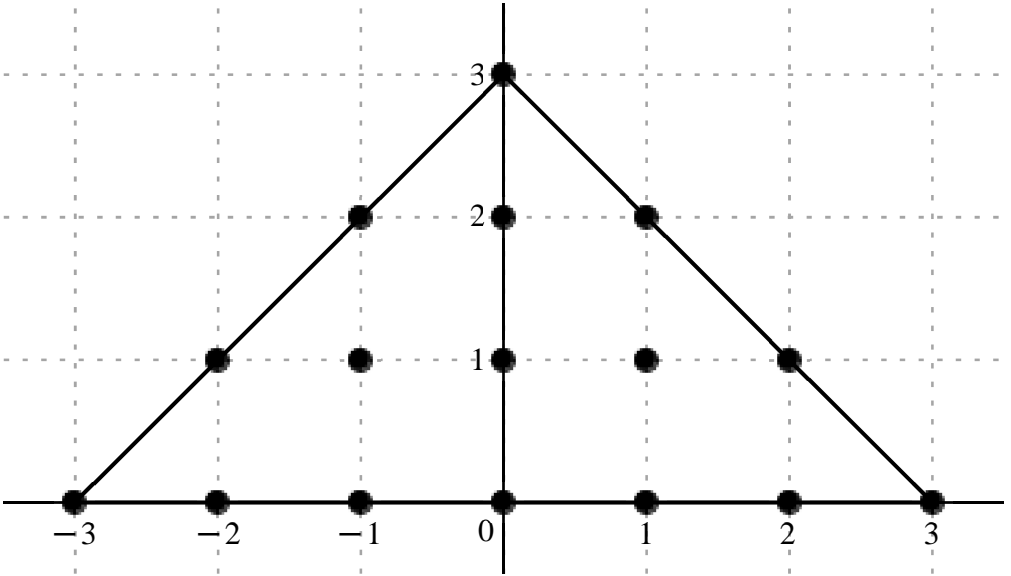
Error order.: 11, Error.: 1.0158914597163877667 × 10<sup>−27</sup>, New Error.: 1.0175417230144397973 × 10<sup>−38</sup>

Error order.: 11, Error.: 1.0175417230144397973 × 10<sup>−38</sup>, New Error.: 1.0177039109104004664 × 10<sup>−49</sup>

*Error order:*, 11, *Error:*,  $1.0177039109104004664 \times 10^{-49}$ , *New Error:*,  $1.0177201013029528680 \times 10^{-60}$   
*Error order:*, 11, *Error:*,  $1.0177201013029528680 \times 10^{-60}$ , *New Error:*,  $1.0177217200582250572 \times 10^{-71}$   
*Error order:*, 11, *Error:*,  $1.0177217200582250572 \times 10^{-71}$ , *New Error:*,  $1.0177218819309124330 \times 10^{-82}$

$$c=\left[\begin{array}{ccccccccc} & & & & 3\text{ I} & & & & \\ & & & & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & & \\ & & -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} & & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & & \end{array}\right]$$

$$\left[\begin{array}{cccccccccccc} & & & & & & -\frac{2609\text{ I}}{520} & & & & & \\ & & & & & & & & & & & \\ & & & & \frac{13539}{130}+\frac{95751\text{ I}}{1040} & \frac{188823\text{ I}}{260} & -\frac{13539}{130}+\frac{95751\text{ I}}{1040} & & & & & \\ & & & & & & & & & & & \\ & & -\frac{661459}{17680}+\frac{253647\text{ I}}{17680} & \frac{99878}{85}+\frac{122439\text{ I}}{85} & -\frac{141723\text{ I}}{20} & -\frac{99878}{85}+\frac{122439\text{ I}}{85} & \frac{661459}{17680}+\frac{253647\text{ I}}{17680} & & & & & \\ \frac{1613}{7072}+\frac{8873\text{ I}}{106080} & -\frac{34677}{8840}+\frac{222943\text{ I}}{8840} & -\frac{879}{32}+\frac{101659\text{ I}}{160} & \frac{11699\text{ I}}{6} & \frac{879}{32}+\frac{101659\text{ I}}{160} & -\frac{34677}{8840}+\frac{222943\text{ I}}{8840} & -\frac{1613}{7072}+\frac{8873\text{ I}}{106080} & & & & & \end{array}\right]$$



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{106080 \, \Delta x_{ol}^5} \, \big( -532236 \, \mathrm{I} \, u_{ol+3\mathrm{I}} + (11047824 + 9766602 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + 77039784 \, \mathrm{I} \, u_{ol+2\mathrm{I}} + (-11047824 + 9766602 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (-3968754 + 1521882 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} + (124647744 + 152803872 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} - 751698792 \, \mathrm{I} \, u_{ol+\mathrm{I}} + (-124647744 + 152803872 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} + (3968754 + 1521882 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} + (24195 + 8873 \, \mathrm{I}) \, u_{ol-3} + (416124 + 2675316 \, \mathrm{I}) \, u_{ol-2} + (-2913885 + 67399917 \, \mathrm{I}) \, u_{ol-1} + 206838320 \, \mathrm{I} \, u_{ol} + (2913885 + 67399917 \, \mathrm{I}) \, u_{ol+1} + (-416124 + 2675316 \, \mathrm{I}) \, u_{ol+2} + (-24195 + 8873 \, \mathrm{I}) \, u_{ol+3} \big), \, O(\, \Delta x_{ol}^{11} \, )$$

*Formula:*, 624, *Var:*, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

*Error order.*, 10, *Error.*,  $5.3530260922479386264 \times 10^{-25}$ , *New Error.*,  $5.3615791124134842656 \times 10^{-35}$

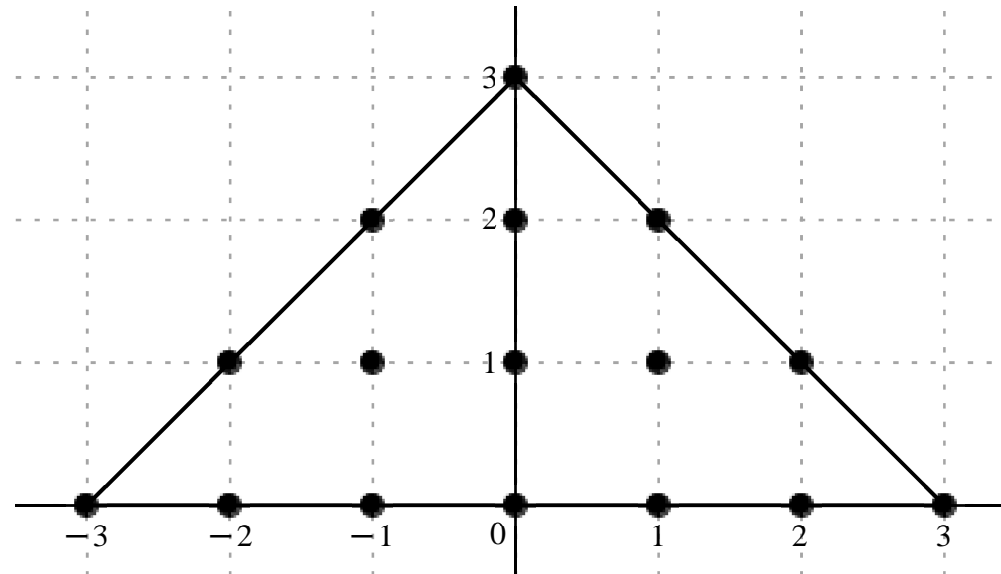
*Error order:*, 10, *Error:*,  $5.3615791124134842656 \times 10^{-35}$ , *New Error:*,  $5.3624199506376190763 \times 10^{-45}$

Error order:, 10, Error:,  $5.3624199506376190763 \times 10^{-45}$ , New Error:,  $5.3625038897585507995 \times 10^{-55}$

Error order:, 10, Error:,  $5.3625038897585507995 \times 10^{-55}$ , New Error:,  $5.36251122822235660457 \times 10^{-65}$

*Error order*:, 10, *Error*:,  $5.3625122822235660457 \times 10^{-65}$ , *New Error*:,  $5.3625131214555967280 \times 10^{-75}$

$$c = , \left[ \begin{array}{ccccccc} & & & & 31 & & \\ & & & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & \\ & -2+1 & -1+1 & 1 & 1+1 & 2+1 & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$



$$\frac{d^6}{dx_{ol}^6} u(x_{ol}) = \frac{1}{106080 \Delta x_{ol}^6} \left( 2913188 u_{ol+3l} + (-54255636 + 58422438 l) u_{ol-1+2l} - 413261568 u_{ol+2l} - (54255636 + 58422438 l) u_{ol+1+2l} - (6969366 + 22264614 l) u_{ol-2+l} + (-835353792 + 613080000 l) u_{ol-1+l} + 3866759208 u_{ol+l} - (835353792 + 613080000 l) u_{ol+1+l} + (-6969366 + 22264614 l) u_{ol+2+l} + (-60089 + 134341 l) u_{ol-3} + (-15146784 + 818496 l) u_{ol-2} - (331556355 + 55359837 l) u_{ol-1} - 969726784 u_{ol} + (-331556355 + 55359837 l) u_{ol+1} - (15146784 + 818496 l) u_{ol+2} - (60089 + 134341 l) u_{ol+3} \right), \quad O(\Delta x_{ol}^{10})$$



Formula:, 625, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

*Error order:*, 9, *Error:*,  $2.6618686930484193452 \times 10^{-22}$ , *New Error:*,  $2.6660398853402946125 \times 10^{-31}$

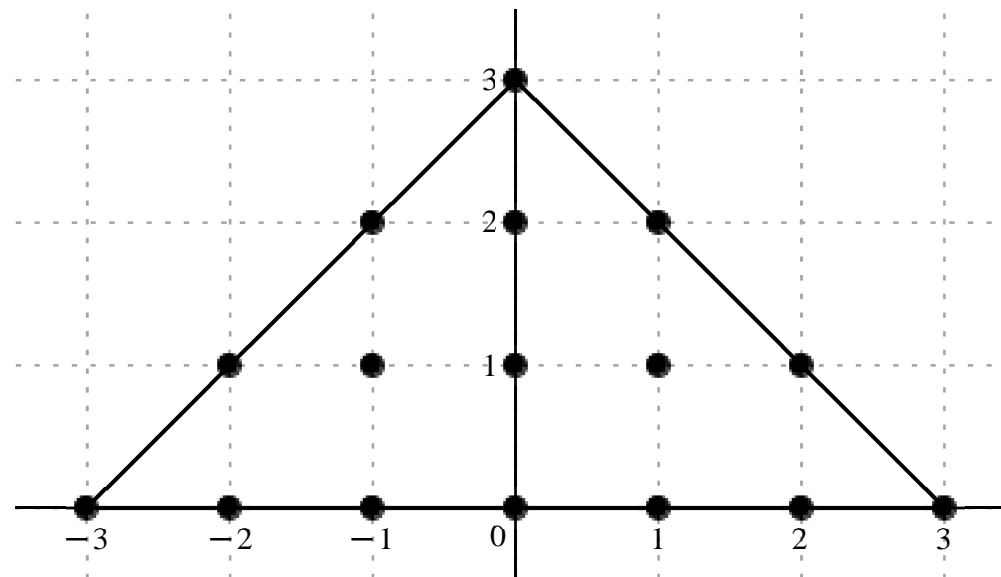
*Error order*., 9, *Error*.,  $2.6660398853402946125 \times 10^{-31}$ , *New Error*.,  $2.6664500868585774102 \times 10^{-40}$

*Error order:*, 9, *Error:*,  $2.6664500868585774102 \times 10^{-40}$ , *New Error:*,  $2.6664910378035160165 \times 10^{-49}$

*Error order:*, 9, *Error:*,  $2.6664910378035160165 \times 10^{-49}$ , *New Error:*,  $2.6664951322059114074 \times 10^{-58}$

*Error order:*, 9, *Error:*,  $2.6664951322059114074 \times 10^{-58}$ , *New Error:*,  $2.6664955416392299323 \times 10^{-67}$

[illegible]



$$\frac{d^7}{dx_{ol}^7} u(x_{ol}) = \frac{1}{530400 \Delta x_{ol}^7} (7 (10685180 I u_{ol+3l} - (206533476 + 201667158 I) u_{ol-1+2l} - 1484406000 I u_{ol+2l} + (206533476 - 201667158 I) u_{ol+1+2l} + (82997370 - 20079090 I) u_{ol-2+l} - (2026147968 + 3038008896 I) u_{ol-1+l} + 13394482920 I u_{ol+l} + (2026147968 - 3038008896 I) u_{ol+1+l} - (82997370 + 20079090 I) u_{ol+2+l})$$

$$-(494047 + 269609 \, \text{I}) \, u_{oI-3} + (3312216 - 56346552 \, \text{I}) \, u_{oI-2} + (294103485 - 1086879105 \, \text{I}) \, u_{oI-1} - 3114261280 \, \text{I} \, u_{oI} - (294103485 + 1086879105 \, \text{I}) \, u_{oI+1} - (3312216 + 56346552 \, \text{I}) \, u_{oI+2} + (494047 - 269609 \, \text{I}) \, u_{oI+3} \Big) \Big), \, O(\, \Delta x_{oI}^{\, 9} \, )$$

Formula.: 626, Var.: 1

Variavel .:,  $x_{oI}$ , Derivada de Ordem .:, 8

Error order.: 8, Error.:  $1.2434728252332238060 \times 10^{-19}$ , New Error.:  $1.2453780732531907362 \times 10^{-27}$

Error order.: 8, Error.:  $1.2453780732531907362 \times 10^{-27}$ , New Error.:  $1.2455655060936182929 \times 10^{-35}$

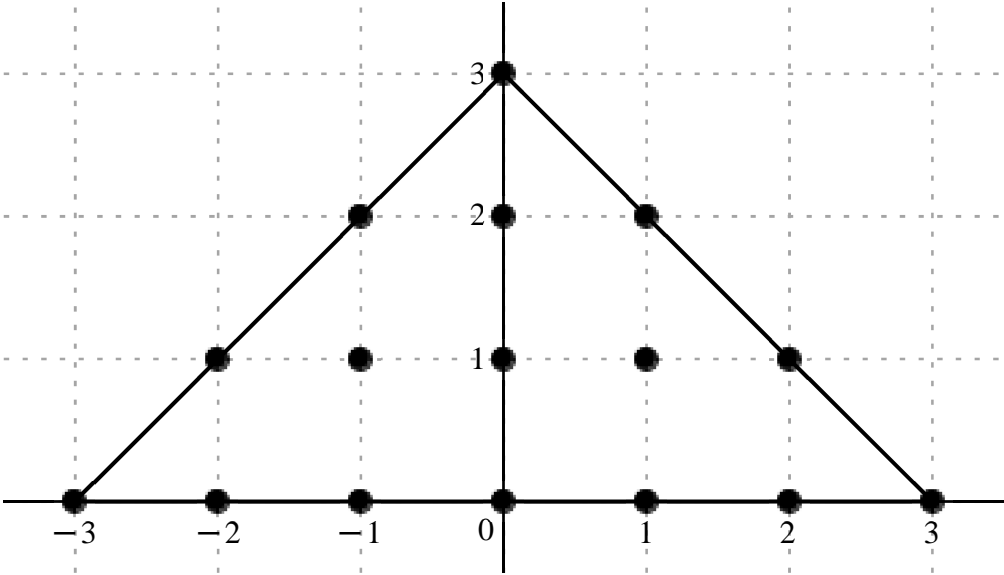
Error order.: 8, Error.:  $1.2455655060936182929 \times 10^{-35}$ , New Error.:  $1.2455842184450194715 \times 10^{-43}$

Error order.: 8, Error.:  $1.2455842184450194715 \times 10^{-43}$ , New Error.:  $1.2455860893708202375 \times 10^{-51}$

Error order.: 8, Error.:  $1.2455860893708202375 \times 10^{-51}$ , New Error.:  $1.2455862764603069076 \times 10^{-59}$

$$x_o + h. , \left[ \begin{array}{cccccc} & & & & 3 \, \text{I} & \\ & & & & -1 + 2 \, \text{I} & 2 \, \text{I} & 1 + 2 \, \text{I} & \\ & & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} & & & & & & & & -\frac{44058}{65} & & & \\ & & & & & & & & \frac{839601}{65} - \frac{820827 \, \text{I}}{65} & \frac{6003648}{65} & \frac{839601}{65} + \frac{820827 \, \text{I}}{65} & \\ & & & & & & & & \frac{16174368}{85} - \frac{1965600 \, \text{I}}{17} & -\frac{4026204}{5} & \frac{16174368}{85} + \frac{1965600 \, \text{I}}{17} & \frac{1021923}{1105} - \frac{5843691 \, \text{I}}{1105} \\ \frac{22638}{1105} - \frac{34041 \, \text{I}}{1105} & \frac{775152}{221} + \frac{697536 \, \text{I}}{1105} & 61425 + \frac{111384 \, \text{I}}{5} & 175392 & 61425 - \frac{111384 \, \text{I}}{5} & \frac{775152}{221} - \frac{697536 \, \text{I}}{1105} & \frac{22638}{1105} + \frac{34041 \, \text{I}}{1105} & \end{array} \right]$$



$$\frac{d^8}{dx_{ol}^8} u(x_{ol}) = \frac{1}{1105 \Delta x_{ol}^8} \left( 21 \left( -35666 u_{ol+31} + (679677 - 664479 I) u_{ol-1+21} + 4860096 u_{ol+21} + (679677 + 664479 I) u_{ol+1+21} + (48663 + 278271 I) u_{ol-2+1} + (10012704 - 6084000 I) u_{ol-1+1} - 42371004 u_{ol+1} + (10012704 + 6084000 I) u_{ol+1+1} + (48663 - 278271 I) u_{ol+2+1} + (1078 - 1621 I) u_{ol-3} + (184560 + 33216 I) u_{ol-2} + (332125 + 1172184 I) u_{ol-1} + 9228960 u_{ol} + (332125 - 1172184 I) u_{ol+1} + (184560 - 33216 I) u_{ol+2} + (1078 + 1621 I) u_{ol+3} \right) \right), O(\Delta x_{ol}^8)$$

Formula:, 627, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 9

*Error order:*, 7, *Error:*,  $5.4271957541808550657 \times 10^{-17}$ , *New Error:*,  $5.4352949866268028950 \times 10^{-24}$

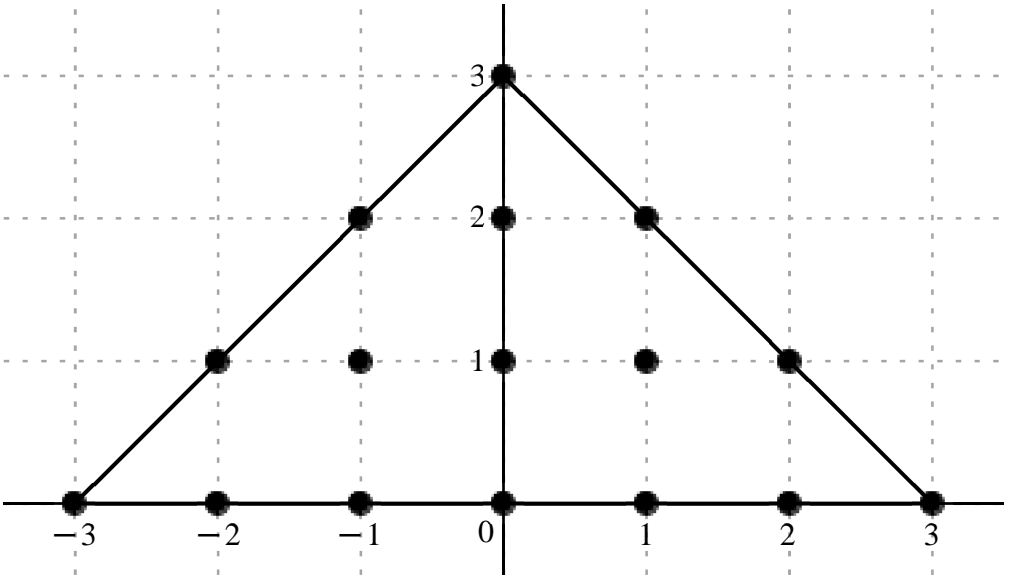
Error order: 7, Error:  $5.4352949866268028950 \times 10^{-24}$ , New Error:  $5.4360920830019275206 \times 10^{-31}$

*Error order:*, 7, *Error:*,  $5.4360920830019275206 \times 10^{-31}$ , *New Error:*,  $5.4361716643179370034 \times 10^{-38}$

*Error order:*, 7, *Error:*,  $5.4361716643179370034 \times 10^{-38}$ , *New Error:*,  $5.4361796211662704740 \times 10^{-45}$

Error order: 7, Error:  $5.4361796211662704740 \times 10^{-45}$ , New Error:  $5.4361804168382710939 \times 10^{-52}$

$$c = \left[ \begin{array}{cccccc} -\frac{196686}{65} & \frac{3525039}{65} + \frac{3782457}{65} & \frac{26258904}{65} & -\frac{3525039}{65} + \frac{3782457}{65} & & \\ -\frac{26013393}{1105} + \frac{2872989}{1105} & \frac{39263616}{85} + \frac{70888608}{85} & -\frac{17039484}{5} & -\frac{39263616}{85} + \frac{70888608}{85} & \frac{26013393}{1105} + \frac{2872989}{1105} & \\ \frac{29169}{221} + \frac{118566}{1105} & -\frac{5010012}{1105} + \frac{16395372}{1105} & -108864 + \frac{1217349}{5} & 700560 & 108864 + \frac{1217349}{5} & \frac{5010012}{1105} + \frac{16395372}{1105} - \frac{29169}{221} + \frac{118566}{1105} \end{array} \right]$$



$$\frac{d^9}{dx_{ol}^9} u(x_{ol}) = \frac{1}{1105 \Delta x_{ol}^9} \left( 63 \left( -53074 I u_{ol+3I} + (951201 + 1020663 I) u_{ol-1+2I} + 7085736 I u_{ol+2I} + (-951201 + 1020663 I) u_{ol+1+2I} + (-412911 + 45603 I) u_{ol-2+I} + (8102016 + 14627808 I) u_{ol-1+I} - 59773428 I u_{ol+I} + (-8102016 + 14627808 I) u_{ol+1+I} + (412911 + 45603 I) u_{ol+2+I} + (2315 + 1882 I) u_{ol-3} + (-79524 + 260244 I) u_{ol-2} + (-1909440 + 4270383 I) u_{ol-1} + 12287600 I u_{ol} + (1909440 + 4270383 I) u_{ol+1} + (79524 + 260244 I) u_{ol+2} + (-2315 + 1882 I) u_{ol+3} \right) \right), O(\Delta x_{ol}^7)$$

Formula: 628, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 10

Error order: 6, Error: 2.1897705661191157645  $\times 10^{-14}$ , New Error: 2.1929346668522990242  $\times 10^{-20}$

Error order: 6, Error: 2.1929346668522990242  $\times 10^{-20}$ , New Error: 2.1932462071930930417  $\times 10^{-26}$

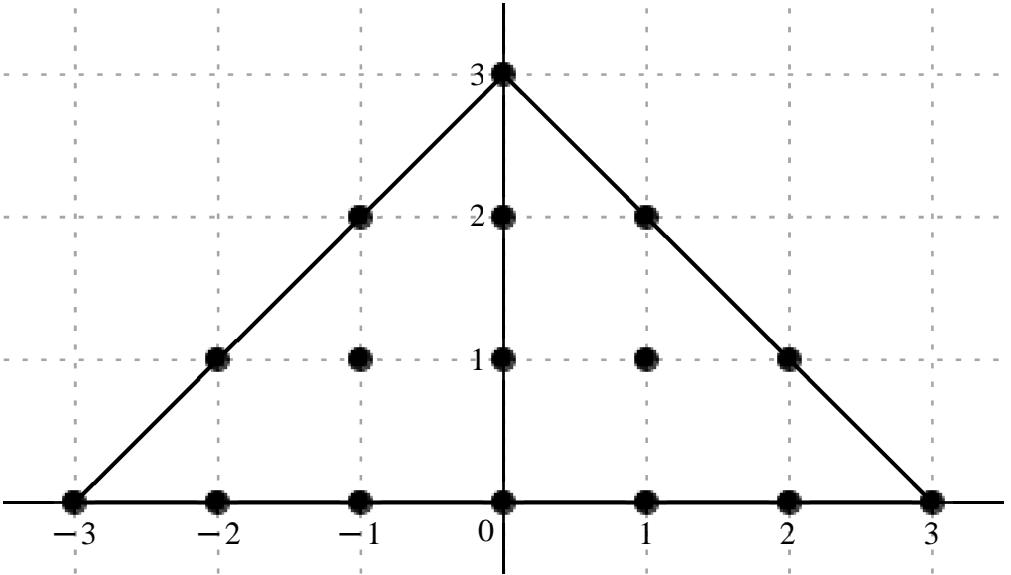
Error order: 6, Error: 2.1932462071930930417  $\times 10^{-26}$ , New Error: 2.1932773125102996253  $\times 10^{-32}$

Error order: 6, Error: 2.1932773125102996253  $\times 10^{-32}$ , New Error: 2.1932804225548321403  $\times 10^{-38}$

Error order: 6, Error: 2.1932804225548321403  $\times 10^{-38}$ , New Error: 2.1932807335544134910  $\times 10^{-44}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} & & & 3 I & & \\ & & -1 + 2 I & 2 I & 1 + 2 I & \\ & -2 + I & -1 + I & I & 1 + I & 2 + I \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccc} & & & & \frac{160776}{13} & & & \\ & & & & -\frac{21028896}{13} & & -\frac{3112830}{13} - \frac{2760156 \text{ I}}{13} & \\ & & -\frac{3112830}{13} + \frac{2760156 \text{ I}}{13} & & -\frac{21028896}{13} & & & \\ & -\frac{895860}{221} - \frac{21053844 \text{ I}}{221} & & -\frac{56645568}{17} + \frac{28558656 \text{ I}}{17} & 13208832 & -\frac{56645568}{17} - \frac{28558656 \text{ I}}{17} & -\frac{895860}{221} + \frac{21053844 \text{ I}}{221} & \\ -\frac{111825}{221} + \frac{110691 \text{ I}}{221} & -\frac{12328848}{221} - \frac{5361552 \text{ I}}{221} & & -881685 - 464373 \text{ I} & -2576448 & -881685 + 464373 \text{ I} & -\frac{12328848}{221} + \frac{5361552 \text{ I}}{221} & -\frac{111825}{221} - \frac{110691 \text{ I}}{221} \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{oI}^{10}}\; u(x_{oI}) = \frac{1}{221 \; \Delta x_{oI}^{10}} \big( 63 \; ( 43384 \; u_{oI+3I} + ( -839970 + 744804 \; \text{I} ) \; u_{oI-1+2I} - 5674464 \; u_{oI+2I} - ( 839970 + 744804 \; \text{I} ) \; u_{oI+1+2I} - ( 14220 + 334188 \; \text{I} ) \; u_{oI-2+1} + ( -11688768 + 5893056 \; \text{I} ) \; u_{oI-1+1} + 46335744 \; u_{oI+1} - ( 11688768 + 5893056 \; \text{I} ) \; u_{oI+1+1} + ( -14220 + 334188 \; \text{I} ) \; u_{oI+2+1} + ( -1775 + 1757 \; \text{I} ) \; u_{oI-3} - ( 195696 + 85104 \; \text{I} ) \; u_{oI-2} - ( 3092895 + 1628991 \; \text{I} ) \; u_{oI-1} - 9038016 \; u_{oI} + ( -3092895 + 1628991 \; \text{I} ) \; u_{oI+1} + ( -195696 + 85104 \; \text{I} ) \; u_{oI+2} - ( 1775 + 1757 \; \text{I} ) \; u_{oI+3} ) \big) , \; O( \; \Delta x_{oI}^6 \; )$$

Formula:., 629, Var:., 1

Variavel :., x\_{oI}, Derivada de Ordem :., 11

Error order:., 5, Error:., 8.0538330581912769958 × 10−12, New Error:., 8.0650016365643639774 × 10−17

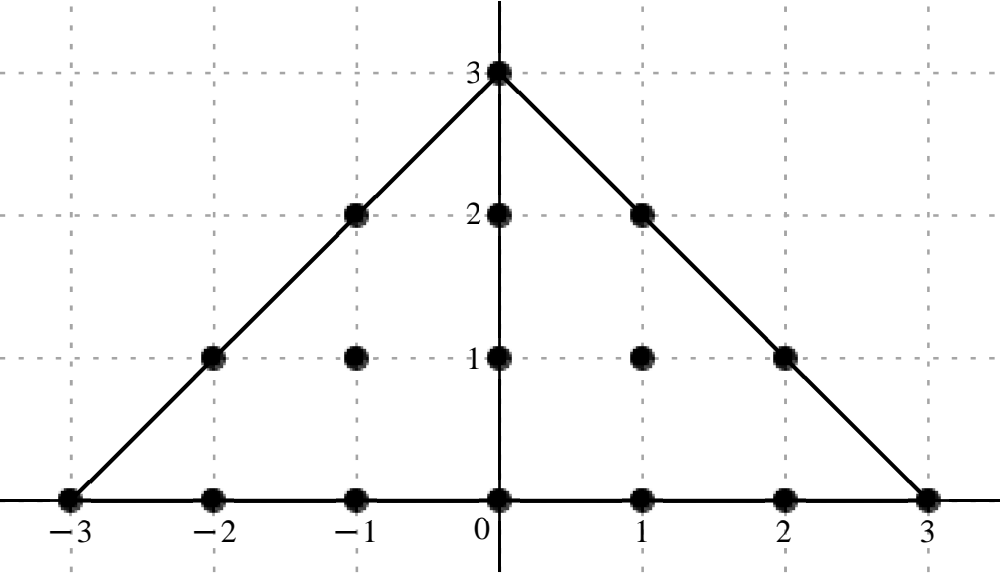
Error order:., 5, Error:., 8.0650016365643639774 × 10−17, New Error:., 8.0661018839645595958 × 10−22

Error order:., 5, Error:., 8.0661018839645595958 × 10−22, New Error:., 8.0662117425353435595 × 10−27

Error order:., 5, Error:., 8.0662117425353435595 × 10−27, New Error:., 8.0662227267306651728 × 10−32

Error order:., 5, Error:., 8.0662227267306651728 × 10−32, New Error:., 8.0662238251335797019 × 10−37

$$c = \left[ \begin{array}{cccccccc} -\frac{1787709}{1105} & -\frac{2324553}{1105} & \frac{115858512}{1105} & -\frac{203276304}{1105} & 1727649 - 2862783 \text{ I} & -8545152 \text{ I} & -1727649 - 2862783 \text{ I} & -\frac{115858512}{1105} - \frac{203276304}{1105} & \frac{1787709}{1105} - \frac{2324553}{1105} \\ \frac{75592440}{221} + \frac{2145528 \text{ I}}{221} & -\frac{462635712}{85} - \frac{1013088384 \text{ I}}{85} & 46004112 \text{ I} & \frac{462635712}{85} - \frac{1013088384 \text{ I}}{85} & -\frac{75592440}{221} + \frac{2145528 \text{ I}}{221} \\ \frac{48511386}{65} - \frac{57530088 \text{ I}}{65} & -\frac{75642336 \text{ I}}{13} & \frac{48511386}{65} - \frac{57530088 \text{ I}}{65} \\ \frac{591360 \text{ I}}{13} \end{array} \right]$$



$$\frac{dI}{dx_{ol}^{11}} u(x_{ol}) = \frac{1}{1105 \Delta x_{ol}^{11}} \left( 231 \left( 217600 I_{u_{ol+31}} - (3570102 + 4233816 I) u_{ol-1+21} - 27833760 I_{u_{ol+21}} + (3570102 - 4233816 I) u_{ol+1+21} + (1636200 + 46440 I) u_{ol-2+1} - (26035776 + 57013632 I) u_{ol-1+1} + 220062960 I_{u_{ol+1}} + (26035776 - 57013632 I) u_{ol+1+1} + (-1636200 + 46440 I) u_{ol+2+1} - (7739 + 10063 I) u_{ol-3} + (501552 - 879984 I) u_{ol-2} + (8264295 - 13694265 I) u_{ol-1} - 40876160 I_{u_{ol}} - (8264295 + 13694265 I) u_{ol+1} - (501552 + 879984 I) u_{ol+2} + (7739 - 10063 I) u_{ol+3} \right), O(\Delta x_{ol}^5)$$

*Formula:*, 630, *Var:*, 1

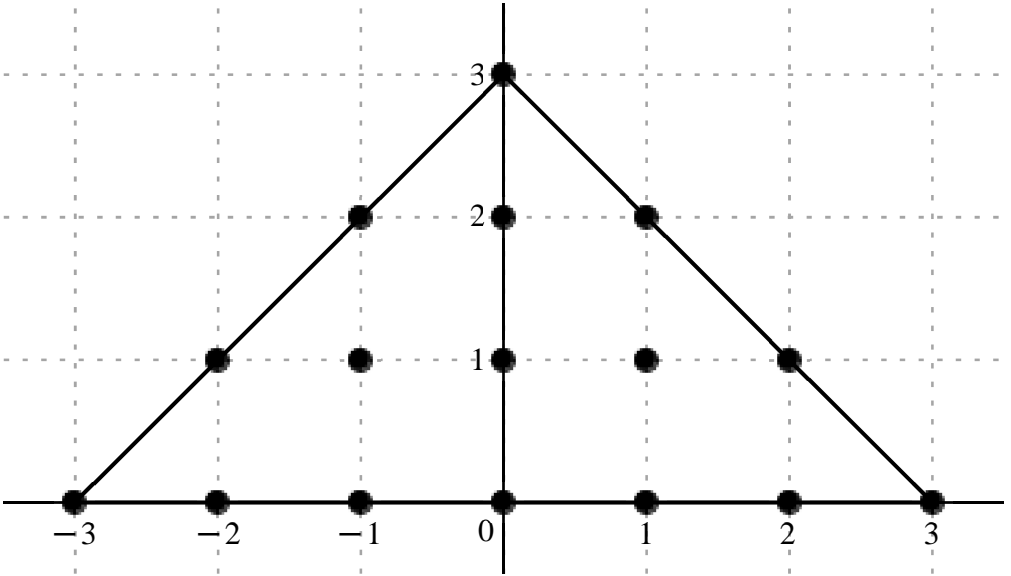
*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 12

*Error order*., 4, *Error*.,  $2.6493095080074200685 \times 10^{-9}$ , *New Error*.,  $2.6527861202142487951 \times 10^{-13}$

*Error order:*, 4, *Error:*,  $2.6527861202142487951 \times 10^{-13}$ , *New Error:*,  $2.6531288241975169519 \times 10^{-13}$

*Error order:*, 4, *Error:*,  $2.6531288241975169519 \times 10^{-17}$ , *New Error:*,  $2.6531630450046747394 \times 10^{-21}$   
*Error order:*, 4, *Error:*,  $2.6531630450046747394 \times 10^{-21}$ , *New Error:*,  $2.6531664665894601600 \times 10^{-25}$   
*Error order:*, 4, *Error:*,  $2.6531664665894601600 \times 10^{-25}$ , *New Error:*,  $2.6531668087429793798 \times 10^{-29}$

$$c =, \begin{bmatrix} x_o+h., \begin{bmatrix} & & & 3\text{ I} & & & \\ & & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & & \\ & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{bmatrix} \\ \\ -\frac{1907136}{13} \\ \\ \frac{37272312}{13}-\frac{29638224\text{ I}}{13} & \frac{238303296}{13} & \frac{37272312}{13}+\frac{29638224\text{ I}}{13} \\ \\ -\frac{23151744}{221}+\frac{235109952\text{ I}}{221} & \frac{631483776}{17}-\frac{259459200\text{ I}}{17} & -140107968 & \frac{631483776}{17}+\frac{259459200\text{ I}}{17} & -\frac{23151744}{221}-\frac{235109952\text{ I}}{221} \\ \\ \frac{1643796}{221}-\frac{917532\text{ I}}{221} & \frac{114760800}{221}+\frac{82428192\text{ I}}{221} & 8108100+5513508\text{ I} & 24837120 & 8108100-5513508\text{ I} & \frac{114760800}{221}-\frac{82428192\text{ I}}{221} & \frac{1643796}{221}+\frac{917532\text{ I}}{221} \end{bmatrix}$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d} x_{o l}^{12}} \; u(x_{o l}) = \frac{1}{221 \; \Delta x_{o l}^{12}} \big( 2772 \; \big( -11696 \; u_{o l+31} + (228582 - 181764 \; \mathrm{I}) \; u_{o l-1+21} + 1461456 \; u_{o l+21} + (228582 + 181764 \; \mathrm{I}) \; u_{o l+1+21} + (-8352 + 84816 \; \mathrm{I}) \; u_{o l-2+1} + (2961504 - 1216800 \; \mathrm{I}) \; u_{o l-1+1} - 11170224 \; u_{o l+1} + (2961504 + 1216800 \; \mathrm{I}) \; u_{o l+1+1} - (8352 + 84816 \; \mathrm{I}) \; u_{o l+2+1} + (593 - 331 \; \mathrm{I}) \; u_{o l-3} + (41400 + 29736 \; \mathrm{I}) \; u_{o l-2} \\ + (646425 + 439569 \; \mathrm{I}) \; u_{o l-1} + 1980160 \; u_{o l} + (646425 - 439569 \; \mathrm{I}) \; u_{o l+1} + (41400 - 29736 \; \mathrm{I}) \; u_{o l+2} + (593 + 331 \; \mathrm{I}) \; u_{o l+3} \big) \big), \; O( \; \Delta x_{o l}^4 \; )$$

Formula:, 631, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 13

Error order:, 3, Error:,  $7.5845892078229250120 \times 10^{-7}$ , New Error:,  $7.5937770557075638995 \times 10^{-10}$

Error order:, 3, Error:,  $7.5937770557075638995 \times 10^{-10}$ , New Error:,  $7.5946834224217400869 \times 10^{-13}$

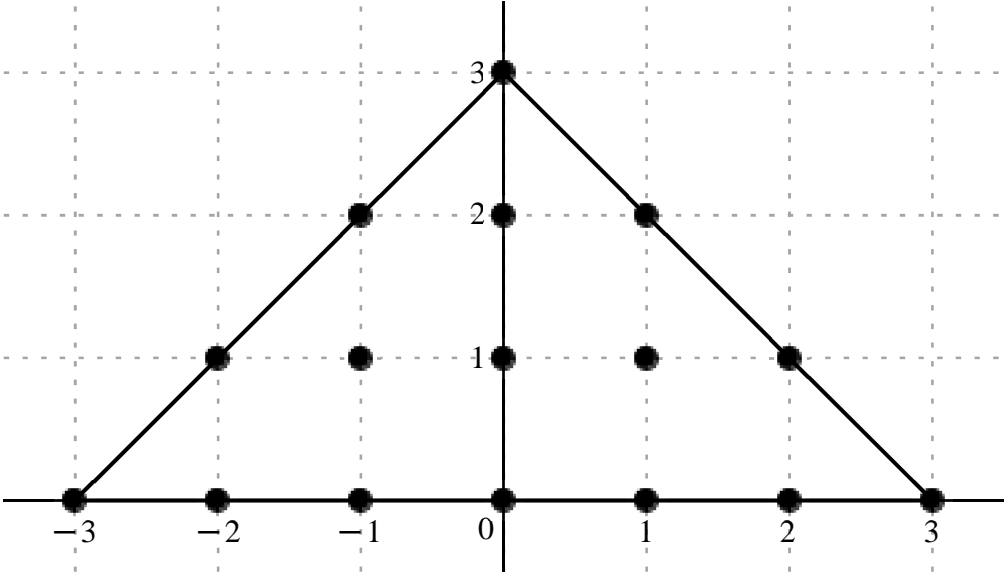
Error order:, 3, Error:,  $7.5946834224217400869 \times 10^{-13}$ , New Error:,  $7.5947739348667233800 \times 10^{-16}$

Error order:, 3, Error:,  $7.5947739348667233800 \times 10^{-16}$ , New Error:,  $7.5947829848689119873 \times 10^{-19}$

Error order:, 3, Error:,  $7.5947829848689119873 \times 10^{-19}$ , New Error:,  $7.5947838898567077054 \times 10^{-22}$

$$x_o + h , \left[ \begin{array}{cccccc} & & & & 3 \text{ I} & \\ & & & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} & & & & & & -399168 \text{ I} & & & & & \\ & & & & 5837832 + 7783776 \text{ I} & 48498912 \text{ I} & -5837832 + 7783776 \text{ I} & & & & & \\ & & -\frac{47101824}{17} - \frac{8382528 \text{ I}}{17} & \frac{601945344}{17} + \frac{1650160512 \text{ I}}{17} & -358053696 \text{ I} & -\frac{601945344}{17} + \frac{1650160512 \text{ I}}{17} & \frac{47101824}{17} - \frac{8382528 \text{ I}}{17} & & & & & \\ \frac{124740}{17} + \frac{357588 \text{ I}}{17} & -\frac{18261936}{17} + \frac{20257776 \text{ I}}{17} & -14594580 + 19135116 \text{ I} & 60540480 \text{ I} & 14594580 + 19135116 \text{ I} & \frac{18261936}{17} + \frac{20257776 \text{ I}}{17} & -\frac{124740}{17} + \frac{357588 \text{ I}}{17} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}} \; u(x_{ol}) = \frac{1}{17 \; \Delta x_{ol}^{13}} \Big( 8316 \; \big( -816 \; \text{I} \; u_{ol+3\text{I}} + (11934 + 15912 \; \text{I}) \; u_{ol-1+2\text{I}} + 99144 \; \text{I} \; u_{ol+2\text{I}} + (-11934 + 15912 \; \text{I}) \; u_{ol+1+2\text{I}} - (5664 + 1008 \; \text{I}) \; u_{ol-2+1\text{I}} + (72384 + 198432 \; \text{I}) \; u_{ol-1+1\text{I}} - 731952 \; \text{I} \; u_{ol+1\text{I}} + (-72384 + 198432 \; \text{I}) \; u_{ol+1+1\text{I}} + (5664 - 1008 \; \text{I}) \; u_{ol+2+1\text{I}} + (15 + 43 \; \text{I}) \; u_{ol-3\text{I}} + (-2196 + 2436 \; \text{I}) \; u_{ol-2\text{I}} + (-29835 + 39117 \; \text{I}) \; u_{ol-1\text{I}} + 123760 \; \text{I} \; u_{ol\text{I}} + (29835 + 39117 \; \text{I}) \; u_{ol+1\text{I}} + (2196 + 2436 \; \text{I}) \; u_{ol+2\text{I}} + (-15 + 43 \; \text{I}) \; u_{ol+3\text{I}} \big) \Big) , \; O( \; \Delta x_{ol}^3 \; )$$



Formula.: 632, Var.: 1

Variavel .:,  $x_{ol}$ , Derivada de Ordem .: 14

Error order.: 2, Error.: 0.00018102577038671113733, New Error.:  $1.8121806892561585756 \times 10^{-6}$

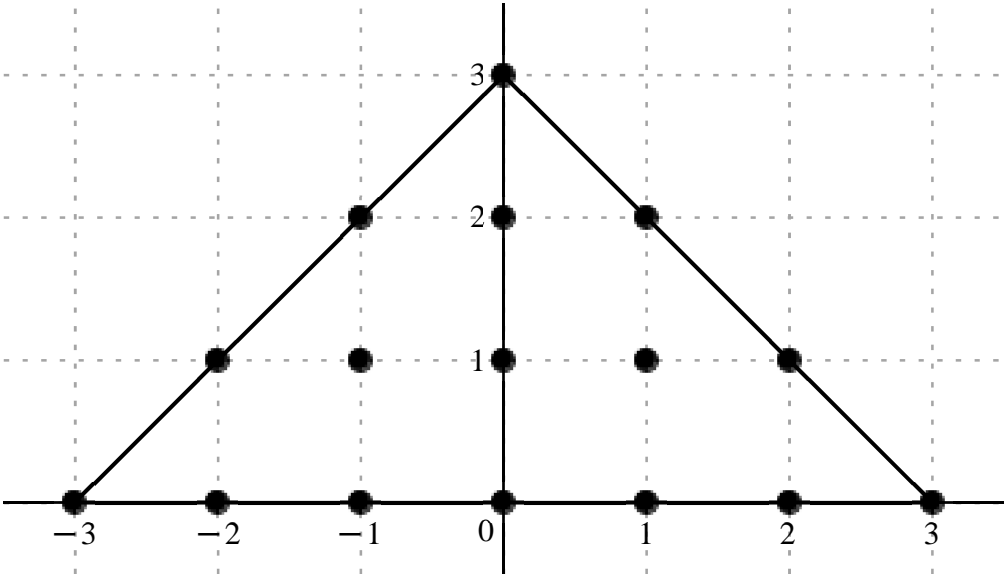
Error order.: 2, Error.:  $1.8121806892561585756 \times 10^{-6}$ , New Error.:  $1.8123705640841096302 \times 10^{-8}$

Error order.: 2, Error.:  $1.8123705640841096302 \times 10^{-8}$ , New Error.:  $1.8123895273210940529 \times 10^{-10}$

Error order.: 2, Error.:  $1.8123895273210940529 \times 10^{-10}$ , New Error.:  $1.8123914234023257484 \times 10^{-12}$

Error order.: 2, Error.:  $1.8123914234023257484 \times 10^{-12}$ , New Error.:  $1.8123916130080242418 \times 10^{-14}$

$$c =, \left[ \begin{array}{cccccc} & & & & 3 \text{ I} & \\ & & & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$
$$c =, \left[ \begin{array}{cccccc} & & & & 853776 & \\ & & & -16765056 + 11525976 \text{ I} & -100590336 & -16765056 - 11525976 \text{ I} \\ & \frac{27592488}{17} - \frac{92557080 \text{ I}}{17} & -\frac{3341834496}{17} + \frac{1017080064 \text{ I}}{17} & 708323616 & -\frac{3341834496}{17} - \frac{1017080064 \text{ I}}{17} & \frac{27592488}{17} + \frac{92557080 \text{ I}}{17} \\ -\frac{717948}{17} + \frac{97020 \text{ I}}{17} & -\frac{33530112}{17} - \frac{39118464 \text{ I}}{17} & -34054020 - 29513484 \text{ I} & -113008896 & -34054020 + 29513484 \text{ I} & -\frac{33530112}{17} + \frac{39118464 \text{ I}}{17} & -\frac{717948}{17} - \frac{97020 \text{ I}}{17} \end{array} \right]$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}} \, u(x_{ol}) = \frac{1}{17 \, \Delta x_{ol}^{14}} \Big( 19404 \, \big( 748 \, u_{ol+3\mathrm{I}} + (-14688 + 10098 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 88128 \, u_{ol+2\mathrm{I}} - (14688 + 10098 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (1422 - 4770 \, \mathrm{I}) \, u_{ol-2+1} + (-172224 + 52416 \, \mathrm{I}) \, u_{ol-1+1} + 620568 \, u_{ol+1} - (172224 + 52416 \, \mathrm{I}) \, u_{ol+1+1} + (1422 + 4770 \, \mathrm{I}) \, u_{ol+2+1} + (-37 + 5 \, \mathrm{I}) \, u_{ol-3} - (1728 + 2016 \, \mathrm{I}) \, u_{ol-2} - (29835 + 25857 \, \mathrm{I}) \, u_{ol-1} \\ - 99008 \, u_{ol} + (-29835 + 25857 \, \mathrm{I}) \, u_{ol+1} + (-1728 + 2016 \, \mathrm{I}) \, u_{ol+2} - (37 + 5 \, \mathrm{I}) \, u_{ol+3} \big) \Big), \, O(\, \Delta x_{ol}^2 \, )$$

Formula:, 633, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 15

Error order:, 1, Error:, 0.032923511764472588071, New Error:, 0.0032949699001349067292

Error order:, 1, Error:, 0.0032949699001349067292, New Error:, 0.00032952287850509926345

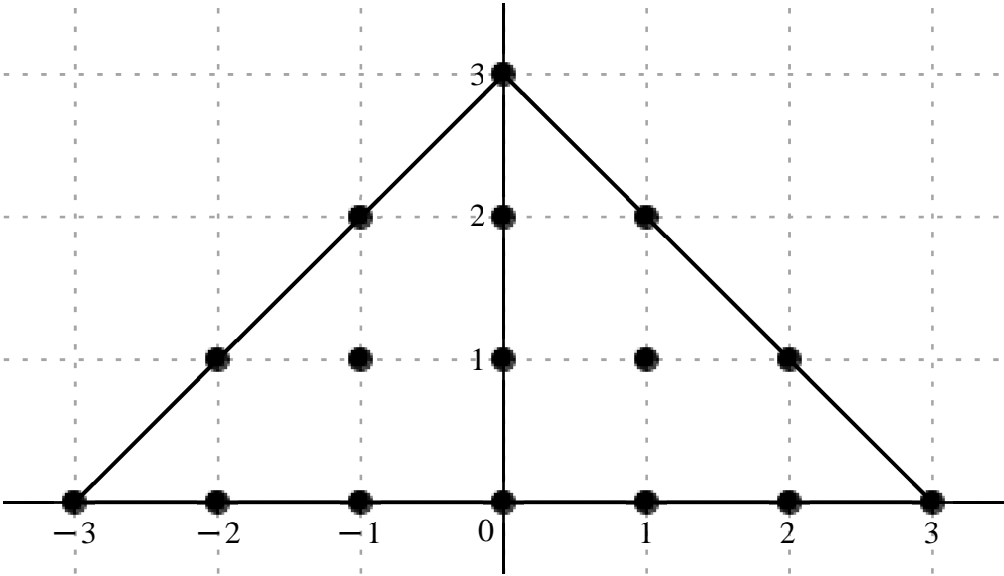
Error order:, 1, Error:, 0.00032952287850509926345, New Error:, 0.000032952546436574657402

Error order:, 1, Error:, 0.000032952546436574657402, New Error:,  $3.2952572292192511649 \times 10^{-6}$

Error order:, 1, Error:,  $3.2952572292192511649 \times 10^{-6}$ , New Error:,  $3.2952574877724410780 \times 10^{-7}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} & & & 3 \text{ I} & & \\ & & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & \\ & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} & & & & 1164240 \text{ I} & & & & & & & \\ & & & -12573792 - 22004136 \text{ I} & -125737920 \text{ I} & 12573792 - 22004136 \text{ I} & & & & & & \\ & \frac{99542520}{17} + \frac{47151720 \text{ I}}{17} & -\frac{871782912}{17} - \frac{3923023104 \text{ I}}{17} & 817296480 \text{ I} & \frac{871782912}{17} - \frac{3923023104 \text{ I}}{17} & -\frac{99542520}{17} + \frac{47151720 \text{ I}}{17} & & & & & & \\ \frac{58212}{17} - \frac{756756 \text{ I}}{17} & \frac{46103904}{17} - \frac{29338848 \text{ I}}{17} & 34054020 - 34054020 \text{ I} & -121080960 \text{ I} & -34054020 - 34054020 \text{ I} & -\frac{46103904}{17} - \frac{29338848 \text{ I}}{17} & -\frac{58212}{17} - \frac{756756 \text{ I}}{17} \end{array} \right]$$



$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}} \, u(x_{ol}) = \frac{1}{17 \, \Delta x_{ol}^{15}} \Big( 58212 \, \big( 340 \, \mathrm{I} \, u_{ol+3 \mathrm{I}} - (3672 + 6426 \, \mathrm{I}) \, u_{ol-1+2 \mathrm{I}} - 36720 \, \mathrm{I} \, u_{ol+2 \mathrm{I}} + (3672 - 6426 \, \mathrm{I}) \, u_{ol+1+2 \mathrm{I}} + (1710 + 810 \, \mathrm{I}) \, u_{ol-2+ \mathrm{I}} - (14976 + 67392 \, \mathrm{I}) \, u_{ol-1+ \mathrm{I}} + 238680 \, \mathrm{I} \, u_{ol+ \mathrm{I}} + (14976 - 67392 \, \mathrm{I}) \, u_{ol+1+ \mathrm{I}} + (-1710 + 810 \, \mathrm{I}) \, u_{ol+2+ \mathrm{I}} + (1 - 13 \, \mathrm{I}) \, u_{ol-3} + (792 - 504 \, \mathrm{I}) \, u_{ol-2} + (9945 - 9945 \, \mathrm{I}) \, u_{ol-1} - 35360 \, \mathrm{I} \, u_{ol} - (9945$$

$$+ 9945 \, \mathrm{I}) \, u_{ol+1} - (792 + 504 \, \mathrm{I}) \, u_{ol+2} - (1 + 13 \, \mathrm{I}) \, u_{ol+3} \Big) \Big), \, O( \, \Delta x_{ol} \, )$$

Formula:, 634, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 1

Error order:, 15, Error:,  $7.3957518435147210783 \times 10^{-39}$ , New Error:,  $7.3835368458141235794 \times 10^{-54}$

Error order:, 15, Error:,  $7.3835368458141235794 \times 10^{-54}$ , New Error:,  $7.3822919003272922434 \times 10^{-69}$

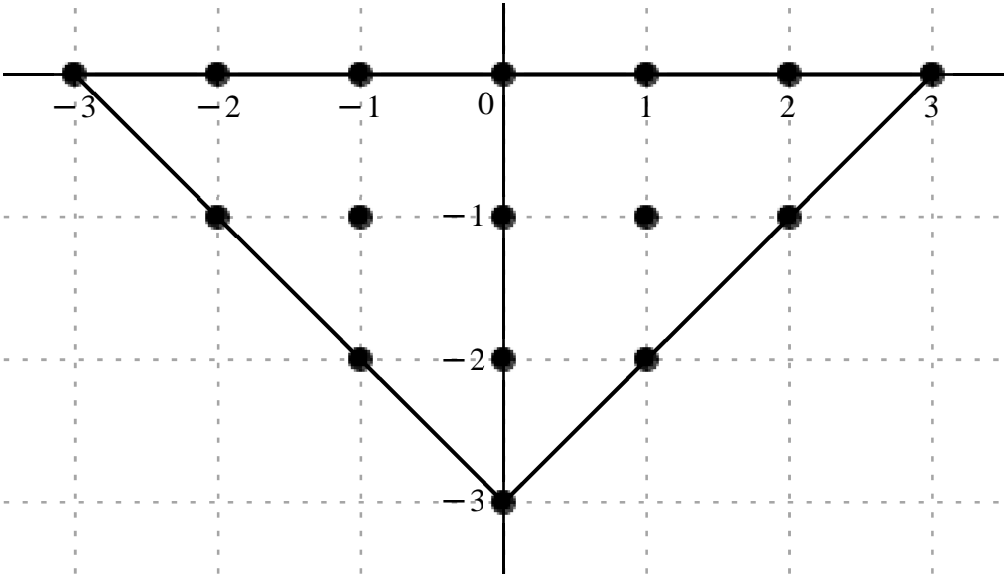
Error order:, 15, Error:,  $7.3822919003272922434 \times 10^{-69}$ , New Error:,  $7.3821671714328500952 \times 10^{-84}$

Error order:, 15, Error:,  $7.3821671714328500952 \times 10^{-84}$ , New Error:,  $7.3821546962000605661 \times 10^{-99}$

Error order:, 15, Error:,  $7.3821546962000605661 \times 10^{-99}$ , New Error:,  $7.3821534486533482724 \times 10^{-114}$

$$x_o + h . , \left[ \begin{array}{cccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & & -1 - 2 I & -2 I & 1 - 2 I & & \\ & & & -3 I & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} \frac{1}{8160} - \frac{I}{106080} & \frac{63}{8840} - \frac{99 I}{8840} & \frac{9}{32} - \frac{9 I}{32} & -\frac{121 I}{30} & -\frac{9}{32} - \frac{9 I}{32} & -\frac{63}{8840} - \frac{99 I}{8840} & -\frac{1}{8160} - \frac{I}{106080} \\ & -\frac{333}{17680} - \frac{261 I}{17680} & \frac{99}{85} - \frac{63 I}{85} & \frac{27 I}{4} & -\frac{99}{85} - \frac{63 I}{85} & \frac{333}{17680} - \frac{261 I}{17680} & \\ & & \frac{81}{1040} - \frac{27 I}{520} & -\frac{27 I}{52} & -\frac{81}{1040} - \frac{27 I}{520} & & \\ & & & \frac{I}{312} & & & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u\big(x_{ol}\big)=\frac{1}{106080\,\Delta x_{ol}}\Big((13-\mathrm{I})\,u_{ol-3}+(756-1188\,\mathrm{I})\,u_{ol-2}+(29835-29835\,\mathrm{I})\,u_{ol-1}-427856\,\mathrm{I}\,u_{ol}-(29835+29835\,\mathrm{I})\,u_{ol+1}-(756+1188\,\mathrm{I})\,u_{ol+2}-(13+\mathrm{I})\,u_{ol+3}-(1998+1566\,\mathrm{I})\,u_{ol-2-\mathrm{I}}+(123552-78624\,\mathrm{I})\,u_{ol-1-\mathrm{I}}+716040\,\mathrm{I}\,u_{ol-1}-(123552+78624\,\mathrm{I})\,u_{ol+1-\mathrm{I}}+(1998-1566\,\mathrm{I})\,u_{ol+2-\mathrm{I}}+(8262-5508\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}-55080\,\mathrm{I}\,u_{ol-2\mathrm{I}}-(8262+5508\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}+340\,\mathrm{I}\,u_{ol-3\mathrm{I}}\Big),\,\,O(\,\,\Delta x_{ol}^{15}\,\,)$$

Formula:, 635, Var:., 1

Variavel :, x\_{ol}, Derivada de Ordem :, 2

Error order:., 14, Error:., 5.4233786926948241161 × 10−36, New Error:., 5.4145757583479800934 × 10−50

Error order:., 14, Error:., 5.4145757583479800934 × 10−50, New Error:., 5.4136789274268887412 × 10−64

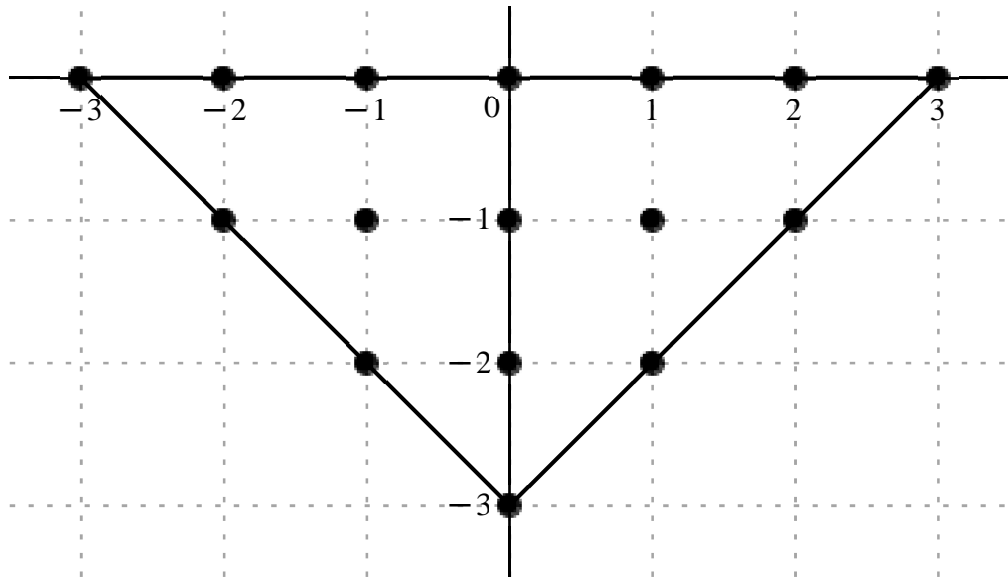
Error order:., 14, Error:., 5.4136789274268887412 × 10−64, New Error:., 5.4135890790365670746 × 10−78

Error order:., 14, Error:., 5.4135890790365670746 × 10−78, New Error:., 5.4135800925446300164 × 10−92

Error order:., 14, Error:., 5.4135800925446300164 × 10−92, New Error:., 5.4135791938789073389 × 10−106

$$x_o\neq h\,.\,.\,\left[\begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & \\ & & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & & \\ & & & -3\,\mathrm{I} & & & \end{array}\right]$$

$$c=,\left[\begin{array}{cccccccc} -\frac{251}{1591200}-\frac{521\,\mathrm{I}}{530400} & -\frac{1077}{11050}-\frac{1023\,\mathrm{I}}{22100} & -\frac{453}{160}-\frac{273\,\mathrm{I}}{160} & -\frac{7933}{450} & -\frac{453}{160}+\frac{273\,\mathrm{I}}{160} & -\frac{1077}{11050}+\frac{1023\,\mathrm{I}}{22100} & -\frac{251}{1591200}+\frac{521\,\mathrm{I}}{530400} \\ & -\frac{8673}{88400}+\frac{13809\,\mathrm{I}}{88400} & -\frac{2721}{425}-\frac{3183\,\mathrm{I}}{425} & \frac{819}{20} & -\frac{2721}{425}+\frac{3183\,\mathrm{I}}{425} & -\frac{8673}{88400}-\frac{13809\,\mathrm{I}}{88400} & \\ & & -\frac{531}{1300}-\frac{567\,\mathrm{I}}{1040} & -\frac{477}{130} & -\frac{531}{1300}+\frac{567\,\mathrm{I}}{1040} & & \\ & & & \frac{37}{1560} & & & \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{1591200 \, \Delta x_{ol}^2} \Big( -(251 + 1563 \, \mathrm{I}) \, u_{ol-3} - (155088 + 73656 \, \mathrm{I}) \, u_{ol-2} - (4505085 + 2714985 \, \mathrm{I}) \, u_{ol-1} - 28051088 \, u_{ol} + (-4505085 + 2714985 \, \mathrm{I}) \, u_{ol+1} + (-155088 + 73656 \, \mathrm{I}) \, u_{ol+2} + (-251 + 1563 \, \mathrm{I}) \, u_{ol+3} + (-156114 + 248562 \, \mathrm{I}) \, u_{ol-2-1} - (10187424 + 11917152 \, \mathrm{I}) \, u_{ol-1-1} + 65159640 \, u_{ol-1} + (-10187424 + 11917152 \, \mathrm{I}) \, u_{ol+1-1} - (156114 + 248562 \, \mathrm{I}) \, u_{ol+2-1} - (649944 + 867510 \, \mathrm{I}) \, u_{ol-1-21} - 5838480 \, u_{ol-21} + (-649944 + 867510 \, \mathrm{I}) \, u_{ol+1-21} + 37740 \, u_{ol-31} \Big), \, O(\, \Delta x_{ol}^{14} \, )$$

Formula:, 636, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 13, Error:,  $3.2323443321188976682 \times 10^{-33}$ , New Error:,  $3.2271757480815922096 \times 10^{-46}$

Error order:, 13, Error:,  $3.2271757480815922096 \times 10^{-46}$ , New Error:,  $3.2266493508772585551 \times 10^{-59}$

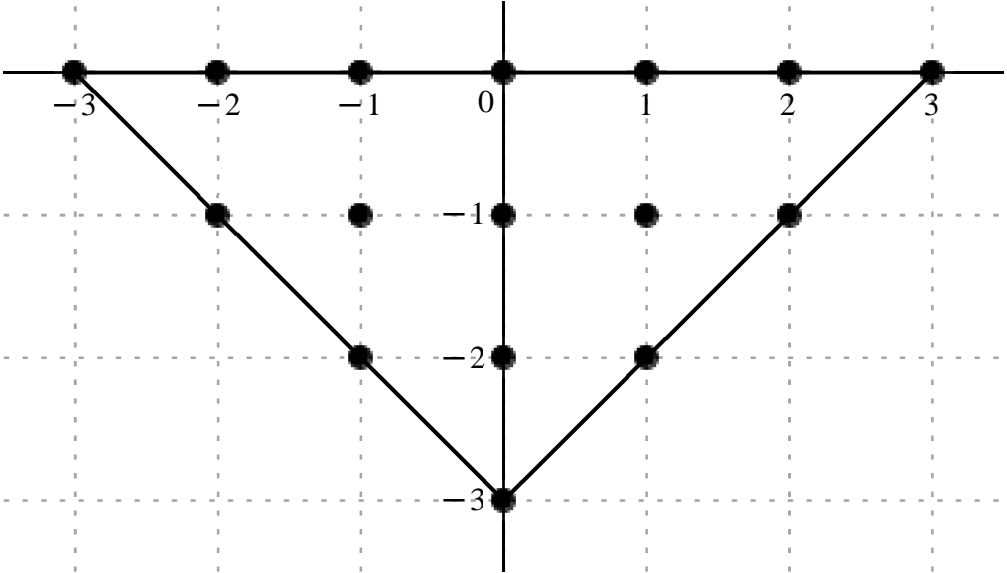
Error order:, 13, Error:,  $3.2266493508772585551 \times 10^{-59}$ , New Error:,  $3.2265966158121709145 \times 10^{-72}$

Error order:, 13, Error:,  $3.2265966158121709145 \times 10^{-72}$ , New Error:,  $3.2265913413522592831 \times 10^{-85}$

Error order:, 13, Error:,  $3.2265913413522592831 \times 10^{-85}$ , New Error:,  $3.2265908138967341350 \times 10^{-98}$

$$x_o + h \cdot , \left[ \begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ & & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & & \\ & & & -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccc} -\frac{100619}{15912000} + \frac{23563 \text{ I}}{15912000} & -\frac{101973}{442000} + \frac{292479 \text{ I}}{442000} & -\frac{10209}{1600} + \frac{31989 \text{ I}}{1600} & \frac{74807 \text{ I}}{900} & \frac{10209}{1600} + \frac{31989 \text{ I}}{1600} & \frac{101973}{442000} + \frac{292479 \text{ I}}{442000} & \frac{100619}{15912000} + \frac{23563 \text{ I}}{15912000} & \\ & \frac{180357}{176800} + \frac{18897 \text{ I}}{35360} & -\frac{173229}{4250} + \frac{173523 \text{ I}}{4250} & -\frac{46827 \text{ I}}{200} & \frac{173229}{4250} + \frac{173523 \text{ I}}{4250} & -\frac{180357}{176800} + \frac{18897 \text{ I}}{35360} & & \\ & & -\frac{12879}{4000} + \frac{2583 \text{ I}}{1000} & \frac{57087 \text{ I}}{2600} & \frac{12879}{4000} + \frac{2583 \text{ I}}{1000} & & & \\ & & & -\frac{6823 \text{ I}}{46800} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{15912000 \, \Delta x_{ol}^3} \big( (-100619 + 23563 \, \text{I}) \, u_{ol-3} + (-3671028 + 10529244 \, \text{I}) \, u_{ol-2} + (-101528505 + 318130605 \, \text{I}) \, u_{ol-1} + 1322587760 \, \text{I} u_{ol} + (101528505 + 318130605 \, \text{I}) \, u_{ol+1} + (3671028 + 10529244 \, \text{I}) \, u_{ol+2} + (100619 + 23563 \, \text{I}) \, u_{ol+3} + (16232130 + 8503650 \, \text{I}) \, u_{ol-2-1} + (-648569376 + 649670112 \, \text{I}) \, u_{ol-1-1} \\ - 3725556120 \, \text{I} u_{ol-1} + (648569376 + 649670112 \, \text{I}) \, u_{ol+1-1} + (-16232130 + 8503650 \, \text{I}) \, u_{ol+2-1} + (-51232662 + 41100696 \, \text{I}) \, u_{ol-1-21} + 349372440 \, \text{I} u_{ol-21} + (51232662 + 41100696 \, \text{I}) \, u_{ol+1-21} - 2319820 \, \text{I} u_{ol-31} \big), \, O( \, \Delta x_{ol}^{13} \, )$$

Formula:, 637, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 4

Error order:, 12, Error:, 1.8472618576692617152 × 10−30, New Error:, 1.8443460946309200965 × 10−42

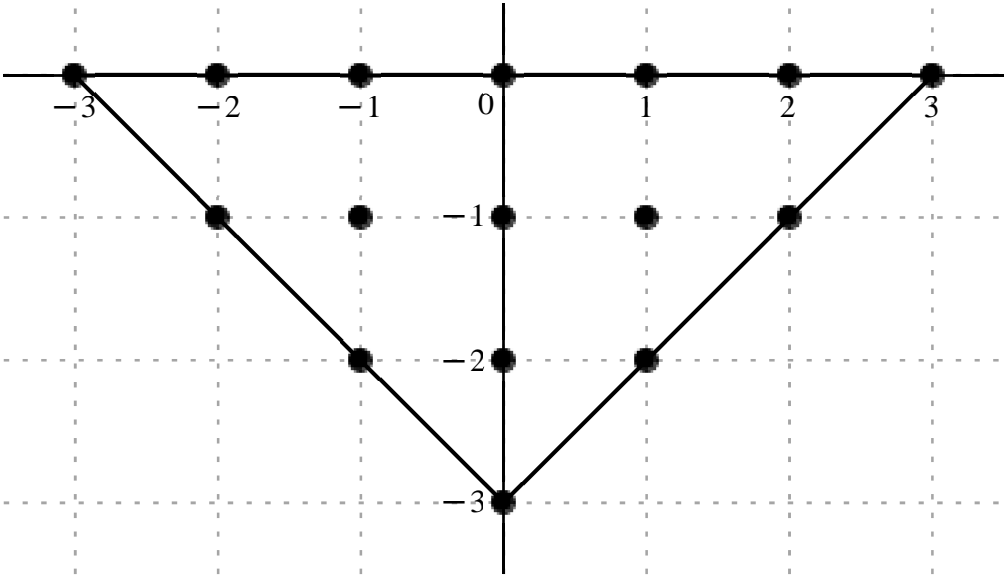
Error order:, 12, Error:, 1.8443460946309200965 × 10−42, New Error:, 1.8440492164537061525 × 10−54

Error order:, 12, Error:, 1.8440492164537061525 × 10−54, New Error:, 1.8440194756409702743 × 10−66

Error order:, 12, Error:, 1.8440194756409702743 × 10−66, New Error:, 1.8440165010297704358 × 10−78

Error order:, 12, Error:, 1.8440165010297704358 × 10−78, New Error:, 1.8440162035633512133 × 10−90

$$c =, \left[ \begin{array}{ccccccccc} \frac{18403}{1591200} + \frac{61691 \text{ I}}{1591200} & \frac{18497}{4420} + \frac{23117 \text{ I}}{22100} & \frac{3809}{32} + \frac{10829 \text{ I}}{800} & \frac{18166}{45} & \frac{3809}{32} - \frac{10829 \text{ I}}{800} & \frac{18497}{4420} - \frac{23117 \text{ I}}{22100} & \frac{18403}{1591200} - \frac{61691 \text{ I}}{1591200} \\ & \frac{251801}{88400} - \frac{557017 \text{ I}}{88400} & \frac{104671}{425} + \frac{3809 \text{ I}}{17} & -\frac{130767}{100} & \frac{104671}{425} - \frac{3809 \text{ I}}{17} & \frac{251801}{88400} + \frac{557017 \text{ I}}{88400} \\ & & \frac{10209}{650} + \frac{97119 \text{ I}}{5200} & \frac{83667}{650} & \frac{10209}{650} - \frac{97119 \text{ I}}{5200} \\ & & & -\frac{20387}{23400} \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{1591200 \, \Delta x_{ol}^4} \Big( (18403 + 61691 \, \text{I}) \, u_{ol-3} + (6658920 + 1664424 \, \text{I}) \, u_{ol-2} + (189402525 + 21538881 \, \text{I}) \, u_{ol-1} + 642349760 \, u_{ol} + (189402525 - 21538881 \, \text{I}) \, u_{ol+1} + (6658920 - 1664424 \, \text{I}) \, u_{ol+2} + (18403 - 61691 \, \text{I}) \, u_{ol+3} + (4532418 - 10026306 \, \text{I}) \, u_{ol-2-1} + (391888224 + 356522400 \, \text{I}) \, u_{ol-1-1} - 2080764504 \, u_{ol-1} \\ + (391888224 - 356522400 \, \text{I}) \, u_{ol+1-1} + (4532418 + 10026306 \, \text{I}) \, u_{ol+2-1} + (24991632 + 29718414 \, \text{I}) \, u_{ol-1-21} + 204816816 \, u_{ol-21} + (24991632 - 29718414 \, \text{I}) \, u_{ol+1-21} - 1386316 \, u_{ol-31} \Big), \, O(\, \Delta x_{ol}^{12} \, )$$

Formula.: 638, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 5

Error order.: 11, Error.: 1.0194885952145156070 × 10<sup>-27</sup>, New Error.: 1.0179014393679804539 × 10<sup>-38</sup>

Error order.: 11, Error.: 1.0179014393679804539 × 10<sup>-38</sup>, New Error.: 1.0177398825485582661 × 10<sup>-49</sup>

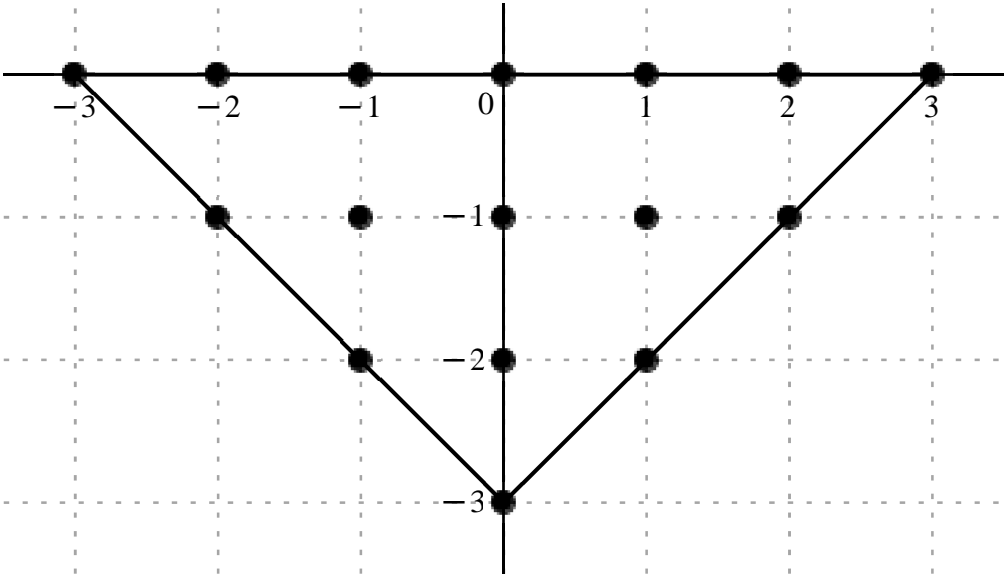
*Error order:*, 11,    *Error:*,  $1.0177398825485582661 \times 10^{-49}$ ,    *New Error:*,  $1.0177236984667714517 \times 10^{-60}$   
*Error order:*, 11,    *Error:*,  $1.0177236984667714517 \times 10^{-60}$ ,    *New Error:*,  $1.0177220797746069184 \times 10^{-71}$   
*Error order:*, 11,    *Error:*,  $1.0177220797746069184 \times 10^{-71}$ ,    *New Error:*,  $1.0177219179025506191 \times 10^{-82}$

$$x_o+h.,$$

$$\begin{bmatrix} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-I & -1-I & -I & 1-I & 2-I & \\ & & -1-2I & -2I & 1-2I & & \\ & & & -3I & & & \end{bmatrix}$$

$$c=,$$

$$\begin{bmatrix} \frac{1613}{7072}-\frac{8873I}{106080} & \frac{34677}{8840}-\frac{222943I}{8840} & -\frac{879}{32}-\frac{101659I}{160} & -\frac{11699I}{6} & \frac{879}{32}-\frac{101659I}{160} & -\frac{34677}{8840}-\frac{222943I}{8840} & -\frac{1613}{7072}-\frac{8873I}{106080} \\ & -\frac{661459}{17680}-\frac{253647I}{17680} & \frac{99878}{85}-\frac{122439I}{85} & \frac{141723I}{20} & -\frac{99878}{85}-\frac{122439I}{85} & \frac{661459}{17680}-\frac{253647I}{17680} & \\ & & \frac{13539}{130}-\frac{95751I}{1040} & -\frac{188823I}{260} & -\frac{13539}{130}-\frac{95751I}{1040} & & \\ & & & \frac{2609I}{520} & & & \end{bmatrix}$$



$$\frac{ds}{dx^5} u(x_o)=\frac{1}{106080 \Delta x_o^5} ((24195-8873 I) u_{oI-3}+(416124-2675316 I) u_{oI-2}-(2913885+67399917 I) u_{oI-1}-206838320 I u_o+(2913885-67399917 I) u_{oI+1}-(416124+2675316 I) u_{oI+2}-(24195+8873 I) u_{oI+3}-(3968754+1521882 I) u_{oI-2-1}+(124647744-152803872 I) u_{oI-1-1}+751698792 I u_{oI-1}-(124647744$$

$$+152803872 I) u_{oI+1-1}+(3968754-1521882 I) u_{oI+2-1}+(11047824-9766602 I) u_{oI-1-21}-77039784 I u_{oI-21}-(11047824+9766602 I) u_{oI+1-21}+532236 I u_{oI-31}), O(\Delta x_o^{11})$$



Formula.: 639, Var.: 1

Variavel :  $x_{ol}$  , Derivada de Ordem : 6

Error order.: 10, Error.:  $5.3716755155120261610 \times 10^{-25}$ , New Error.:  $5.3634440687669305139 \times 10^{-35}$

Error order.: 10, Error.:  $5.3634440687669305139 \times 10^{-35}$ , New Error.:  $5.3626064462869907694 \times 10^{-45}$

Error order.: 10, Error.:  $5.3626064462869907694 \times 10^{-45}$ , New Error.:  $5.3625225393235019959 \times 10^{-55}$

Error order.: 10, Error.:  $5.3625225393235019959 \times 10^{-55}$ , New Error.:  $5.3625141471800611794 \times 10^{-65}$

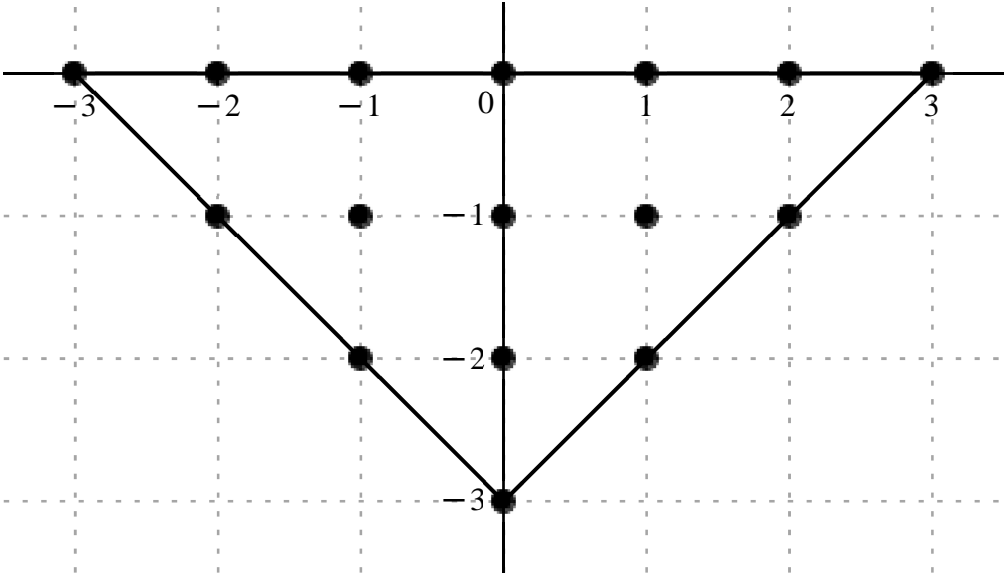
Error order.: 10, Error.:  $5.3625141471800611794 \times 10^{-65}$ , New Error.:  $5.3625133079512462414 \times 10^{-75}$

$$x_o \neq h. ,$$

$$\left[ \begin{array}{ccccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & & -1 - 2 I & -2 I & 1 - 2 I & & \\ & & & -3 I & & & \end{array} \right]$$

$$c = ,$$

$$\left[ \begin{array}{ccccccccc} -\frac{60089}{106080} - \frac{134341 I}{106080} & -\frac{157779}{1105} - \frac{8526 I}{1105} & -\frac{100017}{32} + \frac{83499 I}{160} & -\frac{137122}{15} & -\frac{100017}{32} - \frac{83499 I}{160} & -\frac{157779}{1105} + \frac{8526 I}{1105} & -\frac{60089}{106080} + \frac{134341 I}{106080} \\ & -\frac{1161561}{17680} + \frac{3710769 I}{17680} & -\frac{669354}{85} - \frac{98250 I}{17} & \frac{729027}{20} & -\frac{669354}{85} + \frac{98250 I}{17} & -\frac{1161561}{17680} - \frac{3710769 I}{17680} & \\ & & -\frac{265959}{520} - \frac{572769 I}{1040} & -\frac{253224}{65} & -\frac{265959}{520} + \frac{572769 I}{1040} & & \\ & & & \frac{42841}{1560} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{106080 \, \Delta x_{ol}^6} \big( -(60089 + 134341 \, I) \, u_{ol-3} - (15146784 + 818496 \, I) \, u_{ol-2} + (-331556355 + 55359837 \, I) \, u_{ol-1} - 969726784 \, u_{ol} - (331556355 + 55359837 \, I) \, u_{ol+1} + (-15146784 + 818496 \, I) \, u_{ol+2} + (-60089 + 134341 \, I) \, u_{ol+3} + (-6969366 + 22264614 \, I) \, u_{ol-2-1} - (835353792 + 613080000 \, I) \, u_{ol-1-1}$$

$$+ 3866759208 \, u_{ol-1} + (-835353792 + 613080000 \, I) \, u_{ol+1-1} - (6969366 + 22264614 \, I) \, u_{ol+2-1} - (54255636 + 58422438 \, I) \, u_{ol-1-21} - 413261568 \, u_{ol-21} + (-54255636 + 58422438 \, I) \, u_{ol+1-21} + 2913188 \, u_{ol-31} \big), \, O( \, \Delta x_{ol}^{10} \, )$$

Formula:, 640, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order:, 9, Error:; 2.6709671277529318876 × 10<sup>-22</sup>, New Error:; 2.6669497353839494226 × 10<sup>-31</sup>

Error order:, 9, Error:; 2.6669497353839494226 × 10<sup>-31</sup>, New Error:; 2.6665410718695161091 × 10<sup>-40</sup>

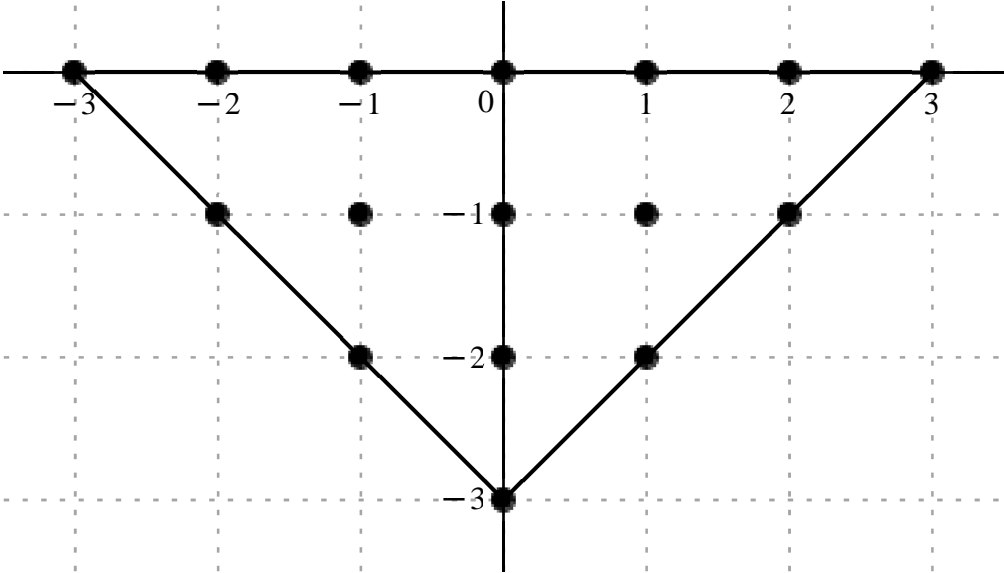
Error order:, 9, Error:; 2.6665410718695161091 × 10<sup>-40</sup>, New Error:; 2.6665001363046164596 × 10<sup>-49</sup>

Error order:, 9, Error:; 2.6665001363046164596 × 10<sup>-49</sup>, New Error:; 2.6664960420560214583 × 10<sup>-58</sup>

Error order:, 9, Error:; 2.6664960420560214583 × 10<sup>-58</sup>, New Error:; 2.6664956326242409374 × 10<sup>-67</sup>

$$x_o + h . , \left[ \begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & & -1 - 2 I & -2 I & 1 - 2 I & & \\ & & & -3 I & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccc} -\frac{3458329}{530400} + \frac{1887263 I}{530400} & \frac{966063}{22100} + \frac{16434411 I}{22100} & \frac{621033}{160} + \frac{2295069 I}{160} & \frac{616511 I}{15} & -\frac{621033}{160} + \frac{2295069 I}{160} & -\frac{966063}{22100} + \frac{16434411 I}{22100} & \frac{3458329}{530400} + \frac{1887263 I}{530400} \\ & \frac{19366053}{17680} + \frac{4685121 I}{17680} & -\frac{11364612}{425} + \frac{17040114 I}{425} & -\frac{3535497 I}{20} & \frac{11364612}{425} + \frac{17040114 I}{425} & -\frac{19366053}{17680} + \frac{4685121 I}{17680} & \\ & & -\frac{7086933}{2600} + \frac{13839903 I}{5200} & \frac{509355 I}{26} & \frac{7086933}{2600} + \frac{13839903 I}{5200} & & \\ & & & -\frac{219989 I}{1560} & & & \end{array} \right]$$



$$\frac{d^7}{dx_{ol}^7} u(x_{ol}) = \frac{1}{530400 \Delta x_{ol}^7} \left( 7 \left( (-494047 + 269609 I) u_{ol-3} + (3312216 + 56346552 I) u_{ol-2} + (294103485 + 1086879105 I) u_{ol-1} + 3114261280 I u_{ol} + (-294103485 + 1086879105 I) u_{ol+1} + (-3312216 + 56346552 I) u_{ol+2} + (494047 + 269609 I) u_{ol+3} + (82997370 + 20079090 I) u_{ol-2-1} + (-2026147968 + 3038008896 I) u_{ol-1-1} \right. \right.$$

$$-13394482920 \operatorname{I} u_{oI-1} + (2026147968 + 3038008896 \operatorname{I}) u_{oI+1-1} + (-82997370 + 20079090 \operatorname{I}) u_{oI+2-1} + (-206533476 + 201667158 \operatorname{I}) u_{oI-1-21} + 1484406000 \operatorname{I} u_{oI-21} + (206533476 + 201667158 \operatorname{I}) u_{oI+1-21} - 10685180 \operatorname{I} u_{oI-31} \Big) \Big), \; O(\; \Delta x_{oI}^{\; 9} \;)$$

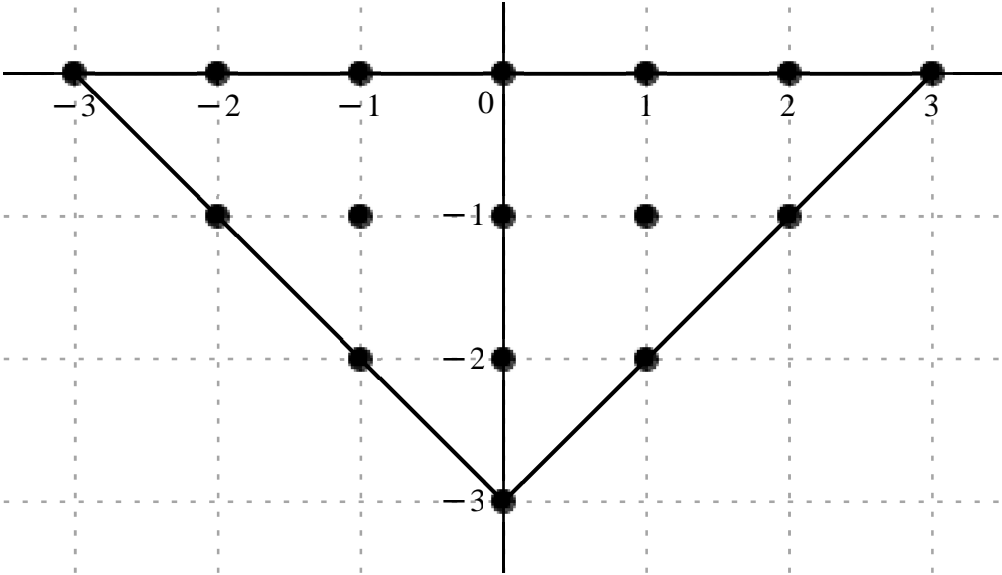
Formula.: 641, Var.: 1

Variavel .:,  $x_{oI}$ , Derivada de Ordem .:, 8

Error order.: 8, Error.:  $1.2476303326995633117 \times 10^{-19}$ , New Error.:  $1.2457938268751650102 \times 10^{-27}$   
 Error order.: 8, Error.:  $1.2457938268751650102 \times 10^{-27}$ , New Error.:  $1.2456070814586910669 \times 10^{-35}$   
 Error order.: 8, Error.:  $1.2456070814586910669 \times 10^{-35}$ , New Error.:  $1.2455883759815296243 \times 10^{-43}$   
 Error order.: 8, Error.:  $1.2455883759815296243 \times 10^{-43}$ , New Error.:  $1.2455865051244712556 \times 10^{-51}$   
 Error order.: 8, Error.:  $1.2455865051244712556 \times 10^{-51}$ , New Error.:  $1.2455863180356720095 \times 10^{-59}$

$$x_o \; + h \; . \; , \; \left[ \begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - \operatorname{I} & -1 - \operatorname{I} & -\operatorname{I} & 1 - \operatorname{I} & 2 - \operatorname{I} & \\ & & -1 - 2 \operatorname{I} & -2 \operatorname{I} & 1 - 2 \operatorname{I} & & \\ & & & -3 \operatorname{I} & & & \end{array} \right]$$

$$c = , \; \left[ \begin{array}{cccccccc} \frac{22638}{1105} + \frac{34041 \operatorname{I}}{1105} & \frac{775152}{221} - \frac{697536 \operatorname{I}}{1105} & 61425 - \frac{111384 \operatorname{I}}{5} & 175392 & 61425 + \frac{111384 \operatorname{I}}{5} & \frac{775152}{221} + \frac{697536 \operatorname{I}}{1105} & \frac{22638}{1105} - \frac{34041 \operatorname{I}}{1105} & \\ & \frac{1021923}{1105} - \frac{5843691 \operatorname{I}}{1105} & \frac{16174368}{85} + \frac{1965600 \operatorname{I}}{17} & -\frac{4026204}{5} & \frac{16174368}{85} - \frac{1965600 \operatorname{I}}{17} & \frac{1021923}{1105} + \frac{5843691 \operatorname{I}}{1105} & & \\ & & \frac{839601}{65} + \frac{820827 \operatorname{I}}{65} & \frac{6003648}{65} & \frac{839601}{65} - \frac{820827 \operatorname{I}}{65} & & & \\ & & & -\frac{44058}{65} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u\big(x_{ol}\big) = \frac{1}{1105 \, \Delta x_{ol}^8} \Big( 21 \, \Big( (1078 + 1621 \, \mathrm{I}) \, u_{ol-3} + (184560 - 33216 \, \mathrm{I}) \, u_{ol-2} + (3232125 - 1172184 \, \mathrm{I}) \, u_{ol-1} + 9228960 \, u_{ol} + (3232125 + 1172184 \, \mathrm{I}) \, u_{ol+1} + (184560 + 33216 \, \mathrm{I}) \, u_{ol+2} + (1078 - 1621 \, \mathrm{I}) \, u_{ol+3} + (48663 - 278271 \, \mathrm{I}) \, u_{ol-2-1} + (10012704 + 6084000 \, \mathrm{I}) \, u_{ol-1-1} - 42371004 \, u_{ol-1} + (10012704 - 6084000 \, \mathrm{I}) \, u_{ol+1-1} \\ + (48663 + 278271 \, \mathrm{I}) \, u_{ol+2-1} + (679677 + 664479 \, \mathrm{I}) \, u_{ol-1-21} + 4860096 \, u_{ol-21} + (679677 - 664479 \, \mathrm{I}) \, u_{ol+1-21} - 35666 \, u_{ol-31} \Big) \Big) \, O(\, \Delta x_{ol}^8 \, )$$

Formula: 642, Var.: 1

Variavel :  $x_{ol}$  , Derivada de Ordem : 9

Error order: 7, Error: 5.4448772047532510658 × 10−17, New Error: 5.4370631433418485969 × 10−24

Error order: 7, Error: 5.4370631433418485969 × 10−24, New Error: 5.4362688986850899225 × 10−31

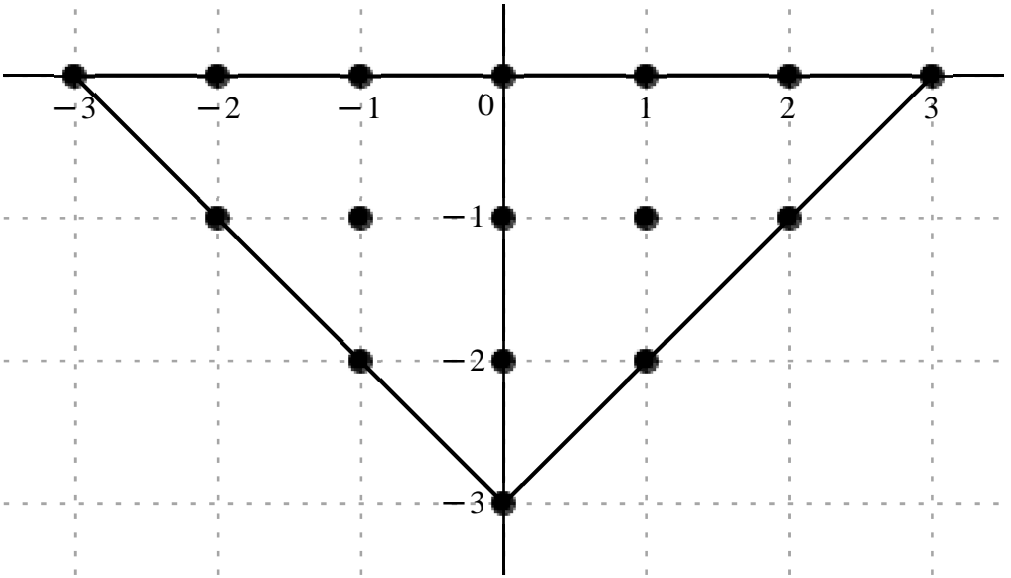
Error order: 7, Error: 5.4362688986850899225 × 10−31, New Error: 5.4361893458862649014 × 10−38

Error order: 7, Error: 5.4361893458862649014 × 10−38, New Error: 5.4361813893231032755 × 10−45

Error order: 7, Error: 5.4361813893231032755 × 10−45, New Error: 5.4361805936539543740 × 10−52

$$x_o \neq h \, , \left[ \begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ & & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & & \\ & & & -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} \frac{29169}{221} - \frac{118566 \, \mathrm{I}}{1105} & - \frac{5010012}{1105} - \frac{16395372 \, \mathrm{I}}{1105} & -108864 - \frac{1217349 \, \mathrm{I}}{5} & -700560 \, \mathrm{I} & 108864 - \frac{1217349 \, \mathrm{I}}{5} & \frac{5010012}{1105} - \frac{16395372 \, \mathrm{I}}{1105} & - \frac{29169}{221} - \frac{118566 \, \mathrm{I}}{1105} & \\ & - \frac{26013393}{1105} - \frac{2872989 \, \mathrm{I}}{1105} & \frac{39263616}{85} - \frac{70888608 \, \mathrm{I}}{85} & \frac{17039484 \, \mathrm{I}}{5} & - \frac{39263616}{85} - \frac{70888608 \, \mathrm{I}}{85} & \frac{26013393}{1105} - \frac{2872989 \, \mathrm{I}}{1105} & & \\ & & \frac{3525039}{65} - \frac{3782457 \, \mathrm{I}}{65} & - \frac{26258904 \, \mathrm{I}}{65} & - \frac{3525039}{65} - \frac{3782457 \, \mathrm{I}}{65} & & & \\ & & & \frac{196686 \, \mathrm{I}}{65} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{1105 \, \Delta x_{ol}^9} \left( 63 \left( (2315 - 1882 \, \mathrm{I}) \, u_{ol-3} - (79524 + 260244 \, \mathrm{I}) \, u_{ol-2} - (1909440 + 4270383 \, \mathrm{I}) \, u_{ol-1} - 12287600 \, \mathrm{I} u_{ol} + (1909440 - 4270383 \, \mathrm{I}) \, u_{ol+1} + (79524 - 260244 \, \mathrm{I}) \, u_{ol+2} - (2315 + 1882 \, \mathrm{I}) \, u_{ol+3} - (412911 + 45603 \, \mathrm{I}) \, u_{ol-2-1} + (8102016 - 14627808 \, \mathrm{I}) \, u_{ol-1-1} + 59773428 \, \mathrm{I} u_{ol-1} - (8102016 + 14627808 \, \mathrm{I}) \, u_{ol+1-1} \right. \right. \\ \left. \left. + (412911 - 45603 \, \mathrm{I}) \, u_{ol+2-1} + (951201 - 1020663 \, \mathrm{I}) \, u_{ol-1-21} - 7085736 \, \mathrm{I} u_{ol-21} - (951201 + 1020663 \, \mathrm{I}) \, u_{ol+1-21} + 53074 \, \mathrm{I} u_{ol-31} \right) \right), \, O( \, \Delta x_{ol}^7 \, )$$

Formula:, 643, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

Error order:, 6, Error:, 2.1966816123063142679 × 10<sup>-14</sup>, New Error:, 2.1936257757865480077 × 10<sup>-20</sup>

Error order:, 6, Error:, 2.1936257757865480077 × 10<sup>-20</sup>, New Error:, 2.1933153180908334788 × 10<sup>-26</sup>

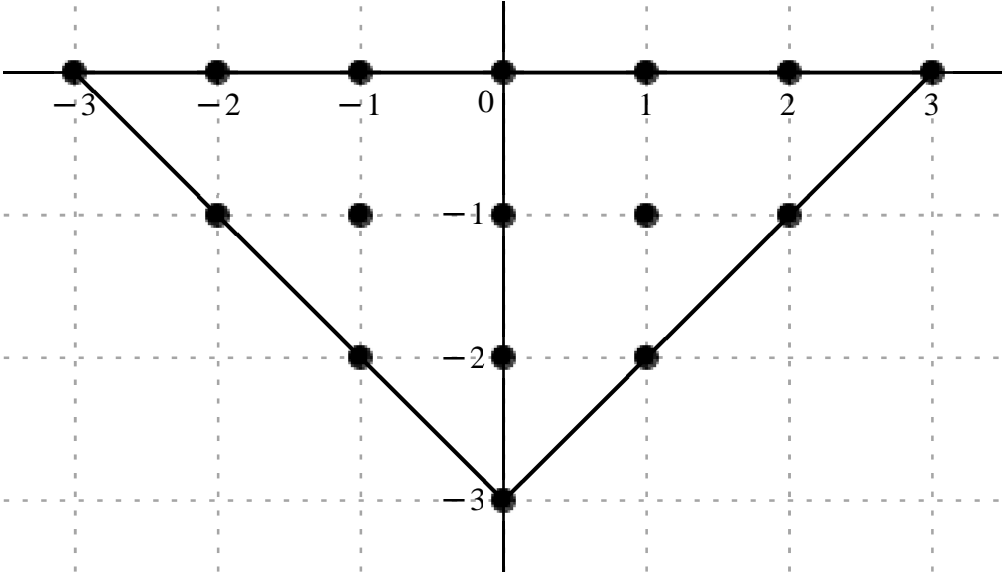
Error order:, 6, Error:, 2.1933153180908334788 × 10<sup>-26</sup>, New Error:, 2.1932842236000779846 × 10<sup>-32</sup>

Error order:, 6, Error:, 2.1932842236000779846 × 10<sup>-32</sup>, New Error:, 2.1932811136638099805 × 10<sup>-38</sup>

Error order:, 6, Error:, 2.1932811136638099805 × 10<sup>-38</sup>, New Error:, 2.1932808026653112750 × 10<sup>-44</sup>

$$x_o + h \cdot , \left[ \begin{array}{ccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & \\ & & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & & \\ & & & -3 \, \mathrm{I} & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccc} -\frac{111825}{221} - \frac{110691 \text{ I}}{221} & -\frac{12328848}{221} + \frac{5361552 \text{ I}}{221} & -881685 + 464373 \text{ I} & -2576448 & -881685 - 464373 \text{ I} & -\frac{12328848}{221} - \frac{5361552 \text{ I}}{221} & -\frac{111825}{221} + \frac{110691 \text{ I}}{221} \\ & -\frac{895860}{221} + \frac{21053844 \text{ I}}{221} & -\frac{56645568}{17} - \frac{28558656 \text{ I}}{17} & 13208832 & -\frac{56645568}{17} + \frac{28558656 \text{ I}}{17} & -\frac{895860}{221} - \frac{21053844 \text{ I}}{221} & \\ & & -\frac{3112830}{13} - \frac{2760156 \text{ I}}{13} & -\frac{21028896}{13} & -\frac{3112830}{13} + \frac{2760156 \text{ I}}{13} & & \\ & & & \frac{160776}{13} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\; u(x_{ol}) = \frac{1}{221 \; \Delta x_{ol}^{10}} \Big( 63 \Big( -(1775 + 1757 \text{ I}) \; u_{ol-3} + (-195696 + 85104 \text{ I}) \; u_{ol-2} + (-3092895 + 1628991 \text{ I}) \; u_{ol-1} - 9038016 \; u_{ol} - (3092895 + 1628991 \text{ I}) \; u_{ol+1} - (195696 + 85104 \text{ I}) \; u_{ol+2} + (-1775 + 1757 \text{ I}) \; u_{ol+3} + (-14220 + 334188 \text{ I}) \; u_{ol-2-1} - (11688768 + 5893056 \text{ I}) \; u_{ol-1-1} + 46335744 \; u_{ol-1} + (-11688768 + 5893056 \text{ I}) \; u_{ol+1-1} - (14220 + 334188 \text{ I}) \; u_{ol+2-1} - (839970 + 744804 \text{ I}) \; u_{ol-1-21} - 5674464 \; u_{ol-21} + (-839970 + 744804 \text{ I}) \; u_{ol+1-21} + 43384 \; u_{ol-31} \Big) \Big), \; O( \; \Delta x_{ol}^6 \; )$$

Formula: 644, Var.: 1

Variavel : x<sub>ol</sub>, Derivada de Ordem : 11

Error order: 5, Error: 8.0782418261637424087 × 10<sup>-12</sup>, New Error: 8.0674425276822107236 × 10<sup>-17</sup>

Error order: 5, Error: 8.0674425276822107236 × 10<sup>-17</sup>, New Error: 8.0663459730906649030 × 10<sup>-22</sup>

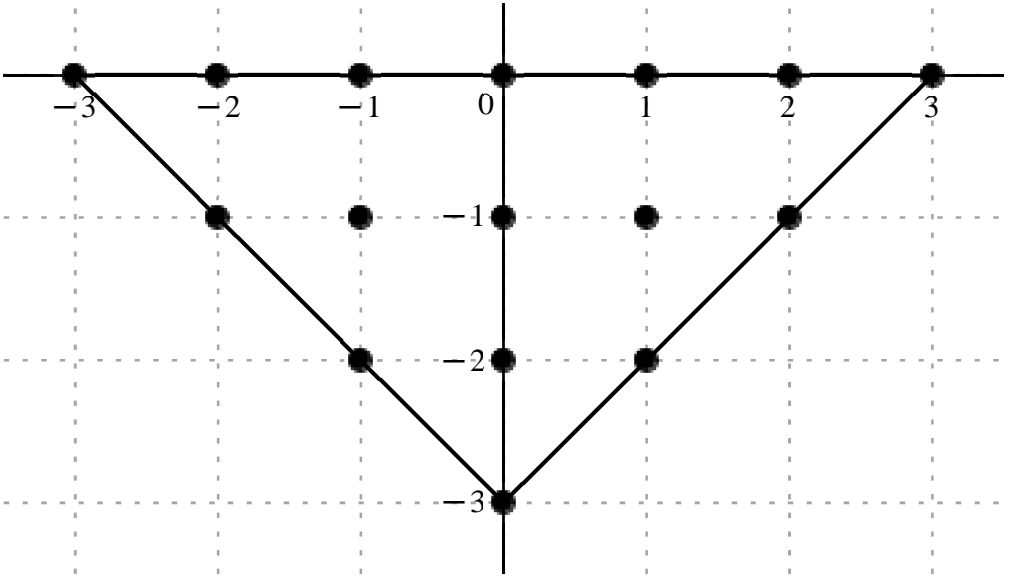
Error order: 5, Error: 8.0663459730906649030 × 10<sup>-22</sup>, New Error: 8.0662361514479684108 × 10<sup>-27</sup>

Error order: 5, Error: 8.0662361514479684108 × 10<sup>-27</sup>, New Error: 8.0662251676219276723 × 10<sup>-32</sup>

Error order: 5, Error: 8.0662251676219276723 × 10<sup>-32</sup>, New Error: 8.0662240692227059519 × 10<sup>-37</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & & -1 - 2 I & -2 I & 1 - 2 I & & \\ & & & -3 I & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{1787709}{1105} + \frac{2324553 I}{1105} & \frac{115858512}{1105} + \frac{203276304 I}{1105} & 1727649 + 2862783 I & 8545152 I & -1727649 + 2862783 I & -\frac{115858512}{1105} + \frac{203276304 I}{1105} & \frac{1787709}{1105} + \frac{2324553 I}{1105} \\ & \frac{75592440}{221} - \frac{2145528 I}{221} & -\frac{462635712}{85} + \frac{1013088384 I}{85} & -46004112 I & \frac{462635712}{85} + \frac{1013088384 I}{85} & -\frac{75592440}{221} - \frac{2145528 I}{221} & \\ & & -\frac{48511386}{65} + \frac{57530088 I}{65} & \frac{75642336 I}{13} & \frac{48511386}{65} + \frac{57530088 I}{65} & & \\ & & & -\frac{591360 I}{13} & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d} x_{o l}^{11}} \; u(x_{o l}) = \frac{1}{1105 \; \Delta x_{o l}^{11}} \Big( 231 \Big( ( \; -7739 + 10063 \; I \;) \; u_{o l - 3} + ( 501552 + 879984 \; I \;) \; u_{o l - 2} + ( 8264295 + 13694265 \; I \;) \; u_{o l - 1} + 40876160 \; I \; u_{o l} + ( \; -8264295 + 13694265 \; I \;) \; u_{o l + 1} + ( \; -501552 + 879984 \; I \;) \; u_{o l + 2} + ( 7739 + 10063 \; I \;) \; u_{o l + 3} + ( 1636200 - 46440 \; I \;) \; u_{o l - 2 - 1} + ( \; -26035776 + 57013632 \; I \;) \; u_{o l - 1 - 1} - 220062960 \; I \; u_{o l - 1} + ( 26035776$$

$$+ 57013632 \; I \;) \; u_{o l + 1 - 1} - ( 1636200 + 46440 \; I \;) \; u_{o l + 2 - 1} + ( \; -3570102 + 4233816 \; I \;) \; u_{o l - 1 - 21} + 27833760 \; I \; u_{o l - 21} + ( 3570102 + 4233816 \; I \;) \; u_{o l + 1 - 21} - 217600 \; I \; u_{o l - 31} \Big) \Big) , \; O( \; \Delta x_{o l}^5 \; )$$

Formula.: 645, Var.: 1

Variavel .:  $x_{o l}$ , Derivada de Ordem .: 12

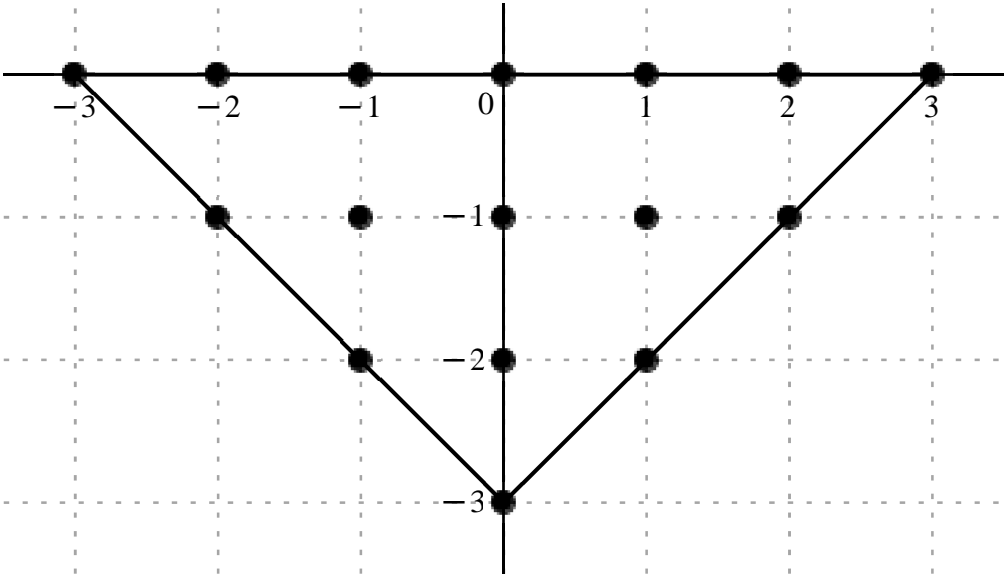
Error order.: 4, Error.:  $2.6569128653871262479 \times 10^{-9}$ , New Error.:  $2.6535464601016327903 \times 10^{-13}$

Error order.: 4, Error.:  $2.6535464601016327903 \times 10^{-13}$ , New Error.:  $2.6532048581904047744 \times 10^{-17}$

*Error order:*, 4, *Error:*,  $2.6532048581904047744 \times 10^{-17}$ , *New Error:*,  $2.6531706484039676711 \times 10^{-21}$   
*Error order:*, 4, *Error:*,  $2.6531706484039676711 \times 10^{-21}$ , *New Error:*,  $2.6531672269293894573 \times 10^{-25}$   
*Error order:*, 4, *Error:*,  $2.6531672269293894573 \times 10^{-25}$ , *New Error:*,  $2.6531668847769723096 \times 10^{-29}$

$$x_o+h\cdot,\left[\begin{array}{ccccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-I & -1-I & -I & 1-I & 2-I & \\ & & -1-2\,I & -2\,I & 1-2\,I & & \\ & & & -3\,I & & & \end{array}\right]$$

$$c=,\left[\begin{array}{cccccccc} \frac{1643796}{221}+\frac{917532\,I}{221} & \frac{114760800}{221}-\frac{82428192\,I}{221} & 8108100-5513508\,I & 24837120 & 8108100+5513508\,I & \frac{114760800}{221}+\frac{82428192\,I}{221} & \frac{1643796}{221}-\frac{917532\,I}{221} \\ & -\frac{23151744}{221}-\frac{235109952\,I}{221} & \frac{631483776}{17}+\frac{259459200\,I}{17} & -140107968 & \frac{631483776}{17}-\frac{259459200\,I}{17} & -\frac{23151744}{221}+\frac{235109952\,I}{221} & \\ & & \frac{37272312}{13}+\frac{29638224\,I}{13} & \frac{238303296}{13} & \frac{37272312}{13}-\frac{29638224\,I}{13} & & \\ & & & -\frac{1907136}{13} & & & \end{array}\right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d} x_{o l}^{12}}\,u\bigl(x_{o l}\bigr)=\frac{1}{221\,\mathcal{A} x_{o l}^{12}}\bigl(2772\,\bigl((593+331\,I)\,u_{o l-3}+(41400-29736\,I)\,u_{o l-2}+(646425-439569\,I)\,u_{o l-1}+1980160\,u_{o l}+(646425+439569\,I)\,u_{o l+1}+(41400+29736\,I)\,u_{o l+2}+(593-331\,I)\,u_{o l+3}-\bigl(8352+84816\,I\bigr)\,u_{o l-2-1}+\bigl(2961504+1216800\,I\bigr)\,u_{o l-1-1}-11170224\,u_{o l-1}+\bigl(2961504-1216800\,I\bigr)\,u_{o l+1-1}+\bigl(-8352$$

$$+84816\,I\bigr)\,u_{o l+2-1}+\bigl(228582+181764\,I\bigr)\,u_{o l-1-21}+1461456\,u_{o l-21}+\bigl(228582-181764\,I\bigr)\,u_{o l+1-21}-11696\,u_{o l-31}\bigr)\bigr),\,\mathcal{O}(\,\mathcal{A} x_{o l}^4\,)$$



Formula.: 646, Var.: 1

Variavel .:,  $x_{ol}$ , Derivada de Ordem .: 13

Error order.: 3, Error.:  $7.6046999151693150494 \times 10^{-7}$ , New Error.:  $7.5957881365287206887 \times 10^{-10}$

Error order.: 3, Error.:  $7.5957881365287206887 \times 10^{-10}$ , New Error.:  $7.5948845305139423079 \times 10^{-13}$

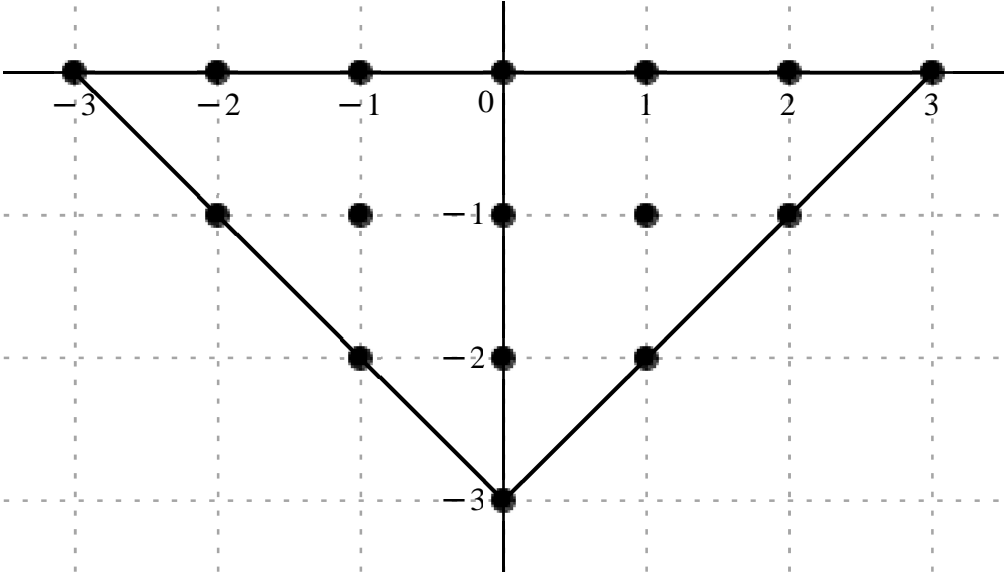
Error order.: 3, Error.:  $7.5948845305139423079 \times 10^{-13}$ , New Error.:  $7.5947940456759536887 \times 10^{-16}$

Error order.: 3, Error.:  $7.5947940456759536887 \times 10^{-16}$ , New Error.:  $7.5947849959498350282 \times 10^{-19}$

Error order.: 3, Error.:  $7.5947849959498350282 \times 10^{-19}$ , New Error.:  $7.5947840909648000095 \times 10^{-22}$

$$x_o \neq h. , \left[ \begin{array}{ccccccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & & -1 - 2 I & -2 I & 1 - 2 I & & \\ & & & -3 I & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccc} \frac{124740}{17} - \frac{357588 I}{17} & -\frac{18261936}{17} - \frac{20257776 I}{17} & -14594580 - 19135116 I & -60540480 I & 14594580 - 19135116 I & \frac{18261936}{17} - \frac{20257776 I}{17} & -\frac{124740}{17} - \frac{357588 I}{17} \\ & -\frac{47101824}{17} + \frac{8382528 I}{17} & \frac{601945344}{17} - \frac{1650160512 I}{17} & 358053696 I & -\frac{601945344}{17} - \frac{1650160512 I}{17} & \frac{47101824}{17} + \frac{8382528 I}{17} & \\ & & 5837832 - 7783776 I & -48498912 I & -5837832 - 7783776 I & & \\ & & & 399168 I & & & \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\; u(x_{ol}) = \frac{1}{17\; \Delta x_{ol}^{13}} \Big( 8316 \Big( (15 - 43\; I)\; u_{ol-3} - (2196 + 2436\; I)\; u_{ol-2} - (29835 + 39117\; I)\; u_{ol-1} - 123760\; I u_{ol} + (29835 - 39117\; I)\; u_{ol+1} + (2196 - 2436\; I)\; u_{ol+2} - (15 + 43\; I)\; u_{ol+3} + (-5664 + 1008\; I)\; u_{ol-2-1} + (72384 - 198432\; I)\; u_{ol-1-1} + 731952\; I u_{ol-1} - (72384 + 198432\; I)\; u_{ol+1-1} + (5664 + 1008\; I)\; u_{ol+2-1} + (11934$$

$$- 15912\; I)\; u_{ol-1-21} - 99144\; I u_{ol-21} - (11934 + 15912\; I)\; u_{ol+1-21} + 816\; I u_{ol-31} \Big) \Big),\; O(\; \Delta x_{ol}^3 \; )$$

Formula:, 647, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:, 2, Error:, 0.00018144711384489037746, New Error:,  $1.8126020346347270907 \times 10^{-6}$

Error order:, 2, Error:,  $1.8126020346347270907 \times 10^{-6}$ , New Error:,  $1.8124126986238868759 \times 10^{-8}$

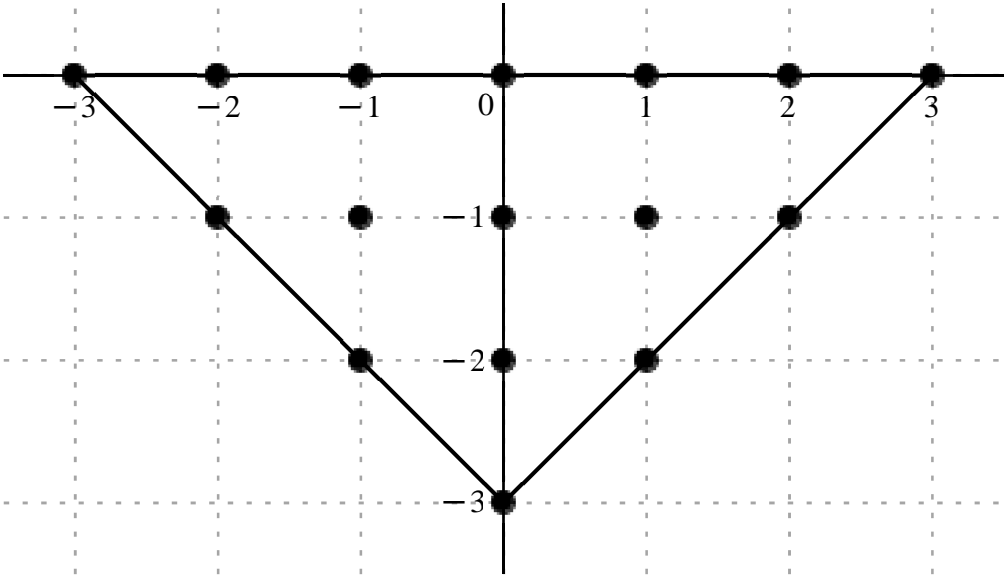
Error order:, 2, Error:,  $1.8124126986238868759 \times 10^{-8}$ , New Error:,  $1.8123937407750736978 \times 10^{-10}$

Error order:, 2, Error:,  $1.8123937407750736978 \times 10^{-10}$ , New Error:,  $1.8123918447477237148 \times 10^{-12}$

Error order:, 2, Error:,  $1.8123918447477237148 \times 10^{-12}$ , New Error:,  $1.8123916551425640385 \times 10^{-14}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & & -1 - 2 I & -2 I & 1 - 2 I & & \\ & & & -3 I & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} -\frac{717948}{17} - \frac{97020 I}{17} & -\frac{33530112}{17} + \frac{39118464 I}{17} & -34054020 + 29513484 I & -113008896 & -34054020 - 29513484 I & -\frac{33530112}{17} - \frac{39118464 I}{17} & -\frac{717948}{17} + \frac{97020 I}{17} \\ & \frac{27592488}{17} + \frac{92557080 I}{17} & -\frac{3341834496}{17} - \frac{1017080064 I}{17} & 708323616 & -\frac{3341834496}{17} + \frac{1017080064 I}{17} & \frac{27592488}{17} - \frac{92557080 I}{17} & \\ & & -16765056 - 11525976 I & -100590336 & -16765056 + 11525976 I & & \\ & & & 853776 & & & \end{array} \right]$$



$$\frac{d^{14}}{dx_{ol}^{14}} \; u(x_{ol}) = \frac{1}{17 \; \Delta x_{ol}^{14}} \Big( 19404 \; \big( -(37 + 5 \; I) \; u_{ol-3} + (-1728 + 2016 \; I) \; u_{ol-2} + (-29835 + 25857 \; I) \; u_{ol-1} - 99008 \; u_{ol} - (29835 + 25857 \; I) \; u_{ol+1} - (1728 + 2016 \; I) \; u_{ol+2} + (-37 + 5 \; I) \; u_{ol+3} + (1422 + 4770 \; I) \; u_{ol-2-1} - (172224 + 52416 \; I) \; u_{ol-1-1} + 620568 \; u_{ol-1} + (-172224 + 52416 \; I) \; u_{ol+1-1} + (1422 - 4770 \; I) \; u_{ol+2-1} - (14688$$

$$+ 10098 \; I) \; u_{ol-1-21} - 88128 \; u_{ol-21} + (-14688 + 10098 \; I) \; u_{ol+1-21} + 748 \; u_{ol-31} \big) \Big) \cdot \; O( \; \Delta x_{ol}^2 \; )$$

Formula:, 648, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 15

Error order:, 1, Error:, 0.032980967718676244320, New Error:, 0.0032955444620175817217

Error order:, 1, Error:, 0.0032955444620175817217, New Error:, 0.00032952862412416007783

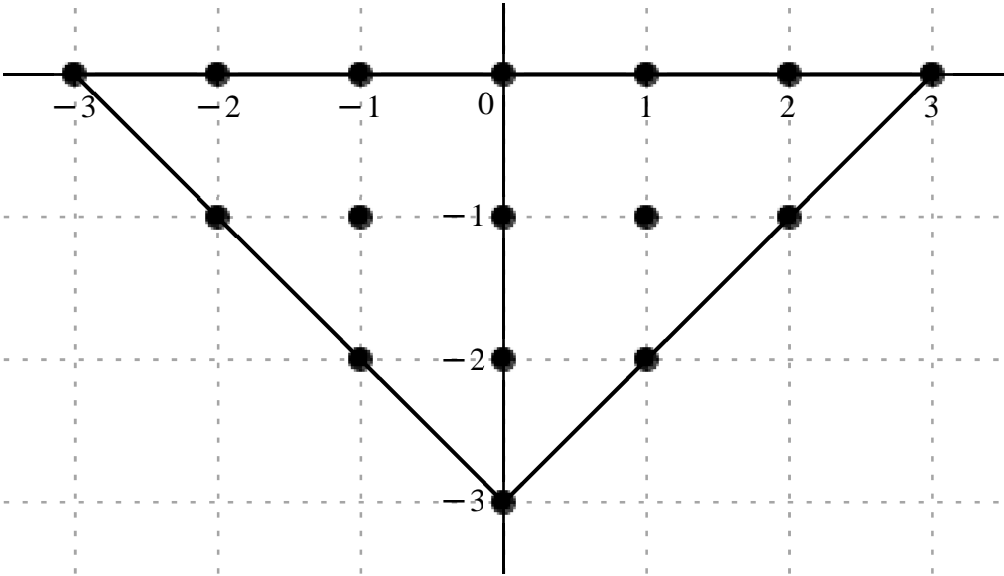
Error order:, 1, Error:, 0.00032952862412416007783, New Error:, 0.000032952603892765288952

Error order:, 1, Error:, 0.000032952603892765288952, New Error:,  $3.2952578037811574827 \times 10^{-6}$

Error order:, 1, Error:,  $3.2952578037811574827 \times 10^{-6}$ , New Error:,  $3.2952575452286317098 \times 10^{-7}$

$$x_o + h., \begin{bmatrix} -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & & -1 - 2 I & -2 I & 1 - 2 I & & \\ & & & -3 I & & & \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{58212}{17} + \frac{756756 I}{17} & \frac{46103904}{17} + \frac{29338848 I}{17} & 34054020 + 34054020 I & 121080960 I & -34054020 + 34054020 I & -\frac{46103904}{17} + \frac{29338848 I}{17} & -\frac{58212}{17} + \frac{756756 I}{17} \\ & \frac{99542520}{17} - \frac{47151720 I}{17} & -\frac{871782912}{17} + \frac{3923023104 I}{17} & -817296480 I & \frac{871782912}{17} + \frac{3923023104 I}{17} & -\frac{99542520}{17} - \frac{47151720 I}{17} & \\ & & -12573792 + 22004136 I & 125737920 I & 12573792 + 22004136 I & & \\ & & & -1164240 I & & & \end{bmatrix}$$



$$\frac{d^{15}}{dx_{ol}^{15}} u(x_{ol}) = \frac{1}{17 \Delta x_{ol}^{15}} \Big( 58212 \Big( (1 + 13 I) u_{ol-3} + (792 + 504 I) u_{ol-2} + (9945 + 9945 I) u_{ol-1} + 35360 I u_{ol} + (-9945 + 9945 I) u_{ol+1} + (-792 + 504 I) u_{ol+2} + (-1 + 13 I) u_{ol+3} + (1710 - 810 I) u_{ol-2-1} + (-14976 + 67392 I) u_{ol-1-1} - 238680 I u_{ol-1} + (14976 + 67392 I) u_{ol+1-1} - (1710 + 810 I) u_{ol+2-1} + (-3672$$

$$+ 6426 I) u_{ol-1-21} + 36720 I u_{ol-21} + (3672 + 6426 I) u_{ol+1-21} - 340 I u_{ol-31} \Big) \Big), \mathcal{O}(\Delta x_{ol})$$

Formula.: 649, Var.: 1

Variavel .:  $x_{oi}$ , Derivada de Ordem .: 1

Error order.: 24, Error.:  $6.7346935776963112492 \times 10^{-66}$ , New Error.:  $6.7346935776827475625 \times 10^{-90}$

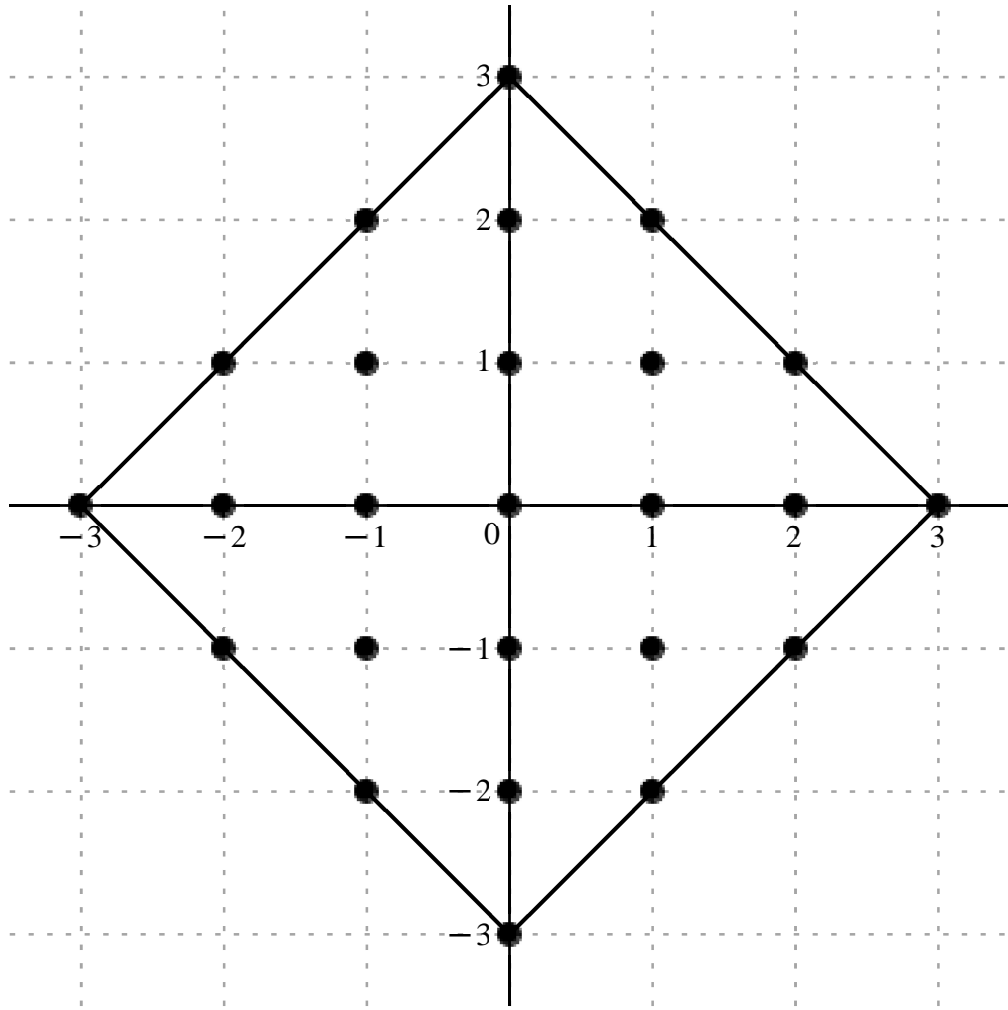
Error order.: 24, Error.:  $6.7346935776827475625 \times 10^{-90}$ , New Error.:  $6.7346935776827462061 \times 10^{-114}$

Error order.: 24, Error.:  $6.7346935776827462061 \times 10^{-114}$ , New Error.:  $6.7346935776827462060 \times 10^{-138}$

Error order.: 24, Error.:  $6.7346935776827462060 \times 10^{-138}$ , New Error.:  $6.7346935776827462060 \times 10^{-162}$

Error order.: 24, Error.:  $6.7346935776827462060 \times 10^{-162}$ , New Error.:  $6.7346935776827462060 \times 10^{-186}$

$$x_o + h . , \left[ \begin{array}{ccccccccc} & & & & 3 \text{ I} & & & & \\ & & & & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & & \\ & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} & & & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & & \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} & & & \\ & & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & & & & \\ & & & & -3 \text{ I} & & & & \end{array} \right]$$
$$c = , \left[ \begin{array}{cccccccc} & & & & -\frac{\text{I}}{1103232} & & & \\ & & & & -\frac{9}{459680} - \frac{297 \text{ I}}{1838720} & \frac{27 \text{ I}}{22984} & \frac{9}{459680} - \frac{297 \text{ I}}{1838720} & \\ & -\frac{297}{1838720} - \frac{9 \text{ I}}{459680} & -\frac{9}{442} - \frac{9 \text{ I}}{442} & -\frac{27 \text{ I}}{128} & \frac{9}{442} - \frac{9 \text{ I}}{442} & \frac{297}{1838720} - \frac{9 \text{ I}}{459680} & & \\ -\frac{1}{1103232} & \frac{27}{22984} & -\frac{27}{128} & 0 & \frac{27}{128} & -\frac{27}{22984} & \frac{1}{1103232} & \\ & -\frac{297}{1838720} + \frac{9 \text{ I}}{459680} & -\frac{9}{442} + \frac{9 \text{ I}}{442} & \frac{27 \text{ I}}{128} & \frac{9}{442} + \frac{9 \text{ I}}{442} & \frac{297}{1838720} + \frac{9 \text{ I}}{459680} & & \\ & & -\frac{9}{459680} + \frac{297 \text{ I}}{1838720} & -\frac{27 \text{ I}}{22984} & \frac{9}{459680} + \frac{297 \text{ I}}{1838720} & & & \\ & & & & \frac{\text{I}}{1103232} & & & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{1}{5516160\,\Delta x_{ol}}\, \big( -5\,\mathrm{I}\,u_{ol+3\mathrm{I}} - (108+891\,\mathrm{I})\,u_{ol-1+2\mathrm{I}} + 6480\,\mathrm{I}\,u_{ol+2\mathrm{I}} + (108-891\,\mathrm{I})\,u_{ol+1+2\mathrm{I}} - (891+108\,\mathrm{I})\,u_{ol-2+1} - (112320+112320\,\mathrm{I})\,u_{ol-1+1} - 1163565\,\mathrm{I}\,u_{ol+1} + (112320-112320\,\mathrm{I})\,u_{ol+1+1} + (891-108\,\mathrm{I})\,u_{ol+2+1} - 5\,u_{ol-3} + 6480\,u_{ol-2} - 1163565\,u_{ol-1} + 1163565\,u_{ol+1} - 6480\,u_{ol+2} + 5\,u_{ol+3} + (-891+108\,\mathrm{I})\,u_{ol-2-1} + (-112320+112320\,\mathrm{I})\,u_{ol-1-1} + 1163565\,\mathrm{I}\,u_{ol-1} + (112320+112320\,\mathrm{I})\,u_{ol+1-1} + (891+108\,\mathrm{I})\,u_{ol+2-1} + (-108+891\,\mathrm{I})\,u_{ol-1-2\mathrm{I}} - 6480\,\mathrm{I}\,u_{ol-2\mathrm{I}} + (108+891\,\mathrm{I})\,u_{ol+1-2\mathrm{I}} + 5\,\mathrm{I}\,u_{ol-3\mathrm{I}} \big),\, O(\,\Delta x_{ol}^{\,24}\,)$$

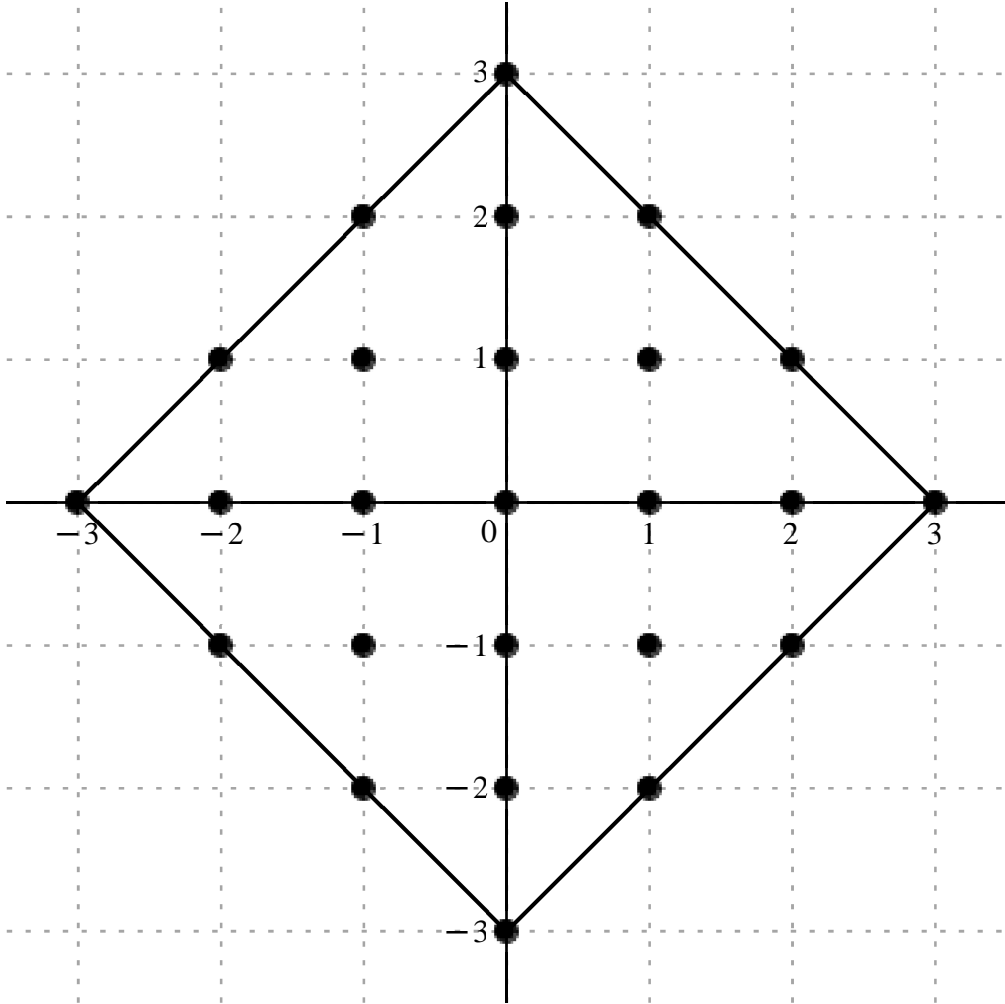
Formula: 650, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 2

Error order: 24, Error: 5.1547597226900134533 × 10<sup>-67</sup>, New Error: 5.1547597226810159829 × 10<sup>-91</sup>  
 Error order: 24, Error: 5.1547597226810159829 × 10<sup>-91</sup>, New Error: 5.1547597226810150831 × 10<sup>-115</sup>  
 Error order: 24, Error: 5.1547597226810150831 × 10<sup>-115</sup>, New Error: 5.1547597226810150831 × 10<sup>-139</sup>  
 Error order: 24, Error: 5.1547597226810150831 × 10<sup>-139</sup>, New Error: 5.1547597226810150831 × 10<sup>-163</sup>  
 Error order: 24, Error: 5.1547597226810150831 × 10<sup>-163</sup>, New Error: 5.1547597226810150831 × 10<sup>-187</sup>

$$x_o \neq h., \left[ \begin{array}{ccccccc} & & & 3\,\mathrm{I} & & & \\ & & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & & \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & & \\ & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & & & \\ & & -3\,\mathrm{I} & & & & \end{array} \right]$$

$$c = , \begin{bmatrix} & & & -\frac{1}{1654848} \\ & & -\frac{279}{2298400} + \frac{369\text{ I}}{4596800} & \frac{27}{22984} & -\frac{279}{2298400} - \frac{369\text{ I}}{4596800} \\ & \frac{279}{2298400} + \frac{369\text{ I}}{4596800} & \frac{9\text{ I}}{221} & -\frac{27}{64} & -\frac{9\text{ I}}{221} & \frac{279}{2298400} - \frac{369\text{ I}}{4596800} \\ \frac{1}{1654848} & -\frac{27}{22984} & \frac{27}{64} & 0 & \frac{27}{64} & -\frac{27}{22984} & \frac{1}{1654848} \\ \frac{279}{2298400} - \frac{369\text{ I}}{4596800} & -\frac{9\text{ I}}{221} & -\frac{27}{64} & \frac{9\text{ I}}{221} & \frac{279}{2298400} + \frac{369\text{ I}}{4596800} \\ & -\frac{279}{2298400} - \frac{369\text{ I}}{4596800} & \frac{27}{22984} & -\frac{279}{2298400} + \frac{369\text{ I}}{4596800} \\ & & -\frac{1}{1654848} \end{bmatrix}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{41371200 \, \Delta x_{ol}^2} \, \big( -25 \, u_{ol+3\text{I}} + (-5022 + 3321 \, \text{I}) \, u_{ol-1+2\text{I}} + 48600 \, u_{ol+2\text{I}} - (5022 + 3321 \, \text{I}) \, u_{ol+1+2\text{I}} + (5022 + 3321 \, \text{I}) \, u_{ol-2+1} + 1684800 \, \text{I} u_{ol-1+1} - 17453475 \, u_{ol+1} - 1684800 \, \text{I} u_{ol+1+1} + (5022 - 3321 \, \text{I}) \, u_{ol+2+1} + 25 \, u_{ol-3} - 48600 \, u_{ol-2} + 17453475 \, u_{ol-1} + 17453475 \, u_{ol+1} - 48600 \, u_{ol+2} + 25 \, u_{ol+3} + (5022 - 3321 \, \text{I}) \, u_{ol-2-1} - 1684800 \, \text{I} u_{ol-1-1} - 17453475 \, u_{ol-1} + 1684800 \, \text{I} u_{ol+1-1} + (5022 + 3321 \, \text{I}) \, u_{ol+2-1} - (5022 + 3321 \, \text{I}) \, u_{ol-1-2\text{I}} + 48600 \, u_{ol-2\text{I}} + (-5022 + 3321 \, \text{I}) \, u_{ol+1-2\text{I}} - 25 \, u_{ol-3\text{I}} \big), \, O( \, \Delta x_{ol}^{24} \, )$$

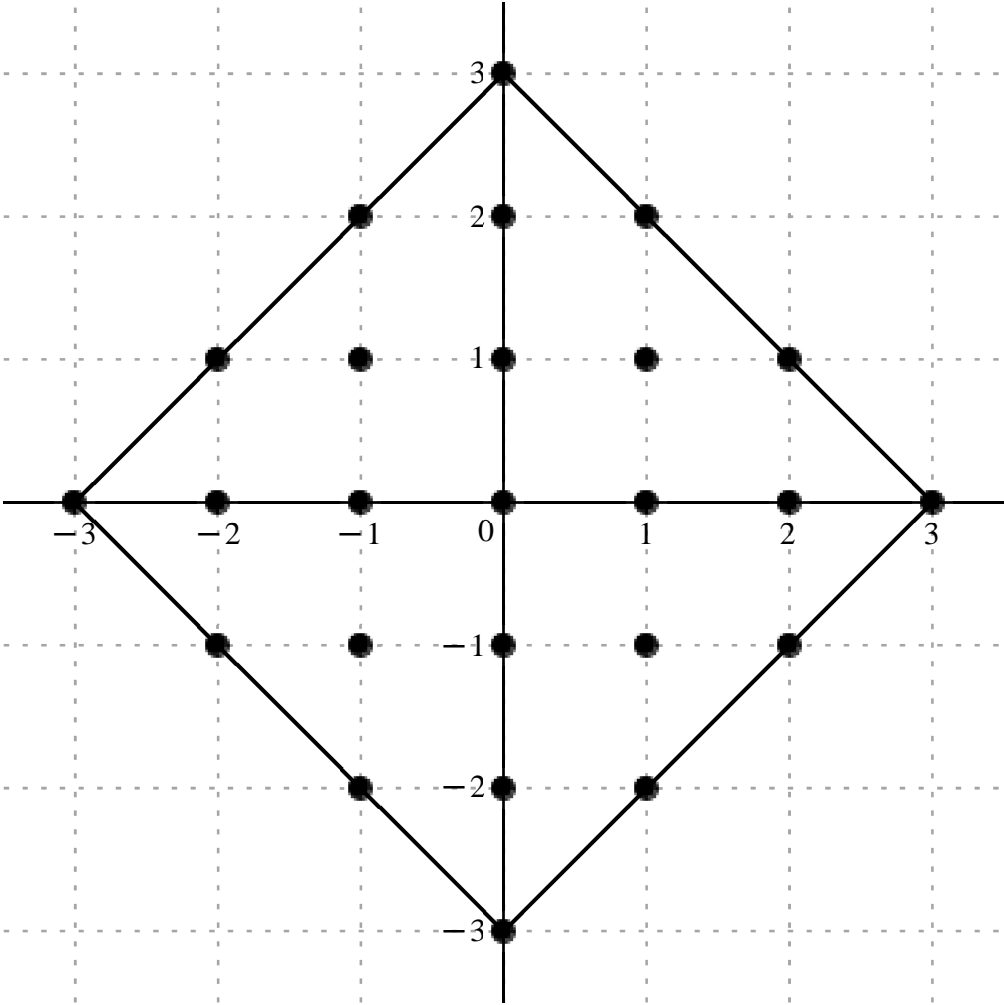
Formula.: 651, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 3

Error order.: 24, Error.: 5.6990157243657848240 × 10<sup>−68</sup>, New Error.: 5.6990157243571209141 × 10<sup>−92</sup>

*Error order:*, 24, *Error:*,  $5.6990157243571209141 \times 10^{-92}$ , *New Error:*,  $5.6990157243571200477 \times 10^{-116}$   
*Error order:*, 24, *Error:*,  $5.6990157243571200477 \times 10^{-116}$ , *New Error:*,  $5.6990157243571200476 \times 10^{-140}$   
*Error order:*, 24, *Error:*,  $5.6990157243571200476 \times 10^{-140}$ , *New Error:*,  $5.6990157243571200476 \times 10^{-164}$   
*Error order:*, 24, *Error:*,  $5.6990157243571200476 \times 10^{-164}$ , *New Error:*,  $5.6990157243571200476 \times 10^{-188}$

$$\begin{aligned}
 &x_o \neq h \text{ , } \left[ \begin{array}{cccccc} & & & & 3 \text{ I} & \\ & & & -1+2 \text{ I} & 2 \text{ I} & 1+2 \text{ I} \\ & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} \\ & -1-2 \text{ I} & -2 \text{ I} & 1-2 \text{ I} & & \\ & & & -3 \text{ I} & & \end{array} \right] \\
 &c = , \left[ \begin{array}{cccccc} & & & & \frac{\text{I}}{1654848} & \\ & & & \frac{243}{1436500} + \frac{2241 \text{ I}}{22984000} & -\frac{81 \text{ I}}{45968} & -\frac{243}{1436500} + \frac{2241 \text{ I}}{22984000} \\ & -\frac{2241}{22984000} - \frac{243 \text{ I}}{1436500} & \frac{27}{442} - \frac{27 \text{ I}}{442} & \frac{81 \text{ I}}{64} & -\frac{27}{442} - \frac{27 \text{ I}}{442} & \frac{2241}{22984000} - \frac{243 \text{ I}}{1436500} \\ -\frac{1}{1654848} & \frac{81}{45968} & -\frac{81}{64} & 0 & \frac{81}{64} & -\frac{81}{45968} & \frac{1}{1654848} \\ & -\frac{2241}{22984000} + \frac{243 \text{ I}}{1436500} & \frac{27}{442} + \frac{27 \text{ I}}{442} & -\frac{81 \text{ I}}{64} & -\frac{27}{442} + \frac{27 \text{ I}}{442} & \frac{2241}{22984000} + \frac{243 \text{ I}}{1436500} \\ & \frac{243}{1436500} - \frac{2241 \text{ I}}{22984000} & \frac{81 \text{ I}}{45968} & -\frac{243}{1436500} - \frac{2241 \text{ I}}{22984000} & & \\ & & & -\frac{\text{I}}{1654848} & & \end{array} \right]
 \end{aligned}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{206856000 \, \Delta x_{ol}^3} \big( 125 \, \mathrm{I} u_{ol+3\mathrm{I}} + (34992 + 20169 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 364500 \, \mathrm{I} u_{ol+2\mathrm{I}} + ( -34992 + 20169 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} - (20169 + 34992 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} + (12636000 - 12636000 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} + 261802125 \, \mathrm{I} u_{ol+\mathrm{I}} - (12636000 + 12636000 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} + (20169 - 34992 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} - 125 \, u_{ol-3} + 364500 \, u_{ol-2} - 261802125 \, u_{ol-1} \\ + 261802125 \, u_{ol+1} - 364500 \, u_{ol+2} + 125 \, u_{ol+3} + ( -20169 + 34992 \, \mathrm{I}) \, u_{ol-2-\mathrm{I}} + (12636000 + 12636000 \, \mathrm{I}) \, u_{ol-1-\mathrm{I}} - 261802125 \, \mathrm{I} u_{ol-\mathrm{I}} + ( -12636000 + 12636000 \, \mathrm{I}) \, u_{ol+1-\mathrm{I}} + (20169 + 34992 \, \mathrm{I}) \, u_{ol+2-\mathrm{I}} + (34992 - 20169 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + 364500 \, \mathrm{I} u_{ol-2\mathrm{I}} - (34992 + 20169 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} - 125 \, \mathrm{I} u_{ol-3\mathrm{I}} \big), \, O( \, \Delta x_{ol}^{24} \, )$$

Formula:, 652, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 4

Error order:., 24, Error:., 8.1009463032902654256 × 10−69, New Error:., 8.1009463032794894183 × 10−93

Error order:., 24, Error:., 8.1009463032794894183 × 10−93, New Error:., 8.1009463032794883407 × 10−117

Error order:., 24, Error:., 8.1009463032794883407 × 10−117, New Error:., 8.1009463032794883406 × 10−141

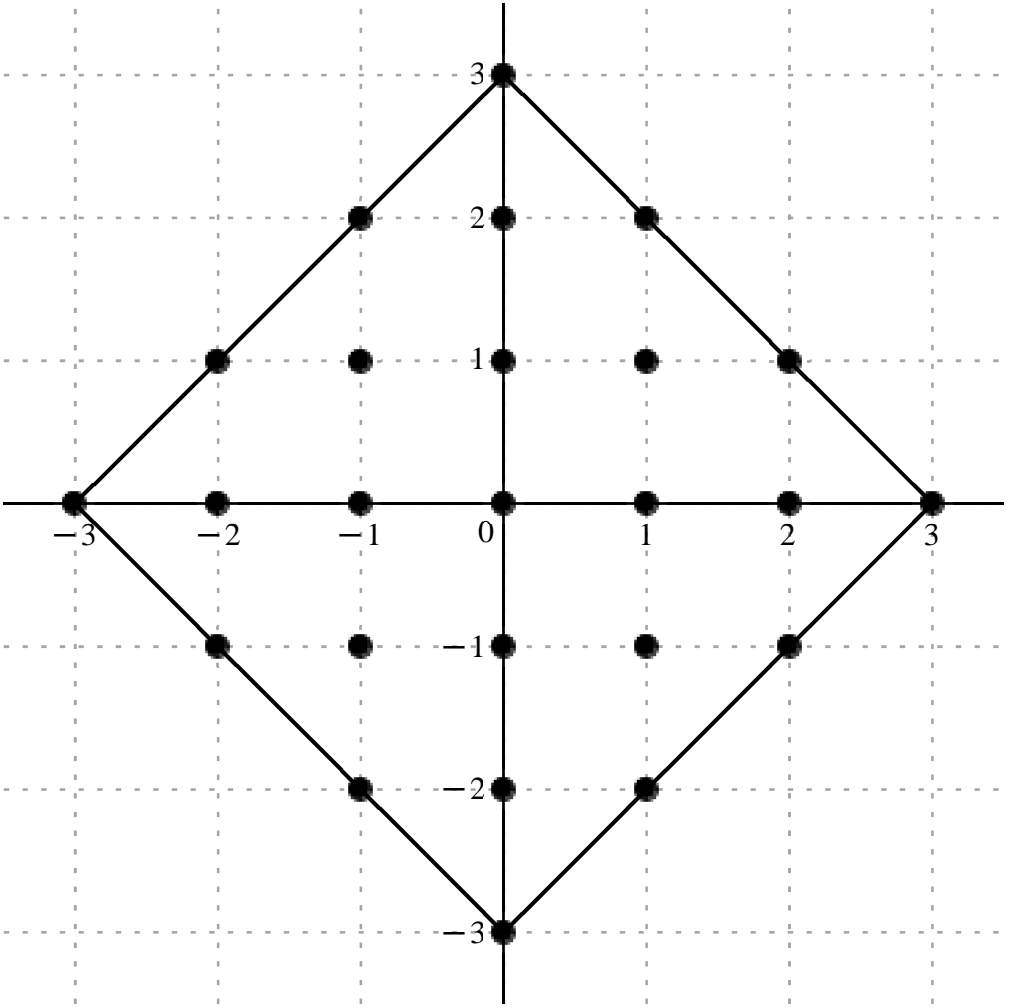
Error order:., 24, Error:., 8.1009463032794883406 × 10−141, New Error:., 8.1009463032794883406 × 10−165

Error order:., 24, Error:., 8.1009463032794883406 × 10−165, New Error:., 8.1009463032794883406 × 10−189

$$x_o \neq h \, . \, , \left[ \begin{array}{ccccccccc} & & & & & & & & 3 \, \mathrm{I} \\ & & & & & & & & -1+2 \, \mathrm{I} \, \, 2 \, \mathrm{I} \, \, 1+2 \, \mathrm{I} \\ & & & & & & & & -2+\mathrm{I} \, \, -1+\mathrm{I} \, \, \mathrm{I} \, \, 1+\mathrm{I} \, \, 2+\mathrm{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & & & & & & & & -2-\mathrm{I} \, \, -1-\mathrm{I} \, \, -\mathrm{I} \, \, 1-\mathrm{I} \, \, 2-\mathrm{I} \\ & & & & & & & & -1-2 \, \mathrm{I} \, \, -2 \, \mathrm{I} \, \, 1-2 \, \mathrm{I} \\ & & & & & & & & -3 \, \mathrm{I} \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} & & & & & & & & \frac{1}{1241136} \\ & & & & & & & & \frac{297}{14365000} - \frac{10017 \, \mathrm{I}}{28730000} - \frac{81}{22984} \frac{297}{14365000} + \frac{10017 \, \mathrm{I}}{28730000} \\ & & & & & & & & \frac{297}{14365000} + \frac{10017 \, \mathrm{I}}{28730000} - \frac{54}{221} \frac{81}{16} - \frac{54}{221} \frac{297}{14365000} - \frac{10017 \, \mathrm{I}}{28730000} \\ \frac{1}{1241136} & - \frac{81}{22984} & \frac{81}{16} & - \frac{649981}{33750} & \frac{81}{16} & - \frac{81}{22984} & \frac{1}{1241136} \\ & & & & & & & & \frac{297}{14365000} - \frac{10017 \, \mathrm{I}}{28730000} - \frac{54}{221} \frac{81}{16} - \frac{54}{221} \frac{297}{14365000} + \frac{10017 \, \mathrm{I}}{28730000} \\ & & & & & & & & \frac{297}{14365000} + \frac{10017 \, \mathrm{I}}{28730000} - \frac{81}{22984} \frac{297}{14365000} - \frac{10017 \, \mathrm{I}}{28730000} \\ & & & & & & & & \frac{1}{1241136} \end{array} \right]$$





$$\frac{d^4}{dx_{ol}^4} u(x_{ol}) = \frac{1}{775710000 \Delta x_{ol}^4} (625 u_{ol+3l} + (16038 - 270459 I) u_{ol-1+2l} - 2733750 u_{ol+2l} + (16038 + 270459 I) u_{ol+1+2l} + (16038 + 270459 I) u_{ol-2+1} - 189540000 u_{ol-1+1} + 3927031875 u_{ol+1} - 189540000 u_{ol+1+1} + (16038 - 270459 I) u_{ol+2+1} + 625 u_{ol-3} - 2733750 u_{ol-2} + 3927031875 u_{ol-1} - 14939163304 u_{ol}$$
  
$$+ 3927031875 u_{ol+1} - 2733750 u_{ol+2} + 625 u_{ol+3} + (16038 - 270459 I) u_{ol-2-1} - 189540000 u_{ol-1-1} + 3927031875 u_{ol-1} - 189540000 u_{ol+1-1} + (16038 + 270459 I) u_{ol+2-1} + (16038 + 270459 I) u_{ol-1-2l} - 2733750 u_{ol-2l} + (16038 - 270459 I) u_{ol+1-2l} + 625 u_{ol-3l}), \quad O(\Delta x_{ol}^{24})$$

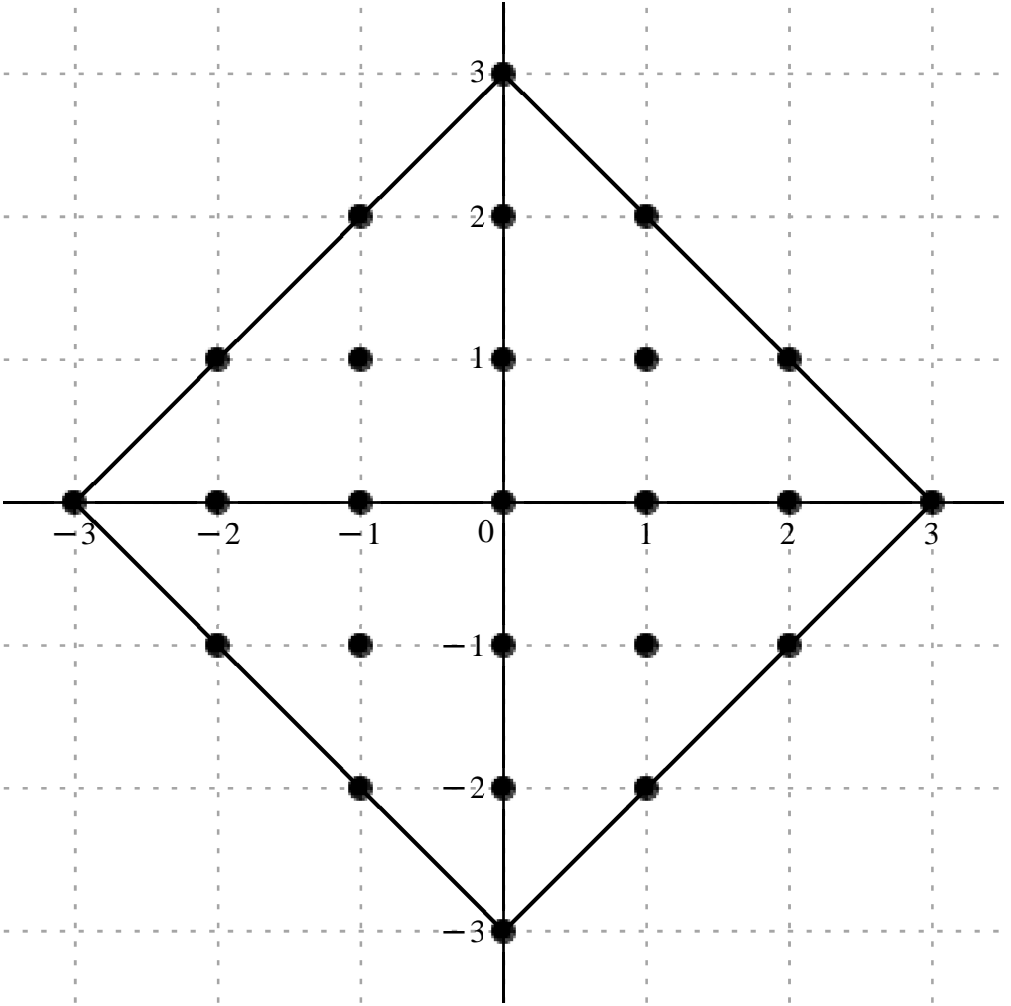
Formula:, 653, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 20, Error:,  $4.4293906926257199958 \times 10^{-56}$ , New Error:,  $4.4293906926169381566 \times 10^{-76}$   
Error order:, 20, Error:,  $4.4293906926169381566 \times 10^{-76}$ , New Error:,  $4.4293906926169372784 \times 10^{-96}$   
Error order:, 20, Error:,  $4.4293906926169372784 \times 10^{-96}$ , New Error:,  $4.4293906926169372783 \times 10^{-116}$   
Error order:, 20, Error:,  $4.4293906926169372783 \times 10^{-116}$ , New Error:,  $4.4293906926169372783 \times 10^{-136}$   
Error order:, 20, Error:,  $4.4293906926169372783 \times 10^{-136}$ , New Error:,  $4.4293906926169372783 \times 10^{-156}$

$$x_o \neq h., \left[ \begin{array}{cccccc} & & & 3 I & & \\ & & -1 + 2 I & 2 I & 1 + 2 I & \\ -2 + I & -1 + I & I & 1 + I & 2 + I & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & -1 - 2 I & -2 I & 1 - 2 I & & \\ & & & -3 I & & \end{array} \right]$$

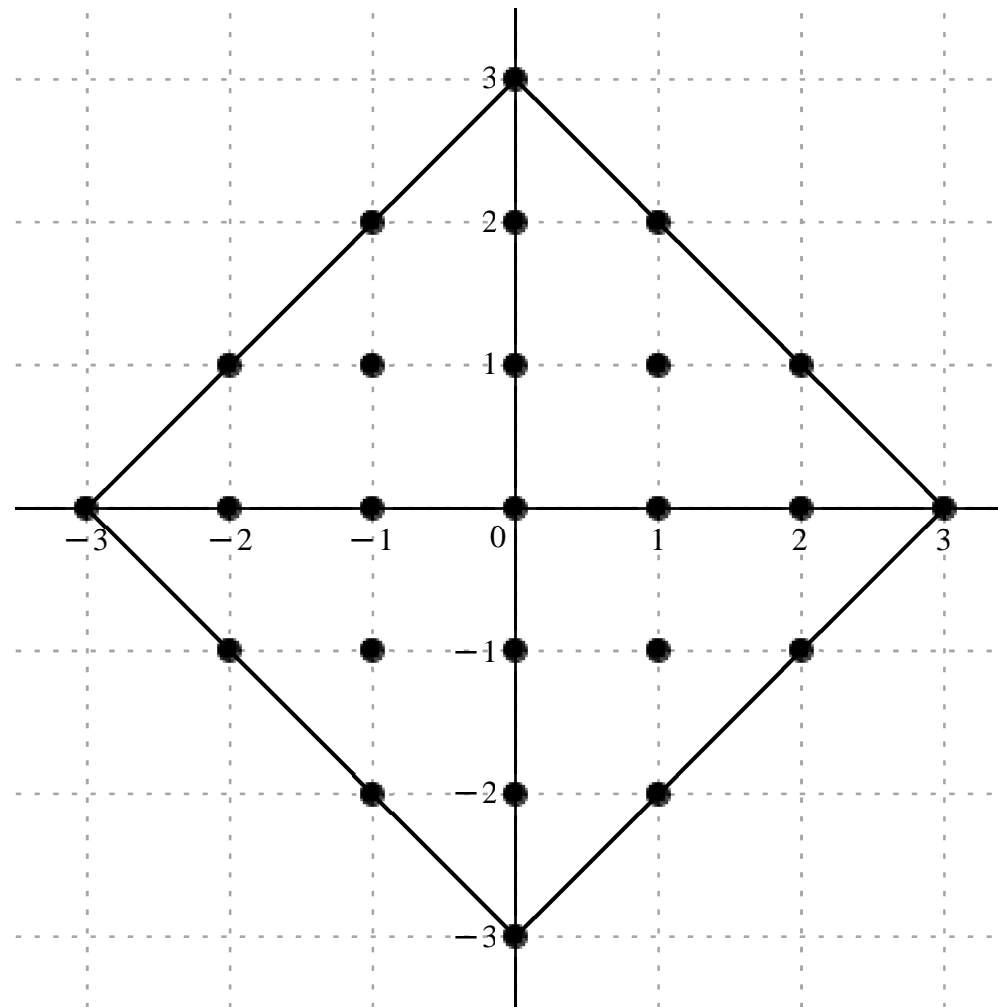
$$c = , \begin{pmatrix} \frac{7901}{91936000} & -\frac{149839}{1436500} & -\frac{160019}{32000} & 0 & \frac{160019}{32000} & \frac{149839}{1436500} & -\frac{7901}{91936000} \\ \frac{1458211}{91936000} - \frac{80489}{68952000} & \frac{852481}{331500} - \frac{852481}{331500} & \frac{160019}{32000} & -\frac{852481}{331500} - \frac{852481}{331500} & -\frac{1458211}{91936000} - \frac{80489}{68952000} \\ \frac{80489}{68952000} - \frac{1458211}{91936000} & \frac{149839}{1436500} - \frac{1458211}{91936000} & -\frac{7901}{91936000} \end{pmatrix}$$



$$\frac{ds}{dx_{ol}^5} \, u(x_{ol}) = \frac{1}{275808000 \, \Delta x_{ol}^5} \, ( 23703 \, \mathbf{I} u_{ol+3\mathbf{I}} + (321956 + 4374633 \, \mathbf{I}) \, u_{ol-1+2\mathbf{I}} - 28769088 \, \mathbf{I} u_{ol+2\mathbf{I}} + (-321956 + 4374633 \, \mathbf{I}) \, u_{ol+1+2\mathbf{I}} + (4374633 + 321956 \, \mathbf{I}) \, u_{ol-2+\mathbf{I}} + (709264192 + 709264192 \, \mathbf{I}) \, u_{ol-1+\mathbf{I}} - 1379203761 \, \mathbf{I} u_{ol+\mathbf{I}} + (-709264192 + 709264192 \, \mathbf{I}) \, u_{ol+1+\mathbf{I}} + (-4374633 + 321956 \, \mathbf{I}) \, u_{ol+2+\mathbf{I}} + 23703 \, u_{ol-3} \\ - 28769088 \, u_{ol-2} - 1379203761 \, u_{ol-1} + 1379203761 \, u_{ol+1} + 28769088 \, u_{ol+2} - 23703 \, u_{ol+3} + (4374633 - 321956 \, \mathbf{I}) \, u_{ol-2-\mathbf{I}} + (709264192 - 709264192 \, \mathbf{I}) \, u_{ol-1-\mathbf{I}} + 1379203761 \, \mathbf{I} u_{ol-\mathbf{I}} - (709264192 + 709264192 \, \mathbf{I}) \, u_{ol+1-\mathbf{I}} - (4374633 + 321956 \, \mathbf{I}) \, u_{ol+2-\mathbf{I}} + (321956 - 4374633 \, \mathbf{I}) \, u_{ol-1-2\mathbf{I}} + 28769088 \, \mathbf{I} u_{ol-2\mathbf{I}} - (321956 \\ + 4374633 \, \mathbf{I}) \, u_{ol+1-2\mathbf{I}} - 23703 \, \mathbf{I} u_{ol-3\mathbf{I}} ), \, O( \, \Delta x_{ol}^{20} \, )$$

*Error order:*, 20, *Error:*,  $1.0170816745406541830 \times 10^{-56}$ , *New Error:*,  $1.0170816745389065533 \times 10^{-76}$   
*Error order:*, 20, *Error:*,  $1.0170816745389065533 \times 10^{-76}$ , *New Error:*,  $1.0170816745389063785 \times 10^{-96}$   
*Error order:*, 20, *Error:*,  $1.0170816745389063785 \times 10^{-96}$ , *New Error:*,  $1.0170816745389063785 \times 10^{-116}$   
*Error order:*, 20, *Error:*,  $1.0170816745389063785 \times 10^{-116}$ , *New Error:*,  $1.0170816745389063785 \times 10^{-136}$   
*Error order:*, 20, *Error:*,  $1.0170816745389063785 \times 10^{-136}$ , *New Error:*,  $1.0170816745389063785 \times 10^{-156}$

[illegible]



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{45968000 \, \Delta x_{ol}^6} \big( 7901 \, u_{ol+31} + (1685462 - 1003709 \, \mathrm{I}) \, u_{ol-1+21} - 14384544 \, u_{ol+21} + (1685462 + 1003709 \, \mathrm{I}) \, u_{ol+1+21} - (1685462 + 1003709 \, \mathrm{I}) \, u_{ol-2+1} - 709264192 \, \mathrm{I} \, u_{ol-1+1} - 1379203761 \, u_{ol+1} + 709264192 \, \mathrm{I} \, u_{ol+1+1} + (-1685462 + 1003709 \, \mathrm{I}) \, u_{ol+2+1} - 7901 \, u_{ol-3} + 14384544 \, u_{ol-2} + 1379203761 \, u_{ol-1} \\ + 1379203761 \, u_{ol+1} + 14384544 \, u_{ol+2} - 7901 \, u_{ol+3} + (-1685462 + 1003709 \, \mathrm{I}) \, u_{ol-2-1} + 709264192 \, \mathrm{I} \, u_{ol-1-1} - 1379203761 \, u_{ol-1} - 709264192 \, \mathrm{I} \, u_{ol+1-1} - (1685462 + 1003709 \, \mathrm{I}) \, u_{ol+2-1} + (1685462 + 1003709 \, \mathrm{I}) \, u_{ol-1-21} - 14384544 \, u_{ol-21} + (1685462 - 1003709 \, \mathrm{I}) \, u_{ol+1-21} + 7901 \, u_{ol-31} \big), \, O(\, \Delta x_{ol}^{20} \, )$$

Formula:, 655, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 7

Error order:., 20, Error:., 2.6237596173882441934 × 10<sup>−57</sup>, New Error:., 2.6237596173843175659 × 10<sup>−77</sup>

Error order:., 20, Error:., 2.6237596173843175659 × 10<sup>−77</sup>, New Error:., 2.6237596173843171732 × 10<sup>−97</sup>

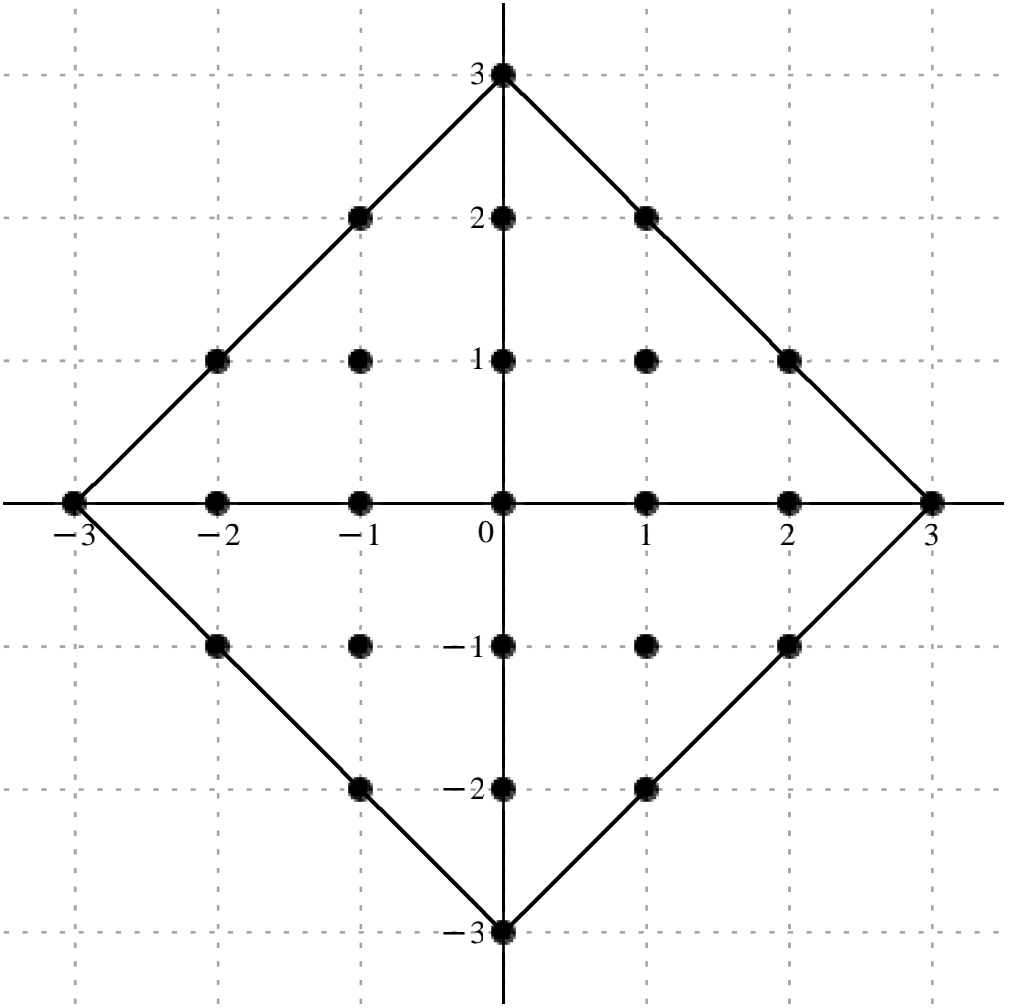
Error order:., 20, Error:., 2.6237596173843171732 × 10<sup>−97</sup>, New Error:., 2.6237596173843171732 × 10<sup>−117</sup>

Error order:., 20, Error:., 2.6237596173843171732 × 10<sup>−117</sup>, New Error:., 2.6237596173843171732 × 10<sup>−137</sup>

Error order:., 20, Error:., 2.6237596173843171732 × 10<sup>−137</sup>, New Error:., 2.6237596173843171732 × 10<sup>−157</sup>

$$x_o \neq h. . \left[ \begin{array}{ccccccccc} & & & & 3 \, \mathrm{I} & & & & \\ & & & & -1+2 \, \mathrm{I} & 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & & \\ & & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & & \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & & & \\ & & -1-2 \, \mathrm{I} & -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & & & & \\ & & & & -3 \, \mathrm{I} & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} & & & & -\frac{55307 \, \mathrm{I}}{137904000} & & & \\ & & & & & & & & \\ & & & & -\frac{323127}{2873000} - \frac{3314101 \, \mathrm{I}}{45968000} & \frac{3146619 \, \mathrm{I}}{2873000} & \frac{323127}{2873000} - \frac{3314101 \, \mathrm{I}}{45968000} & & \\ & & \frac{3314101}{45968000} + \frac{323127 \, \mathrm{I}}{2873000} & -\frac{5967367}{110500} + \frac{5967367 \, \mathrm{I}}{110500} & \frac{3360399 \, \mathrm{I}}{16000} & \frac{5967367}{110500} + \frac{5967367 \, \mathrm{I}}{110500} & -\frac{3314101}{45968000} + \frac{323127 \, \mathrm{I}}{2873000} & & \\ \frac{55307}{137904000} & -\frac{3146619}{2873000} & -\frac{3360399}{16000} & 0 & \frac{3360399}{16000} & \frac{3146619}{2873000} & -\frac{55307}{137904000} & & \\ & \frac{3314101}{45968000} - \frac{323127 \, \mathrm{I}}{2873000} & -\frac{5967367}{110500} - \frac{5967367 \, \mathrm{I}}{110500} & -\frac{3360399 \, \mathrm{I}}{16000} & \frac{5967367}{110500} - \frac{5967367 \, \mathrm{I}}{110500} & -\frac{3314101}{45968000} - \frac{323127 \, \mathrm{I}}{2873000} & & & \\ & & -\frac{323127}{2873000} + \frac{3314101 \, \mathrm{I}}{45968000} & -\frac{3146619 \, \mathrm{I}}{2873000} & \frac{323127}{2873000} + \frac{3314101 \, \mathrm{I}}{45968000} & & & & \\ & & & & \frac{55307 \, \mathrm{I}}{137904000} & & & & \end{array} \right]$$



$$\frac{d^7}{dx_{ol}^7} u(x_{ol}) = \frac{1}{137904000 \Delta x_{ol}^7} (7 \left( -7901 I u_{ol+3I} - (2215728 + 1420329 I) u_{ol-1+2I} + 21576816 I u_{ol+2I} + (2215728 - 1420329 I) u_{ol+1+2I} + (1420329 + 2215728 I) u_{ol-2+I} + (-1063896288 + 1063896288 I) u_{ol-1+I} + 4137611283 I u_{ol+I} + (1063896288 + 1063896288 I) u_{ol+1+I} + (-1420329 + 2215728 I) u_{ol+2+I} + 7901 u_{ol-3} \right. \\ \left. - 21576816 u_{ol-2} - 4137611283 u_{ol-1} + 4137611283 u_{ol+1} + 21576816 u_{ol+2} - 7901 u_{ol+3} + (1420329 - 2215728 I) u_{ol-2-I} - (1063896288 + 1063896288 I) u_{ol-1-I} - 4137611283 I u_{ol-I} + (1063896288 - 1063896288 I) u_{ol+1-I} - (1420329 + 2215728 I) u_{ol+2-I} + (-2215728 + 1420329 I) u_{ol-1-2I} - 21576816 I u_{ol-2I} \right. \\ \left. + (2215728 + 1420329 I) u_{ol+1-2I} + 7901 I u_{ol-3I} \right) \cdot O(\Delta x_{ol}^{20})$$

Formula.: 656, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 8

Error order.: 20, Error.:  $7.4591602484371096399 \times 10^{-58}$ , New Error.:  $7.4591602484273419099 \times 10^{-78}$

Error order.: 20, Error.:  $7.4591602484273419099 \times 10^{-78}$ , New Error.:  $7.4591602484273409331 \times 10^{-98}$

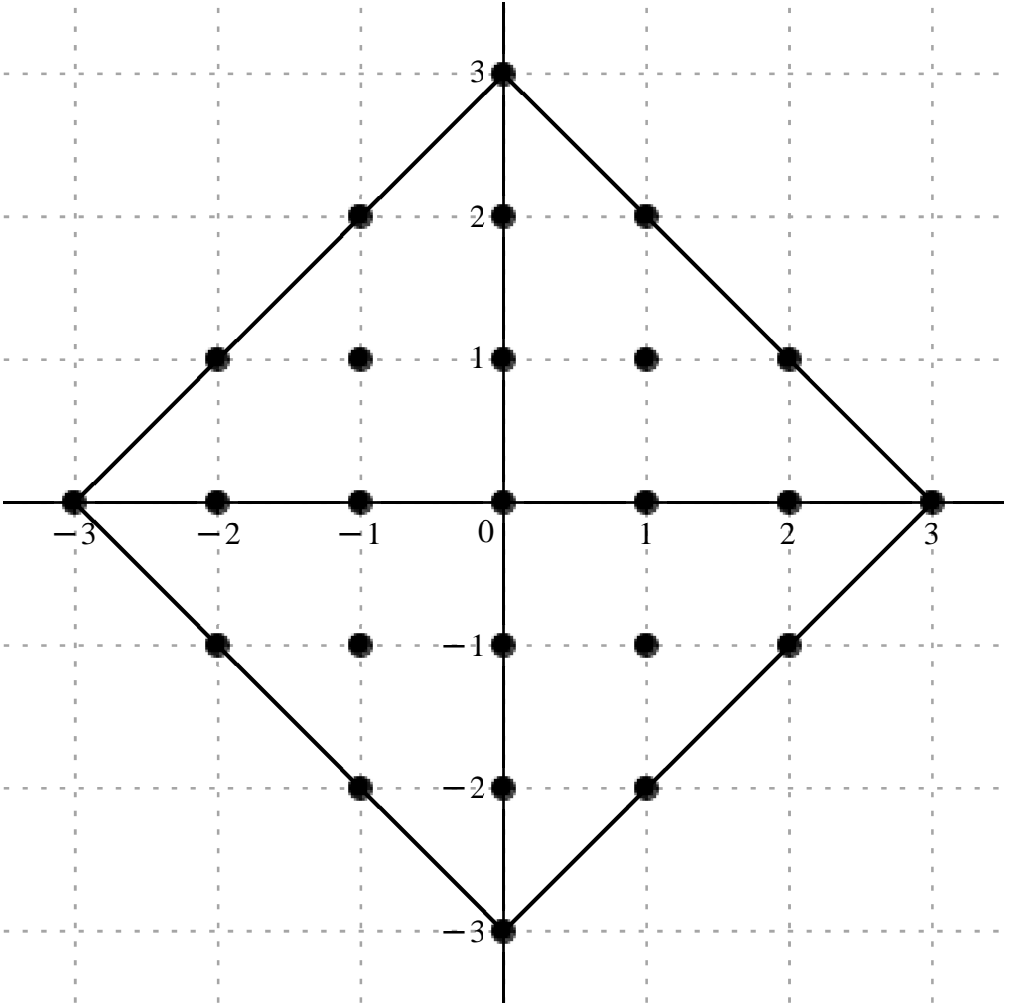
Error order.: 20, Error.:  $7.4591602484273409331 \times 10^{-98}$ , New Error.:  $7.4591602484273409330 \times 10^{-118}$

Error order.: 20, Error.:  $7.4591602484273409330 \times 10^{-118}$ , New Error.:  $7.4591602484273409330 \times 10^{-138}$

Error order.: 20, Error.:  $7.4591602484273409330 \times 10^{-138}$ , New Error.:  $7.4591602484273409330 \times 10^{-158}$

$$x_o + h \cdot , \left[ \begin{array}{cccccc} & & & 3 I & & \\ & & -1 + 2 I & 2 I & 1 + 2 I & \\ -2 + I & -1 + I & I & 1 + I & 2 + I & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & -1 - 2 I & -2 I & 1 - 2 I & & \\ & & -3 I & & & \end{array} \right]$$

$$c = \begin{bmatrix} -\frac{55307}{51714000} & -\frac{145817}{2873000} - \frac{2730833 \text{ I}}{5746000} & -\frac{145817}{2873000} + \frac{2730833 \text{ I}}{5746000} & -\frac{55307}{51714000} \\ -\frac{145817}{2873000} - \frac{2730833 \text{ I}}{5746000} & \frac{3146619}{718250} & \frac{11934734}{27625} & \frac{3360399}{2000} & -\frac{1904854}{225} & \frac{3360399}{2000} & \frac{11934734}{27625} & -\frac{145817}{2873000} - \frac{2730833 \text{ I}}{5746000} \\ -\frac{145817}{2873000} + \frac{2730833 \text{ I}}{5746000} & \frac{11934734}{27625} & \frac{3360399}{2000} & \frac{3146619}{718250} & -\frac{1904854}{225} & \frac{3360399}{2000} & \frac{11934734}{27625} & -\frac{145817}{2873000} + \frac{2730833 \text{ I}}{5746000} \\ -\frac{55307}{51714000} & -\frac{145817}{2873000} - \frac{2730833 \text{ I}}{5746000} & -\frac{145817}{2873000} + \frac{2730833 \text{ I}}{5746000} & -\frac{55307}{51714000} \end{bmatrix}$$

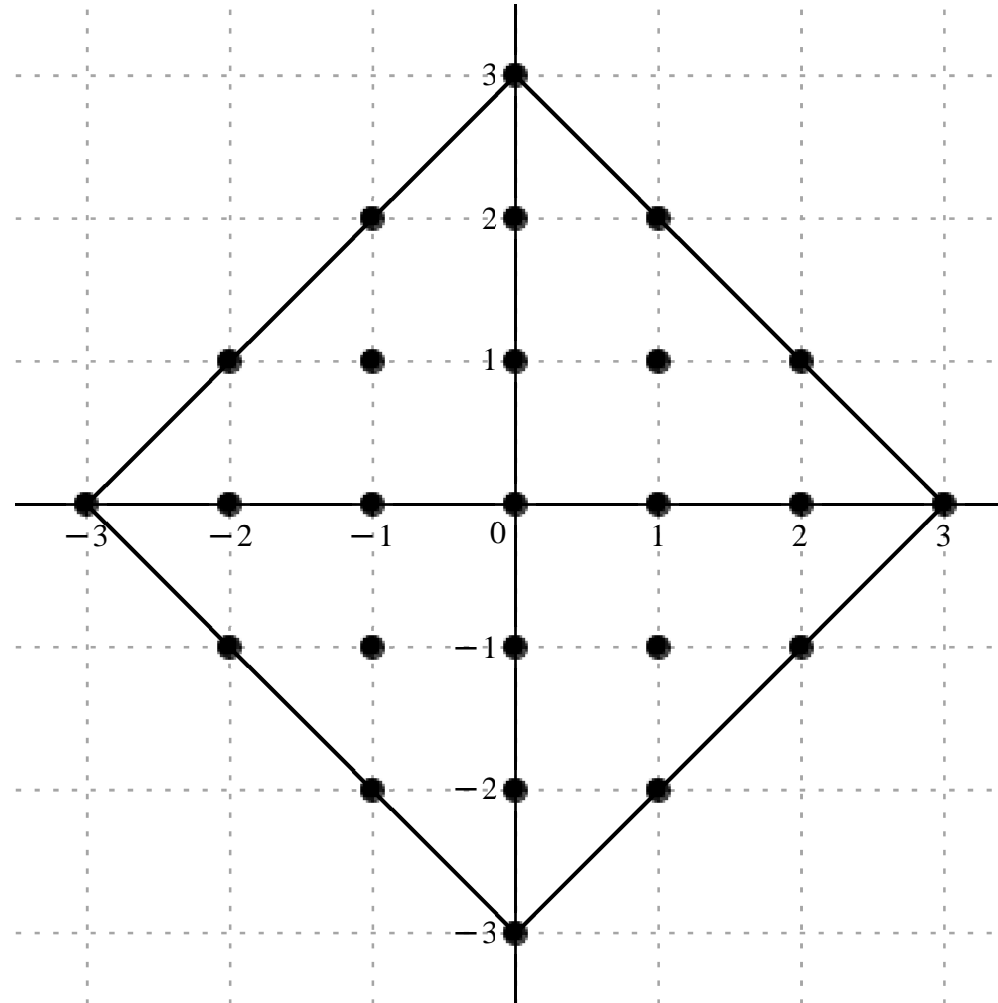


$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{51714000 \, \Delta x_{ol}^8} \Big( 7 \, \big( -7901 \, u_{ol+3\text{I}} + (-374958 + 3511071 \, \text{I}) \, u_{ol-1+2\text{I}} + 32365224 \, u_{ol+2\text{I}} - (374958 + 3511071 \, \text{I}) \, u_{ol+1+2\text{I}} - (374958 + 3511071 \, \text{I}) \, u_{ol-2+1} + 3191688864 \, u_{ol-1+1} + 12412833849 \, u_{ol+1} + 3191688864 \, u_{ol+1+1} + (-374958 + 3511071 \, \text{I}) \, u_{ol+2+1} - 7901 \, u_{ol-3} + 32365224 \, u_{ol-2} + 12412833849 \, u_{ol-1} - 62544520480 \, u_{ol} + 12412833849 \, u_{ol+1} + 32365224 \, u_{ol+2} - 7901 \, u_{ol+3} + (-374958 + 3511071 \, \text{I}) \, u_{ol-2-1} + 3191688864 \, u_{ol-1-1} + 12412833849 \, u_{ol-1} + 3191688864 \, u_{ol+1-1} - (374958 + 3511071 \, \text{I}) \, u_{ol+2-1} - (374958 + 3511071 \, \text{I}) \, u_{ol-1-2\text{I}} + 32365224 \, u_{ol-2\text{I}} + (-374958 + 3511071 \, \text{I}) \, u_{ol+1-2\text{I}} - 7901 \, u_{ol-3\text{I}} \big) \Big) \, O( \, \Delta x_{ol}^{20} \, )$$

Formula.: 657, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 9

Error order.: 16, Error.:  $2.3938561239737696991 \times 10^{-45}$ , New Error.:  $2.3938561239687181515 \times 10^{-61}$

$$c =, \left[ \begin{array}{cccccccc} \frac{97713}{1352000} & -\frac{2307312}{21125} & \frac{7603281}{8000} & 0 & -\frac{7603281}{8000} & \frac{2307312}{21125} & -\frac{97713}{1352000} \\ \frac{15729903}{1352000} - \frac{1113399}{338000} & -\frac{638064}{1625} + \frac{638064}{1625} & -\frac{7603281}{8000} & \frac{7603281}{8000} & \frac{638064}{1625} + \frac{638064}{1625} & -\frac{15729903}{1352000} - \frac{1113399}{338000} & \\ \frac{15729903}{1352000} - \frac{1113399}{338000} & -\frac{638064}{1625} + \frac{638064}{1625} & -\frac{7603281}{8000} & \frac{7603281}{8000} & \frac{638064}{1625} + \frac{638064}{1625} & -\frac{15729903}{1352000} - \frac{1113399}{338000} & \\ \frac{1113399}{338000} - \frac{15729903}{1352000} & \frac{2307312}{21125} & -\frac{1113399}{338000} & \frac{15729903}{1352000} & -\frac{1113399}{338000} & \frac{15729903}{1352000} & \\ -\frac{97713}{1352000} & \end{array} \right]$$


$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{1352000 \, \mathcal{A}x_{ol}^9} \Big( 189 \, \big( 517 \, \mathrm{I} \, u_{ol+3\mathrm{I}} + (23564 + 83227 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 781312 \, \mathrm{I} \, u_{ol+2\mathrm{I}} + ( -23564 + 83227 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (83227 + 23564 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} - (2808832 + 2808832 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} + 6798701 \, \mathrm{I} \, u_{ol+\mathrm{I}} + (2808832 - 2808832 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} + ( -83227 + 23564 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} + 517 \, u_{ol-3} - 781312 \, u_{ol-2} + 6798701 \, u_{ol-1} - 6798701 \, u_{ol+1} + 781312 \, u_{ol+2} - 517 \, u_{ol+3} + (83227 - 23564 \, \mathrm{I}) \, u_{ol-2-\mathrm{I}} + ( -2808832 + 2808832 \, \mathrm{I}) \, u_{ol-1-\mathrm{I}} - 6798701 \, \mathrm{I} \, u_{ol-\mathrm{I}} + (2808832 + 2808832 \, \mathrm{I}) \, u_{ol+1-\mathrm{I}} - (83227 + 23564 \, \mathrm{I}) \, u_{ol+2-\mathrm{I}} + (23564 - 83227 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + 781312 \, \mathrm{I} \, u_{ol-2\mathrm{I}} - (23564 + 83227 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} - 517 \, \mathrm{I} \, u_{ol-3\mathrm{I}} \big) \Big), \, \, O( \, \mathcal{A}x_{ol}^{16} \, )$$

Formula.: 658, Var.: 1

Variavel :, x\_{ol}, \, \, Derivada de Ordem :, 10

Error order.: 16, \, \, Error.: 9.1613322769731959128 \times 10^{-46}, \, \, New Error.: 9.1613322769564411945 \times 10^{-62}

Error order.: 16, \, \, Error.: 9.1613322769564411945 \times 10^{-62}, \, \, New Error.: 9.1613322769564395190 \times 10^{-78}

Error order.: 16, \, \, Error.: 9.1613322769564395190 \times 10^{-78}, \, \, New Error.: 9.1613322769564395188 \times 10^{-94}

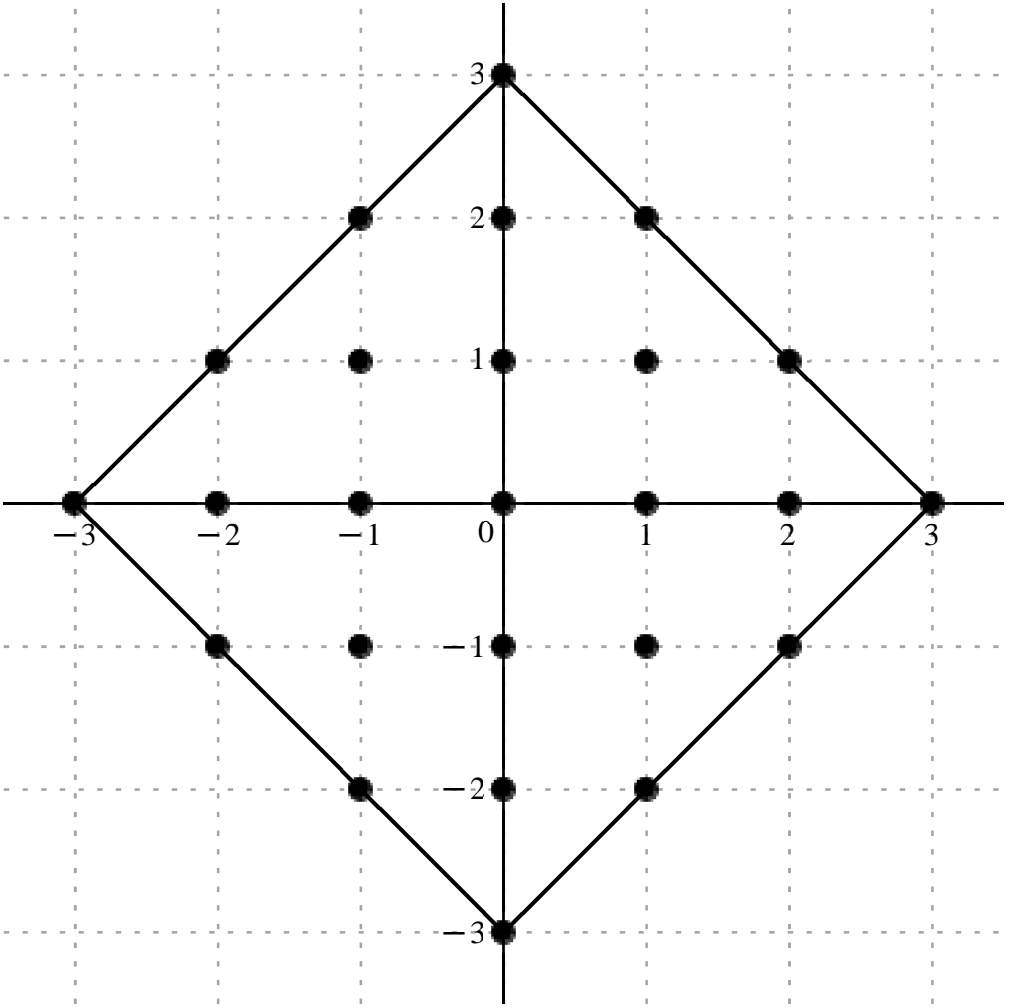
Error order.: 16, \, \, Error.: 9.1613322769564395188 \times 10^{-94}, \, \, New Error.: 9.1613322769564395188 \times 10^{-110}

Error order.: 16, \, \, Error.: 9.1613322769564395188 \times 10^{-110}, \, \, New Error.: 9.1613322769564395188 \times 10^{-126}

$$x_o \neq h \, . \, . \, \left[ \begin{array}{ccccccccc} & & & & 3 \, \mathrm{I} & & & & \\ & & & & -1+2 \, \mathrm{I} & 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & & \\ & & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & & \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & & & \\ & & -1-2 \, \mathrm{I} & -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & & & & \\ & & & & -3 \, \mathrm{I} & & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{ccccccc} & & & & \frac{32571}{135200} & & \\ & & & & \frac{2700621}{67600} - \frac{4927419 \, \mathrm{I}}{135200} & - \frac{2307312}{4225} & \frac{2700621}{67600} + \frac{4927419 \, \mathrm{I}}{135200} \\ & & - \frac{2700621}{67600} - \frac{4927419 \, \mathrm{I}}{135200} & \frac{1276128 \, \mathrm{I}}{325} & \frac{7603281}{800} & - \frac{1276128 \, \mathrm{I}}{325} & - \frac{2700621}{67600} + \frac{4927419 \, \mathrm{I}}{135200} \\ - \frac{32571}{135200} & \frac{2307312}{4225} & - \frac{7603281}{800} & 0 & - \frac{7603281}{800} & \frac{2307312}{4225} & - \frac{32571}{135200} \\ & - \frac{2700621}{67600} + \frac{4927419 \, \mathrm{I}}{135200} & - \frac{1276128 \, \mathrm{I}}{325} & \frac{7603281}{800} & \frac{1276128 \, \mathrm{I}}{325} & - \frac{2700621}{67600} - \frac{4927419 \, \mathrm{I}}{135200} & \\ & & \frac{2700621}{67600} + \frac{4927419 \, \mathrm{I}}{135200} & - \frac{2307312}{4225} & \frac{2700621}{67600} - \frac{4927419 \, \mathrm{I}}{135200} & & \\ & & & \frac{32571}{135200} & & & \end{array} \right]$$





$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\; u(x_{ol}) = \frac{1}{135200\; \Delta x_{ol}^{10}}\; \Big( 63\; \big( 517\; u_{ol+3\mathrm{I}} + (85734 - 78213\; \mathrm{I})\; u_{ol-1+2\mathrm{I}} - 1171968\; u_{ol+2\mathrm{I}} + (85734 + 78213\; \mathrm{I})\; u_{ol+1+2\mathrm{I}} - (85734 + 78213\; \mathrm{I})\; u_{ol-2+1} + 8426496\; \mathrm{I}\; u_{ol-1+1} + 20396103\; u_{ol+1} - 8426496\; \mathrm{I}\; u_{ol+1+1} + (-85734 + 78213\; \mathrm{I})\; u_{ol+2+1} - 517\; u_{ol-3} + 1171968\; u_{ol-2} - 20396103\; u_{ol-1} - 20396103\; u_{ol+1} + 1171968\; u_{ol+2}$$
  
$$- 517\; u_{ol+3} + (-85734 + 78213\; \mathrm{I})\; u_{ol-2-1} - 8426496\; \mathrm{I}\; u_{ol-1-1} + 20396103\; u_{ol-1} + 8426496\; \mathrm{I}\; u_{ol+1-1} - (85734 + 78213\; \mathrm{I})\; u_{ol+2-1} + (85734 + 78213\; \mathrm{I})\; u_{ol-1-2\mathrm{I}} - 1171968\; u_{ol-2\mathrm{I}} + (85734 - 78213\; \mathrm{I})\; u_{ol+1-2\mathrm{I}} + 517\; u_{ol-3\mathrm{I}} \big) \Big),\; O(\; \Delta x_{ol}^{16}\; )$$

Formula: 659, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 11

Error order: 16, Error: 3.7138255038393724626 × 10<sup>-46</sup>, New Error: 3.7138255038334568182 × 10<sup>-62</sup>  
Error order: 16, Error: 3.7138255038334568182 × 10<sup>-62</sup>, New Error: 3.7138255038334562266 × 10<sup>-78</sup>  
Error order: 16, Error: 3.7138255038334562266 × 10<sup>-78</sup>, New Error: 3.7138255038334562265 × 10<sup>-94</sup>  
Error order: 16, Error: 3.7138255038334562265 × 10<sup>-94</sup>, New Error: 3.7138255038334562265 × 10<sup>-110</sup>  
Error order: 16, Error: 3.7138255038334562265 × 10<sup>-110</sup>, New Error: 3.7138255038334562265 × 10<sup>-126</sup>

$$x_o \neq h., \left[ \begin{array}{cccccc} & & & 3\mathrm{I} & & \\ & & -1+2\mathrm{I} & 2\mathrm{I} & 1+2\mathrm{I} & \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & \\ & -1-2\mathrm{I} & -2\mathrm{I} & 1-2\mathrm{I} & & \\ & & -3\mathrm{I} & & & \end{array} \right]$$

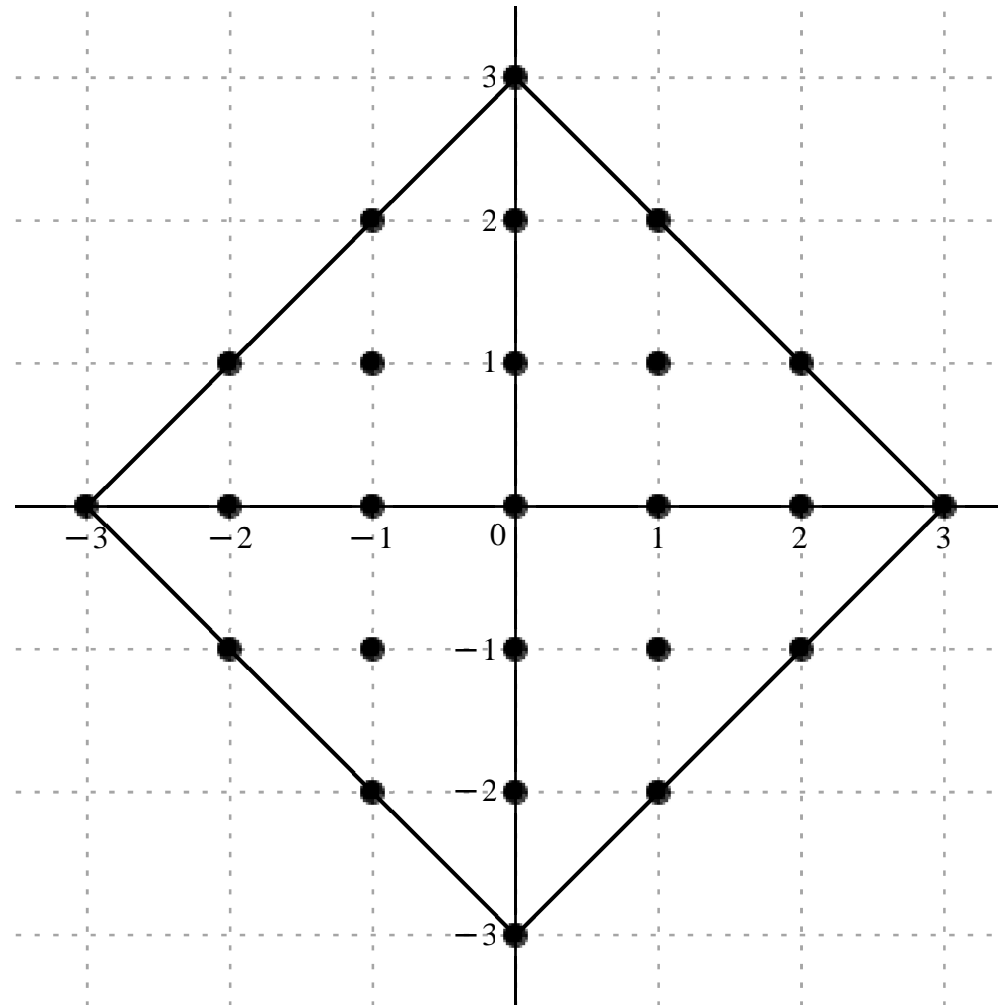
$$\mathcal{C} =$$



$$-61188309 u^{o_{l+1}} + 1757952 u^{o_{l+2}} - 517 u^{o_{l+3}} + (55953 - 145296 \text{ I}) u^{o_{l-2}-1} + (12639744 + 12639744 \text{ I}) u^{o_{l-1}-1} + 61188309 \text{ I} u^{o_{l-1}} + (-12639744 + 12639744 \text{ I}) u^{o_{l+1}-1} - (55953 + 145296 \text{ I}) u^{o_{l+2}-1} + (-145296 + 55953 \text{ I}) u^{o_{l+1}-21} - 1757952 \text{ I} u^{o_{l-21}} + (145296 + 55953 \text{ I}) u^{o_{l+1}-21} + 517 \text{ I} u^{o_{l-31}}), \quad O(\Delta x_{\text{I}}^{16})$$

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

*Error order:*, 16, *Error:*,  $1.5837208971593317412 \times 10^{-46}$ , *New Error:*,  $1.5837208971571244112 \times 10^{-62}$

[illegible]

$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\,u(x_{ol})=\frac{1}{33800\,\Delta x_{ol}^{12}}\big(231\,(-517\,u_{ol+31}+(20034+207927\,\mathrm{I})\,u_{ol-1+21}+2636928\,u_{ol+21}+(20034-207927\,\mathrm{I})\,u_{ol+1+21}+(20034-207927\,\mathrm{I})\,u_{ol-2+1}-37919232\,u_{ol-1+1}-183564927\,u_{ol+1}-37919232\,u_{ol+1+1}+(20034+207927\,\mathrm{I})\,u_{ol+2+1}-517\,u_{ol-3}+2636928\,u_{ol-2}-183564927\,u_{ol-1}+875230720\,u_{ol}-183564927\,u_{ol+1}+2636928\,u_{ol+2}-517\,u_{ol+3}+(20034+207927\,\mathrm{I})\,u_{ol-2-1}-37919232\,u_{ol-1-1}-183564927\,u_{ol-1}-37919232\,u_{ol+1-1}+(20034-207927\,\mathrm{I})\,u_{ol+2-1}+(20034-207927\,\mathrm{I})\,u_{ol-1-21}+2636928\,u_{ol-21}+(20034+207927\,\mathrm{I})\,u_{ol+1-21}-517\,u_{ol-31})\big),\,\,O(\,\Delta x_{ol}^{16}\,)$$

Formula:, 661, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 13

Error order:., 12, Error:., 1.6686559571257878129 × 10−34, New Error:., 1.6686559571231334775 × 10−46

Error order:., 12, Error:., 1.6686559571231334775 × 10−46, New Error:., 1.6686559571231332121 × 10−58

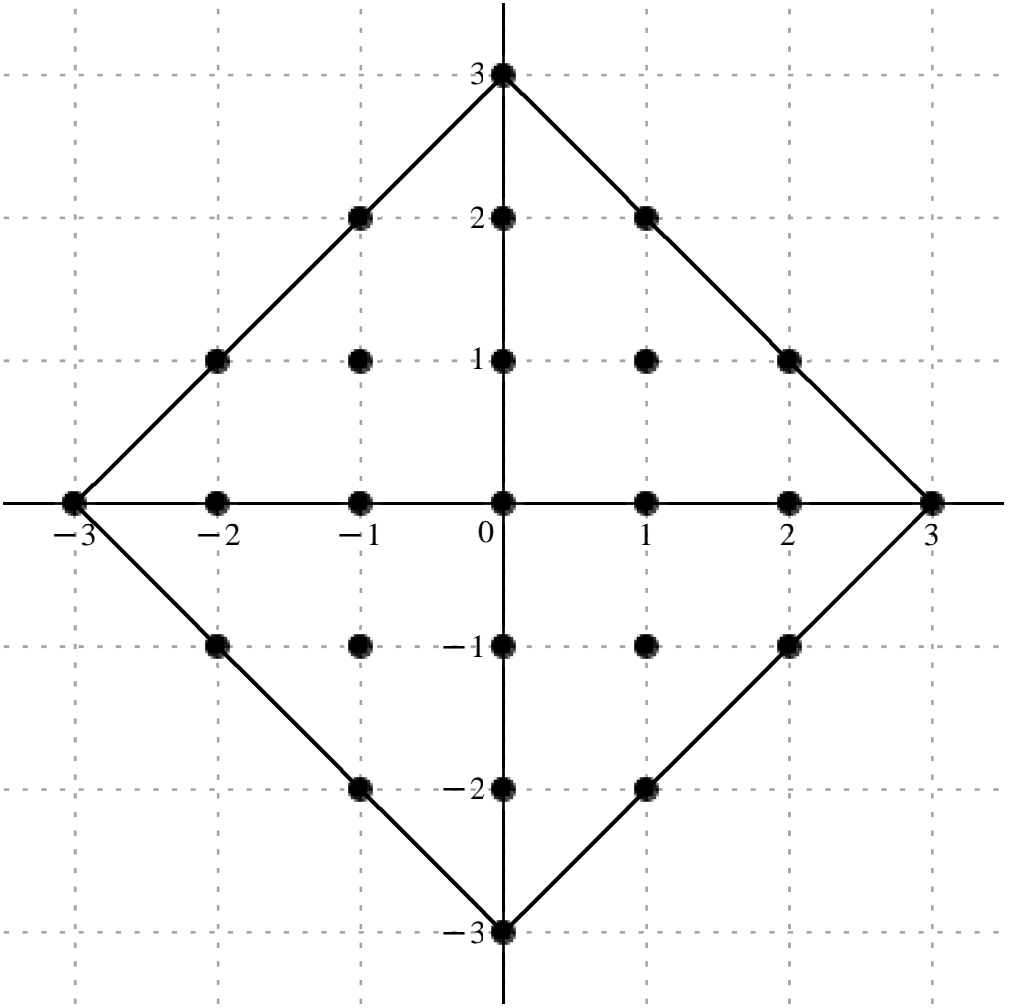
Error order:., 12, Error:., 1.6686559571231332121 × 10−58, New Error:., 1.6686559571231332120 × 10−70

Error order:., 12, Error:., 1.6686559571231332120 × 10−70, New Error:., 1.6686559571231332120 × 10−82

Error order:., 12, Error:., 1.6686559571231332120 × 10−82, New Error:., 1.6686559571231332120 × 10−94

$$x_o\neq h\,.\,.\,\left[\begin{array}{ccccccc} & & & & 3\,\mathrm{I} & & \\ & & & & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & \\ & & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & & \\ & & & & -3\,\mathrm{I} & & \end{array}\right]$$

$$c=,\left[\begin{array}{ccccccc} & & & & -\frac{143451\,\mathrm{I}}{2600} & & \\ & & & & \frac{3582117}{650}-\frac{44114301\,\mathrm{I}}{2600} & -\frac{8382528\,\mathrm{I}}{325} & -\frac{3582117}{650}-\frac{44114301\,\mathrm{I}}{2600} \\ -\frac{44114301}{2600}+\frac{3582117\,\mathrm{I}}{650} & \frac{2528064}{25}+\frac{2528064\,\mathrm{I}}{25} & -\frac{18729711\,\mathrm{I}}{200} & -\frac{2528064}{25}+\frac{2528064\,\mathrm{I}}{25} & \frac{44114301}{2600}+\frac{3582117\,\mathrm{I}}{650} & & \\ -\frac{143451}{2600} & -\frac{8382528}{325} & -\frac{18729711}{200} & 0 & \frac{18729711}{200} & \frac{8382528}{325} & \frac{143451}{2600} \\ -\frac{44114301}{2600}-\frac{3582117\,\mathrm{I}}{650} & \frac{2528064}{25}-\frac{2528064\,\mathrm{I}}{25} & \frac{18729711\,\mathrm{I}}{200} & -\frac{2528064}{25}-\frac{2528064\,\mathrm{I}}{25} & \frac{44114301}{2600}-\frac{3582117\,\mathrm{I}}{650} & & \\ & \frac{3582117}{650}+\frac{44114301\,\mathrm{I}}{2600} & \frac{8382528\,\mathrm{I}}{325} & -\frac{3582117}{650}+\frac{44114301\,\mathrm{I}}{2600} & & & \\ & & \frac{143451\,\mathrm{I}}{2600} & & & & \end{array}\right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\; u(x_{ol}) = \frac{1}{2600\; \Delta x_{ol}^{13}}\; \Big( 2079\; \Big( -69\; \mathrm{I}\; u_{ol+3\mathrm{I}} + (6892-21219\; \mathrm{I})\; u_{ol-1+2\mathrm{I}} - 32256\; \mathrm{I}\; u_{ol+2\mathrm{I}} - (6892+21219\; \mathrm{I})\; u_{ol+1+2\mathrm{I}} + (-21219+6892\; \mathrm{I})\; u_{ol-2+1} + (126464+126464\; \mathrm{I})\; u_{ol-1+1} - 117117\; \mathrm{I}\; u_{ol+1} + (-126464+126464\; \mathrm{I})\; u_{ol+1+1} + (21219+6892\; \mathrm{I})\; u_{ol+2+1} - 69\; u_{ol-3} - 32256\; u_{ol-2} - 117117\; u_{ol-1} + 117117\; u_{ol+1} + 32256\; u_{ol+2}$$
  
$$+ 69\; u_{ol+3} - (21219+6892\; \mathrm{I})\; u_{ol-2-1} + (126464-126464\; \mathrm{I})\; u_{ol-1-1} + 117117\; \mathrm{I}\; u_{ol-1} - (126464+126464\; \mathrm{I})\; u_{ol+1-1} + (21219-6892\; \mathrm{I})\; u_{ol+2-1} + (6892+21219\; \mathrm{I})\; u_{ol-1-2\mathrm{I}} + 32256\; \mathrm{I}\; u_{ol-2\mathrm{I}} + (-6892+21219\; \mathrm{I})\; u_{ol+1-2\mathrm{I}} + 69\; \mathrm{I}\; u_{ol-3\mathrm{I}} \Big) \Big),\; O(\; \Delta x_{ol}^{12}\; )$$

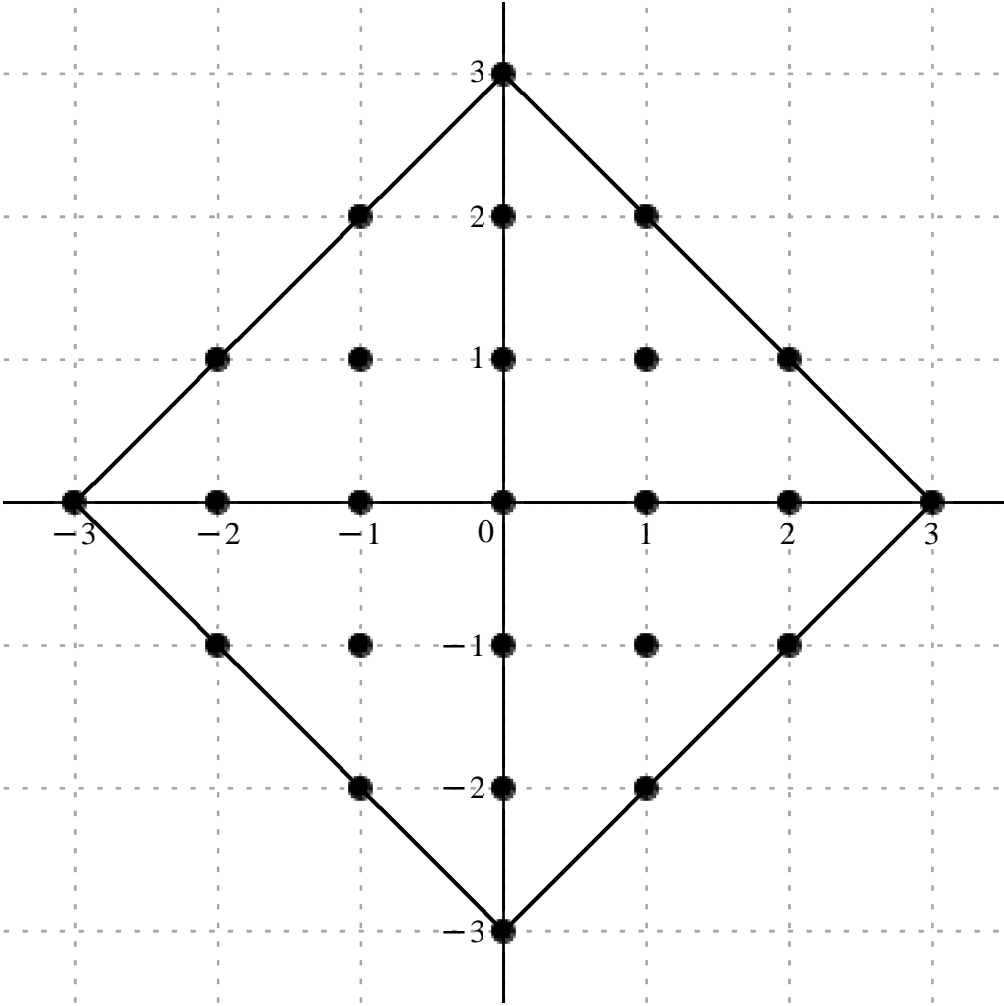
Formula: 662, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 14

Error order: 12, Error: 8.9403686948932545447 × 10<sup>-35</sup>, New Error: 8.9403686948809292727 × 10<sup>-47</sup>  
Error order: 12, Error: 8.9403686948809292727 × 10<sup>-47</sup>, New Error: 8.9403686948809280402 × 10<sup>-59</sup>  
Error order: 12, Error: 8.9403686948809280402 × 10<sup>-59</sup>, New Error: 8.9403686948809280401 × 10<sup>-71</sup>  
Error order: 12, Error: 8.9403686948809280401 × 10<sup>-71</sup>, New Error: 8.9403686948809280401 × 10<sup>-83</sup>  
Error order: 12, Error: 8.9403686948809280401 × 10<sup>-83</sup>, New Error: 8.9403686948809280401 × 10<sup>-95</sup>

$$x_o \neq h., \left[ \begin{array}{ccccccccc} & & & & 3\; \mathrm{I} & & & & \\ & & & & -1+2\; \mathrm{I} & 2\; \mathrm{I} & 1+2\; \mathrm{I} & & \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & & & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & & \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & & & \\ & & -1-2\; \mathrm{I} & -2\; \mathrm{I} & 1-2\; \mathrm{I} & & & & \\ & & & & -3\; \mathrm{I} & & & & \end{array} \right]$$

$$c = , \begin{bmatrix} & & & -\frac{334719}{1300} & & \\ & & -\frac{71789949}{650} + \frac{21640311 \text{ I}}{1300} & -\frac{58677696}{325} & -\frac{71789949}{650} - \frac{21640311 \text{ I}}{1300} & \\ \frac{71789949}{650} + \frac{21640311 \text{ I}}{1300} & -\frac{35392896 \text{ I}}{25} & -\frac{131107977}{100} & \frac{35392896 \text{ I}}{25} & \frac{71789949}{650} - \frac{21640311 \text{ I}}{1300} & \\ \frac{334719}{1300} & \frac{58677696}{325} & \frac{131107977}{100} & 0 & \frac{131107977}{100} & \frac{58677696}{325} & \frac{334719}{1300} \\ \frac{71789949}{650} - \frac{21640311 \text{ I}}{1300} & \frac{35392896 \text{ I}}{25} & -\frac{131107977}{100} & -\frac{35392896 \text{ I}}{25} & \frac{71789949}{650} + \frac{21640311 \text{ I}}{1300} & \\ & -\frac{71789949}{650} - \frac{21640311 \text{ I}}{1300} & -\frac{58677696}{325} & -\frac{71789949}{650} + \frac{21640311 \text{ I}}{1300} & & \\ & & -\frac{334719}{1300} & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^{14}}{\mathrm{d} x_{o l}^{14}} \; u(x_{o l}) = \frac{1}{1300 \; \Delta x_{o l}^{14}} \Big( 14553 \; \big( -23 \; u_{o l + 3 \text{I}} + (-9866 + 1487 \; \text{I}) \; u_{o l - 1 + 2 \text{I}} - 16128 \; u_{o l + 2 \text{I}} - (9866 + 1487 \; \text{I}) \; u_{o l + 1 + 2 \text{I}} + (9866 + 1487 \; \text{I}) \; u_{o l - 2 + \text{I}} - 126464 \; \text{I} u_{o l - 1 + \text{I}} - 117117 \; u_{o l + \text{I}} + 126464 \; \text{I} u_{o l + 1 + \text{I}} + (9866 - 1487 \; \text{I}) \; u_{o l + 2 + \text{I}} + 23 \; u_{o l - 3} + 16128 \; u_{o l - 2} + 117117 \; u_{o l - 1} + 117117 \; u_{o l + 1} + 16128 \; u_{o l + 2} + 23 \; u_{o l + 3} + (9866 - 1487 \; \text{I}) \; u_{o l - 2 - \text{I}} + 126464 \; \text{I} u_{o l - 1 - \text{I}} - 117117 \; u_{o l - \text{I}} - 126464 \; \text{I} u_{o l + 1 - \text{I}} + (9866 + 1487 \; \text{I}) \; u_{o l + 2 - \text{I}} - (9866 + 1487 \; \text{I}) \; u_{o l - 1 - 2 \text{I}} - 16128 \; u_{o l - 2 \text{I}} + (-9866 + 1487 \; \text{I}) \; u_{o l + 1 - 2 \text{I}} - 23 \; u_{o l - 3 \text{I}} \big) \Big) \; O( \; \Delta x_{o l}^{12} \; )$$

Formula.: 663, Var.: 1

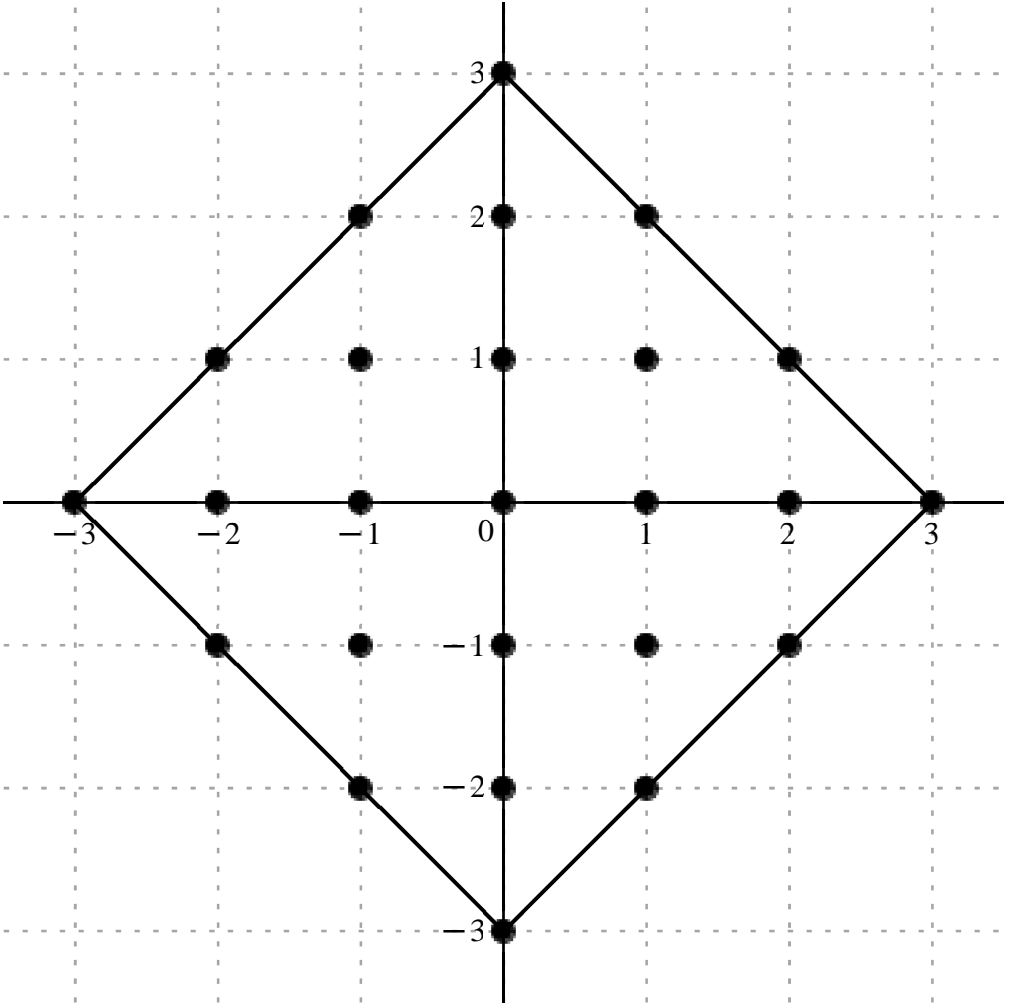
Variavel :, x\_{o l}, Derivada de Ordem :, 15

Error order.: 12, Error.: 4.9421606936935677324 × 10−35, New Error.: 4.9421606936876335620 × 10−47

Error order:, 12, Error:, 4.9421606936876335620 × 10<sup>-47</sup>, New Error:, 4.9421606936876329686 × 10<sup>-59</sup>  
Error order:, 12, Error:, 4.9421606936876329686 × 10<sup>-59</sup>, New Error:, 4.9421606936876329685 × 10<sup>-71</sup>  
Error order:, 12, Error:, 4.9421606936876329685 × 10<sup>-71</sup>, New Error:, 4.9421606936876329685 × 10<sup>-83</sup>  
Error order:, 12, Error:, 4.9421606936876329685 × 10<sup>-83</sup>, New Error:, 4.9421606936876329685 × 10<sup>-95</sup>

$$x_o + h \cdot , \begin{bmatrix} & & & & 3 \text{ I} & & \\ & & & & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} \\ & & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} & \\ & & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & & \\ & & & & -3 \text{ I} & & \end{bmatrix}$$

$$c = , \begin{bmatrix} & & & & \frac{334719 \text{ I}}{260} & & \\ & & & & \frac{28029078}{65} + \frac{159311691 \text{ I}}{260} & \frac{88016544 \text{ I}}{65} & -\frac{28029078}{65} + \frac{159311691 \text{ I}}{260} \\ & -\frac{159311691}{260} - \frac{28029078 \text{ I}}{65} & -\frac{53089344}{5} + \frac{53089344 \text{ I}}{5} & \frac{393323931 \text{ I}}{20} & \frac{53089344}{5} + \frac{53089344 \text{ I}}{5} & \frac{159311691}{260} - \frac{28029078 \text{ I}}{65} & \\ -\frac{334719}{260} & -\frac{88016544}{65} & -\frac{393323931}{20} & 0 & \frac{393323931}{20} & \frac{88016544}{65} & \frac{334719}{260} \\ -\frac{159311691}{260} + \frac{28029078 \text{ I}}{65} & -\frac{53089344}{5} - \frac{53089344 \text{ I}}{5} & -\frac{393323931 \text{ I}}{20} & \frac{53089344}{5} - \frac{53089344 \text{ I}}{5} & \frac{159311691}{260} + \frac{28029078 \text{ I}}{65} & & \\ & \frac{28029078}{65} - \frac{159311691 \text{ I}}{260} & -\frac{88016544 \text{ I}}{65} & -\frac{28029078}{65} - \frac{159311691 \text{ I}}{260} & & & \\ & & & -\frac{334719 \text{ I}}{260} & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}}\,u(x_{ol})=\frac{1}{260\,\mathcal{A}x_{ol}^{15}}\big(14553\,(23\,\mathrm{I}\,u_{ol+3\mathrm{I}}+(7704+10947\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+24192\,\mathrm{I}\,u_{ol+2\mathrm{I}}+(-7704+10947\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}-(10947+7704\,\mathrm{I})\,u_{ol-2+1}+(-189696+189696\,\mathrm{I})\,u_{ol-1+1}+351351\,\mathrm{I}\,u_{ol+1}+(189696+189696\,\mathrm{I})\,u_{ol+1+1}+(10947-7704\,\mathrm{I})\,u_{ol+2+1}-23\,u_{ol-3}-24192\,u_{ol-2}-351351\,u_{ol-1}+351351\,u_{ol+1}+24192\,u_{ol+2}+23\,u_{ol+3}+(-10947+7704\,\mathrm{I})\,u_{ol-2-1}-(189696+189696\,\mathrm{I})\,u_{ol-1-1}-351351\,\mathrm{I}\,u_{ol-1}+(189696-189696\,\mathrm{I})\,u_{ol+1-1}+(10947+7704\,\mathrm{I})\,u_{ol+2-1}+(7704-10947\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}-24192\,\mathrm{I}\,u_{ol-2\mathrm{I}}-(7704+10947\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}-23\,\mathrm{I}\,u_{ol-3\mathrm{I}})\big),\,O(\,\mathcal{A}x_{ol}^{12}\,)$$

Formula:, 664, Var.:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 16

Error order:., 12, Error:., 2.8100416168829145057 × 10−35, New Error:., 2.8100416168799621821 × 10−47

Error order:., 12, Error:., 2.8100416168799621821 × 10−47, New Error:., 2.8100416168799618869 × 10−59

Error order:., 12, Error:., 2.8100416168799618869 × 10−59, New Error:., 2.8100416168799618869 × 10−71

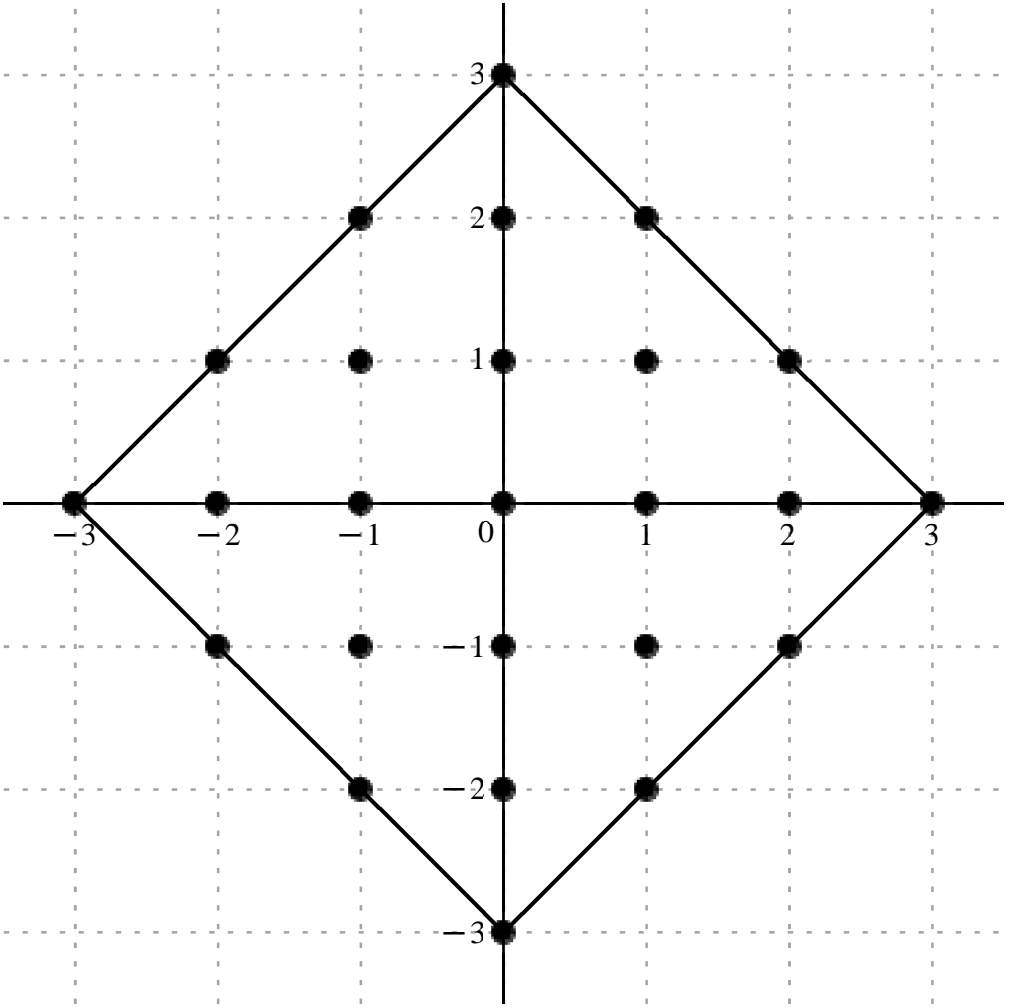
Error order:., 12, Error:., 2.8100416168799618869 × 10−71, New Error:., 2.8100416168799618869 × 10−83

Error order:., 12, Error:., 2.8100416168799618869 × 10−83, New Error:., 2.8100416168799618869 × 10−95

$$x_o+h\, , \left[ \begin{array}{ccccccccc} & & & & 3\,\mathrm{I} & & & & \\ & & & & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & & \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & & & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & & \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & & & \\ & & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & & & & \\ & & & & -3\,\mathrm{I} & & & & \end{array} \right]$$

$$c=,\left[\begin{array}{ccccccc} & & & & \frac{446292}{65} & & \\ & & & & & & \\ & & \frac{165205656}{65}-\frac{306835452\,\mathrm{I}}{65} & \frac{704132352}{65} & \frac{165205656}{65}+\frac{306835452\,\mathrm{I}}{65} & & \\ & \frac{165205656}{65}+\frac{306835452\,\mathrm{I}}{65} & \frac{849429504}{5} & \frac{1573295724}{5} & \frac{849429504}{5} & \frac{165205656}{65}-\frac{306835452\,\mathrm{I}}{65} & \\ \frac{446292}{65} & \frac{704132352}{65} & \frac{1573295724}{5} & -2001871872 & \frac{1573295724}{5} & \frac{704132352}{65} & \frac{446292}{65} \\ \frac{165205656}{65}-\frac{306835452\,\mathrm{I}}{65} & \frac{849429504}{5} & \frac{1573295724}{5} & \frac{849429504}{5} & \frac{165205656}{65}+\frac{306835452\,\mathrm{I}}{65} & & \\ & \frac{165205656}{65}+\frac{306835452\,\mathrm{I}}{65} & \frac{704132352}{65} & \frac{165205656}{65}-\frac{306835452\,\mathrm{I}}{65} & & & \\ & & \frac{446292}{65} & & & & \end{array}\right]$$





$$\frac{\mathrm{d}^{16}}{\mathrm{d}x_{ol}^{16}}\,u(x_{ol})=\frac{1}{65\,\Delta x_{ol}^{16}}\Big(19404\,(23\,u_{ol+3\mathrm{I}}+(8514-15813\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+36288\,u_{ol+2\mathrm{I}}+(8514+15813\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+(8514+15813\,\mathrm{I})\,u_{ol-2+1}+569088\,u_{ol-1+1}+1054053\,u_{ol+1}+569088\,u_{ol+1+1}+(8514-15813\,\mathrm{I})\,u_{ol+2+1}+23\,u_{ol-3}+36288\,u_{ol-2}+1054053\,u_{ol-1}-6705920\,u_{ol}+1054053\,u_{ol+1}+36288\,u_{ol+2}+23\,u_{ol+3}+(8514-15813\,\mathrm{I})\,u_{ol-2-1}+569088\,u_{ol-1-1}+1054053\,u_{ol-1}+569088\,u_{ol+1-1}+(8514+15813\,\mathrm{I})\,u_{ol+2-1}+(8514+15813\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}+36288\,u_{ol-2\mathrm{I}}+(8514-15813\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}+23\,u_{ol-3\mathrm{I}})\Big),\,O(\,\Delta x_{ol}^{12}\,)$$

Formula: 665, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 17

Error order.: 8, Error.:  $4.9879268617059751867\times 10^{-24}$ , New Error.:  $4.9879268617123185569\times 10^{-32}$

Error order.: 8, Error.:  $4.9879268617123185569\times 10^{-32}$ , New Error.:  $4.9879268617123191913\times 10^{-40}$

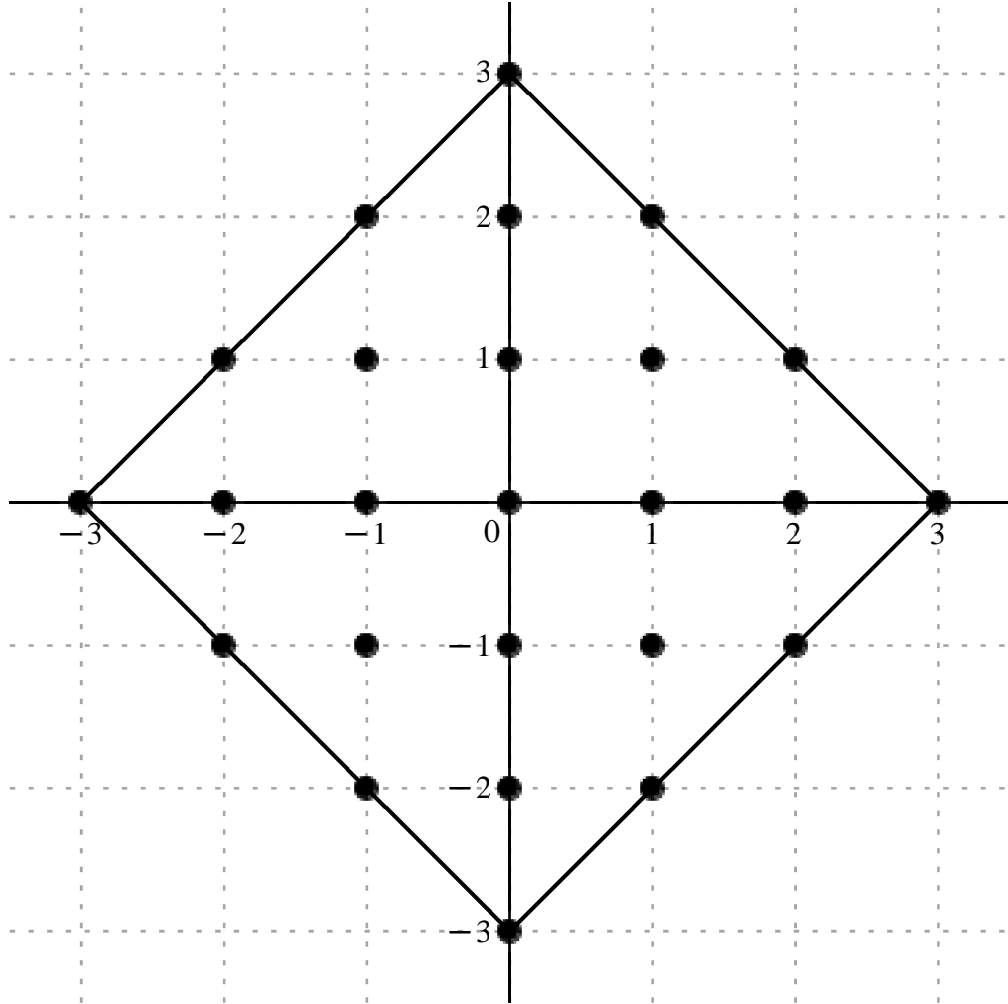
Error order.: 8, Error.:  $4.9879268617123191913\times 10^{-40}$ , New Error.:  $4.9879268617123191913\times 10^{-48}$

Error order.: 8, Error.:  $4.9879268617123191913\times 10^{-48}$ , New Error.:  $4.9879268617123191913\times 10^{-56}$

Error order.: 8, Error.:  $4.9879268617123191913\times 10^{-56}$ , New Error.:  $4.9879268617123191913\times 10^{-64}$

$$x_o+h.,\left[\begin{array}{ccccccccc} & & & & 3\,\mathrm{I} & & & & \\ & & & & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & & \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & & & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & & \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & & & \\ & & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & & & & \\ & & & & -3\,\mathrm{I} & & & & \end{array}\right]$$

$$c = \begin{bmatrix} -\frac{523908}{65} & -\frac{8583708672}{65} & \frac{9146909772}{5} & 0 & -\frac{9146909772}{5} & \frac{8583708672}{65} & \frac{523908}{65} \\ \frac{277147332}{65} + \frac{2604870576}{65} & -\frac{3755372544}{5} + \frac{3755372544}{5} & -\frac{9146909772}{5} & \frac{3755372544}{5} + \frac{3755372544}{5} & -\frac{277147332}{65} + \frac{2604870576}{65} & & \\ -\frac{2604870576}{65} - \frac{277147332}{65} & \frac{8583708672}{65} & \frac{2604870576}{65} - \frac{277147332}{65} & & & & \\ \frac{523908}{65} & & & & & & \end{bmatrix}$$



$$\frac{d^{17}}{dx_{ol}^{17}} \; u(x_{ol}) = \frac{1}{65 \; \Delta x_{ol}^{17}} \Big( 523908 \; \big( -I u_{ol+3I} + (-4972+529 \; I) \; u_{ol-1+2I} -16384 \; I u_{ol+2I} + (4972+529 \; I) \; u_{ol+1+2I} + (529-4972 \; I) \; u_{ol-2+I} - (93184+93184 \; I) \; u_{ol-1+I} + 226967 \; I u_{ol+I} + (93184-93184 \; I) \; u_{ol+1+I} - (529+4972 \; I) \; u_{ol+2+I} - u_{ol-3} -16384 \; u_{ol-2} + 226967 \; u_{ol-1} -226967 \; u_{ol+1} +16384 \; u_{ol+2} + u_{ol+3} + (529+4972 \; I) \; u_{ol-2-I} + (-93184+93184 \; I) \; u_{ol-1-I} -226967 \; I u_{ol-1} + (93184+93184 \; I) \; u_{ol+1-I} + (-529+4972 \; I) \; u_{ol+2-I} - (4972+529 \; I) \; u_{ol-1-2I} + 16384 \; I u_{ol-2I} + (4972-529 \; I) \; u_{ol+1-2I} + I u_{ol-3I} \big) \Big), \; O(\; \Delta x_{ol}^{\; 8} \; )$$

Formula.: 666, Var.: 1

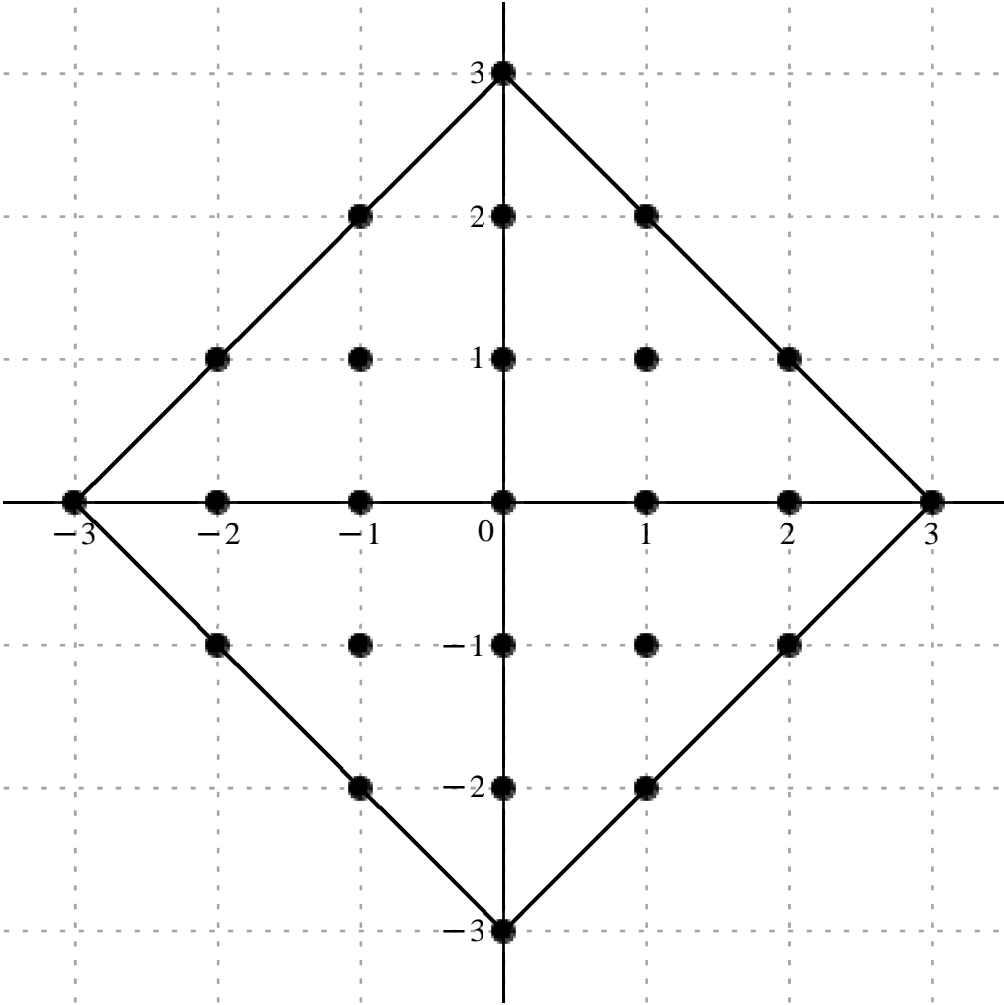
Variavel :, x\_{ol}, Derivada de Ordem :, 18

Error order.: 8, Error.: 3.4360001343560190957 × 10−24, New Error.: 3.4360001343598061824 × 10−32

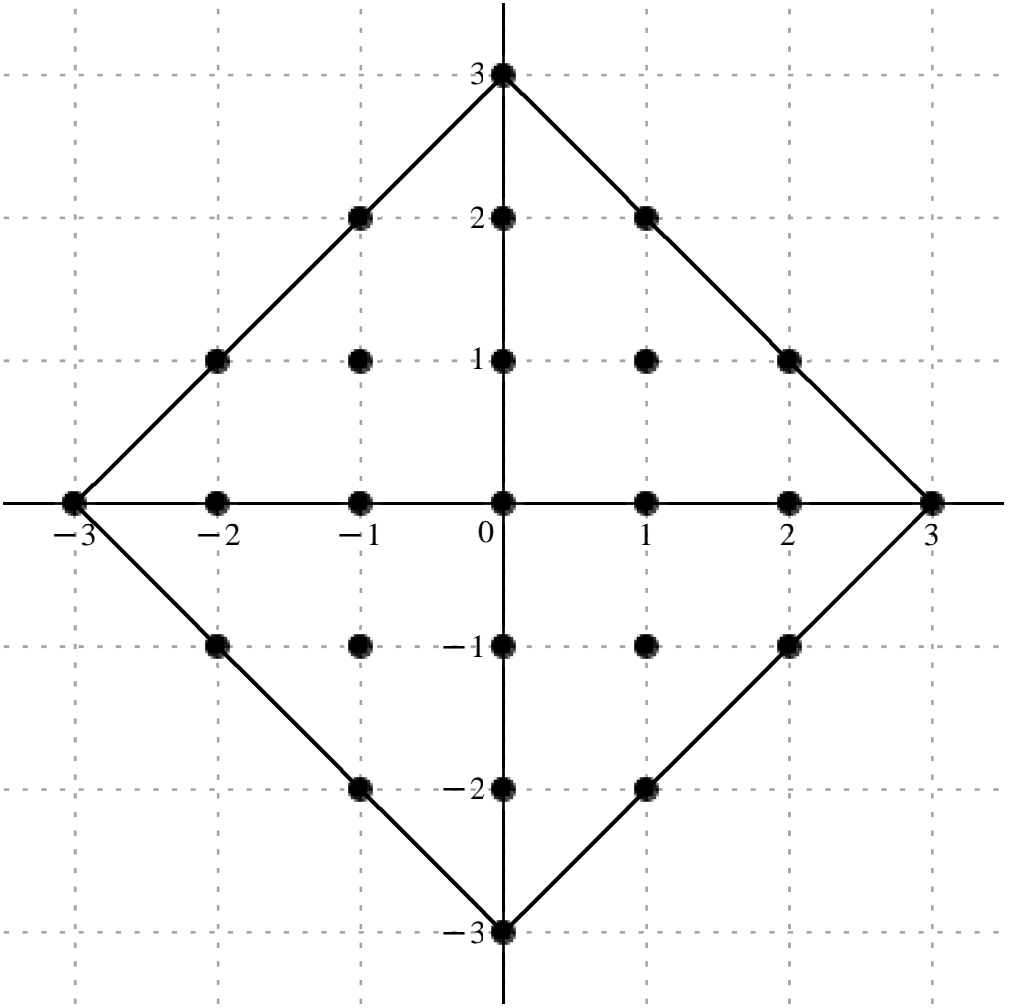
Error order:, 8, Error:, 3.4360001343598061824 × 10<sup>−32</sup>, New Error:, 3.4360001343598065612 × 10<sup>−40</sup>  
Error order:, 8, Error:, 3.4360001343598065612 × 10<sup>−40</sup>, New Error:, 3.4360001343598065612 × 10<sup>−48</sup>  
Error order:, 8, Error:, 3.4360001343598065612 × 10<sup>−48</sup>, New Error:, 3.4360001343598065612 × 10<sup>−56</sup>  
Error order:, 8, Error:, 3.4360001343598065612 × 10<sup>−56</sup>, New Error:, 3.4360001343598065612 × 10<sup>−64</sup>

$$x_o + h., \begin{bmatrix} & & & & 3\text{ I} & & \\ & & & & -1 + 2\text{ I} & 2\text{ I} & 1 + 2\text{ I} \\ & & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} & \\ & & -1 - 2\text{ I} & -2\text{ I} & 1 - 2\text{ I} & & \\ & & & & -3\text{ I} & & \end{bmatrix}$$

$$c =, \begin{bmatrix} & & & & -\frac{3143448}{65} & & \\ & & & & \frac{11372994864}{65} + \frac{17757337752\text{ I}}{65} & -\frac{77253378048}{65} & \frac{11372994864}{65} - \frac{17757337752\text{ I}}{65} \\ & -\frac{11372994864}{65} + \frac{17757337752\text{ I}}{65} & \frac{67596705792\text{ I}}{5} & \frac{164644375896}{5} & -\frac{67596705792\text{ I}}{5} & -\frac{11372994864}{65} - \frac{17757337752\text{ I}}{65} & \\ \frac{3143448}{65} & \frac{77253378048}{65} & -\frac{164644375896}{5} & 0 & -\frac{164644375896}{5} & \frac{77253378048}{65} & \frac{3143448}{65} \\ & -\frac{11372994864}{65} - \frac{17757337752\text{ I}}{65} & -\frac{67596705792\text{ I}}{5} & \frac{164644375896}{5} & \frac{67596705792\text{ I}}{5} & -\frac{11372994864}{65} + \frac{17757337752\text{ I}}{65} & \\ & \frac{11372994864}{65} - \frac{17757337752\text{ I}}{65} & -\frac{77253378048}{65} & \frac{11372994864}{65} + \frac{17757337752\text{ I}}{65} & & & \\ & & & -\frac{3143448}{65} & & & \end{bmatrix}$$







$$\frac{\mathrm{d}^{19}}{\mathrm{d}x_{ol}^{19}}\; u(x_{ol}) = \frac{1}{65\; \Delta x_{ol}^{19}} \Big( 19908504 \left( \mathrm{I} u_{ol+3\mathrm{I}} + (4608 - 7731\; \mathrm{I})\; u_{ol-1+2\mathrm{I}} + 36864\; \mathrm{I} u_{ol+2\mathrm{I}} - (4608 + 7731\; \mathrm{I})\; u_{ol+1+2\mathrm{I}} + (7731 - 4608\; \mathrm{I})\; u_{ol-2+1} + (419328 - 419328\; \mathrm{I})\; u_{ol-1+1} - 2042703\; \mathrm{I} u_{ol+1} - (419328 + 419328\; \mathrm{I})\; u_{ol+1+1} - (7731 + 4608\; \mathrm{I})\; u_{ol+2+1} - u_{ol-3} - 36864\; u_{ol-2} + 2042703\; u_{ol-1} - 2042703\; u_{ol+1} + 36864\; u_{ol+2} + u_{ol+3} \right. \\ \left. + (7731 + 4608\; \mathrm{I})\; u_{ol-2-1} + (419328 + 419328\; \mathrm{I})\; u_{ol-1-1} + 2042703\; \mathrm{I} u_{ol-1} + (-419328 + 419328\; \mathrm{I})\; u_{ol+1-1} + (-7731 + 4608\; \mathrm{I})\; u_{ol+2-1} + (4608 + 7731\; \mathrm{I})\; u_{ol-1-2\mathrm{I}} - 36864\; \mathrm{I} u_{ol-2\mathrm{I}} + (-4608 + 7731\; \mathrm{I})\; u_{ol+1-2\mathrm{I}} - \mathrm{I} u_{ol-3\mathrm{I}} \right) \Big),\; O(\; \Delta x_{ol}^8 \; )$$

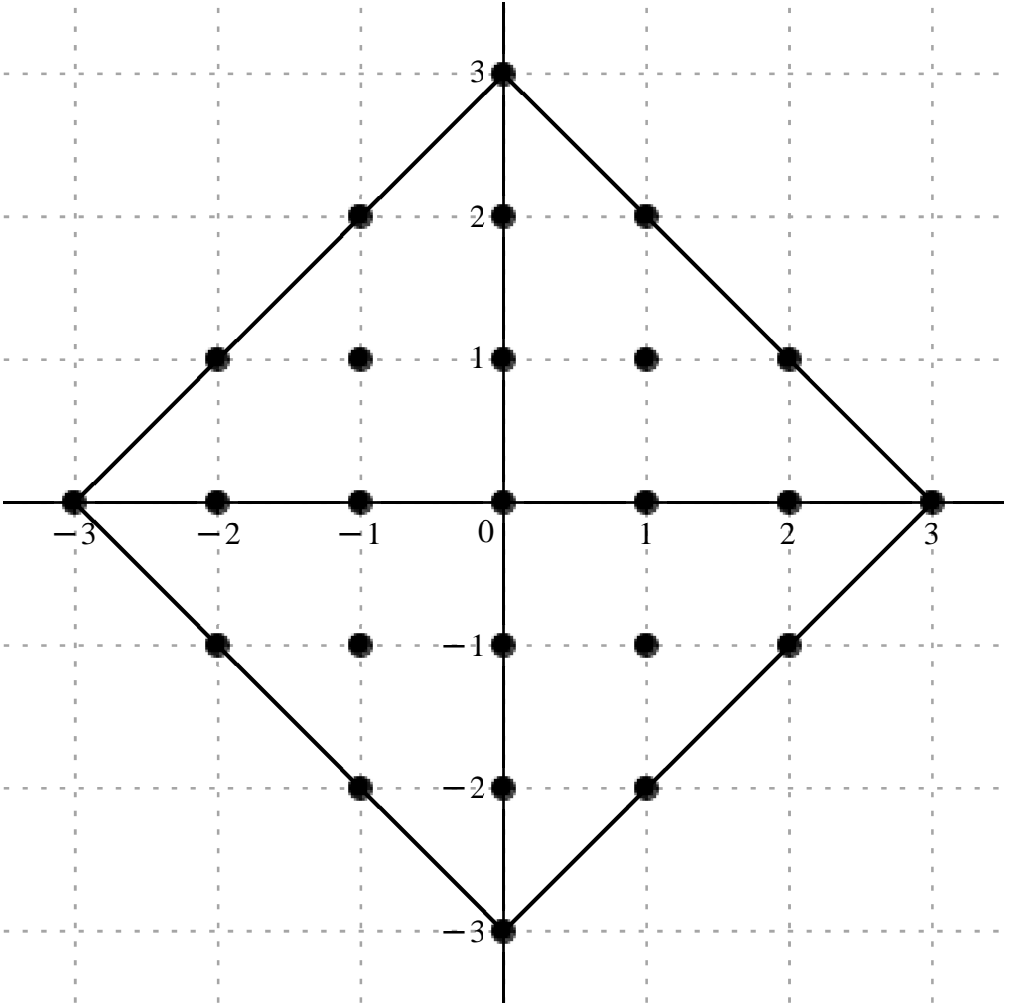
Formula: 668, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 20

Error order: 8, Error: 1.7099477880486609249 × 10<sup>-24</sup>, New Error: 1.7099477880500972245 × 10<sup>-32</sup>  
Error order: 8, Error: 1.7099477880500972245 × 10<sup>-32</sup>, New Error: 1.7099477880500973681 × 10<sup>-40</sup>  
Error order: 8, Error: 1.7099477880500973681 × 10<sup>-40</sup>, New Error: 1.7099477880500973681 × 10<sup>-48</sup>  
Error order: 8, Error: 1.7099477880500973681 × 10<sup>-48</sup>, New Error: 1.7099477880500973681 × 10<sup>-56</sup>  
Error order: 8, Error: 1.7099477880500973681 × 10<sup>-56</sup>, New Error: 1.7099477880500973681 × 10<sup>-64</sup>

$$x_o \neq h., \left[ \begin{array}{cccccc} & & & 3\mathrm{I} & & \\ & & -1+2\mathrm{I} & 2\mathrm{I} & 1+2\mathrm{I} & \\ -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & \\ & -1-2\mathrm{I} & -2\mathrm{I} & 1-2\mathrm{I} & & \\ & & -3\mathrm{I} & & & \end{array} \right]$$

$$c = , \begin{array}{cccccc} & & & \frac{26544672}{13} & & \\ & & -\frac{319650940224}{13} - \frac{23651302752 \text{ I}}{13} & \frac{1467814182912}{13} & -\frac{319650940224}{13} + \frac{23651302752 \text{ I}}{13} & \\ & -\frac{319650940224}{13} + \frac{23651302752 \text{ I}}{13} & -2568674820096 & -12512972568096 & -2568674820096 & -\frac{319650940224}{13} - \frac{23651302752 \text{ I}}{13} \\ \frac{26544672}{13} & \frac{1467814182912}{13} & -12512972568096 & 60071654522880 & -12512972568096 & \frac{1467814182912}{13} & \frac{26544672}{13} \\ & -\frac{319650940224}{13} - \frac{23651302752 \text{ I}}{13} & -2568674820096 & -12512972568096 & -2568674820096 & -\frac{319650940224}{13} + \frac{23651302752 \text{ I}}{13} \\ & & -\frac{319650940224}{13} + \frac{23651302752 \text{ I}}{13} & \frac{1467814182912}{13} & -\frac{319650940224}{13} - \frac{23651302752 \text{ I}}{13} & \\ & & & \frac{26544672}{13} & & \end{array}$$



$$\frac{\mathrm{d}^{20}}{\mathrm{d} x_{o l}^{20}} \; u(x_{o l}) = \frac{1}{13 \; \mathcal{A}_{o l}^{20}} \big( 26544672 \; ( u_{o l + 3 \text{ I}} - (12042 + 891 \; \text{I}) \; u_{o l - 1 + 2 \text{ I}} + 55296 \; u_{o l + 2 \text{ I}} + ( -12042 + 891 \; \text{I}) \; u_{o l + 1 + 2 \text{ I}} + ( -12042 + 891 \; \text{I}) \; u_{o l - 2 + \text{ I}} - 1257984 \; u_{o l - 1 + \text{ I}} - 6128109 \; u_{o l + \text{ I}} - 1257984 \; u_{o l + 1 + \text{ I}} - (12042 + 891 \; \text{I}) \; u_{o l + 2 + \text{ I}} + u_{o l - 3} + 55296 \; u_{o l - 2} - 6128109 \; u_{o l - 1} + 29419520 \; u_{o l} - 6128109 \; u_{o l + 1} + 55296 \; u_{o l + 2} + u_{o l + 3} - (12042$$

$$+ 891 \; \text{I}) \; u_{o l - 2 - 1} - 1257984 \; u_{o l - 1 - 1} - 6128109 \; u_{o l - 1} - 1257984 \; u_{o l + 1 - 1} + ( -12042 + 891 \; \text{I}) \; u_{o l + 2 - 1} + ( -12042 + 891 \; \text{I}) \; u_{o l - 1 - 2 \text{ I}} + 55296 \; u_{o l - 2 \text{ I}} - (12042 + 891 \; \text{I}) \; u_{o l + 1 - 2 \text{ I}} + u_{o l - 3 \text{ I}} ) \big) , \; O( \; \mathcal{A}_{o l}^8 \; )$$

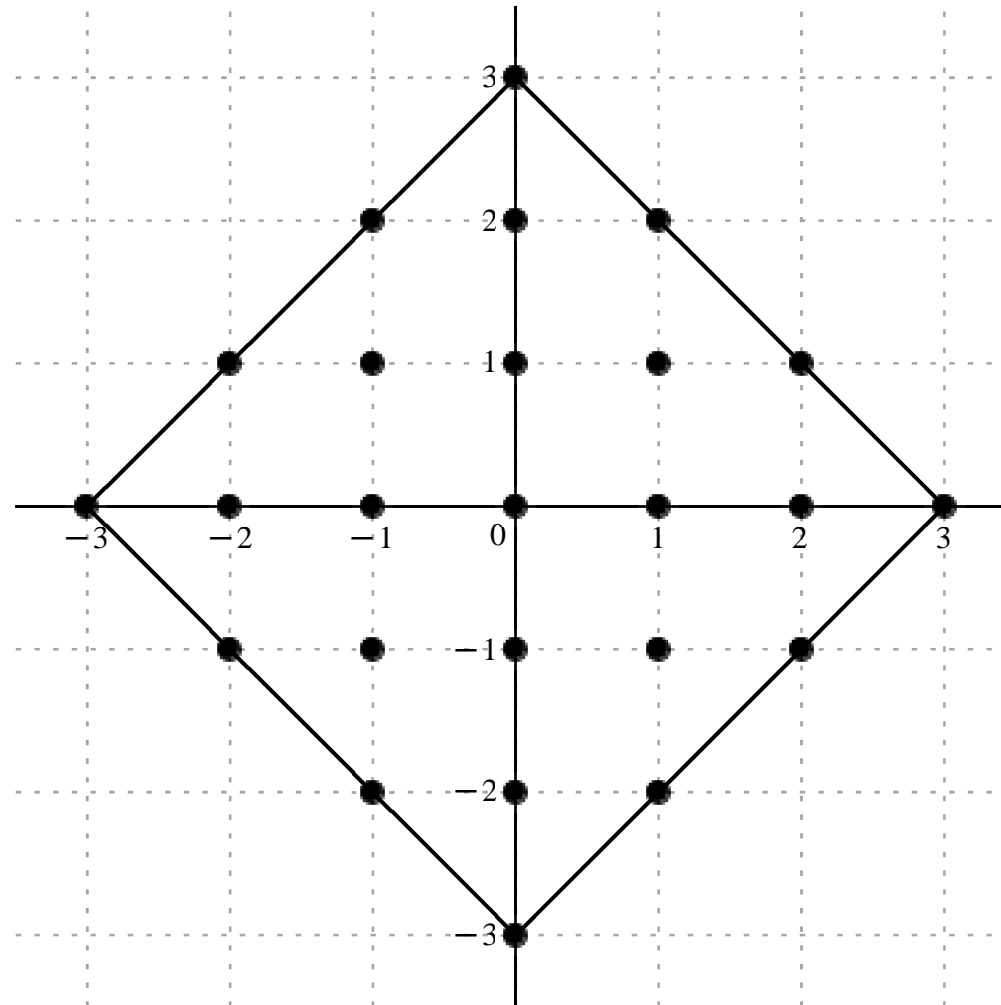
Formula.: 669,
Var.: 1

Variavel :,  $x_{o l}$ ,
Derivada de Ordem :, 21

Error order.: 4,
Error.: 1.2628536556294290422 × 10<sup>−11</sup>,
New Error.: 1.2628536556270088478 × 10<sup>−15</sup>

*Error order:*, 4, *Error:*, 1.2628536556270088478  $\times 10^{-15}$ , *New Error:*, 1.2628536556270086058  $\times 10^{-19}$   
*Error order:*, 4, *Error:*, 1.2628536556270086058  $\times 10^{-19}$ , *New Error:*, 1.2628536556270086058  $\times 10^{-23}$   
*Error order:*, 4, *Error:*, 1.2628536556270086058  $\times 10^{-23}$ , *New Error:*, 1.2628536556270086058  $\times 10^{-27}$   
*Error order:*, 4, *Error:*, 1.2628536556270086058  $\times 10^{-27}$ , *New Error:*, 1.2628536556270086058  $\times 10^{-31}$

[illegible]



$$\frac{d^{(21)}}{dx_{ol}^{21}} u(x_{ol}) = \frac{1}{13 \mathcal{A}_{ol}^{21}} (5016943008 (-3 I u_{ol+31} + (164+27 I) u_{ol-1+21} + 768 I u_{ol+21} + (-164+27 I) u_{ol+1+21} + (27+164 I) u_{ol-2+1} + (3328+3328 I) u_{ol-1+1} - 8619 I u_{ol+1} + (-3328+3328 I) u_{ol+1+1} + (-27+164 I) u_{ol+2+1} - 3 u_{ol-3} + 768 u_{ol-2} - 8619 u_{ol-1} + 8619 u_{ol+1} - 768 u_{ol+2} + 3 u_{ol+3} + (27-164 I) u_{ol-2-1} + (3328-3328 I) u_{ol-1-1} + 8619 I u_{ol-1} - (3328+3328 I) u_{ol+1-1} - (27+164 I) u_{ol+2-1} + (164-27 I) u_{ol-1-21} - 768 I u_{ol-21} - (164+27 I) u_{ol+1-21} + 3 I u_{ol-31})), O(\mathcal{A}_{ol}^4)$$

Formula:, 670, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 22

*Error order:*, 4, *Error:*,  $1.0632522167562318784 \times 10^{-11}$ , *New Error:*,  $1.0632522167544658990 \times 10^{-15}$

*Error order*., 4, *Error*.,  $1.0632522167544658990 \times 10^{-15}$ , *New Error*.,  $1.0632522167544657225 \times 10^{-19}$

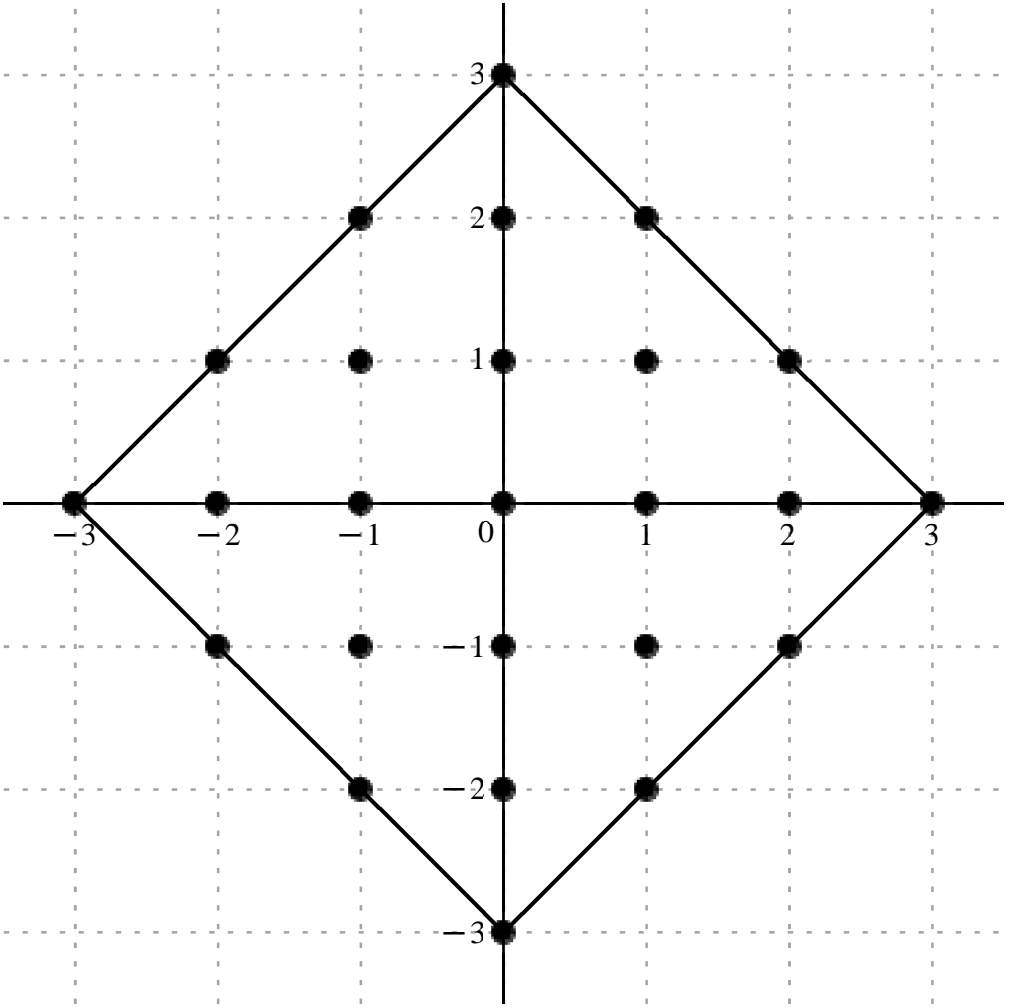
*Error order*., 4, *Error*.,  $1.0632522167544657225 \times 10^{-19}$ , *New Error*.,  $1.0632522167544657224 \times 10^{-23}$

*Error order*., 4, *Error*.,  $1.0632522167544657224 \times 10^{-23}$ , *New Error*.,  $1.0632522167544657224 \times 10^{-27}$

*Error order*:, 4, *Error*:,  $1.0632522167544657224 \times 10^{-27}$ , *New Error*:,  $1.0632522167544657224 \times 10^{-31}$

[illegible]





$$\frac{d^{22}}{dx_{ol}^{22}} u(x_{ol}) = \frac{1}{13 \Delta x_{ol}^{22}} \left( 110372746176 \left( -u_{ol+3I} - (22+71I) u_{ol-1+2I} + 384 u_{ol+2I} + (-22+71I) u_{ol+1+2I} + (22-71I) u_{ol-2+I} - 3328 I u_{ol-1+I} - 8619 u_{ol+I} + 3328 I u_{ol+1+I} + (22+71I) u_{ol+2+I} + u_{ol-3} - 384 u_{ol-2} + 8619 u_{ol-1} + 8619 u_{ol+1} - 384 u_{ol+2} + u_{ol+3} + (22+71I) u_{ol-2-I} + 3328 I u_{ol-1-I} - 8619 u_{ol-I} \right. \right. \\ \left. \left. - 3328 I u_{ol+1-I} + (22-71I) u_{ol+2-I} + (-22+71I) u_{ol-1-2I} + 384 u_{ol-2I} - (22+71I) u_{ol+1-2I} - u_{ol-3I} \right) \right), O(\Delta x_{ol}^4)$$

Not square - Triangle: Interval, 7

Formula:, 671, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 35, Error:,  $1.3841280798844900525 \times 10^{-90}$ , New Error:,  $1.3344102452261343435 \times 10^{-125}$

Error order:, 35, Error:,  $1.3344102452261343435 \times 10^{-125}$ , New Error:,  $1.3294857034163676005 \times 10^{-160}$

Error order:, 35, Error:,  $1.3294857034163676005 \times 10^{-160}$ , New Error:,  $1.3289937237600794496 \times 10^{-195}$

Error order:, 35, Error:,  $1.3289937237600794496 \times 10^{-195}$ , New Error:,  $1.3289445305417340839 \times 10^{-230}$

Error order:, 35, Error:,  $1.3289445305417340839 \times 10^{-230}$ , New Error:,  $1.3289396112673744112 \times 10^{-265}$

$$x_o \neq h., \left[ \begin{array}{cccccccc} 7I & & & & & & & \\ 6I & 1+6I & & & & & & \\ 5I & 1+5I & 2+5I & & & & & \\ 4I & 1+4I & 2+4I & 3+4I & & & & \\ 3I & 1+3I & 2+3I & 3+3I & 4+3I & & & \\ 2I & 1+2I & 2+2I & 3+2I & 4+2I & 5+2I & & \\ I & 1+I & 2+I & 3+I & 4+I & 5+I & 6+I & \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \end{array} \right]$$



Formula:, 672, Var:, 1

*Variavel* :,  $x_{oI}$ , *Derivada de Ordem* :, 1

*Error order*., 35, *Error*.,  $1.3170307476353480658 \times 10^{-90}$ , *New Error*.,  $1.3277951124383059892 \times 10^{-125}$

*Error order*., 35, *Error*.,  $1.3277951124383059892 \times 10^{-125}$ , *New Error*.,  $1.3288251479215405829 \times 10^{-160}$

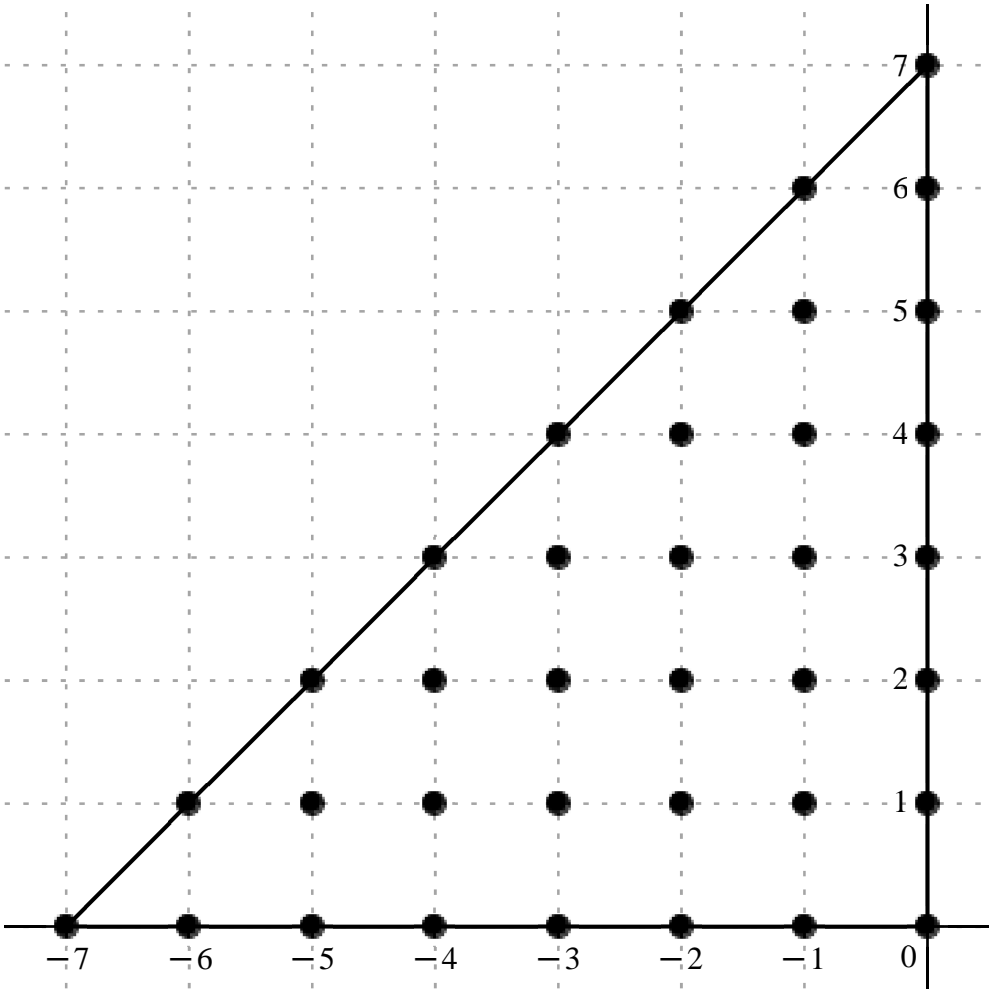
*Error order*., 35, *Error*.,  $1.3288251479215405829 \times 10^{-160}$ , *New Error*.,  $1.3289276778002151359 \times 10^{-195}$

*Error order*., 35, *Error*.,  $1.3289276778002151359 \times 10^{-195}$ , *New Error*.,  $1.3289379260416556152 \times 10^{-230}$

*Error order*., 35, *Error*.,  $1.3289379260416556152 \times 10^{-230}$ , *New Error*.,  $1.3289389508183256558 \times 10^{-265}$

$x_o + h.$							7 I
						-1 + 6 I	6 I
					-2 + 5 I	-1 + 5 I	5 I
				-3 + 4 I	-2 + 4 I	-1 + 4 I	4 I
			-4 + 3 I	-3 + 3 I	-2 + 3 I	-1 + 3 I	3 I
		-5 + 2 I	-4 + 2 I	-3 + 2 I	-2 + 2 I	-1 + 2 I	2 I
	-6 + I	-5 + I	-4 + I	-3 + I	-2 + I	-1 + I	I
	-7	-6	-5	-4	-3	-2	-1

$$c = ,$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{264034600611600\,\Delta x_{ol}}\left(\begin{aligned} &-(993238545+209235\,\mathrm{I})\,u_{ol+71}+(10475430147525-3286152840075\,\mathrm{I})\,u_{ol-1+61}-(879918682370+631411388790\,\mathrm{I})\,u_{ol+61}+(8000842584149415-743335025300595\,\mathrm{I})\,u_{ol-2+51}-(11523572673338880+6182696052822240\,\mathrm{I})\,u_{ol-1+51}+(293199009108390-89000917082910\,\mathrm{I})\,u_{ol+51}\\ &+(34705367990890233-242937575936231631\,\mathrm{I})\,u_{ol-3+41}+(1599832817141037570+4342403360811387690\,\mathrm{I})\,u_{ol-2+41}+(-1949376121726474350+1008297993996452250\,\mathrm{I})\,u_{ol-1+41}+(-17255674482187050+429245633885250\,\mathrm{I})\,u_{ol+41}+(-242937575936231631+34705367990890233\,\mathrm{I})\,u_{ol-4+31}\\ &-(24204769470569598400+24204769470569598400\,\mathrm{I})\,u_{ol-3+31}-(178759341590000769360+118211822664355347480\,\mathrm{I})\,u_{ol-2+31}+(-36898916198995992960+18156609558236123520\,\mathrm{I})\,u_{ol-1+31}+(79782455151471800+139619296515075650\,\mathrm{I})\,u_{ol+31}+(-743335025300595+8000842584149415\,\mathrm{I})\,u_{ol-5+21}\\ &+(4342403360811387690+1599832817141037570\,\mathrm{I})\,u_{ol-4+21}-(118211822664355347480+178759341590000769360\,\mathrm{I})\,u_{ol-3+21}+(420054626372499027000+420054626372499027000\,\mathrm{I})\,u_{ol-2+21}-(69470572823144069850+9693568300903823700\,\mathrm{I})\,u_{ol-1+21}+(175240438432113600-121253201592131700\,\mathrm{I})\,u_{ol+21}\\ &+(-3286152840075+10475430147525\,\mathrm{I})\,u_{ol-6+1}-(6182696052822240+11523572673338880\,\mathrm{I})\,u_{ol-5+1}+(1008297993996452250-1949376121726474350\,\mathrm{I})\,u_{ol-4+1}+(18156609558236123520-36898916198995992960\,\mathrm{I})\,u_{ol-3+1}-(9693568300903823700+69470572823144069850\,\mathrm{I})\,u_{ol-2+1}-(5958950306861916000\\ &+5958950306861916000\,\mathrm{I})\,u_{ol-1+1}-(26144682258026640+28097044894177980\,\mathrm{I})\,u_{ol+1}-(209235+993238545\,\mathrm{I})\,u_{ol-7}-(631411388790+879918682370\,\mathrm{I})\,u_{ol-6}+(-89000917082910+293199009108390\,\mathrm{I})\,u_{ol-5}+(429245633885250-17255674482187050\,\mathrm{I})\,u_{ol-4}+(139619296515075650+79782455151471800\,\mathrm{I})\,u_{ol-3}\\ &+(-121253201592131700+175240438432113600\,\mathrm{I})\,u_{ol-2}-(28097044894177980+26144682258026640\,\mathrm{I})\,u_{ol-1}+(1697635434780848+1697635434780848\,\mathrm{I})\,u_{ol}\Big),\,\,O(\,\,\Delta x_{ol}^{\,35}\,\,)\end{aligned}\right)$$

Formula.: 673, Var.: 1

Variavel.:  $x_{ol}$ , Derivada de Ordem.: 1

Error order.: 35, Error.:  $1.3397815637480455091 \times 10^{-90}$ , New Error.:  $1.3300723603237694477 \times 10^{-125}$

Error order.: 35, Error.:  $1.3300723603237694477 \times 10^{-125}$ , New Error.:  $1.3290528748763351975 \times 10^{-160}$

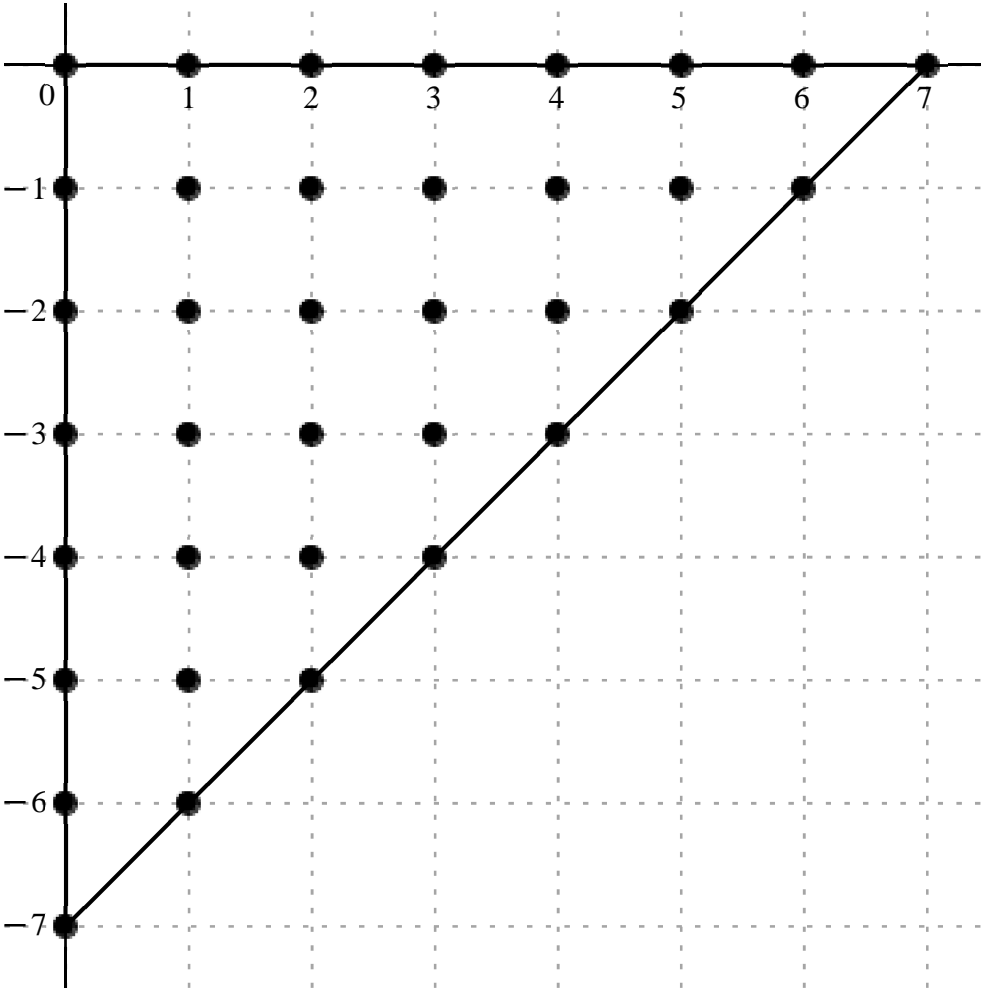
Error order.: 35, Error.:  $1.3290528748763351975 \times 10^{-160}$ , New Error.:  $1.3289504504978608454 \times 10^{-195}$

Error order.: 35, Error.:  $1.3289504504978608454 \times 10^{-195}$ , New Error.:  $1.3289402033114223524 \times 10^{-230}$

Error order.: 35, Error.:  $1.3289402033114223524 \times 10^{-230}$ , New Error.:  $1.3289391785453023317 \times 10^{-265}$

$$x_o+h\cdot,\left[\begin{array}{cccccccc}0&1&2&3&4&5&6&7\\-1&1-1&2-1&3-1&4-1&5-1&6-1&\\-21&1-21&2-21&3-21&4-21&5-21&\\-31&1-31&2-31&3-31&4-31&\\-41&1-41&2-41&3-41&\\-51&1-51&2-51&\\-61&1-61&\\-71&\end{array}\right]$$

$$c=,\left[\begin{array}{cccccccc} -\frac{800451251}{124494825}-\frac{800451251\text{ I}}{124494825}& \frac{470351}{4420}+\frac{109417\text{ I}}{1105}& \frac{1655073}{3604}-\frac{597996\text{ I}}{901}& -\frac{12691}{24}-\frac{1813\text{ I}}{6}& -\frac{9065}{5576}+\frac{364413\text{ I}}{5576}& \frac{7452459}{22108840}-\frac{24550911\text{ I}}{22108840}& \frac{4067}{1700680}+\frac{17003\text{ I}}{5102040}& \frac{1}{1261904560}+\frac{4747\text{ I}}{1261904560}\\ \frac{109417}{1105}+\frac{470351\text{ I}}{4420}& \frac{383670}{17}+\frac{383670\text{ I}}{17}& \frac{146853}{4}+\frac{2104893\text{ I}}{8}& -\frac{5845112}{85}+\frac{11878776\text{ I}}{85}& -\frac{21293685}{5576}+\frac{41167791\text{ I}}{5576}& \frac{64713222}{2763605}+\frac{120615264\text{ I}}{2763605}& \frac{4072439}{327210832}-\frac{12981913\text{ I}}{327210832}& \\ -\frac{597996}{901}+\frac{1655073\text{ I}}{3604}& \frac{2104893}{8}+\frac{146853\text{ I}}{4}& -\frac{3181815}{2}-\frac{3181815\text{ I}}{2}& \frac{58202739}{130}+\frac{44006949\text{ I}}{65}& -\frac{26972001}{1640}-\frac{9937053\text{ I}}{1640}& \frac{4552443}{1617040}-\frac{48999951\text{ I}}{1617040}& & \\ -\frac{1813}{6}-\frac{12691\text{ I}}{24}& \frac{11878776}{85}-\frac{5845112\text{ I}}{85}& \frac{44006949}{65}+\frac{58202739\text{ I}}{130}& \frac{3575236}{39}+\frac{3575236\text{ I}}{39}& \frac{368039}{400}-\frac{52577\text{ I}}{400}& & & \\ \frac{364413}{5576}-\frac{9065\text{ I}}{5576}& \frac{41167791}{5576}-\frac{21293685\text{ I}}{5576}& -\frac{9937053}{1640}-\frac{26972001\text{ I}}{1640}& -\frac{52577}{400}+\frac{368039\text{ I}}{400}& & & & \\ -\frac{24550911}{22108840}+\frac{7452459\text{ I}}{22108840}& \frac{120615264}{2763605}+\frac{64713222\text{ I}}{2763605}& -\frac{48999951}{1617040}+\frac{4552443\text{ I}}{1617040}& & & & & \\ \frac{17003}{5102040}+\frac{4067\text{ I}}{1700680}& -\frac{12981913}{327210832}+\frac{4072439\text{ I}}{327210832}& & & & & & \\ \frac{4747}{1261904560}+\frac{\text{I}}{1261904560}& & & & & & & \end{array}\right]$$



$$\frac{\mathrm{d}}{\mathrm{d} x_{o l}} u\left(x_{o l}\right)=\frac{1}{264034600611600 \Delta x_{o l}}\left(-\left(1697635434780848+1697635434780848 \text { I}\right) u_{o l}+\left(28097044894177980+26144682258026640 \text { I}\right) u_{o l+1}+\left(121253201592131700-175240438432113600 \text { I}\right) u_{o l+2}-\left(139619296515075650+79782455151471800 \text { I}\right) u_{o l+3}+\left(-429245633885250+17255674482187050 \text { I}\right) u_{o l+4}+\left(89000917082910\right.\\ \left.-293199009108390 \text { I}\right) u_{o l+5}+\left(631411388790+879918682370 \text { I}\right) u_{o l+6}+\left(209235+993238545 \text { I}\right) u_{o l+7}+\left(26144682258026640+28097044894177980 \text { I}\right) u_{o l-1}+\left(5958950306861916000+5958950306861916000 \text { I}\right) u_{o l+1-1}+\left(9693568300903823700+69470572823144069850 \text { I}\right) u_{o l+2-1}+\left(-18156609558236123520\right.$$

$$\begin{aligned}
&+ 36898916198995992960 \, \text{I} \, u_{ol+3-1} + (-1008297993996452250 + 1949376121726474350 \, \text{I}) \, u_{ol+4-1} + (6182696052822240 + 11523572673338880 \, \text{I}) \, u_{ol+5-1} + (3286152840075 - 10475430147525 \, \text{I}) \, u_{ol+6-1} + (-175240438432113600 + 121253201592131700 \, \text{I}) \, u_{ol-21} + (69470572823144069850 \\
&+ 9693568300903823700 \, \text{I}) \, u_{ol+1-21} - (420054626372499027000 + 420054626372499027000 \, \text{I}) \, u_{ol+2-21} + (118211822664355347480 + 178759341590000769360 \, \text{I}) \, u_{ol+3-21} - (4342403360811387690 + 1599832817141037570 \, \text{I}) \, u_{ol+4-21} + (743335025300595 - 8000842584149415 \, \text{I}) \, u_{ol+5-21} - (79782455151471800 \\
&+ 139619296515075650 \, \text{I}) \, u_{ol-31} + (36898916198995992960 - 18156609558236123520 \, \text{I}) \, u_{ol+1-31} + (178759341590000769360 + 118211822664355347480 \, \text{I}) \, u_{ol+2-31} + (24204769470569598400 + 24204769470569598400 \, \text{I}) \, u_{ol+3-31} + (242937575936231631 - 34705367990890233 \, \text{I}) \, u_{ol+4-31} + (17255674482187050 \\
&- 429245633885250 \, \text{I}) \, u_{ol-41} + (1949376121726474350 - 1008297993996452250 \, \text{I}) \, u_{ol+1-41} - (1599832817141037570 + 4342403360811387690 \, \text{I}) \, u_{ol+2-41} + (-34705367990890233 + 242937575936231631 \, \text{I}) \, u_{ol+3-41} + (-293199009108390 + 89000917082910 \, \text{I}) \, u_{ol-51} + (11523572673338880 + 6182696052822240 \, \text{I}) \, u_{ol+1-51} \\
&+ (-8000842584149415 + 743335025300595 \, \text{I}) \, u_{ol+2-51} + (879918682370 + 631411388790 \, \text{I}) \, u_{ol-61} + (-10475430147525 + 3286152840075 \, \text{I}) \, u_{ol+1-61} + (993238545 + 209235 \, \text{I}) \, u_{ol-71}), \quad O(\Delta x_{ol}^{35})
\end{aligned}$$

Formula: 674, Var: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 1

Error order: 35, Error: 1.2748155486346784436 × 10<sup>−90</sup>, New Error: 1.3234785407073768355 × 10<sup>−125</sup>

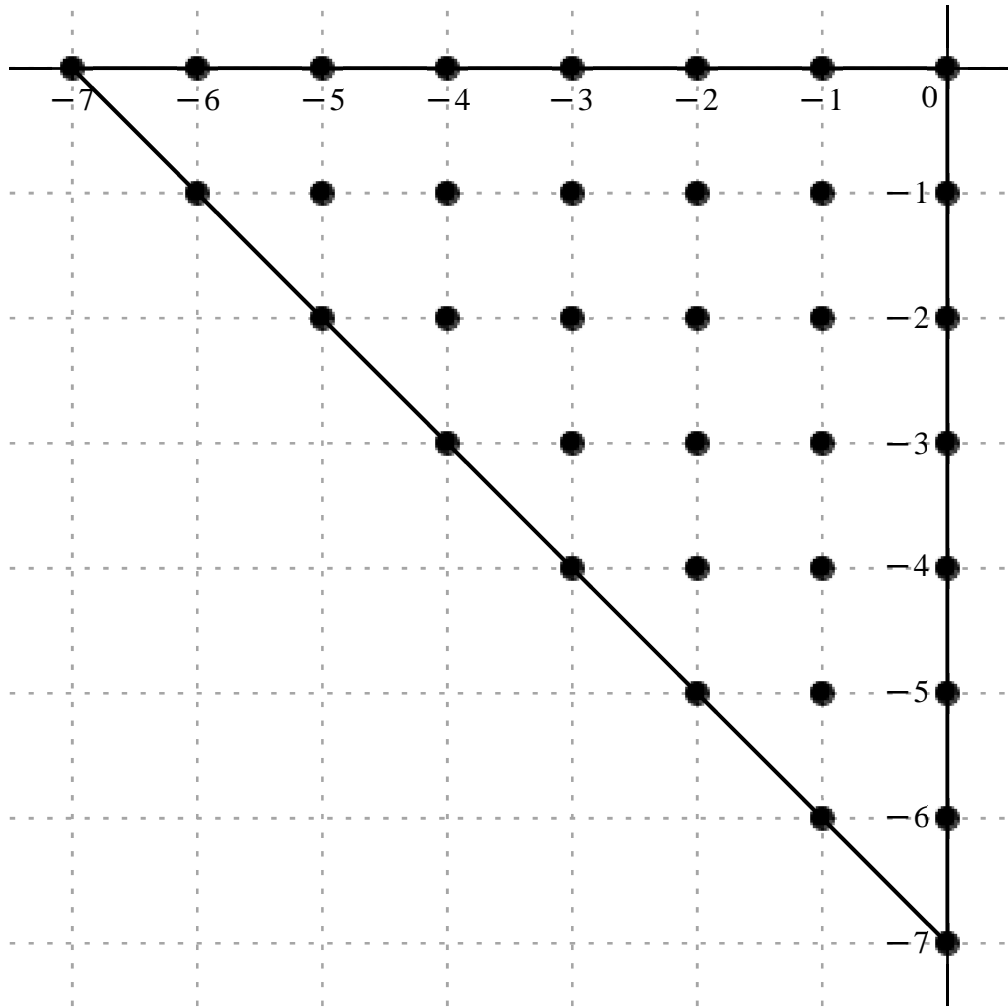
Error order: 35, Error: 1.3234785407073768355 × 10<sup>−125</sup>, New Error: 1.3283925325132225374 × 10<sup>−160</sup>

Error order: 35, Error: 1.3283925325132225374 × 10<sup>−160</sup>, New Error: 1.3288844066693136753 × 10<sup>−195</sup>

Error order: 35, Error: 1.3288844066693136753 × 10<sup>−195</sup>, New Error: 1.3289335988326570552 × 10<sup>−230</sup>

Error order: 35, Error: 1.3289335988326570552 × 10<sup>−230</sup>, New Error: 1.3289385180964667079 × 10<sup>−265</sup>

$$\begin{aligned}
&x_o + h \cdot \left[ \begin{array}{cccccccc} -7 & -6 & -5 & -4 & -3 & -2 & -1 & 0 \\ & -6 - \text{I} & -5 - \text{I} & -4 - \text{I} & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} \\ & & -5 - 2 \, \text{I} & -4 - 2 \, \text{I} & -3 - 2 \, \text{I} & -2 - 2 \, \text{I} & -1 - 2 \, \text{I} & -2 \, \text{I} \\ & & & -4 - 3 \, \text{I} & -3 - 3 \, \text{I} & -2 - 3 \, \text{I} & -1 - 3 \, \text{I} & -3 \, \text{I} \\ & & & & -3 - 4 \, \text{I} & -2 - 4 \, \text{I} & -1 - 4 \, \text{I} & -4 \, \text{I} \\ & & & & & -2 - 5 \, \text{I} & -1 - 5 \, \text{I} & -5 \, \text{I} \\ & & & & & & -1 - 6 \, \text{I} & -6 \, \text{I} \\ & & & & & & & -7 \, \text{I} \end{array} \right] \\
c =, &\left[ \begin{array}{cccccccccccccccc} -\frac{1}{1261904560} + \frac{4747 \, \text{I}}{1261904560} & -\frac{4067}{1700680} + \frac{17003 \, \text{I}}{5102040} & -\frac{7452459}{22108840} - \frac{24550911 \, \text{I}}{22108840} & \frac{9065}{5576} + \frac{364413 \, \text{I}}{5576} & \frac{12691}{24} - \frac{1813 \, \text{I}}{6} & -\frac{1655073}{3604} - \frac{597996 \, \text{I}}{901} & -\frac{470351}{4420} + \frac{109417 \, \text{I}}{1105} & \frac{800451251}{124494825} - \frac{800451251 \, \text{I}}{124494825} \\ & -\frac{4072439}{327210832} - \frac{12981913 \, \text{I}}{327210832} & -\frac{64713222}{2763605} + \frac{120615264 \, \text{I}}{2763605} & \frac{21293685}{5576} + \frac{41167791 \, \text{I}}{5576} & \frac{5845112}{85} + \frac{11878776 \, \text{I}}{85} & -\frac{146853}{4} + \frac{2104893 \, \text{I}}{8} & -\frac{383670}{17} + \frac{383670 \, \text{I}}{17} & -\frac{109417}{1105} + \frac{470351 \, \text{I}}{4420} \\ & & -\frac{4552443}{1617040} - \frac{48999951 \, \text{I}}{1617040} & \frac{26972001}{1640} - \frac{9937053 \, \text{I}}{1640} & -\frac{58202739}{130} + \frac{44006949 \, \text{I}}{65} & \frac{3181815}{2} - \frac{3181815 \, \text{I}}{2} & -\frac{2104893}{8} + \frac{146853 \, \text{I}}{4} & \frac{597996}{901} + \frac{1655073 \, \text{I}}{3604} \\ & & & -\frac{368039}{400} - \frac{52577 \, \text{I}}{400} & -\frac{3575236}{39} + \frac{3575236 \, \text{I}}{39} & -\frac{44006949}{65} + \frac{58202739 \, \text{I}}{130} & -\frac{11878776}{85} - \frac{5845112 \, \text{I}}{85} & \frac{1813}{6} - \frac{12691 \, \text{I}}{24} \\ & & & & \frac{52577}{400} + \frac{368039 \, \text{I}}{400} & \frac{9937053}{1640} - \frac{26972001 \, \text{I}}{1640} & -\frac{41167791}{5576} - \frac{21293685 \, \text{I}}{5576} & -\frac{364413}{5576} - \frac{9065 \, \text{I}}{5576} \\ & & & & & \frac{48999951}{1617040} + \frac{4552443 \, \text{I}}{1617040} & -\frac{120615264}{2763605} + \frac{64713222 \, \text{I}}{2763605} & \frac{24550911}{22108840} + \frac{7452459 \, \text{I}}{22108840} \\ & & & & & & \frac{12981913}{327210832} + \frac{4072439 \, \text{I}}{327210832} & -\frac{17003}{5102040} + \frac{4067 \, \text{I}}{1700680} \\ & & & & & & & -\frac{4747}{1261904560} + \frac{\text{I}}{1261904560} \end{array} \right]
\end{aligned}$$



$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{264034600611600 \Delta x_{ol}} \left( (-209235 + 993238545 I) u_{ol-7} + (-631411388790 + 879918682370 I) u_{ol-6} - (89000917082910 + 293199009108390 I) u_{ol-5} + (429245633885250 + 17255674482187050 I) u_{ol-4} + (139619296515075650 - 79782455151471800 I) u_{ol-3} - (121253201592131700 + 175240438432113600 I) u_{ol-2} \right. \\
+ (-28097044894177980 + 26144682258026640 I) u_{ol-1} + (1697635434780848 - 1697635434780848 I) u_{ol} - (3286152840075 + 10475430147525 I) u_{ol-6-1} + (-6182696052822240 + 11523572673338880 I) u_{ol-5-1} + (1008297993996452250 + 1949376121726474350 I) u_{ol-4-1} + (18156609558236123520 \\
+ 36898916198995992960 I) u_{ol-3-1} + (-9693568300903823700 + 69470572823144069850 I) u_{ol-2-1} + (-5958950306861916000 + 5958950306861916000 I) u_{ol-1-1} + (-26144682258026640 + 28097044894177980 I) u_{ol-1} - (743335025300595 + 8000842584149415 I) u_{ol-5-21} + (4342403360811387690 \\
- 1599832817141037570 I) u_{ol-4-21} + (-118211822664355347480 + 178759341590000769360 I) u_{ol-3-21} + (420054626372499027000 - 420054626372499027000 I) u_{ol-2-21} + (-69470572823144069850 + 9693568300903823700 I) u_{ol-1-21} + (175240438432113600 + 121253201592131700 I) u_{ol-21} - (242937575936231631 \\
+ 34705367990890233 I) u_{ol-4-31} + (-24204769470569598400 + 24204769470569598400 I) u_{ol-3-31} + (-178759341590000769360 + 118211822664355347480 I) u_{ol-2-31} - (36898916198995992960 + 18156609558236123520 I) u_{ol-1-31} + (79782455151471800 - 139619296515075650 I) u_{ol-31} + (34705367990890233 \\
+ 242937575936231631 I) u_{ol-3-41} + (1599832817141037570 - 4342403360811387690 I) u_{ol-2-41} - (1949376121726474350 + 1008297993996452250 I) u_{ol-1-41} - (17255674482187050 + 429245633885250 I) u_{ol-41} + (8000842584149415 + 743335025300595 I) u_{ol-2-51} + (-11523572673338880 \\
+ 6182696052822240 I) u_{ol-1-51} + (293199009108390 + 89000917082910 I) u_{ol-51} + (10475430147525 + 3286152840075 I) u_{ol-1-61} + (-879918682370 + 631411388790 I) u_{ol-61} + (-993238545 + 209235 I) u_{ol-71} \Big), \quad O(\Delta x_{ol}^{35})$$

Not square - Triangle: Interval , 8

Formula:, 675, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 1

Error order:, 44, Error:, 2.7447192119188215162 × 10<sup>-115</sup>, New Error:, 2.6905776659047696349 × 10<sup>-159</sup>

Error order:, 44, Error:, 2.6905776659047696349 × 10<sup>-159</sup>, New Error:, 2.6851207085182269977 × 10<sup>-203</sup>

Error order:, 44, Error:, 2.6851207085182269977 × 10<sup>-203</sup>, New Error:, 2.6845746069578134714 × 10<sup>-247</sup>

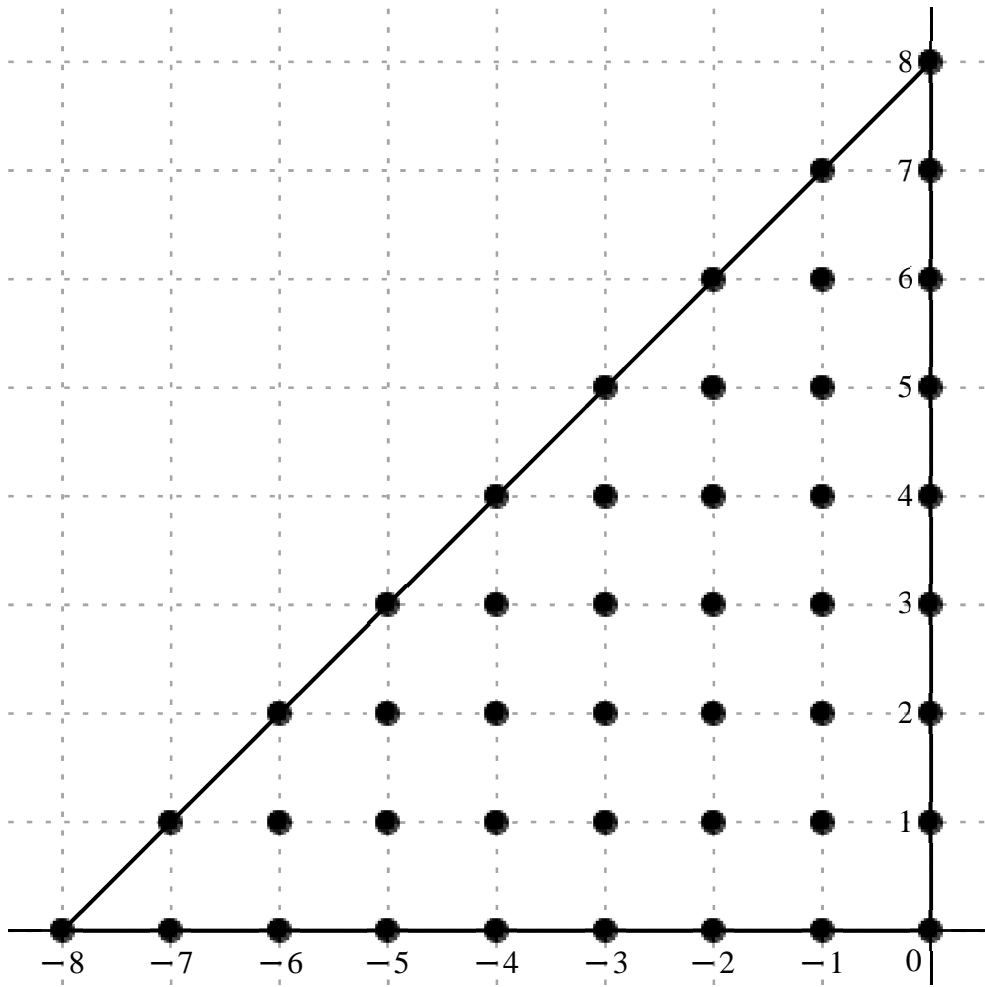
Error order:, 44, Error:, 2.6845746069578134714 × 10<sup>-247</sup>, New Error:, 2.6845199927655062385 × 10<sup>-291</sup>

Error order:, 44, Error:, 2.6845199927655062385 × 10<sup>-291</sup>, New Error:, 2.6845145313059347828 × 10<sup>-335</sup>

$$c = ,$$







$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\, u(x_{ol}) = \frac{1}{193843906419612867600\, \Delta x_{ol}} \big( -(977432530725 + 34047966321075\, \mathrm{I})\, u_{ol+81} + (1080835651892269056 + 873475976245512192\, \mathrm{I})\, u_{ol-1+71} + (76745572121395200 - 48639508706918400\, \mathrm{I})\, u_{ol+71} + (4300302427408678656000 + 613494232171075080000\, \mathrm{I})\, u_{ol-2+61} + (1471977439726811136000$$

$$- 4541965928720855040000\, \mathrm{I})\, u_{ol-1+61} + (-37436044437586323200 + 56343562944308774400\, \mathrm{I})\, u_{ol+61} - (397167573551361134592000 + 521282440286161489152000\, \mathrm{I})\, u_{ol-3+51} + (-2215629281849410603008000 + 8656412077923278635008000\, \mathrm{I})\, u_{ol-2+51} - (383661764393156895744000$$

$$+ 2554379641880755121664000\, \mathrm{I})\, u_{ol-1+51} + (10803065560677278515200 - 1142825852716326912000\, \mathrm{I})\, u_{ol+51} + (2547932766955996434951300 + 2547932766955996434951300\, \mathrm{I})\, u_{ol-4+41} - (412754017807810750957928448 + 106517165885886645408497664\, \mathrm{I})\, u_{ol-3+41} + (156948834155158114357075200$$

$$- 1751218570573343170721049600\, \mathrm{I})\, u_{ol-2+41} + (87774033754850810744832000 - 154895353685030842490880000\, \mathrm{I})\, u_{ol-1+41} + (49452017214647016270000 - 309899307878454635292000\, \mathrm{I})\, u_{ol+41} - (521282440286161489152000 + 397167573551361134592000\, \mathrm{I})\, u_{ol-5+31} - (106517165885886645408497664$$

$$+ 412754017807810750957928448\, \mathrm{I})\, u_{ol-4+31} - (11372926565941022035803136000 + 11372926565941022035803136000\, \mathrm{I})\, u_{ol-3+31} + (-20485109108632104599986176000 + 16055896328387325227016192000\, \mathrm{I})\, u_{ol-2+31} + (1214573192082748093681612800 + 494826115292971445573990400\, \mathrm{I})\, u_{ol-1+31}$$

$$- (710017993196036245504000 + 1195395704386790029312000\, \mathrm{I})\, u_{ol+31} + (613494232171075080000 + 4300302427408678656000\, \mathrm{I})\, u_{ol-6+21} + (8656412077923278635008000 - 2215629281849410603008000\, \mathrm{I})\, u_{ol-5+21} + (-1751218570573343170721049600 + 156948834155158114357075200\, \mathrm{I})\, u_{ol-4+21}$$

$$+ (16055896328387325227016192000 - 20485109108632104599986176000\, \mathrm{I})\, u_{ol-3+21} + (16131050207348998119208920000 + 16131050207348998119208920000\, \mathrm{I})\, u_{ol-2+21} + (-512642982262204114384896000 + 680347749693705832101888000\, \mathrm{I})\, u_{ol-1+21} - (696291680918524992672000$$

$$+ 454830986203277622624000\, \mathrm{I})\, u_{ol+21} + (873475976245512192 + 1080835651892269056\, \mathrm{I})\, u_{ol-7+1} + (-4541965928720855040000 + 1471977439726811136000\, \mathrm{I})\, u_{ol-6+1} - (2554379641880755121664000 + 383661764393156895744000\, \mathrm{I})\, u_{ol-5+1} + (-154895353685030842490880000$$

$$+ 87774033754850810744832000\, \mathrm{I})\, u_{ol-4+1} + (494826115292971445573990400 + 1214573192082748093681612800\, \mathrm{I})\, u_{ol-3+1} + (680347749693705832101888000 - 512642982262204114384896000\, \mathrm{I})\, u_{ol-2+1} - (27121446500654265586176000 + 27121446500654265586176000\, \mathrm{I})\, u_{ol-1+1} + (-65202480888652817203200$$

$$+ 5777435015450249625600\, \mathrm{I})\, u_{ol+1} - (34047966321075 + 977432530725\, \mathrm{I})\, u_{ol-8} + (-48639508706918400 + 76745572121395200\, \mathrm{I})\, u_{ol-7} + (56343562944308774400 - 37436044437586323200\, \mathrm{I})\, u_{ol-6} + (-1142825852716326912000 + 10803065560677278515200\, \mathrm{I})\, u_{ol-5} + (-309899307878454635292000$$

$$+ 49452017214647016270000\, \mathrm{I})\, u_{ol-4} - (1195395704386790029312000 + 710017993196036245504000\, \mathrm{I})\, u_{ol-3} - (454830986203277622624000 + 696291680918524992672000\, \mathrm{I})\, u_{ol-2} + (5777435015450249625600 - 65202480888652817203200\, \mathrm{I})\, u_{ol-1} + (1410192842272367848964 + 1410192842272367848964\, \mathrm{I})\, u_{ol}),$$

$$O(\, \Delta x_{ol}^{44} \,)$$

Formula:, 677, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 44, Error:,  $2.7775685466718970201 \times 10^{-115}$ , New Error:,  $2.6937802671656777791 \times 10^{-159}$

Error order:, 44, Error:,  $2.6937802671656777791 \times 10^{-159}$ , New Error:,  $2.6854401528884663310 \times 10^{-203}$

Error order:, 44, Error:,  $2.6854401528884663310 \times 10^{-203}$ , New Error:,  $2.6846065432448458368 \times 10^{-247}$

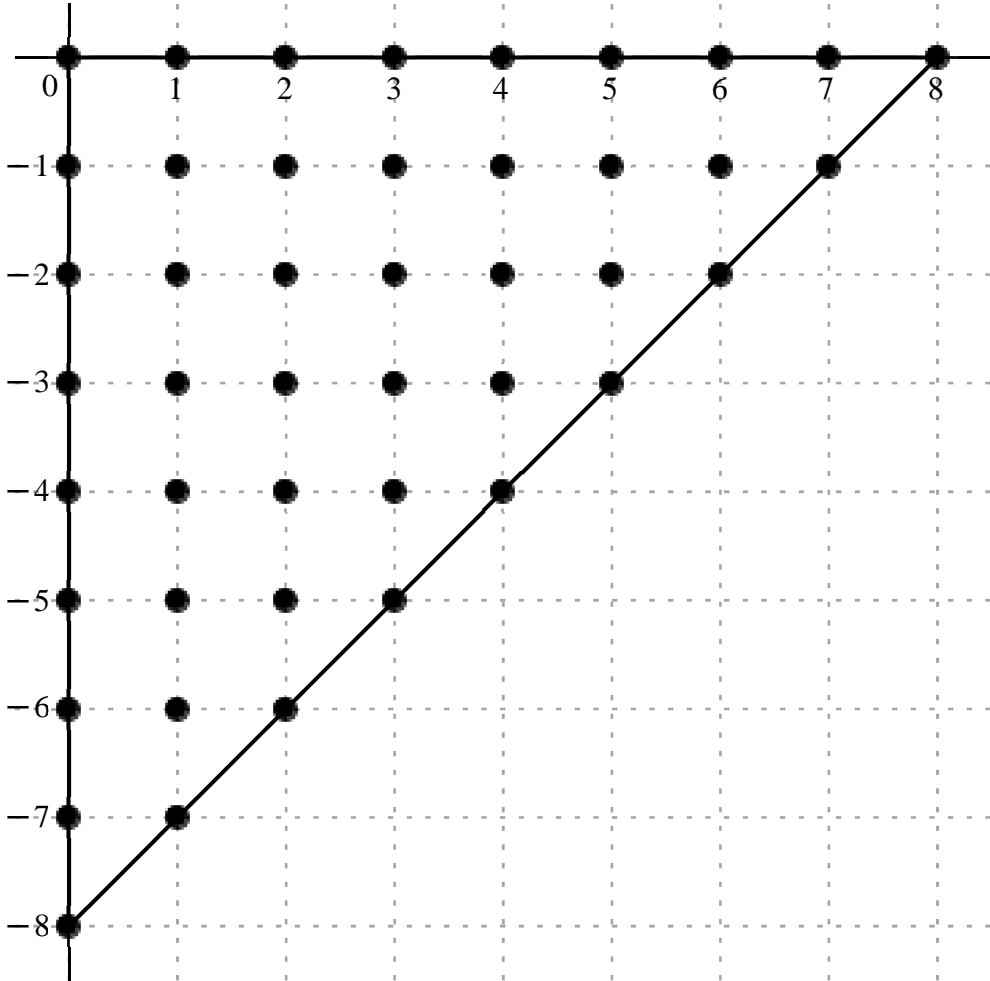
Error order:, 44, Error:,  $2.6846065432448458368 \times 10^{-247}$ , New Error:,  $2.6845231863127171263 \times 10^{-291}$

Error order:, 44, Error:,  $2.6845231863127171263 \times 10^{-291}$ , New Error:,  $2.6845148506598409556 \times 10^{-335}$

c =,

$$x_o + h., \left[ \begin{array}{cccccccccc} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ -1 & 1-1 & 2-1 & 3-1 & 4-1 & 5-1 & 6-1 & 7-1 & \\ -2\ 1 & 1-2\ 1 & 2-2\ 1 & 3-2\ 1 & 4-2\ 1 & 5-2\ 1 & 6-2\ 1 & & \\ -3\ 1 & 1-3\ 1 & 2-3\ 1 & 3-3\ 1 & 4-3\ 1 & 5-3\ 1 & & & \\ -4\ 1 & 1-4\ 1 & 2-4\ 1 & 3-4\ 1 & 4-4\ 1 & & & & \\ -5\ 1 & 1-5\ 1 & 2-5\ 1 & 3-5\ 1 & & & & & \\ -6\ 1 & 1-6\ 1 & 2-6\ 1 & & & & & & \\ -7\ 1 & 1-7\ 1 & & & & & & & \\ -8\ 1 & & & & & & & & \end{array} \right]$$

$-\frac{3622743977}{497979300}-\frac{3622743977\ I}{497979300}$	$-\frac{14336}{481}+\frac{161792\ I}{481}$	$\frac{27483120}{11713}+\frac{42073360\ I}{11713}$	$\frac{930513920}{150891}+\frac{552688640\ I}{150891}$	$\frac{852110}{533}-\frac{135975\ I}{533}$	$\frac{17059840}{2893657}-\frac{161265664\ I}{2893657}$	$-\frac{349664}{1202981}+\frac{696976\ I}{3608943}$	$\frac{342016}{1363042499}-\frac{539648\ I}{1363042499}$	$\frac{60441071}{344106699364688}+\frac{1735113\ I}{344106699364688}$
$\frac{161792}{481}-\frac{14336\ I}{481}$	$\frac{1818880}{13}+\frac{1818880\ I}{13}$	$-\frac{2418232320}{689}+\frac{1822141440\ I}{689}$	$-2552704-6265728\ I$	$\frac{556953600}{697}-\frac{18565120\ I}{41}$	$\frac{428440320}{32513}+\frac{64350720\ I}{32513}$	$\frac{479180800}{20450677}-\frac{155294720\ I}{20450677}$	$-\frac{7182464}{1593949825}-\frac{8887552\ I}{1593949825}$	
$\frac{42073360}{11713}+\frac{27483120\ I}{11713}$	$\frac{1822141440}{689}-\frac{2418232320\ I}{689}$	$-83216700-83216700\ I$	$-\frac{1076776960}{13}+\frac{1373818880\ I}{13}$	$\frac{4815211968}{533}-\frac{431552016\ I}{533}$	$-\frac{42105692160}{942877}+\frac{10777052160\ I}{942877}$	$-\frac{102900}{32513}-\frac{721280\ I}{32513}$		
$\frac{552688640}{150891}+\frac{930513920\ I}{150891}$	$-6265728-2552704\ I$	$\frac{1373818880}{13}-\frac{1076776960\ I}{13}$	$\frac{2288151040}{39}+\frac{2288151040\ I}{39}$	$\frac{7322083328}{13325}+\frac{28373072896\ I}{13325}$	$\frac{24366720}{9061}+\frac{18565120\ I}{9061}$			
$-\frac{135975}{533}+\frac{852110\ I}{533}$	$-\frac{18565120}{41}+\frac{556953600\ I}{697}$	$-\frac{431552016}{533}+\frac{4815211968\ I}{533}$	$\frac{28373072896}{13325}+\frac{7322083328\ I}{13325}$	$-\frac{52577}{4}-\frac{52577\ I}{4}$				
$-\frac{161265664}{2893657}+\frac{17059840\ I}{2893657}$	$\frac{64350720}{32513}+\frac{428440320\ I}{32513}$	$\frac{10777052160}{942877}-\frac{42105692160\ I}{942877}$	$\frac{18565120}{9061}+\frac{24366720\ I}{9061}$					
$\frac{696976}{3608943}-\frac{349664\ I}{1202981}$	$-\frac{155294720}{20450677}+\frac{479180800\ I}{20450677}$	$-\frac{721280}{32513}-\frac{102900\ I}{32513}$						
$-\frac{539648}{1363042499}+\frac{342016\ I}{1363042499}$	$-\frac{8887552}{1593949825}-\frac{7182464\ I}{1593949825}$							
$\frac{1735113}{344106699364688}+\frac{60441071\ I}{344106699364688}$								



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{193843906419612867600\,\mathcal{A}_{ol}}\Bigl(- (1410192842272367848964+1410192842272367848964\,\mathrm{I})\,u_{ol}+( -5777435015450249625600+65202480888652817203200\,\mathrm{I})\,u_{ol+1}+(454830986203277622624000+696291680918524992672000\,\mathrm{I})\,u_{ol+2}+(1195395704386790029312000+710017993196036245504000\,\mathrm{I})\,u_{ol+3}+ (309899307878454635292000-49452017214647016270000\,\mathrm{I})\,u_{ol+4}+(1142825852716326912000-10803065560677278515200\,\mathrm{I})\,u_{ol+5}+( -56343562944308774400+37436044437586323200\,\mathrm{I})\,u_{ol+6}+(48639508706918400-76745572121395200\,\mathrm{I})\,u_{ol+7}+(34047966321075+977432530725\,\mathrm{I})\,u_{ol+8}+(65202480888652817203200-5777435015450249625600\,\mathrm{I})\,u_{ol-1}+(27121446500654265586176000+27121446500654265586176000\,\mathrm{I})\,u_{ol+1-1}+( -680347749693705832101888000+512642982262204114384896000\,\mathrm{I})\,u_{ol+2-1}-(494826115292971445573990400+1214573192082748093681612800\,\mathrm{I})\,u_{ol+3-1}+(154895353685030842490880000-87774033754850810744832000\,\mathrm{I})\,u_{ol+4-1}+(2554379641880755121664000+383661764393156895744000\,\mathrm{I})\,u_{ol+5-1}+(4541965928720855040000-1471977439726811136000\,\mathrm{I})\,u_{ol+6-1}-(873475976245512192+1080835651892269056\,\mathrm{I})\,u_{ol+7-1}+(696291680918524992672000+454830986203277622624000\,\mathrm{I})\,u_{ol-21}+(512642982262204114384896000-680347749693705832101888000\,\mathrm{I})\,u_{ol+1-21}-(16131050207348998119208920000+16131050207348998119208920000\,\mathrm{I})\,u_{ol+2-21}+( -16055896328387325227016192000+20485109108632104599986176000\,\mathrm{I})\,u_{ol+3-21}+(1751218570573343170721049600-156948834155158114357075200\,\mathrm{I})\,u_{ol+4-21}+( -8656412077923278635008000+2215629281849410603008000\,\mathrm{I})\,u_{ol+5-21}-(613494232171075080000+4300302427408678656000\,\mathrm{I})\,u_{ol+6-21}+(710017993196036245504000+1195395704386790029312000\,\mathrm{I})\,u_{ol-31}-(1214573192082748093681612800+494826115292971445573990400\,\mathrm{I})\,u_{ol+1-31}+(20485109108632104599986176000-16055896328387325227016192000\,\mathrm{I})\,u_{ol+2-31}+(11372926565941022035803136000+11372926565941022035803136000\,\mathrm{I})\,u_{ol+3-31}+(106517165885886645408497664+412754017807810750957928448\,\mathrm{I})\,u_{ol+4-31}+(521282440286161489152000+397167573551361134592000\,\mathrm{I})\,u_{ol+5-31}+( -49452017214647016270000+309899307878454635292000\,\mathrm{I})\,u_{ol-41}+( -87774033754850810744832000+154895353685030842490880000\,\mathrm{I})\,u_{ol+1-41}+( -156948834155158114357075200+1751218570573343170721049600\,\mathrm{I})\,u_{ol+2-41}+(412754017807810750957928448+106517165885886645408497664\,\mathrm{I})\,u_{ol+3-41}-(2547932766955996434951300+2547932766955996434951300\,\mathrm{I})\,u_{ol+4-41}+( -10803065560677278515200+1142825852716326912000\,\mathrm{I})\,u_{ol-51}+(383661764393156895744000+2554379641880755121664000\,\mathrm{I})\,u_{ol+1-51}+(2215629281849410603008000-8656412077923278635008000\,\mathrm{I})\,u_{ol+2-51}+(397167573551361134592000+521282440286161489152000\,\mathrm{I})\,u_{ol+3-51}+(37436044437586323200-56343562944308774400\,\mathrm{I})\,u_{ol-61}+( -1471977439726811136000+4541965928720855040000\,\mathrm{I})\,u_{ol+1-61}-(4300302427408678656000+613494232171075080000\,\mathrm{I})\,u_{ol+2-61}+( -76745572121395200+48639508706918400\,\mathrm{I})\,u_{ol-71}-(1080835651892269056+873475976245512192\,\mathrm{I})\,u_{ol+1-71}+(977432530725+34047966321075\,\mathrm{I})\,u_{ol-81}),\,O(\,\mathcal{A}_{ol}{}^{44}\,)\Bigr)$$

Formula.: 678, Var.: 1

Variavel .:, x<sub>ol</sub>., Derivada de Ordem .:, 1

Error order.: 44, Error.: 2.6234026069752107444 × 10<sup>−115</sup>, New Error.: 2.6784411283796304706 × 10<sup>−159</sup>

Error order.: 44, Error.: 2.6784411283796304706 × 10<sup>−159</sup>, New Error.: 2.6839070498889289181 × 10<sup>−203</sup>

Error order.: 44, Error.: 2.6839070498889289181 × 10<sup>−203</sup>, New Error.: 2.6844532410900068818 × 10<sup>−247</sup>

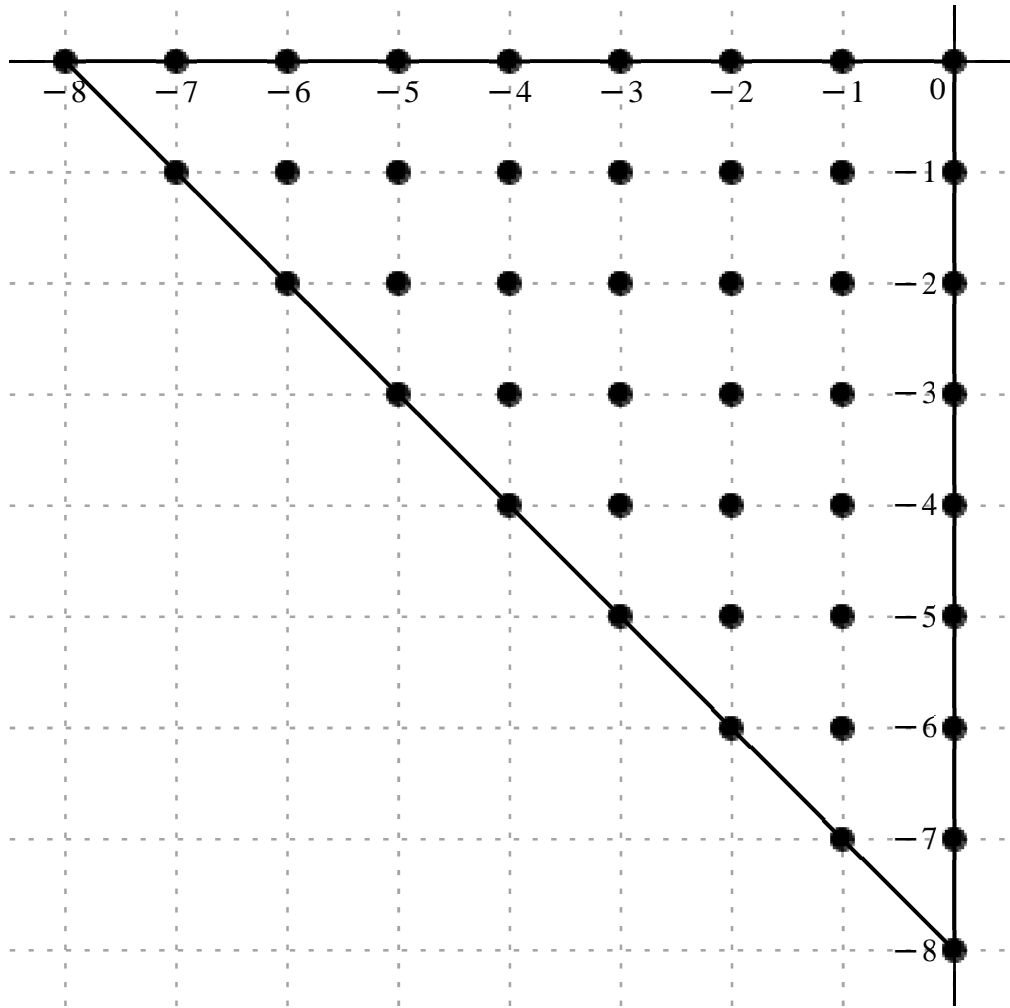
Error order.: 44, Error.: 2.6844532410900068818 × 10<sup>−247</sup>, New Error.: 2.6845078561787207027 × 10<sup>−291</sup>

Error order.: 44, Error.: 2.6845078561787207027 × 10<sup>−291</sup>, New Error.: 2.6845133176472562243 × 10<sup>−335</sup>

$$x_o\, +h\, .\, .\, \left[ \begin{array}{cccccccc} -8 & -7 & -6 & -5 & -4 & -3 & -2 & -1 & 0 \\ & -7-1 & -6-1 & -5-1 & -4-1 & -3-1 & -2-1 & -1-1 & -1 \\ & & -6-2\,\mathrm{I} & -5-2\,\mathrm{I} & -4-2\,\mathrm{I} & -3-2\,\mathrm{I} & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} \\ & & & -5-3\,\mathrm{I} & -4-3\,\mathrm{I} & -3-3\,\mathrm{I} & -2-3\,\mathrm{I} & -1-3\,\mathrm{I} & -3\,\mathrm{I} \\ & & & & -4-4\,\mathrm{I} & -3-4\,\mathrm{I} & -2-4\,\mathrm{I} & -1-4\,\mathrm{I} & -4\,\mathrm{I} \\ & & & & & -3-5\,\mathrm{I} & -2-5\,\mathrm{I} & -1-5\,\mathrm{I} & -5\,\mathrm{I} \\ & & & & & & -2-6\,\mathrm{I} & -1-6\,\mathrm{I} & -6\,\mathrm{I} \\ & & & & & & & -1-7\,\mathrm{I} & -7\,\mathrm{I} \\ & & & & & & & & -8\,\mathrm{I} \end{array} \right]$$

c =,

$$\left[ \begin{array}{cccccccccccccccc} -\frac{60441071}{344106699364688}+\frac{1735113\,\mathrm{I}}{344106699364688} & -\frac{342016}{1363042499}-\frac{539648\,\mathrm{I}}{1363042499} & \frac{349664}{1202981}+\frac{696976\,\mathrm{I}}{3608943} & -\frac{17059840}{2893657}-\frac{161265664\,\mathrm{I}}{2893657} & -\frac{852110}{533}-\frac{135975\,\mathrm{I}}{533} & -\frac{930513920}{150891}+\frac{552688640\,\mathrm{I}}{150891} & -\frac{27483120}{11713}+\frac{42073360\,\mathrm{I}}{11713} & \frac{14336}{481}+\frac{161792\,\mathrm{I}}{481} & \frac{3622743977}{497979300}-\frac{36227439}{4979793} \cdots \\ & \frac{7182464}{1593949825}-\frac{8887552\,\mathrm{I}}{1593949825} & -\frac{479180800}{20450677}-\frac{155294720\,\mathrm{I}}{20450677} & -\frac{428440320}{32513}+\frac{64350720\,\mathrm{I}}{32513} & -\frac{556953600}{697}-\frac{18565120\,\mathrm{I}}{41} & 2552704-6265728\,\mathrm{I} & \frac{2418232320}{689}+\frac{1822141440\,\mathrm{I}}{689} & -\frac{1818880}{13}+\frac{1818880\,\mathrm{I}}{13} & -\frac{161792}{481}-\frac{14336\,\mathrm{I}}{481} \cdots \\ & & \frac{102900}{32513}-\frac{721280\,\mathrm{I}}{32513} & \frac{42105692160}{942877}+\frac{10777052160\,\mathrm{I}}{942877} & -\frac{4815211968}{533}-\frac{431552016\,\mathrm{I}}{533} & \frac{1076776960}{13}+\frac{1373818880\,\mathrm{I}}{13} & 83216700-83216700\,\mathrm{I} & -\frac{1822141440}{689}-\frac{2418232320\,\mathrm{I}}{689} & -\frac{42073360}{11713}+\frac{2748312}{11713} \cdots \\ & & -\frac{24366720}{9061}+\frac{18565120\,\mathrm{I}}{9061} & -\frac{7322083328}{13325}+\frac{28373072896\,\mathrm{I}}{13325} & -\frac{2288151040}{39}+\frac{2288151040\,\mathrm{I}}{39} & -\frac{1373818880}{13}-\frac{1076776960\,\mathrm{I}}{13} & 6265728-2552704\,\mathrm{I} & -\frac{552688640}{150891}+\frac{9305139}{15089} \cdots \\ & & \frac{52577}{4}-\frac{52577\,\mathrm{I}}{4} & -\frac{28373072896}{13325}+\frac{7322083328\,\mathrm{I}}{13325} & -\frac{431552016}{533}+\frac{4815211968\,\mathrm{I}}{533} & \frac{18565120}{41}+\frac{556953600\,\mathrm{I}}{697} & \frac{135975}{533}+\frac{852110\,\mathrm{I}}{533} \cdots \\ & & & -\frac{18565120}{9061}+\frac{24366720\,\mathrm{I}}{9061} & -\frac{10777052160}{942877}-\frac{42105692160\,\mathrm{I}}{942877} & -\frac{64350720}{32513}+\frac{428440320\,\mathrm{I}}{32513} & \frac{161265664}{2893657}+\frac{17059840}{2893657} \cdots \\ & & & & \frac{721280}{32513}-\frac{102900\,\mathrm{I}}{32513} & \frac{155294720}{20450677}+\frac{479180800\,\mathrm{I}}{20450677} & -\frac{696976}{3608943}-\frac{349664}{120298} \cdots \\ & & & & & \frac{8887552}{1593949825}-\frac{7182464\,\mathrm{I}}{1593949825} & \frac{539648}{1363042499}+\frac{342016}{1363042499} \cdots \\ & & & & & & -\frac{1735113}{344106699364688}+\frac{604}{344106699364688} \cdots \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}} u(x_{ol}) = \frac{1}{193843906419612867600 \Delta x_{ol}} \big( (-34047966321075 + 977432530725 \, \mathrm{I}) \, u_{ol-8} - (48639508706918400 + 76745572121395200 \, \mathrm{I}) \, u_{ol-7} + (56343562944308774400 + 37436044437586323200 \, \mathrm{I}) \, u_{ol-6} - (1142825852716326912000 + 10803065560677278515200 \, \mathrm{I}) \, u_{ol-5} - (309899307878454635292000$$

$$+ 49452017214647016270000 \, \mathrm{I}) \, u_{ol-4} + (-1195395704386790029312000 + 710017993196036245504000 \, \mathrm{I}) \, u_{ol-3} + (-454830986203277622624000 + 696291680918524992672000 \, \mathrm{I}) \, u_{ol-2} + (5777435015450249625600 + 65202480888652817203200 \, \mathrm{I}) \, u_{ol-1} + (1410192842272367848964 - 1410192842272367848964 \, \mathrm{I}) \, u_{ol}$$

$$+ (873475976245512192 - 1080835651892269056 \, \mathrm{I}) \, u_{ol-7-1} - (4541965928720855040000 + 1471977439726811136000 \, \mathrm{I}) \, u_{ol-6-1} + (-2554379641880755121664000 + 383661764393156895744000 \, \mathrm{I}) \, u_{ol-5-1} - (154895353685030842490880000 + 87774033754850810744832000 \, \mathrm{I}) \, u_{ol-4-1} + (494826115292971445573990400$$

$$- 1214573192082748093681612800 \, \mathrm{I}) \, u_{ol-3-1} + (680347749693705832101888000 + 512642982262204114384896000 \, \mathrm{I}) \, u_{ol-2-1} + (-27121446500654265586176000 + 27121446500654265586176000 \, \mathrm{I}) \, u_{ol-1-1} - (65202480888652817203200 + 5777435015450249625600 \, \mathrm{I}) \, u_{ol-1} + (613494232171075080000$$

$$- 4300302427408678656000 \, \mathrm{I}) \, u_{ol-6-21} + (8656412077923278635008000 + 2215629281849410603008000 \, \mathrm{I}) \, u_{ol-5-21} - (1751218570573343170721049600 + 156948834155158114357075200 \, \mathrm{I}) \, u_{ol-4-21} + (16055896328387325227016192000 + 20485109108632104599986176000 \, \mathrm{I}) \, u_{ol-3-21} + (16131050207348998119208920000$$

$$- 16131050207348998119208920000 \, \mathrm{I}) \, u_{ol-2-21} - (512642982262204114384896000 + 680347749693705832101888000 \, \mathrm{I}) \, u_{ol-1-21} + (-696291680918524992672000 + 454830986203277622624000 \, \mathrm{I}) \, u_{ol-21} + (-521282440286161489152000 + 397167573551361134592000 \, \mathrm{I}) \, u_{ol-5-31} + (-106517165885886645408497664$$

$$+ 412754017807810750957928448 \, \mathrm{I}) \, u_{ol-4-31} + (-11372926565941022035803136000 + 11372926565941022035803136000 \, \mathrm{I}) \, u_{ol-3-31} - (20485109108632104599986176000 + 16055896328387325227016192000 \, \mathrm{I}) \, u_{ol-2-31} + (1214573192082748093681612800 - 494826115292971445573990400 \, \mathrm{I}) \, u_{ol-1-31}$$

$$+ (-710017993196036245504000 + 1195395704386790029312000 \, \mathrm{I}) \, u_{ol-31} + (2547932766955996434951300 - 2547932766955996434951300 \, \mathrm{I}) \, u_{ol-4-41} + (-412754017807810750957928448 + 106517165885886645408497664 \, \mathrm{I}) \, u_{ol-3-41} + (156948834155158114357075200 + 1751218570573343170721049600 \, \mathrm{I}) \, u_{ol-2-41}$$

$$+ (87774033754850810744832000 + 154895353685030842490880000 \, \mathrm{I}) \, u_{ol-1-41} + (49452017214647016270000 + 309899307878454635292000 \, \mathrm{I}) \, u_{ol-41} + (-397167573551361134592000 + 521282440286161489152000 \, \mathrm{I}) \, u_{ol-3-51} - (2215629281849410603008000 + 8656412077923278635008000 \, \mathrm{I}) \, u_{ol-2-51}$$

$$+ (-383661764393156895744000 + 2554379641880755121664000 \, \mathrm{I}) \, u_{ol-1-51} + (10803065560677278515200 + 1142825852716326912000 \, \mathrm{I}) \, u_{ol-51} + (4300302427408678656000 - 613494232171075080000 \, \mathrm{I}) \, u_{ol-2-61} + (1471977439726811136000 + 4541965928720855040000 \, \mathrm{I}) \, u_{ol-1-61} - (37436044437586323200$$

$$+ 56343562944308774400 \, \mathrm{I}) \, u_{ol-61} + (1080835651892269056 - 873475976245512192 \, \mathrm{I}) \, u_{ol-1-71} + (76745572121395200 + 48639508706918400 \, \mathrm{I}) \, u_{ol-71} + (-977432530725 + 34047966321075 \, \mathrm{I}) \, u_{ol-81} \big), \, O( \Delta x_{ol}^{44} )$$

Formula.: 679, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 1

Error order.: 24, Error.:  $1.1639891435481631243 \times 10^{-63}$ , New Error.:  $1.1508401378152446435 \times 10^{-87}$

Error order.: 24, Error.:  $1.1508401378152446435 \times 10^{-87}$ , New Error.:  $1.1495328704910383920 \times 10^{-111}$

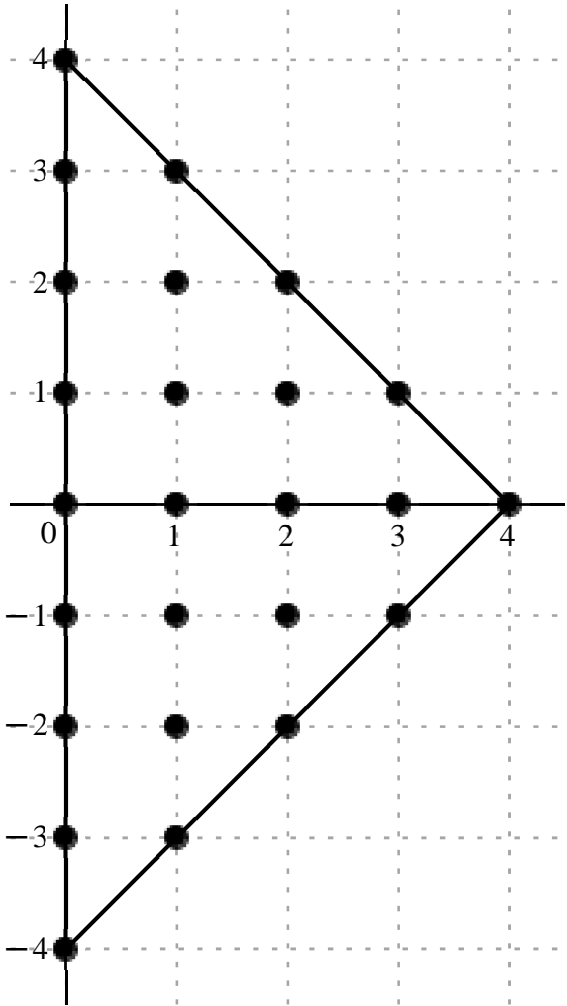
Error order.: 24, Error.:  $1.1495328704910383920 \times 10^{-111}$ , New Error.:  $1.1494022198132255439 \times 10^{-135}$

Error order.: 24, Error.:  $1.1494022198132255439 \times 10^{-135}$ , New Error.:  $1.1493891555057131679 \times 10^{-159}$

Error order.: 24, Error.:  $1.1493891555057131679 \times 10^{-159}$ , New Error.:  $1.1493878490825643423 \times 10^{-183}$

$$x_o+h., \begin{bmatrix} 4\text{ I} \\ 3\text{ I} & 1+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \\ -3\text{ I} & 1-3\text{ I} \\ -4\text{ I} \end{bmatrix}$$

$$c=, \begin{bmatrix} \frac{9}{26558896}+\frac{11\text{ I}}{132794480} \\ \frac{7360}{64737309}+\frac{24256\text{ I}}{323686545}-\frac{232}{531505}-\frac{88\text{ I}}{531505} \\ \frac{38}{2873}-\frac{18\text{ I}}{2873}-\frac{54144}{531505}+\frac{3456\text{ I}}{31265}-\frac{279}{12818}+\frac{45\text{ I}}{12818} \\ -\frac{64}{221}-\frac{64\text{ I}}{221}-\frac{1368}{221}-\frac{648\text{ I}}{221}-\frac{56448}{32045}-\frac{9216\text{ I}}{32045}-\frac{224}{14365}-\frac{16\text{ I}}{2873} \\ -\frac{67}{12}-\frac{512}{17}-\frac{108}{13}-\frac{256}{2535}-\frac{1}{8840} \\ -\frac{64}{221}+\frac{64\text{ I}}{221}-\frac{1368}{221}+\frac{648\text{ I}}{221}-\frac{56448}{32045}+\frac{9216\text{ I}}{32045}-\frac{224}{14365}+\frac{16\text{ I}}{2873} \\ \frac{38}{2873}+\frac{18\text{ I}}{2873}-\frac{54144}{531505}-\frac{3456\text{ I}}{31265}-\frac{279}{12818}-\frac{45\text{ I}}{12818} \\ \frac{7360}{64737309}-\frac{24256\text{ I}}{323686545}-\frac{232}{531505}+\frac{88\text{ I}}{531505} \\ \frac{9}{26558896}-\frac{11\text{ I}}{132794480} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u\big(x_{ol}\big)=\frac{1}{5178984720\,\mathcal{A}_{ol}}\Big((1755+429\,\mathrm{I})\,u_{ol+41}+(588800+388096\,\mathrm{I})\,u_{ol+31}-(2260608+857472\,\mathrm{I})\,u_{ol+1+31}+(68500320-32447520\,\mathrm{I})\,u_{ol+21}+(527579136+572479488\,\mathrm{I})\,u_{ol+1+21}+(-112727160+18181800\,\mathrm{I})\,u_{ol+2+21}-(1499796480+1499796480\,\mathrm{I})\,u_{ol+1}-(32058149760+15185439360\,\mathrm{I})\,u_{ol+1+1}-(9122899968$$

$$+1489453056\,\mathrm{I})\,u_{ol+2+1}-(80758272+28842240\,\mathrm{I})\,u_{ol+3+1}-28915998020\,u_{ol}+155978833920\,u_{ol+1}-43025411520\,u_{ol+2}+523005952\,u_{ol+3}-585858\,u_{ol+4}+(-1499796480+1499796480\,\mathrm{I})\,u_{ol-1}+(-32058149760+15185439360\,\mathrm{I})\,u_{ol+1-1}+(-9122899968+1489453056\,\mathrm{I})\,u_{ol+2-1}+(-80758272+28842240\,\mathrm{I})\,u_{ol+3-1}$$

$$+(68500320+32447520\,\mathrm{I})\,u_{ol-21}+(527579136-572479488\,\mathrm{I})\,u_{ol+1-21}-(112727160+18181800\,\mathrm{I})\,u_{ol+2-21}+(588800-388096\,\mathrm{I})\,u_{ol-31}+(-2260608+857472\,\mathrm{I})\,u_{ol+1-31}+(1755-429\,\mathrm{I})\,u_{ol-41}\Big)\,O(\,\mathcal{A}_{ol}^{\,24}\,)$$

Formula.: 680, Var.: 1

Variavel .: x<sub>ol</sub> , Derivada de Ordem .: 2

Error order.: 23, Error.: 1.1815362921460041889 × 10<sup>−60</sup>, New Error.: 1.1682683014387121485 × 10<sup>−83</sup>

Error order.: 23, Error.: 1.1682683014387121485 × 10<sup>−83</sup>, New Error.: 1.1669491553427931407 × 10<sup>−106</sup>

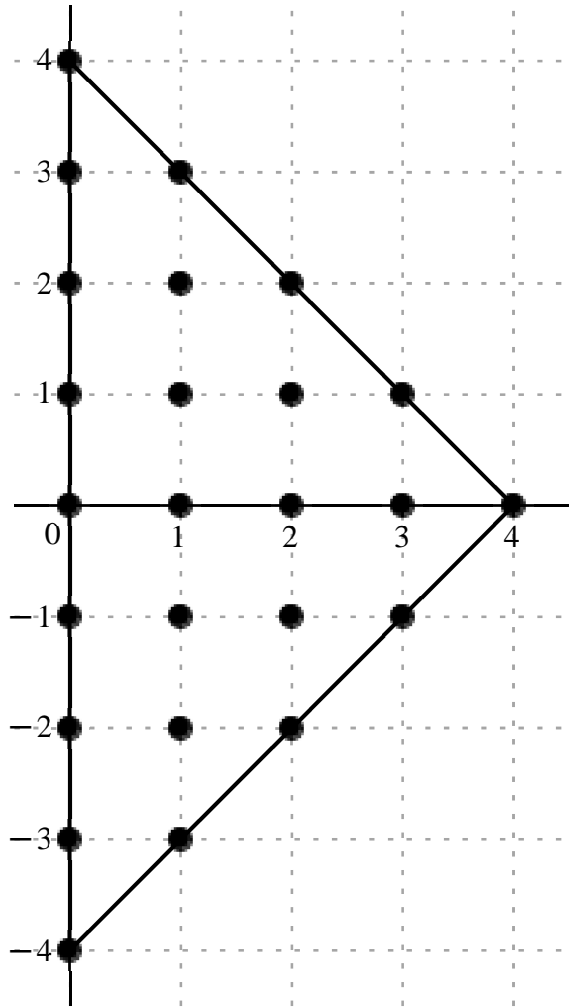
Error order.: 23, Error.: 1.1669491553427931407 × 10<sup>−106</sup>, New Error.: 1.1668173169862749444 × 10<sup>−129</sup>

Error order.: 23, Error.: 1.1668173169862749444 × 10<sup>−129</sup>, New Error.: 1.1668041339128778932 × 10<sup>−152</sup>

Error order.: 23, Error.: 1.1668041339128778932 × 10<sup>−152</sup>, New Error.: 1.1668028156131604599 × 10<sup>−175</sup>

$$x_o\, + h\, .\, , \left[\begin{array}{cccccc} 4\,\mathrm{I} & & & & & \\ 3\,\mathrm{I} & 1+3\,\mathrm{I} & & & & \\ 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & & & \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & & \\ 0 & 1 & 2 & 3 & 4 & \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & & \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & & & \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & & & & \\ -4\,\mathrm{I} & & & & & \end{array}\right]$$

$$c\, =,\left[\begin{array}{ccccccccc} -\frac{71}{18970640} & -\frac{109\,\mathrm{I}}{99595860} & & & & & & & \\ -\frac{9952}{8160165} & -\frac{5792\,\mathrm{I}}{6346795} & \frac{37372}{7972575} & +\frac{16564\,\mathrm{I}}{7972575} & & & & & \\ -\frac{1327}{8619} & +\frac{163\,\mathrm{I}}{2873} & -\frac{157632}{156325} & -\frac{3379392\,\mathrm{I}}{2657525} & \frac{5997}{25636} & -\frac{681\,\mathrm{I}}{25636} & & & \\ \frac{1760}{663} & +\frac{2528\,\mathrm{I}}{663} & 60+36\,\mathrm{I} & & \frac{2907456}{160225} & +\frac{590592\,\mathrm{I}}{160225} & \frac{35264}{215475} & +\frac{13352\,\mathrm{I}}{215475} & \\ \frac{2347}{72} & & -\frac{14080}{51} & & \frac{1098}{13} & & -\frac{896}{845} & & \frac{4}{3315} \\ \frac{1760}{663} & -\frac{2528\,\mathrm{I}}{663} & 60-36\,\mathrm{I} & & \frac{2907456}{160225} & -\frac{590592\,\mathrm{I}}{160225} & \frac{35264}{215475} & -\frac{13352\,\mathrm{I}}{215475} & \\ -\frac{1327}{8619} & -\frac{163\,\mathrm{I}}{2873} & -\frac{157632}{156325} & +\frac{3379392\,\mathrm{I}}{2657525} & \frac{5997}{25636} & +\frac{681\,\mathrm{I}}{25636} & & & \\ -\frac{9952}{8160165} & +\frac{5792\,\mathrm{I}}{6346795} & \frac{37372}{7972575} & -\frac{16564\,\mathrm{I}}{7972575} & & & & & \\ -\frac{71}{18970640} & +\frac{109\,\mathrm{I}}{99595860} & & & & & & & \end{array}\right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{77684770800 \, \Delta x_{ol}^2} \, \big( -(290745 + 85020 \, \mathrm{I}) \, u_{ol+41} - (94743040 + 70894080 \, \mathrm{I}) \, u_{ol+31} + (364152768 + 161399616 \, \mathrm{I}) \, u_{ol+1+31} + (-11960516400 + 4407454800 \, \mathrm{I}) \, u_{ol+21} - (78334276608 + 98786386944 \, \mathrm{I}) \, u_{ol+1+21} + (18172709100 - 2063634300 \, \mathrm{I}) \, u_{ol+2+21} + (206222016000 + 296209804800 \, \mathrm{I}) \, u_{ol+1} + (4661086248000$$

$$+ 2796651748800 \, \mathrm{I}) \, u_{ol+1+1} + (1409674226688 + 286347350016 \, \mathrm{I}) \, u_{ol+2+1} + (12713659392 + 4813769856 \, \mathrm{I}) \, u_{ol+3+1} + 2532307737050 \, u_{ol} - 21447089664000 \, u_{ol+1} + 6561375256800 \, u_{ol+2} - 82373437440 \, u_{ol+3} + 93737280 \, u_{ol+4} + (206222016000 - 296209804800 \, \mathrm{I}) \, u_{ol-1} + (4661086248000 - 2796651748800 \, \mathrm{I}) \, u_{ol+1-1}$$

$$+ (1409674226688 - 286347350016 \, \mathrm{I}) \, u_{ol+2-1} + (12713659392 - 4813769856 \, \mathrm{I}) \, u_{ol+3-1} - (11960516400 + 4407454800 \, \mathrm{I}) \, u_{ol-21} + (-78334276608 + 98786386944 \, \mathrm{I}) \, u_{ol+1-21} + (18172709100 + 2063634300 \, \mathrm{I}) \, u_{ol+2-21} + (-94743040 + 70894080 \, \mathrm{I}) \, u_{ol-31} + (364152768 - 161399616 \, \mathrm{I}) \, u_{ol+1-31} + (-290745 + 85020 \, \mathrm{I}) \, u_{ol-41} \big),$$

$$O(\, \Delta x_{ol}^{23} \,)$$

Formula:, 681, Var.:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 3

Error order:., 22, Error:., 9.4059530542966662524 × 10<sup>−58</sup>, New Error:., 9.3009051447813872163 × 10<sup>−80</sup>

Error order:., 22, Error:., 9.3009051447813872163 × 10<sup>−80</sup>, New Error:., 9.2904605934464596666 × 10<sup>−102</sup>

Error order:., 22, Error:., 9.2904605934464596666 × 10<sup>−102</sup>, New Error:., 9.2894167385447897194 × 10<sup>−124</sup>

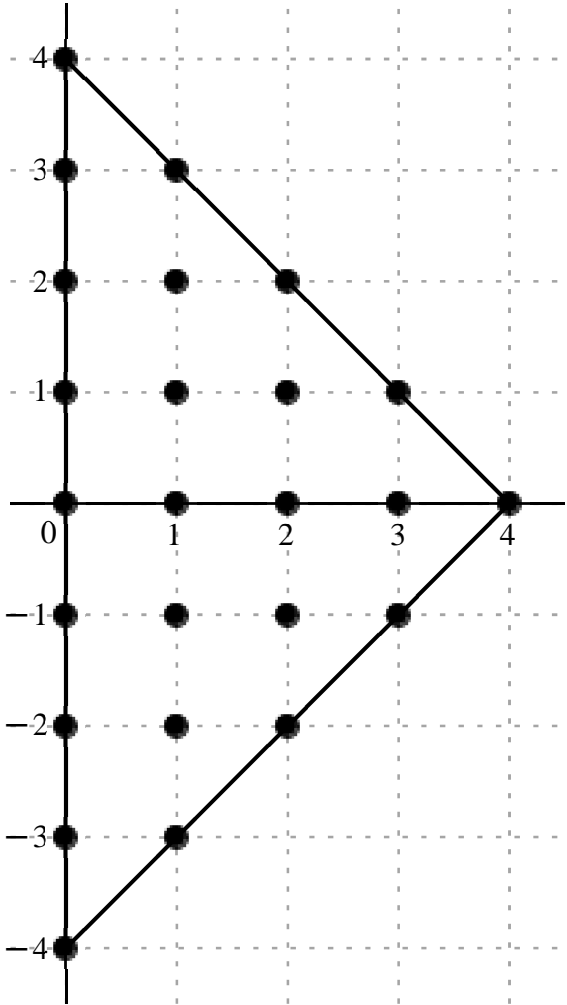
Error order:., 22, Error:., 9.2894167385447897194 × 10<sup>−124</sup>, New Error:., 9.2893123590547820963 × 10<sup>−146</sup>

Error order:., 22, Error:., 9.2893123590547820963 × 10<sup>−146</sup>, New Error:., 9.2893019211657807694 × 10<sup>−168</sup>

$$x_o \, + h \, . \, , \left[ \begin{array}{ccccc} 4 \, \mathrm{I} & & & & \\ 3 \, \mathrm{I} & 1 + 3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1 + 2 \, \mathrm{I} & 2 + 2 \, \mathrm{I} & & \\ \mathrm{I} & 1 + \mathrm{I} & 2 + \mathrm{I} & 3 + \mathrm{I} & \\ 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & 3 - \mathrm{I} & \\ -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & 2 - 2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & 1 - 3 \, \mathrm{I} & & & \\ -4 \, \mathrm{I} & & & & \end{array} \right]$$



$$c = , \left( \begin{array}{ccccc} \frac{2641}{81719680} + \frac{34763 \text{ I}}{3187067520} & & & & \\ \frac{9910024}{971059635} + \frac{8300392 \text{ I}}{971059635} & - \frac{1570979}{39862875} - \frac{788753 \text{ I}}{39862875} & & & \\ \frac{47527}{34476} - \frac{4387 \text{ I}}{11492} & \frac{104055216}{13287625} + \frac{149576688 \text{ I}}{13287625} & - \frac{202323}{102544} + \frac{1167 \text{ I}}{7888} & & \\ - \frac{11192}{663} - \frac{24056 \text{ I}}{663} & - \frac{101955}{221} - \frac{71325 \text{ I}}{221} & - \frac{118787088}{801125} - \frac{27710016 \text{ I}}{801125} & - \frac{1464184}{1077375} - \frac{579562 \text{ I}}{1077375} & \\ - \frac{1431421}{7200} & \frac{107968}{51} & - \frac{17829}{26} & \frac{13408}{1521} & - \frac{431}{42432} \\ - \frac{11192}{663} + \frac{24056 \text{ I}}{663} & - \frac{101955}{221} + \frac{71325 \text{ I}}{221} & - \frac{118787088}{801125} + \frac{27710016 \text{ I}}{801125} & - \frac{1464184}{1077375} + \frac{579562 \text{ I}}{1077375} & \\ \frac{47527}{34476} + \frac{4387 \text{ I}}{11492} & \frac{104055216}{13287625} - \frac{149576688 \text{ I}}{13287625} & - \frac{202323}{102544} - \frac{1167 \text{ I}}{7888} & & \\ \frac{9910024}{971059635} - \frac{8300392 \text{ I}}{971059635} & - \frac{1570979}{39862875} + \frac{788753 \text{ I}}{39862875} & & & \\ \frac{2641}{81719680} - \frac{34763 \text{ I}}{3187067520} & & & & \end{array} \right)$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{3107390832000 \, \Delta x_{ol}^3} \big( (100424025 + 33893925 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (31712076800 + 26561254400 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} - (122460955008 + 61484873856 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (4283703564000 - 1186227252000 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (24333936592896 + 34979405948928 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (-6130993869000 + 459726813000 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} - (52455381888000 + 112747200384000 \, \mathrm{I}) \, u_{ol+1} - (1433547657360000 + 1002871724400000 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} - (460749456340992 + 107481166700544 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} - (4223034633216 + 1671586629888 \, \mathrm{I}) \, u_{ol+3+\mathrm{I}} - 617775623907260 \, u_{ol} + 6578407320576000 \, u_{ol+1} - 2130833505528000 \, u_{ol+2} + 27392436736000 \, u_{ol+3} - 31563099750 \, u_{ol+4} + (-52455381888000 + 112747200384000 \, \mathrm{I}) \, u_{ol-1} + (-1433547657360000 + 1002871724400000 \, \mathrm{I}) \, u_{ol+1-\mathrm{I}} + (-460749456340992 + 107481166700544 \, \mathrm{I}) \, u_{ol+2-\mathrm{I}} + (-4223034633216 + 1671586629888 \, \mathrm{I}) \, u_{ol+3-\mathrm{I}} + (4283703564000 + 1186227252000 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (24333936592896 - 34979405948928 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} - (6130993869000 + 459726813000 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} + (31712076800 - 26561254400 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + (-122460955008 + 61484873856 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} + (100424025 - 33893925 \, \mathrm{I}) \, u_{ol-4\mathrm{I}} \big), \, O(\, \Delta x_{ol}^{22} \, )$$

Formula.: 682, Var.: 1

Variavel .:  $x_o$  , Derivada de Ordem .: 4

Error order.: 21, Error.:  $6.9530582645338360624 \times 10^{-55}$ , New Error.:  $6.8757936027174404393 \times 10^{-76}$

Error order.: 21, Error.:  $6.8757936027174404393 \times 10^{-76}$ , New Error.:  $6.8681112102115596826 \times 10^{-97}$

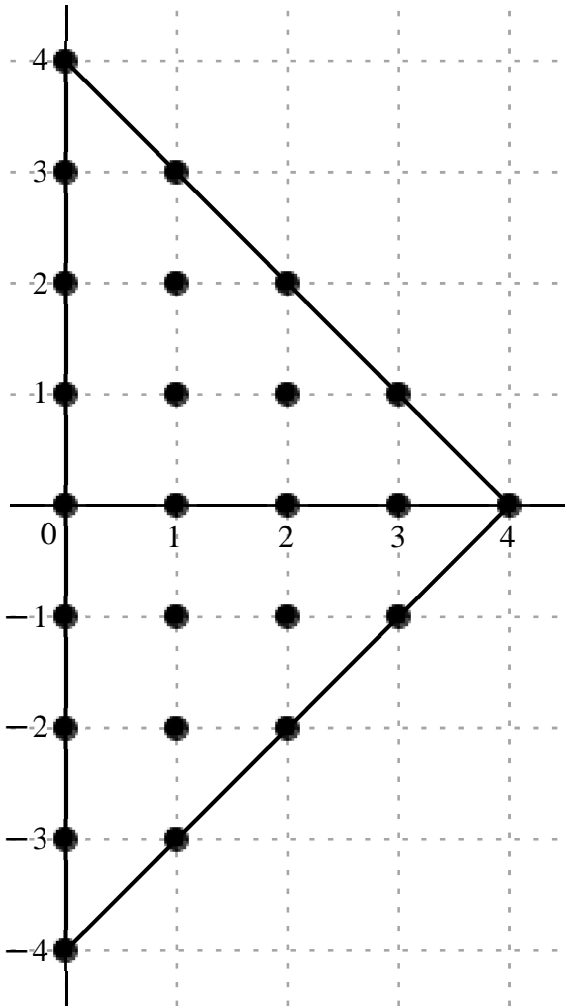
Error order.: 21, Error.:  $6.8681112102115596826 \times 10^{-97}$ , New Error.:  $6.8673434101229897303 \times 10^{-118}$

Error order.: 21, Error.:  $6.8673434101229897303 \times 10^{-118}$ , New Error.:  $6.8672666345041821465 \times 10^{-139}$

Error order.: 21, Error.:  $6.8672666345041821465 \times 10^{-139}$ , New Error.:  $6.8672589569862003119 \times 10^{-160}$

$$x_o + h. , \left[ \begin{array}{cccccc} 4 \text{ I} & & & & & \\ 3 \text{ I} & 1 + 3 \text{ I} & & & & \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & & & \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} & & \\ 0 & 1 & 2 & 3 & 4 & \\ -\text{I} & 1 - \text{I} & 2 - \text{I} & 3 - \text{I} & & \\ -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} & & & \\ -3 \text{ I} & 1 - 3 \text{ I} & & & & \\ -4 \text{ I} & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccc} -\frac{32191}{124494825} - \frac{5867639 \text{ I}}{59757516000} & & & & \\ -\frac{25575544}{323686545} - \frac{592341208 \text{ I}}{8092163625} & \frac{183932617}{597943125} + \frac{102273259 \text{ I}}{597943125} & & & \\ -\frac{29171149}{2585700} + \frac{1917913 \text{ I}}{861900} & -\frac{3769308592}{66438125} - \frac{6074332656 \text{ I}}{66438125} & \frac{39695251}{2563600} - \frac{343951 \text{ I}}{512720} & & \\ \frac{325736}{3825} + \frac{14808968 \text{ I}}{49725} & \frac{18532999}{5525} + \frac{14414289 \text{ I}}{5525} & \frac{4550033552}{4005625} + \frac{1169577664 \text{ I}}{4005625} & \frac{170566256}{16160625} + \frac{69924038 \text{ I}}{16160625} & \\ \frac{37453523}{30000} & -\frac{59220544}{3825} & \frac{3402813}{650} & -\frac{4344608}{63375} & \frac{317449}{3978000} \\ \frac{325736}{3825} - \frac{14808968 \text{ I}}{49725} & \frac{18532999}{5525} - \frac{14414289 \text{ I}}{5525} & \frac{4550033552}{4005625} - \frac{1169577664 \text{ I}}{4005625} & \frac{170566256}{16160625} - \frac{69924038 \text{ I}}{16160625} & \\ -\frac{29171149}{2585700} - \frac{1917913 \text{ I}}{861900} & -\frac{3769308592}{66438125} + \frac{6074332656 \text{ I}}{66438125} & \frac{39695251}{2563600} + \frac{343951 \text{ I}}{512720} & & \\ -\frac{25575544}{323686545} + \frac{592341208 \text{ I}}{8092163625} & \frac{183932617}{597943125} - \frac{102273259 \text{ I}}{597943125} & & & \\ -\frac{32191}{124494825} + \frac{5867639 \text{ I}}{59757516000} & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u\big(x_{ol}\big) = \frac{1}{3884238540000 \, \Delta x_{ol}^4} \Big( \begin{aligned} &-(1004359200 + 381396535 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} - (306906528000 + 284323779840 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (1194826280032 + 664367090464 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (-43820900027800 + 8643266725800 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} \\ &- (220368857522688 + 355129784400384 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (60144259552650 - 2605686788250 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} \\ &+ (330780738579200 + 1156793649939200 \, \mathrm{I}) \, u_{ol+1} + (13029246873770400 + 10133671829954400 \, \mathrm{I}) \, u_{ol+1+1} + (4412149335240192 + 1134134782470144 \, \mathrm{I}) \, u_{ol+2+1} + (40995940762112 + 16806382381376 \, \mathrm{I}) \, u_{ol+3+1} \\ &+ 4849280583179214 \, u_{ol} - 60137704409036800 \, u_{ol+1} + 20334365229250800 \, u_{ol+2} - 266279981614080 \, u_{ol+3} \\ &+ 309966727070 \, u_{ol+4} + (330780738579200 - 1156793649939200 \, \mathrm{I}) \, u_{ol-1} + (13029246873770400 - 10133671829954400 \, \mathrm{I}) \, u_{ol+1-1} + (4412149335240192 - 1134134782470144 \, \mathrm{I}) \, u_{ol+2-1} + (40995940762112 - 16806382381376 \, \mathrm{I}) \, u_{ol+3-1} \\ &- (43820900027800 + 8643266725800 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (-220368857522688 + 355129784400384 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (60144259552650 + 2605686788250 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} \\ &+ (-306906528000 + 284323779840 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + (1194826280032 - 664367090464 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} + (-1004359200 + 381396535 \, \mathrm{I}) \, u_{ol-4\mathrm{I}} \Big), \, O(\, \Delta x_{ol}^{21} \, ) \end{aligned}$$

Formula: 683, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 5

Error order: 20, Error: 4.9613883211714169200 × 10<sup>−52</sup>, New Error: 4.9065252650672714639 × 10<sup>−72</sup>

Error order: 20, Error: 4.9065252650672714639 × 10<sup>−72</sup>, New Error: 4.9010700949155730960 × 10<sup>−92</sup>

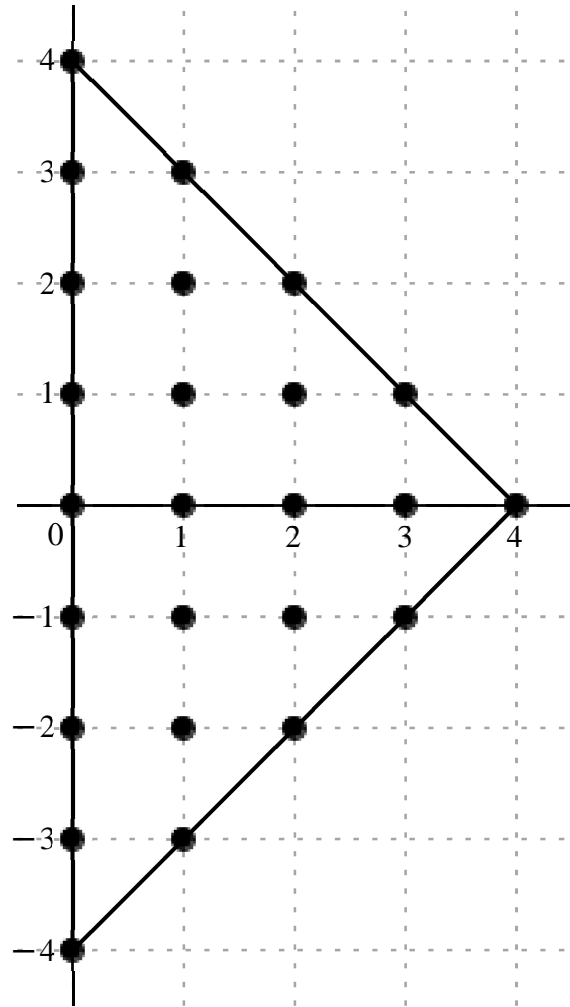
Error order: 20, Error: 4.9010700949155730960 × 10<sup>−92</sup>, New Error: 4.9005248881484465263 × 10<sup>−112</sup>

Error order: 20, Error: 4.9005248881484465263 × 10<sup>−112</sup>, New Error: 4.9004703705731105327 × 10<sup>−132</sup>

Error order: 20, Error: 4.9004703705731105327 × 10<sup>−132</sup>, New Error: 4.9004649188465895965 × 10<sup>−152</sup>

$$x_o+h., \left[ \begin{array}{ccccc} 4 \, \mathrm{I} & & & & \\ 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & & & \\ 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & & \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & \\ 0 & 1 & 2 & 3 & 4 \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & \\ -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} & & \\ -3 \, \mathrm{I} & 1-3 \, \mathrm{I} & & & \\ -4 \, \mathrm{I} & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccc} \frac{952568731}{478060128000} + \frac{223172251 \text{ I}}{265588960000} & & & & & \\ \frac{951127636}{1618432725} + \frac{24254751956 \text{ I}}{40460818125} & - \frac{2767704107}{1195886250} - \frac{1685490851 \text{ I}}{1195886250} & & & & \\ \frac{126594127}{1436500} - \frac{70491599 \text{ I}}{6464250} & \frac{5265920008}{13287625} + \frac{556557608 \text{ I}}{781625} & - \frac{3008483939}{25636000} + \frac{4411527 \text{ I}}{2563600} & & & \\ - \frac{79218076}{248625} - \frac{555306476 \text{ I}}{248625} & - \frac{1311168611}{55250} - \frac{1114212871 \text{ I}}{55250} & - \frac{6755139656}{801125} - \frac{144645456 \text{ I}}{61625} & - \frac{1282236563}{16160625} - \frac{542199916 \text{ I}}{16160625} & & \\ & - \frac{12706517}{1600} & \frac{2115024608}{19125} & - \frac{126005691}{3250} & \frac{163547056}{316875} & - \frac{7422163}{12240000} \\ - \frac{79218076}{248625} + \frac{555306476 \text{ I}}{248625} & - \frac{1311168611}{55250} + \frac{1114212871 \text{ I}}{55250} & - \frac{6755139656}{801125} + \frac{144645456 \text{ I}}{61625} & - \frac{1282236563}{16160625} + \frac{542199916 \text{ I}}{16160625} & & \\ \frac{126594127}{1436500} + \frac{70491599 \text{ I}}{6464250} & \frac{5265920008}{13287625} - \frac{556557608 \text{ I}}{781625} & - \frac{3008483939}{25636000} - \frac{4411527 \text{ I}}{2563600} & & & \\ \frac{951127636}{1618432725} - \frac{24254751956 \text{ I}}{40460818125} & - \frac{2767704107}{1195886250} + \frac{1685490851 \text{ I}}{1195886250} & & & & \\ \frac{952568731}{478060128000} - \frac{223172251 \text{ I}}{265588960000} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} u(x_{ol}) = \frac{1}{31073908320000 \Delta x_{ol}^5} \left( (61916967515 + 26111153367 \text{ I}) u_{ol+4\text{I}} + (18261650611200 + 18627649502208 \text{ I}) u_{ol+3\text{I}} - (71916023516288 + 43795794272384 \text{ I}) u_{ol+1+3\text{I}} + (2738443645143360 - 338855936056960 \text{ I}) u_{ol+2\text{I}} + (12314669893908480 + 22126237115996160 \text{ I}) u_{ol+1+2\text{I}} + (-3646643552140680 \right. \\ \left. + 53473001072400 \text{ I}) u_{ol+2+2\text{I}} - (9900915961431040 + 69403891502167040 \text{ I}) u_{ol+1\text{I}} - (737432275299108480 + 626659703211185280 \text{ I}) u_{ol+1+\text{I}} - (262017276154583040 + 72936302452715520 \text{ I}) u_{ol+2+\text{I}} - (2465504979121408 + 1042550673683456 \text{ I}) u_{ol+3+\text{I}} - 246775715202825900 u_{ol} + 3436448667374428160 u_{ol+1} \right. \\ \left. - 1204765935363768960 u_{ol+2} + 16038015697514496 u_{ol+3} - 18842778807034 u_{ol+4} + (-9900915961431040 + 69403891502167040 \text{ I}) u_{ol-1\text{I}} + (-737432275299108480 + 626659703211185280 \text{ I}) u_{ol+1-\text{I}} + (-262017276154583040 + 72936302452715520 \text{ I}) u_{ol+2-\text{I}} + (-2465504979121408 + 1042550673683456 \text{ I}) u_{ol+3-\text{I}} \right. \\ \left. + (2738443645143360 + 338855936056960 \text{ I}) u_{ol-2\text{I}} + (12314669893908480 - 22126237115996160 \text{ I}) u_{ol+1-2\text{I}} - (3646643552140680 + 53473001072400 \text{ I}) u_{ol+2-2\text{I}} + (18261650611200 - 18627649502208 \text{ I}) u_{ol-3\text{I}} + (-71916023516288 + 43795794272384 \text{ I}) u_{ol+1-3\text{I}} + (61916967515 - 26111153367 \text{ I}) u_{ol-4\text{I}} \right), \quad O(\Delta x_{ol}^{20})$$

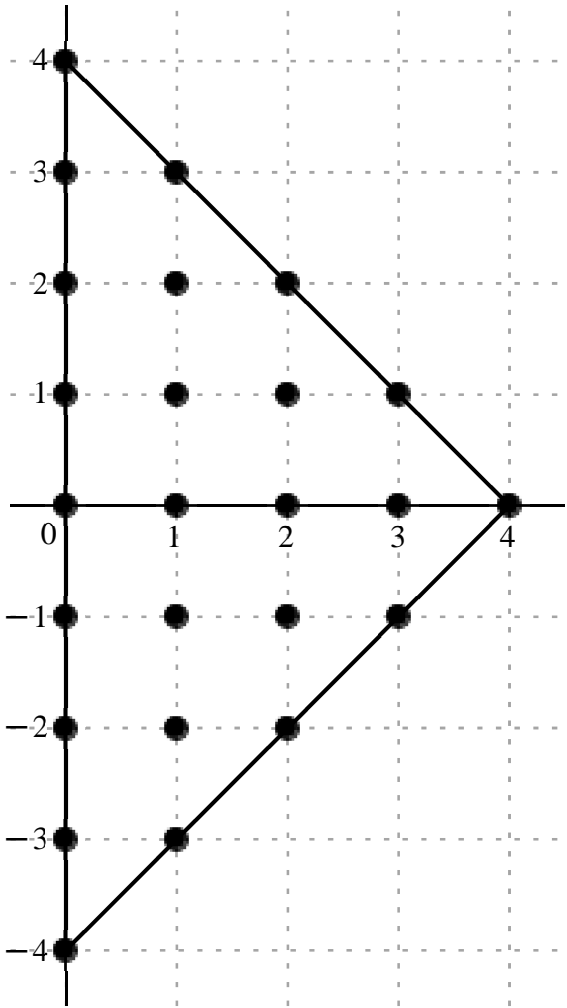
Formula:, 684, Var.: 1

Variavel :,  $x_o$  , Derivada de Ordem :, 6

Error order:, 19, Error:,  $3.4427038778432731928 \times 10^{-49}$ , New Error:,  $3.4048265625769867413 \times 10^{-68}$   
Error order:, 19, Error:,  $3.4048265625769867413 \times 10^{-68}$ , New Error:,  $3.4010602144254525995 \times 10^{-87}$   
Error order:, 19, Error:,  $3.4010602144254525995 \times 10^{-87}$ , New Error:,  $3.4006837926882015952 \times 10^{-106}$   
Error order:, 19, Error:,  $3.4006837926882015952 \times 10^{-106}$ , New Error:,  $3.4006461526445015554 \times 10^{-125}$   
Error order:, 19, Error:,  $3.4006461526445015554 \times 10^{-125}$ , New Error:,  $3.4006423886614310482 \times 10^{-144}$

$$x_o + h. , \begin{bmatrix} 4 \text{ I} \\ 3 \text{ I} & 1 + 3 \text{ I} \\ 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1 - \text{I} & 2 - \text{I} & 3 - \text{I} \\ -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \\ -3 \text{ I} & 1 - 3 \text{ I} \\ -4 \text{ I} \end{bmatrix}$$

$$c = , \begin{bmatrix} -\frac{3953691111}{265588960000} - \frac{157893851 \text{ I}}{22764768000} \\ -\frac{346202666}{82070625} - \frac{11128918 \text{ I}}{2344875} & \frac{13452334021}{797257500} + \frac{8936774503 \text{ I}}{797257500} \\ -\frac{11428004827}{17238000} + \frac{196250271 \text{ I}}{5746000} & -\frac{2086566228}{781625} - \frac{71271928452 \text{ I}}{13287625} & \frac{763511511}{884000} + \frac{5007747 \text{ I}}{442000} \\ \frac{32973578}{82875} + \frac{1302022682 \text{ I}}{82875} & \frac{1061172189}{6500} + \frac{195531207 \text{ I}}{1300} & \frac{48774083676}{801125} + \frac{14571660048 \text{ I}}{801125} & \frac{3124770934}{5386875} + \frac{2721221051 \text{ I}}{10773750} \\ \frac{242212859}{4800} & -\frac{4918643024}{6375} & \frac{3634071093}{13000} & -\frac{1197687928}{316875} & \frac{237652573}{53040000} \\ \frac{32973578}{82875} - \frac{1302022682 \text{ I}}{82875} & \frac{1061172189}{6500} - \frac{195531207 \text{ I}}{1300} & \frac{48774083676}{801125} - \frac{14571660048 \text{ I}}{801125} & \frac{3124770934}{5386875} - \frac{2721221051 \text{ I}}{10773750} \\ -\frac{11428004827}{17238000} - \frac{196250271 \text{ I}}{5746000} & -\frac{2086566228}{781625} + \frac{71271928452 \text{ I}}{13287625} & \frac{763511511}{884000} - \frac{5007747 \text{ I}}{442000} \\ -\frac{346202666}{82070625} + \frac{11128918 \text{ I}}{2344875} & \frac{13452334021}{797257500} - \frac{8936774503 \text{ I}}{797257500} \\ -\frac{3953691111}{265588960000} + \frac{157893851 \text{ I}}{22764768000} \end{bmatrix}$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{10357969440000 \, \Delta x_{ol}^6} \Big( -(154193953329 + 71841702205 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} - (43693546070528 + 49159546903040 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (174772723600832 + 116106574342976 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + ( -6866859540447760 + 353768588515440 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} - (27650841802859520 + 55557893666903040 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (8946186536228760$$

$$+ 117353145677040 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (4121138018117120 + 162730752945313280 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} + (1691013708344600640 + 1557927897440241600 \, \mathrm{I}) \, u_{ol+1+1\mathrm{I}} + (630613784590433280 + 188401072825405440 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} + (6008359548230144 + 2616203688199808 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} + 522673623228547700 \, u_{ol} - 7991710451586068480 \, u_{ol+1}$$

$$+ 2895507486467799840 \, u_{ol+2} - 39149869686409216 \, u_{ol+3} + 46410220370878 \, u_{ol+4} + (4121138018117120 - 162730752945313280 \, \mathrm{I}) \, u_{ol-1\mathrm{I}} + (1691013708344600640 - 1557927897440241600 \, \mathrm{I}) \, u_{ol+1-1\mathrm{I}} + (630613784590433280 - 188401072825405440 \, \mathrm{I}) \, u_{ol+2-1\mathrm{I}} + (6008359548230144 - 2616203688199808 \, \mathrm{I}) \, u_{ol+3-1\mathrm{I}}$$

$$- (6866859540447760 + 353768588515440 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + ( -27650841802859520 + 55557893666903040 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (8946186536228760 - 117353145677040 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} + ( -43693546070528 + 49159546903040 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + (174772723600832 - 116106574342976 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} + ( -154193953329 + 71841702205 \, \mathrm{I}) \, u_{ol-4\mathrm{I}} \Big),$$

$$O( \, \Delta x_{ol}^{19} \, )$$

Formula:, 685, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 7

Error order:, 18, Error:, 2.3199267868719672853 × 10<sup>−46</sup>, New Error:, 2.2945399582219021906 × 10<sup>−64</sup>

Error order:, 18, Error:, 2.2945399582219021906 × 10<sup>−64</sup>, New Error:, 2.2920155279164835686 × 10<sup>−82</sup>

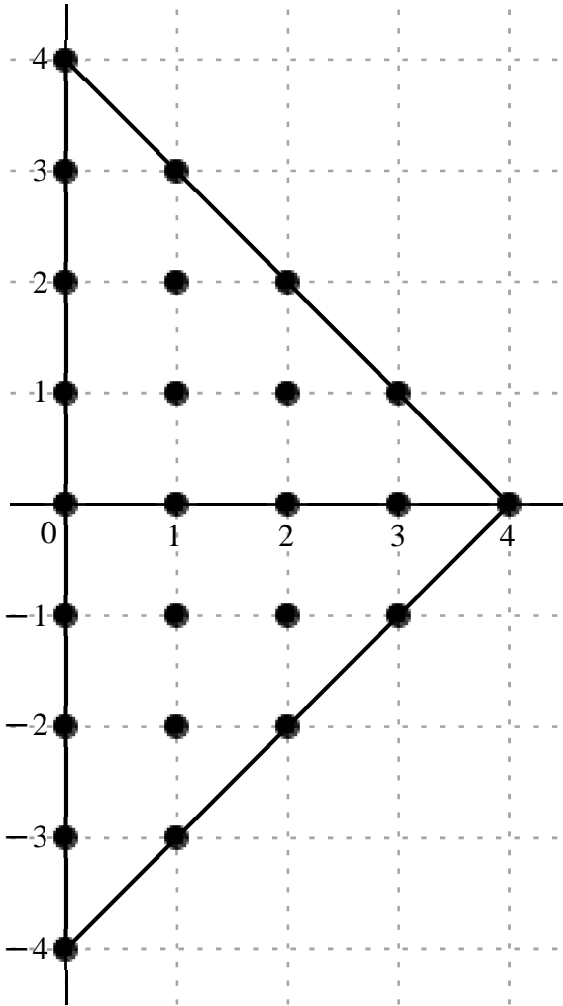
Error order:, 18, Error:, 2.2920155279164835686 × 10<sup>−82</sup>, New Error:, 2.2917632269106057654 × 10<sup>−100</sup>

Error order:, 18, Error:, 2.2917632269106057654 × 10<sup>−100</sup>, New Error:, 2.2917379982297649362 × 10<sup>−118</sup>

Error order:, 18, Error:, 2.2917379982297649362 × 10<sup>−118</sup>, New Error:, 2.2917354753758778232 × 10<sup>−136</sup>

$$x_o + h., \begin{bmatrix} 4\text{ I} \\ 3\text{ I} & 1+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \\ -3\text{ I} & 1-3\text{ I} \\ -4\text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{4897160849}{45529536000} + \frac{740670017\text{ I}}{13391040000} & & & & \\ \frac{33622165969}{1156023375} + \frac{209890427381\text{ I}}{5780116875} & -\frac{63159443781}{531505000} - \frac{45746756433\text{ I}}{531505000} & & & \\ \frac{82596403463}{17238000} + \frac{924745801\text{ I}}{8619000} & \frac{228906507774}{13287625} + \frac{518359796598\text{ I}}{13287625} & -\frac{63137687403}{10254400} - \frac{6449485119\text{ I}}{25636000} & & \\ \frac{48977593}{6375} - \frac{223288849\text{ I}}{2125} & -\frac{240594095049}{221000} - \frac{238829574081\text{ I}}{221000} & -\frac{341506305462}{801125} - \frac{108866589636\text{ I}}{801125} & -\frac{88626515593}{21547500} - \frac{6617913421\text{ I}}{3591250} & \\ & -\frac{3043404217}{9600} & \frac{11129699784}{2125} & -\frac{25429276467}{13000} & \frac{8508661588}{316875} - \frac{1135647009}{35360000} \\ \frac{48977593}{6375} + \frac{223288849\text{ I}}{2125} & -\frac{240594095049}{221000} + \frac{238829574081\text{ I}}{221000} & -\frac{341506305462}{801125} + \frac{108866589636\text{ I}}{801125} & -\frac{88626515593}{21547500} + \frac{6617913421\text{ I}}{3591250} & \\ \frac{82596403463}{17238000} - \frac{924745801\text{ I}}{8619000} & \frac{228906507774}{13287625} - \frac{518359796598\text{ I}}{13287625} & -\frac{63137687403}{10254400} + \frac{6449485119\text{ I}}{25636000} & & \\ \frac{33622165969}{1156023375} - \frac{209890427381\text{ I}}{5780116875} & -\frac{63159443781}{531505000} + \frac{45746756433\text{ I}}{531505000} & & & \\ \frac{4897160849}{45529536000} - \frac{740670017\text{ I}}{13391040000} & & & & \end{bmatrix}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7}u\big(x_{ol}\big)=\frac{1}{2959419840000\,\mathcal{A}_{ol}^7}\Big((318315455185+163688073757\,\mathrm{I})\,u_{ol+41}+(86072744880640+107463898819072\,\mathrm{I})\,u_{ol+31}-(351671782972608+254717939818944\,\mathrm{I})\,u_{ol+1+31}+(14180150546527840+317520718231360\,\mathrm{I})\,u_{ol+21}+(50982057411425280+115449093898306560\,\mathrm{I})\,u_{ol+1+21}-(18221536584505800\\ +744528562137360\,\mathrm{I})\,u_{ol+2+21}+(22736511441512960-310967270485347840\,\mathrm{I})\,u_{ol+1}-(3221805150564960960+3198176379701634240\,\mathrm{I})\,u_{ol+1+1}-(1261551612881064960+402161891442554880\,\mathrm{I})\,u_{ol+2+1}-(12172320157604992+5453584205362944\,\mathrm{I})\,u_{ol+3+1}-938199043846819300\,u_{ol}+15499978519535677440\,u_{ol+1}\\ -5788915791791146560\,u_{ol+2}+79465725965674496\,u_{ol+3}-95046840771246\,u_{ol+4}+(22736511441512960+310967270485347840\,\mathrm{I})\,u_{ol-1}+(-3221805150564960960+3198176379701634240\,\mathrm{I})\,u_{ol+1-1}+(-1261551612881064960+402161891442554880\,\mathrm{I})\,u_{ol+2-1}+(-12172320157604992+5453584205362944\,\mathrm{I})\,u_{ol+3-1}\\ +(14180150546527840-317520718231360\,\mathrm{I})\,u_{ol-21}+(50982057411425280-115449093898306560\,\mathrm{I})\,u_{ol+1-21}+(-18221536584505800+744528562137360\,\mathrm{I})\,u_{ol+2-21}+(86072744880640-107463898819072\,\mathrm{I})\,u_{ol-31}+(-351671782972608+254717939818944\,\mathrm{I})\,u_{ol+1-31}+(318315455185-163688073757\,\mathrm{I})\,u_{ol-41}\Big),\\ O(\,\mathcal{A}_{ol}^{18}\,)$$

Formula:, 686, Var:, 1

Variavel :,  $x_{ol}$  , Derivada de Ordem :, 8

Error order:, 17, Error:, 1.5141710734800553357 × 10<sup>−43</sup>, New Error:, 1.4976979210053851481 × 10<sup>−60</sup>

Error order:, 17, Error:, 1.4976979210053851481 × 10<sup>−60</sup>, New Error:, 1.4960597992477858193 × 10<sup>−77</sup>

Error order:, 17, Error:, 1.4960597992477858193 × 10<sup>−77</sup>, New Error:, 1.4958960786857450346 × 10<sup>−94</sup>

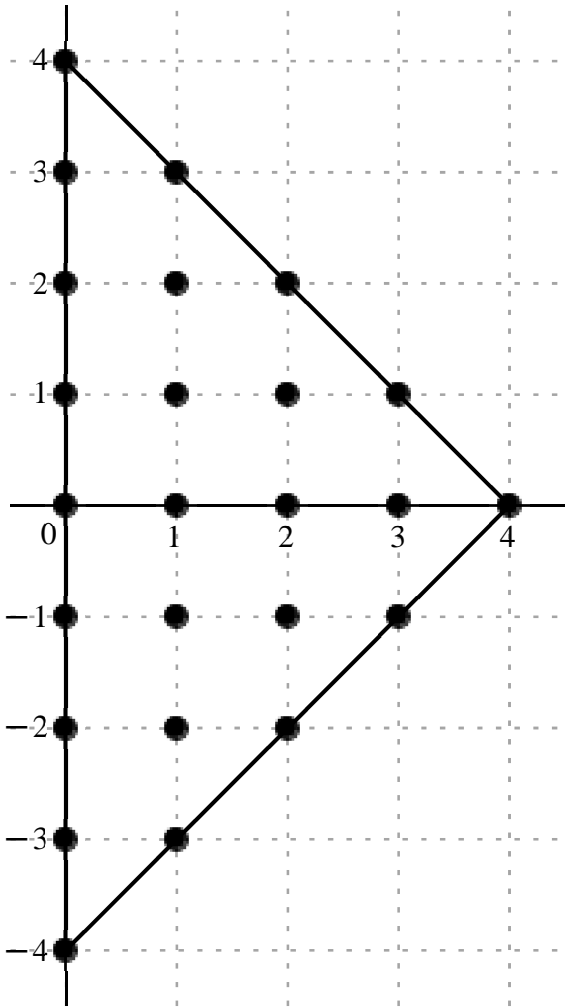
Error order:, 17, Error:, 1.4958960786857450346 × 10<sup>−94</sup>, New Error:, 1.4958797075453577600 × 10<sup>−111</sup>

Error order:, 17, Error:, 1.4958797075453577600 × 10<sup>−111</sup>, New Error:, 1.4958780704404768803 × 10<sup>−128</sup>

$$x_o+h\, , \left[\begin{array}{cccccc} 4\,\mathrm{I} & & & & & \\ 3\,\mathrm{I} & 1+3\,\mathrm{I} & & & & \\ 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & & & \\ \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & & \\ 0 & 1 & 2 & 3 & 4 & \\ -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & 3-\mathrm{I} & & \\ -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & & & \\ -3\,\mathrm{I} & 1-3\,\mathrm{I} & & & & \\ -4\,\mathrm{I} & & & & & \end{array}\right]$$

$$c=,\left[\begin{array}{ccccccccc} -\frac{42616158343}{56911920000}-\frac{967965319\,\mathrm{I}}{2276476800} & & & & & & & & \\ -\frac{368972770828}{1926705625}-\frac{103121302972\,\mathrm{I}}{385341125} & \frac{321053783617}{398628750}+\frac{253626176881\,\mathrm{I}}{398628750} & & & & & & & \\ -\frac{285424417411}{8619000}-\frac{28239617161\,\mathrm{I}}{8619000} & -\frac{1407958195224}{13287625}-\frac{3628251911928\,\mathrm{I}}{13287625} & \frac{271648888413}{6409000}+\frac{37267075251\,\mathrm{I}}{12818000} & & & & & & \\ -\frac{8798036548}{82875}+\frac{18591471556\,\mathrm{I}}{27625} & \frac{77589306543}{11050}+\frac{412624090263\,\mathrm{I}}{55250} & \frac{2312036638296}{801125}+\frac{60182354736\,\mathrm{I}}{61625} & \frac{151920889729}{5386875}+\frac{23328640076\,\mathrm{I}}{1795625} & & & & & \\ & \frac{1564141467}{800} & -\frac{219831879904}{6375} & \frac{86094636831}{6500} & -\frac{19489227184}{105625} & \frac{5905040029}{26520000} & & & \\ & -\frac{8798036548}{82875}-\frac{18591471556\,\mathrm{I}}{27625} & \frac{77589306543}{11050}-\frac{412624090263\,\mathrm{I}}{55250} & \frac{2312036638296}{801125}-\frac{60182354736\,\mathrm{I}}{61625} & \frac{151920889729}{5386875}-\frac{23328640076\,\mathrm{I}}{1795625} & & & & \\ & -\frac{285424417411}{8619000}+\frac{28239617161\,\mathrm{I}}{8619000} & -\frac{1407958195224}{13287625}+\frac{3628251911928\,\mathrm{I}}{13287625} & \frac{271648888413}{6409000}-\frac{37267075251\,\mathrm{I}}{12818000} & & & & & \\ & -\frac{368972770828}{1926705625}+\frac{103121302972\,\mathrm{I}}{385341125} & \frac{321053783617}{398628750}-\frac{253626176881\,\mathrm{I}}{398628750} & & & & & & \\ & -\frac{42616158343}{56911920000}+\frac{967965319\,\mathrm{I}}{2276476800} & & & & & & & \end{array}\right]$$





$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{739854960000 \, \Delta x_{ol}^8} \, \big( -(554010058459 + 314588728675 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} - (141685543997952 + 197992901706240 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (595875822393152 + 470730184291136 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} - (24500831990560240 + 2424088737100240 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} - (78395112310072320 + 202021066456151040 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (31359147678396720$$

$$+ 2151055583487720 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (-78543239557153280 + 497918278530516480 \, \mathrm{I}) \, u_{ol+1\mathrm{I}} + (5195007537447873600 + 5525465697675443520 \, \mathrm{I}) \, u_{ol+1+1\mathrm{I}} + (2135212076199121920 + 722534907195279360 \, \mathrm{I}) \, u_{ol+2+1\mathrm{I}} + (20865422678939776 + 9612146227794432 \, \mathrm{I}) \, u_{ol+3+1\mathrm{I}} + 1446547278127032900 \, u_{ol}$$

$$- 25512738307937054720 \, u_{ol+1\mathrm{I}} + 9799622167509851040 \, u_{ol+2\mathrm{I}} - 136513149336324096 \, u_{ol+3\mathrm{I}} + 164738806729042 \, u_{ol+4\mathrm{I}} - (78543239557153280 + 497918278530516480 \, \mathrm{I}) \, u_{ol-1\mathrm{I}} + (5195007537447873600 - 5525465697675443520 \, \mathrm{I}) \, u_{ol+1-1\mathrm{I}} + (2135212076199121920 - 722534907195279360 \, \mathrm{I}) \, u_{ol+2-1\mathrm{I}} + (20865422678939776$$

$$- 9612146227794432 \, \mathrm{I}) \, u_{ol+3-1\mathrm{I}} + (-24500831990560240 + 2424088737100240 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (-78395112310072320 + 202021066456151040 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (31359147678396720 - 2151055583487720 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} + (-141685543997952 + 197992901706240 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} + (595875822393152 - 470730184291136 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}}$$

$$+ (-554010058459 + 314588728675 \, \mathrm{I}) \, u_{ol-4\mathrm{I}} \big), \, O( \, \Delta x_{ol}^{17} \, )$$

Formula.: 687, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 9

Error order.: 16, Error.: 9.5499038716598205744 × 10<sup>−41</sup>, New Error.: 9.4466615828493775571 × 10<sup>−57</sup>

Error order.: 16, Error.: 9.4466615828493775571 × 10<sup>−57</sup>, New Error.: 9.4363946066631814630 × 10<sup>−73</sup>

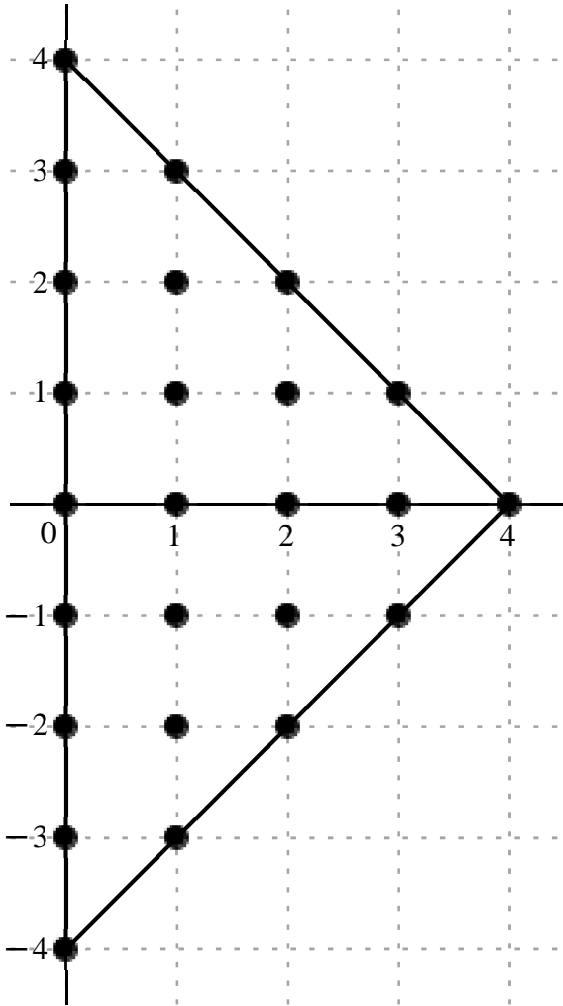
Error order.: 16, Error.: 9.4363946066631814630 × 10<sup>−73</sup>, New Error.: 9.4353684795840872827 × 10<sup>−89</sup>

Error order.: 16, Error.: 9.4353684795840872827 × 10<sup>−89</sup>, New Error.: 9.4352658725795905665 × 10<sup>−105</sup>

Error order.: 16, Error.: 9.4352658725795905665 × 10<sup>−105</sup>, New Error.: 9.4352556119361730398 × 10<sup>−121</sup>

$$x_o + h., \begin{bmatrix} 4\text{ I} \\ 3\text{ I} & 1+3\text{ I} \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \\ -3\text{ I} & 1-3\text{ I} \\ -4\text{ I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{111731289}{22318400} + \frac{1753350159\text{ I}}{557960000} \\ \frac{27149081502}{22667125} + \frac{214560644262\text{ I}}{113335625} & -\frac{81885013287}{15632500} - \frac{70586537091\text{ I}}{15632500} & & & \\ \frac{36841826553}{169000} + \frac{6552822297\text{ I}}{169000} & \frac{483689095596}{781625} + \frac{1434333509532\text{ I}}{781625} & -\frac{211951653669}{754000} - \frac{163163511\text{ I}}{6032} & & \\ \frac{1561794822}{1625} - \frac{6728154258\text{ I}}{1625} & -\frac{284172528339}{6500} - \frac{322305742899\text{ I}}{6500} & -\frac{888277113612}{47125} - \frac{317610966456\text{ I}}{47125} & -\frac{39409410033}{211250} - \frac{9326756103\text{ I}}{105625} & \\ & -\frac{294298662}{25} & \frac{27452130384}{125} & -\frac{562790075463}{6500} & \frac{129229294488}{105625} - \frac{387288573}{260000} \\ \frac{1561794822}{1625} + \frac{6728154258\text{ I}}{1625} & -\frac{284172528339}{6500} + \frac{322305742899\text{ I}}{6500} & -\frac{888277113612}{47125} + \frac{317610966456\text{ I}}{47125} & -\frac{39409410033}{211250} + \frac{9326756103\text{ I}}{105625} & \\ \frac{36841826553}{169000} - \frac{6552822297\text{ I}}{169000} & \frac{483689095596}{781625} - \frac{1434333509532\text{ I}}{781625} & -\frac{211951653669}{754000} + \frac{163163511\text{ I}}{6032} & & \\ \frac{27149081502}{22667125} - \frac{214560644262\text{ I}}{113335625} & -\frac{81885013287}{15632500} + \frac{70586537091\text{ I}}{15632500} & & & \\ \frac{111731289}{22318400} - \frac{1753350159\text{ I}}{557960000} \end{bmatrix}$$



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9}u\big(x_{ol}\big)=\frac{1}{7253480000\,\mathcal{A}x_{ol}^9}\Big(3\left((12104222975+7597850689\,\mathrm{I})\,u_{ol+4\,\mathrm{I}}+(2895902026880+4577293744256\,\mathrm{I})\,u_{ol+3\,\mathrm{I}}-(12664882055056+10917384403408\,\mathrm{I})\,u_{ol+1+3\,\mathrm{I}}+(527083731884920+93749044329080\,\mathrm{I})\,u_{ol+2\,\mathrm{I}}+(1496211602376960+4436871656152320\,\mathrm{I})\,u_{ol+1+2\,\mathrm{I}}-(679658302765260+65401373992500\,\mathrm{I})\,u_{ol+2+2\,\mathrm{I}}\right.\\ \left.+(2323784103688320-10010775866116480\,\mathrm{I})\,u_{ol+1\,\mathrm{I}}-(105704602608018960+119889141538617360\,\mathrm{I})\,u_{ol+1+1\,\mathrm{I}}-(45574537775719680+16295559985635840\,\mathrm{I})\,u_{ol+2+1\,\mathrm{I}}-(451053834297696+213495665035072\,\mathrm{I})\,u_{ol+3+1\,\mathrm{I}}-28462526117916800\,u_{ol}+530995943193963520\,u_{ol+1\,\mathrm{I}}-209342900336890320\,u_{ol+2\,\mathrm{I}}\right.\\ \left.+2958144703693312\,u_{ol+3\,\mathrm{I}}-3601525536518\,u_{ol+4\,\mathrm{I}}+(2323784103688320+10010775866116480\,\mathrm{I})\,u_{ol-1\,\mathrm{I}}+(-105704602608018960+119889141538617360\,\mathrm{I})\,u_{ol+1-1\,\mathrm{I}}+(-45574537775719680+16295559985635840\,\mathrm{I})\,u_{ol+2-1\,\mathrm{I}}+(-451053834297696+213495665035072\,\mathrm{I})\,u_{ol+3-1\,\mathrm{I}}+(527083731884920\right.\\ \left.-93749044329080\,\mathrm{I})\,u_{ol-2\,\mathrm{I}}+(1496211602376960-4436871656152320\,\mathrm{I})\,u_{ol+1-2\,\mathrm{I}}+(-679658302765260+65401373992500\,\mathrm{I})\,u_{ol+2-2\,\mathrm{I}}+(2895902026880-4577293744256\,\mathrm{I})\,u_{ol-3\,\mathrm{I}}+(-12664882055056+10917384403408\,\mathrm{I})\,u_{ol+1-3\,\mathrm{I}}+(12104222975-7597850689\,\mathrm{I})\,u_{ol-4\,\mathrm{I}}\Big)\Big),\,\mathcal{O}(\,\mathcal{A}x_{ol}^{16}\,)\,$$

Formula: 688, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 10

Error order: 15, Error: 5.8075096652406908291 × 10<sup>−38</sup>, New Error: 5.7451554760971790104 × 10<sup>−53</sup>

Error order: 15, Error: 5.7451554760971790104 × 10<sup>−53</sup>, New Error: 5.7389543997421975902 × 10<sup>−68</sup>

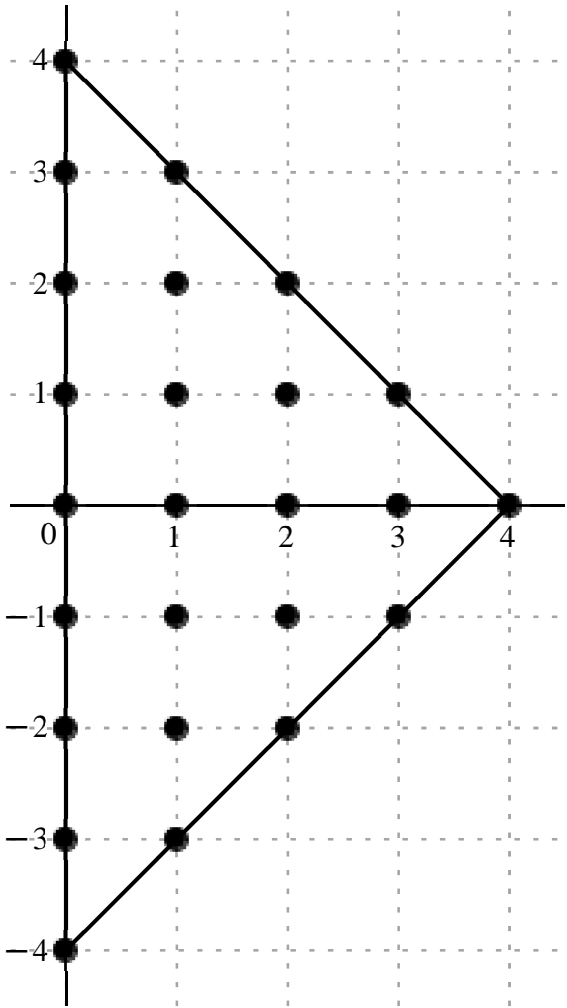
Error order: 15, Error: 5.7389543997421975902 × 10<sup>−68</sup>, New Error: 5.7383346343482012910 × 10<sup>−83</sup>

Error order: 15, Error: 5.7383346343482012910 × 10<sup>−83</sup>, New Error: 5.7382726612300354711 × 10<sup>−98</sup>

Error order: 15, Error: 5.7382726612300354711 × 10<sup>−98</sup>, New Error: 5.7382664639524300463 × 10<sup>−113</sup>

$$x_o+h.\,,\left[\begin{array}{cccccc}4\,\mathrm{I}&&&&&\\3\,\mathrm{I}&1+3\,\mathrm{I}&&&&\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&&&\\\mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}&&\\0&1&2&3&4&\\-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}&3-\mathrm{I}&&\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}&&&\\-3\,\mathrm{I}&1-3\,\mathrm{I}&&&&\\-4\,\mathrm{I}&&&&&\end{array}\right]$$

$$c=\,,\left[\begin{array}{ccccccccc}-\frac{7149802641}{223184000}-\frac{993921693\,\mathrm{I}}{44636800}&&&&&&&&&\\-\frac{160326258492}{22667125}-\frac{11618206212\,\mathrm{I}}{906685}&\frac{25480880292}{781625}+\frac{47975417637\,\mathrm{I}}{1563250}&&&&&&&&\\-\frac{46074703143}{33800}-\frac{11912998713\,\mathrm{I}}{33800}&-\frac{533705407704}{156325}-\frac{1847410224408\,\mathrm{I}}{156325}&\frac{16888955328}{9425}+\frac{2573541369\,\mathrm{I}}{11600}&&&&&&&\\-\frac{2376829476}{325}+\frac{611991492\,\mathrm{I}}{25}&\frac{170408593341}{650}+\frac{20529284328\,\mathrm{I}}{65}&\frac{1116754025184}{9425}+\frac{32331620664\,\mathrm{I}}{725}&\frac{50180004819}{42250}+\frac{24388472283\,\mathrm{I}}{42250}&&&&&&\\&\frac{11017787907}{160}&-\frac{33731571552}{25}&\frac{708580144377}{1300}&-\frac{164981995248}{21125}&\frac{997646307}{104000}&&&\\-\frac{2376829476}{325}-\frac{611991492\,\mathrm{I}}{25}&\frac{170408593341}{650}-\frac{20529284328\,\mathrm{I}}{65}&\frac{1116754025184}{9425}-\frac{32331620664\,\mathrm{I}}{725}&\frac{50180004819}{42250}-\frac{24388472283\,\mathrm{I}}{42250}&&&&&&\\-\frac{46074703143}{33800}+\frac{11912998713\,\mathrm{I}}{33800}&-\frac{533705407704}{156325}+\frac{1847410224408\,\mathrm{I}}{156325}&\frac{16888955328}{9425}-\frac{2573541369\,\mathrm{I}}{11600}&&&&&&&\\-\frac{160326258492}{22667125}+\frac{11618206212\,\mathrm{I}}{906685}&\frac{25480880292}{781625}-\frac{47975417637\,\mathrm{I}}{1563250}&&&&&&&&\\-\frac{7149802641}{223184000}+\frac{993921693\,\mathrm{I}}{44636800}&&&&&&&&&\end{array}\right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{2901392000\,\Delta x_{ol}^{10}}\Big(3\left(-\left(30982478111+21534970015\,\mathrm{I}\right)u_{ol+4\mathrm{I}}-\left(6840587028992+12392753292800\,\mathrm{I}\right)u_{ol+3\mathrm{I}}+\left(31528342547968+29680791711424\,\mathrm{I}\right)u_{ol+1+3\mathrm{I}}-\left(1318350839265040+340870603174640\,\mathrm{I}\right)u_{ol+2\mathrm{I}}-\left(3301857455662080+11429311255004160\,\mathrm{I}\right)u_{ol+1+2\mathrm{I}}+\left(1733032002723840\right.\\ \left.+214564722404760\,\mathrm{I}\right)u_{ol+2+2\mathrm{I}}+\left(-7072937463621120+23675029586091520\,\mathrm{I}\right)u_{ol+1\mathrm{I}}+\left(253549809974784960+305453852897356800\,\mathrm{I}\right)u_{ol+1+1\mathrm{I}}+\left(114593853037547520+43129519789224960\,\mathrm{I}\right)u_{ol+2+1\mathrm{I}}+\left(1148653763643456+558268389539392\,\mathrm{I}\right)u_{ol+3+1\mathrm{I}}+66597753523055300\,u_{ol}-1304913491312005120\,u_{ol+1}\\ +527145836475454560\,u_{ol+2}-7553095718447104\,u_{ol+3}+9277445557562\,u_{ol+4}-\left(7072937463621120+23675029586091520\,\mathrm{I}\right)u_{ol-1\mathrm{I}}+\left(253549809974784960-305453852897356800\,\mathrm{I}\right)u_{ol+1-1\mathrm{I}}+\left(114593853037547520-43129519789224960\,\mathrm{I}\right)u_{ol+2-1\mathrm{I}}+\left(1148653763643456-558268389539392\,\mathrm{I}\right)u_{ol+3-1\mathrm{I}}\\ \left.+\left(-1318350839265040+340870603174640\,\mathrm{I}\right)u_{ol-2\mathrm{I}}+\left(-3301857455662080+11429311255004160\,\mathrm{I}\right)u_{ol+1-2\mathrm{I}}+\left(1733032002723840-214564722404760\,\mathrm{I}\right)u_{ol+2-2\mathrm{I}}+\left(-6840587028992+12392753292800\,\mathrm{I}\right)u_{ol-3\mathrm{I}}+\left(31528342547968-29680791711424\,\mathrm{I}\right)u_{ol+1-3\mathrm{I}}+\left(-30982478111+21534970015\,\mathrm{I}\right)u_{ol-4\mathrm{I}}\right)\Big),\\ O(\,\Delta x_{ol}^{15}\,)$$

Formula:, 689, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 11

Error order:, 14, Error:, 3.3968538929323040098 × 10<sup>−35</sup>, New Error:, 3.3606555904443261807 × 10<sup>−49</sup>

Error order:, 14, Error:, 3.3606555904443261807 × 10<sup>−49</sup>, New Error:, 3.3570555502035367616 × 10<sup>−63</sup>

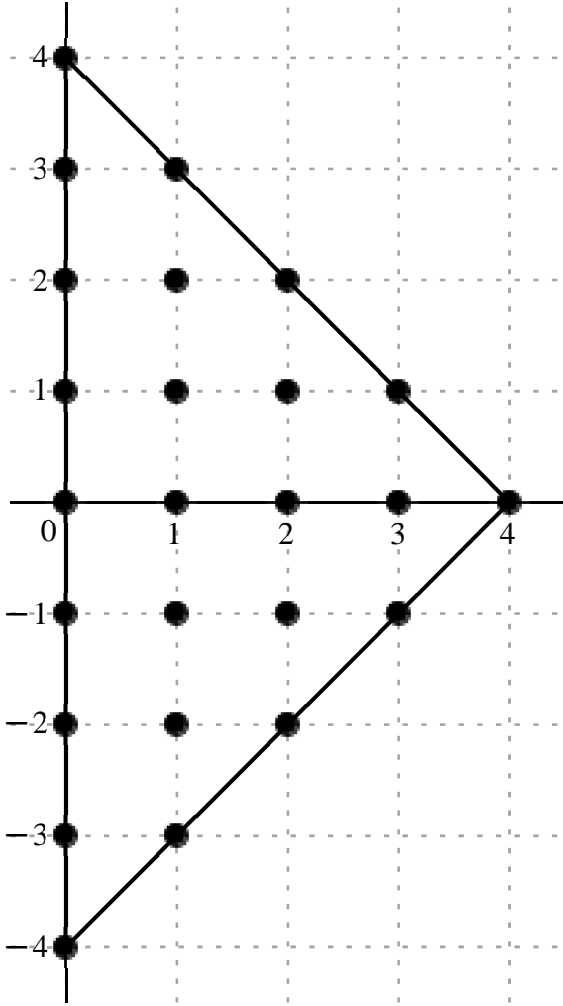
Error order:, 14, Error:, 3.3570555502035367616 × 10<sup>−63</sup>, New Error:, 3.3566957434021064637 × 10<sup>−77</sup>

Error order:, 14, Error:, 3.3566957434021064637 × 10<sup>−77</sup>, New Error:, 3.3566597646935141276 × 10<sup>−91</sup>

Error order:, 14, Error:, 3.3566597646935141276 × 10<sup>−91</sup>, New Error:, 3.3566561668423697253 × 10<sup>−105</sup>

$$x_o + h., \begin{bmatrix} 4\text{I} \\ 3\text{I} & 1+3\text{I} \\ 2\text{I} & 1+2\text{I} & 2+2\text{I} \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ -2\text{I} & 1-2\text{I} & 2-2\text{I} \\ -3\text{I} & 1-3\text{I} \\ -4\text{I} \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{8724288903}{44636800} + \frac{33665658279\text{I}}{223184000} \\ \frac{35481152586}{906685} + \frac{1874506022994\text{I}}{22667125} - \frac{151243529514}{781625} - \frac{155726332377\text{I}}{781625} \\ \frac{136556729463}{16900} + \frac{11625604683\text{I}}{4225} - \frac{2759776558308}{156325} + \frac{11373133333716\text{I}}{156325} - \frac{66047012955}{6032} - \frac{125047427967\text{I}}{75400} \\ \frac{16223214546}{325} - \frac{45146444574\text{I}}{325} - \frac{490678332606}{325} - \frac{625895446869\text{I}}{325} - \frac{6737430676284}{9425} - \frac{2660687335152\text{I}}{9425} - \frac{153309823128}{21125} - \frac{76472484396\text{I}}{21125} \\ - \frac{62324227119}{160} - \frac{199285263408}{25} - \frac{2141758363437}{650} - \frac{1011008243784}{21125} - \frac{474455289}{8000} \\ \frac{16223214546}{325} + \frac{45146444574\text{I}}{325} - \frac{490678332606}{325} + \frac{625895446869\text{I}}{325} - \frac{6737430676284}{9425} + \frac{2660687335152\text{I}}{9425} - \frac{153309823128}{21125} + \frac{76472484396\text{I}}{21125} \\ \frac{136556729463}{16900} - \frac{11625604683\text{I}}{4225} - \frac{2759776558308}{156325} - \frac{11373133333716\text{I}}{156325} - \frac{66047012955}{6032} + \frac{125047427967\text{I}}{75400} \\ \frac{35481152586}{906685} - \frac{1874506022994\text{I}}{22667125} - \frac{151243529514}{781625} + \frac{155726332377\text{I}}{781625} \\ \frac{8724288903}{44636800} - \frac{33665658279\text{I}}{223184000} \end{bmatrix}$$



$$\frac{\mathrm{d}^{11}}{\mathrm{d}x_{ol}^{11}}\;u(x_{ol})=\frac{1}{2901392000\,\Delta x_{ol}^{11}}\Big(33\Big(\big(17184205415+13262229019\,\mathrm{I}\big)\,u_{ol+41}+\big(3440596614400+7270811240704\,\mathrm{I}\big)\,u_{ol+31}-\big(17012605501696+17516852902528\,\mathrm{I}\big)\,u_{ol+1+31}+\big(710426039824480+241925310542720\,\mathrm{I}\big)\,u_{ol+21}+\big(1552165240066560+6396525899205120\,\mathrm{I}\big)\,u_{ol+1+21}-\big(962685249435000$$

$$+145812879641520\,\mathrm{I}\big)\,u_{ol+2+21}+\big(4388802321496320-12213289800974080\,\mathrm{I}\big)\,u_{ol+1}-\big(132741276344651520+169321029592740480\,\mathrm{I}\big)\,u_{ol+1+1}-\big(62850019981432320+24820181492520960\,\mathrm{I}\big)\,u_{ol+2+1}-\big(638066192354304+318273845360128\,\mathrm{I}\big)\,u_{ol+3+1}-34247540524479100\,u_{ol}+700854144205895680\,u_{ol+1}$$

$$-289700726415347520\,u_{ol+2}+4207755037402112\,u_{ol+3}-5214321135842\,u_{ol+4}+\big(4388802321496320+12213289800974080\,\mathrm{I}\big)\,u_{ol-1}+\big(-132741276344651520+169321029592740480\,\mathrm{I}\big)\,u_{ol+1-1}+\big(-62850019981432320+24820181492520960\,\mathrm{I}\big)\,u_{ol+2-1}+\big(-638066192354304+318273845360128\,\mathrm{I}\big)\,u_{ol+3-1}$$

$$+\big(710426039824480-241925310542720\,\mathrm{I}\big)\,u_{ol-21}+\big(1552165240066560-6396525899205120\,\mathrm{I}\big)\,u_{ol+1-21}+\big(-962685249435000+145812879641520\,\mathrm{I}\big)\,u_{ol+2-21}+\big(3440596614400-7270811240704\,\mathrm{I}\big)\,u_{ol-31}+\big(-17012605501696+17516852902528\,\mathrm{I}\big)\,u_{ol+1-31}+\big(17184205415-13262229019\,\mathrm{I}\big)\,u_{ol-41}\Big)\Big),\;O(\,\Delta x_{ol}^{14}\,)$$

Formula:, 690, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 12

Error order:, 13, Error:, 1.9054269418755744746 × 10<sup>−32</sup>, New Error:, 1.8852896308840845977 × 10<sup>−45</sup>

Error order:, 13, Error:, 1.8852896308840845977 × 10<sup>−45</sup>, New Error:, 1.8832868209456862466 × 10<sup>−58</sup>

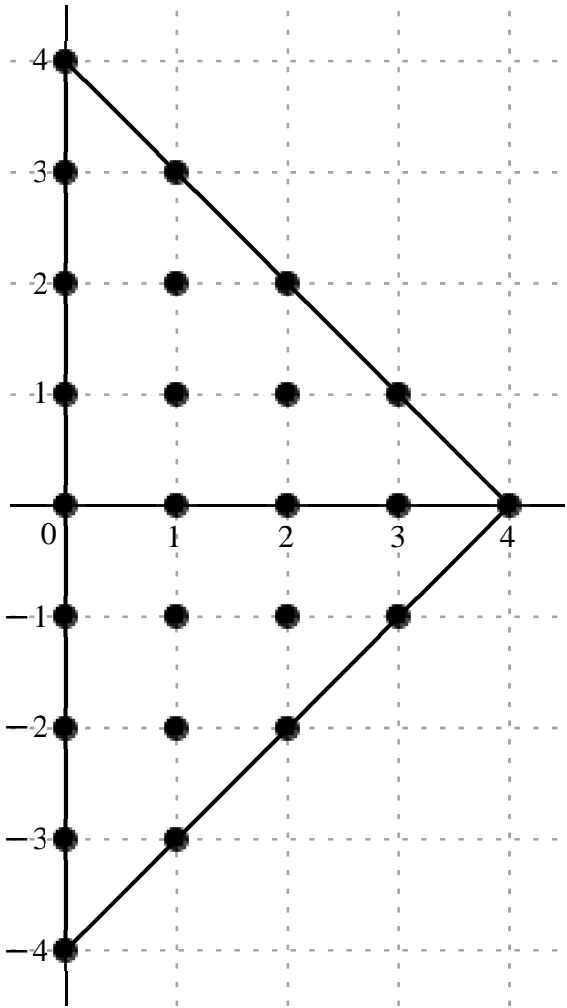
Error order:, 13, Error:, 1.8832868209456862466 × 10<sup>−58</sup>, New Error:, 1.8830866487924897868 × 10<sup>−71</sup>

Error order:, 13, Error:, 1.8830866487924897868 × 10<sup>−71</sup>, New Error:, 1.8830666326652065015 × 10<sup>−84</sup>

Error order:, 13, Error:, 1.8830666326652065015 × 10<sup>−84</sup>, New Error:, 1.8830646310633581666 × 10<sup>−97</sup>

$$x_o+h.\,,\left[\begin{array}{cccccc}4\,\mathrm{I}&&&&&\\3\,\mathrm{I}&1+3\,\mathrm{I}&&&&\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&&&\\\mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}&&\\0&1&2&3&4&\\-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}&3-\mathrm{I}&&\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}&&&\\-3\,\mathrm{I}&1-3\,\mathrm{I}&&&&\\-4\,\mathrm{I}&&&&&\end{array}\right]$$

$$c=\,,\left[\begin{array}{ccccccccc}-\frac{126261400419}{111592000}-\frac{21728027871\,\mathrm{I}}{22318400}&&&&&&&&&\\-\frac{4547834931024}{22667125}-\frac{2297581510752\,\mathrm{I}}{4533425}&\frac{852659956071}{781625}+\frac{962516723553\,\mathrm{I}}{781625}&&&&&&&&\\-\frac{765832824603}{16900}-\frac{324412690833\,\mathrm{I}}{16900}&-\frac{13222620224352}{156325}-\frac{66723605825184\,\mathrm{I}}{156325}&\frac{2409736931217}{37700}+\frac{66484729773\,\mathrm{I}}{5800}&&&&&&&\\-\frac{101821614048}{325}+\frac{245257146288\,\mathrm{I}}{325}&\frac{540836671221}{65}+\frac{3643046487927\,\mathrm{I}}{325}&\frac{38879344305648}{9425}+\frac{1236052551888\,\mathrm{I}}{725}&\frac{896092678404}{21125}+\frac{458590494978\,\mathrm{I}}{21125}&&&&&\\&\frac{169648390989}{80}&-\frac{1128062605824}{25}&\frac{12390761802573}{650}&-\frac{5927843363904}{21125}&\frac{18244104417}{52000}&&&\\-\frac{101821614048}{325}-\frac{245257146288\,\mathrm{I}}{325}&\frac{540836671221}{65}-\frac{3643046487927\,\mathrm{I}}{325}&\frac{38879344305648}{9425}-\frac{1236052551888\,\mathrm{I}}{725}&\frac{896092678404}{21125}-\frac{458590494978\,\mathrm{I}}{21125}&&&&&\\-\frac{765832824603}{16900}+\frac{324412690833\,\mathrm{I}}{16900}&-\frac{13222620224352}{156325}+\frac{66723605825184\,\mathrm{I}}{156325}&\frac{2409736931217}{37700}-\frac{66484729773\,\mathrm{I}}{5800}&&&&&&&\\-\frac{4547834931024}{22667125}+\frac{2297581510752\,\mathrm{I}}{4533425}&\frac{852659956071}{781625}-\frac{962516723553\,\mathrm{I}}{781625}&&&&&&&&\\-\frac{126261400419}{111592000}+\frac{21728027871\,\mathrm{I}}{22318400}&&&&&&&&&\end{array}\right]$$



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\;u(x_{ol})=\frac{1}{1450696000\,\varDelta x_{ol}^{12}}\big(99\,\big(-\big(16579779853+14265876885\,\mathrm{I}\big)\,u_{ol+41}-\big(2940014500864+7426526095360\,\mathrm{I}\big)\,u_{ol+31}+\big(15985220994624+18044757968832\,\mathrm{I}\big)\,u_{ol+1+31}-\big(664031208726480+281288741223280\,\mathrm{I}\big)\,u_{ol+21}-\big(1239453693757440+6254495576340480\,\mathrm{I}\big)\,u_{ol+1+21}+\big(936633102153840+167971319301240\,\mathrm{I}\big)\,u_{ol+2+21}+\big(-4590900022159360+11058074936796160\,\mathrm{I}\big)\,u_{ol+1}+\big(121925345080593600+164256502497272640\,\mathrm{I}\big)\,u_{ol+1+1}+\big(60447562379043840+24982744588139520\,\mathrm{I}\big)\,u_{ol+2+1}+\big(621580569811712+318104307789184\,\mathrm{I}\big)\,u_{ol+3+1}+31074273006840700\,u_{ol}-661202387886243840\,u_{ol+1}+279335331529843680\,u_{ol+2}-4111887469555712\,u_{ol+3}+5141151767934\,u_{ol+4}-\big(4590900022159360+11058074936796160\,\mathrm{I}\big)\,u_{ol-1}+\big(121925345080593600-164256502497272640\,\mathrm{I}\big)\,u_{ol+1-1}+\big(60447562379043840-24982744588139520\,\mathrm{I}\big)\,u_{ol+2-1}+\big(621580569811712-318104307789184\,\mathrm{I}\big)\,u_{ol+3-1}+\big(-664031208726480+281288741223280\,\mathrm{I}\big)\,u_{ol-21}+\big(-1239453693757440+6254495576340480\,\mathrm{I}\big)\,u_{ol+1-21}+\big(936633102153840-167971319301240\,\mathrm{I}\big)\,u_{ol+2-21}+\big(-2940014500864+7426526095360\,\mathrm{I}\big)\,u_{ol-31}+\big(15985220994624-18044757968832\,\mathrm{I}\big)\,u_{ol+1-31}+\big(-16579779853+14265876885\,\mathrm{I}\big)\,u_{ol-41}\big)\big),\;O(\,\varDelta x_{ol}^{13}\,)\;$$

Formula:, 691, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 13

Error order:, 12, Error:, 1.0214971171512675409 × 10−29, New Error:, 1.0108008368153678033 × 10−41

Error order:, 12, Error:, 1.0108008368153678033 × 10−41, New Error:, 1.0097369588582774548 × 10−53

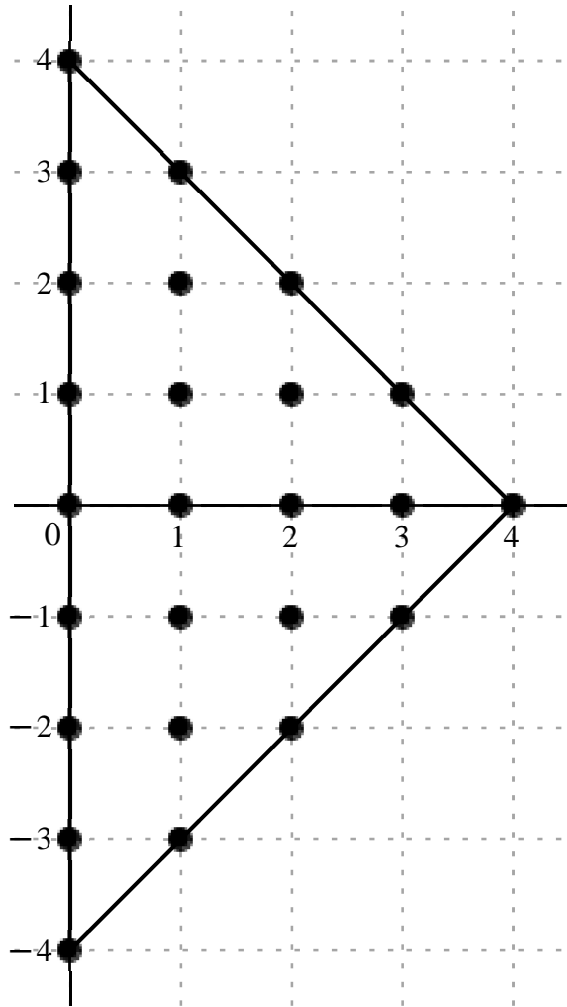
Error order:, 12, Error:, 1.0097369588582774548 × 10−53, New Error:, 1.0096306283696379913 × 10−65

Error order:, 12, Error:, 1.0096306283696379913 × 10−65, New Error:, 1.0096199958936515071 × 10−77

Error order:, 12, Error:, 1.0096199958936515071 × 10−77, New Error:, 1.0096189326517814401 × 10−89

$$x_o+h.,\left[\begin{array}{ccccc}4\,\mathrm{I}&&&&\\3\,\mathrm{I}&1+3\,\mathrm{I}&&&\\2\,\mathrm{I}&1+2\,\mathrm{I}&2+2\,\mathrm{I}&&\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}&\\0&1&2&3&4\\-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}&3-\mathrm{I}&\\-2\,\mathrm{I}&1-2\,\mathrm{I}&2-2\,\mathrm{I}&&\\-3\,\mathrm{I}&1-3\,\mathrm{I}&&&\\-4\,\mathrm{I}&&&&\end{array}\right]$$

$$c = , \quad \begin{array}{cccccc} \frac{1325772657}{214600} + \frac{12791895039 \text{ I}}{2146000} & & & & & \\ \frac{327112323516}{348725} + \frac{5118003250668 \text{ I}}{1743625} & - \frac{698958956619}{120250} - \frac{867955070367 \text{ I}}{120250} & & & & \\ \frac{311811217641}{1300} + \frac{158381777169 \text{ I}}{1300} & \frac{4436042748984}{12025} + \frac{28588379378328 \text{ I}}{12025} & - \frac{2059343007183}{5800} - \frac{85491301203 \text{ I}}{1160} & & & \\ \frac{45670803948}{25} - \frac{97764728292 \text{ I}}{25} & - \frac{2185086291003}{50} - \frac{3102760300563 \text{ I}}{50} & - \frac{16441556431608}{725} - \frac{7096482250704 \text{ I}}{725} & - \frac{383865345171}{1625} - \frac{201515047272 \text{ I}}{1625} & & \\ & - \frac{442173999267}{40} & \frac{6092165727648}{25} & - \frac{5255885490471}{50} & \frac{2548009305072}{1625} & - \frac{1978280073}{1000} \\ \frac{45670803948}{25} + \frac{97764728292 \text{ I}}{25} & - \frac{2185086291003}{50} + \frac{3102760300563 \text{ I}}{50} & - \frac{16441556431608}{725} + \frac{7096482250704 \text{ I}}{725} & - \frac{383865345171}{1625} + \frac{201515047272 \text{ I}}{1625} & & \\ \frac{311811217641}{1300} - \frac{158381777169 \text{ I}}{1300} & \frac{4436042748984}{12025} - \frac{28588379378328 \text{ I}}{12025} & - \frac{2059343007183}{5800} + \frac{85491301203 \text{ I}}{1160} & & & \\ \frac{327112323516}{348725} - \frac{5118003250668 \text{ I}}{1743625} & - \frac{698958956619}{120250} + \frac{867955070367 \text{ I}}{120250} & & & & \\ \frac{1325772657}{214600} - \frac{12791895039 \text{ I}}{2146000} & & & & & \end{array}$$



$$\frac{d^{13}}{dx_{ol}^{13}} u(x_{ol}) = \frac{1}{27898000 \Delta x_{ol}^{13}} \left( 99 \left( (1740913590 + 1679743793 \text{ I}) u_{ol+41} + (264333190720 + 827152040512 \text{ I}) u_{ol+31} - (1637964423592 + 2033995720456 \text{ I}) u_{ol+1+31} + (67590593238140 + 34332049879260 \text{ I}) u_{ol+21} + (103955749269120 + 669949900583040 \text{ I}) u_{ol+1+21} - (100054948126770 + 20768341352850 \text{ I}) u_{ol+2+21} \right. \right. \\ + (514797611531840 - 1101996117127360 \text{ I}) u_{ol+1} - (12315058049778120 + 17487031689920520 \text{ I}) u_{ol+1+1} - (6390617085740160 + 2758309464718080 \text{ I}) u_{ol+2+1} - (66567679251472 + 34945558904704 \text{ I}) u_{ol+3+1} - 3115093492815850 u_{ol} + 68670399785827840 u_{ol+1} - 29621958265284840 u_{ol+2} + 441860845954304 u_{ol+3} \\ - 557475328046 u_{ol+4} + (514797611531840 + 1101996117127360 \text{ I}) u_{ol-1} + (-12315058049778120 + 17487031689920520 \text{ I}) u_{ol+1-1} + (-6390617085740160 + 2758309464718080 \text{ I}) u_{ol+2-1} + (-66567679251472 + 34945558904704 \text{ I}) u_{ol+3-1} + (67590593238140 - 34332049879260 \text{ I}) u_{ol-21} + (103955749269120 \\ \left. - 669949900583040 \text{ I}) u_{ol+1-21} + (-100054948126770 + 20768341352850 \text{ I}) u_{ol+2-21} + (264333190720 - 827152040512 \text{ I}) u_{ol-31} + (-1637964423592 + 2033995720456 \text{ I}) u_{ol+1-31} + (1740913590 - 1679743793 \text{ I}) u_{ol-41} \right) \Big), \quad O(\Delta x_{ol}^{12})$$



Formula:, 692, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

*Error order:*, 11, *Error:*,  $5.2125437085625667517 \times 10^{-27}$ , *New Error:*,  $5.1585274878753865503 \times 10^{-38}$

*Error order*., 11, *Error*.,  $5.1585274878753865503 \times 10^{-38}$ , *New Error*.,  $5.1531546221279995420 \times 10^{-49}$

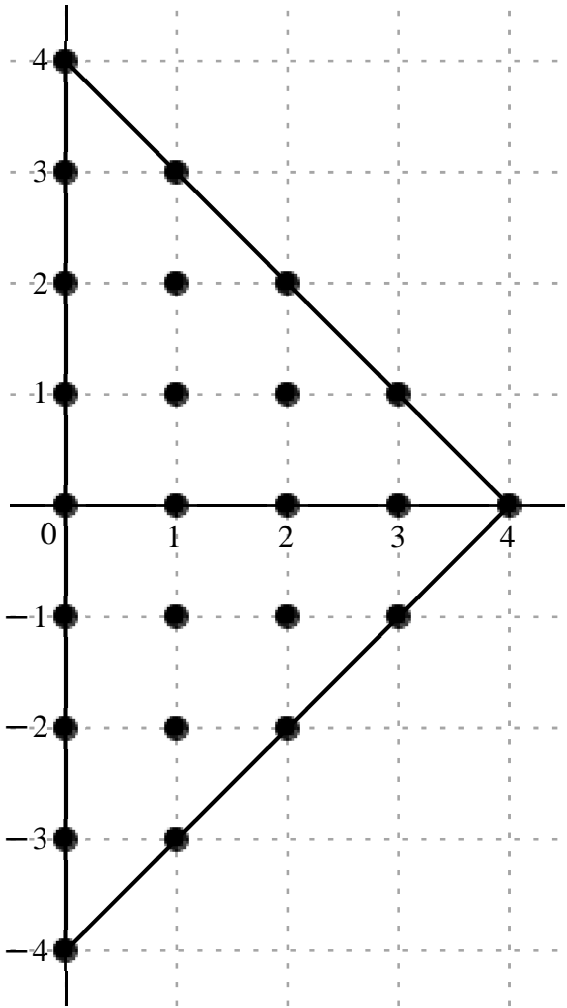
*Error order:*, 11, *Error:*,  $5.1531546221279995420 \times 10^{-49}$ , *New Error:*,  $5.1526176221565112321 \times 10^{-60}$

*Error order:*, 11, *Error:*,  $5.1526176221565112321 \times 10^{-60}$ , *New Error:*,  $5.1525639250244372132 \times 10^{-71}$

*Error order:*, 11, *Error:*,  $5.1525639250244372132 \times 10^{-71}$ , *New Error:*,  $5.1525585553398796019 \times 10^{-82}$

$$x_o \neq h., \left| \begin{array}{cccc} 4\text{ I} & & & \\ 3\text{ I} & 1+3\text{ I} & & \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & \\ -3\text{ I} & 1-3\text{ I} & & \\ -4\text{ I} & & & \end{array} \right.$$

c = ,	$-\frac{271090618029}{8584000} - \frac{59130294993 \text{ I}}{1716800}$							
	$-\frac{6794723844216}{1743625} - \frac{5570782293384 \text{ I}}{348725}$	$\frac{1749621356406}{60125} + \frac{2400851501433 \text{ I}}{60125}$						
	$-\frac{1552374704727}{1300} - \frac{922182507477 \text{ I}}{1300}$	$-\frac{17062756592112}{12025} - \frac{150507326947824 \text{ I}}{12025}$	$\frac{5416944975981}{2900} + \frac{2560362714063 \text{ I}}{5800}$					
	$-\frac{248265292968}{25} + \frac{481049647848 \text{ I}}{25}$	$\frac{5441961233709}{25} + \frac{1626521022126 \text{ I}}{5}$	$\frac{85702908991392}{725} + \frac{38564755414416 \text{ I}}{725}$	$\frac{2027187645021}{1625} + \frac{1091599413597 \text{ I}}{1625}$				
	$\frac{4389411385359}{80}$	$-\frac{31235533737408}{25}$	$\frac{27494098383213}{50}$	$-\frac{13505950380384}{1625}$	$\frac{42331635423}{4000}$			
	$-\frac{248265292968}{25} - \frac{481049647848 \text{ I}}{25}$	$\frac{5441961233709}{25} - \frac{1626521022126 \text{ I}}{5}$	$\frac{85702908991392}{725} - \frac{38564755414416 \text{ I}}{725}$	$\frac{2027187645021}{1625} - \frac{1091599413597 \text{ I}}{1625}$				
	$-\frac{1552374704727}{1300} + \frac{922182507477 \text{ I}}{1300}$	$-\frac{17062756592112}{12025} + \frac{150507326947824 \text{ I}}{12025}$	$\frac{5416944975981}{2900} - \frac{2560362714063 \text{ I}}{5800}$					
	$-\frac{6794723844216}{1743625} + \frac{5570782293384 \text{ I}}{348725}$	$\frac{1749621356406}{60125} - \frac{2400851501433 \text{ I}}{60125}$						
$-\frac{271090618029}{8584000} + \frac{59130294993 \text{ I}}{1716800}$								



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}}\;u(x_{ol})=\frac{1}{111592000\;\Delta x_{ol}^{14}}\left(693\left(-(5085393989+5546131565\;\mathrm{I})\;u_{ol+41}-(627506963968+2572367004160\;\mathrm{I})\;u_{ol+31}+(4685854599552+6429986127936\;\mathrm{I})\;u_{ol+1+31}-(192288376123760+114228205543760\;\mathrm{I})\;u_{ol+21}-(228488284523520+2015451650903040\;\mathrm{I})\;u_{ol+1+21}+(300785054366160+71084240430840\;\mathrm{I})\;u_{ol+2+21}\right.\\ \left.+(−1599100754567680+3098487290196480\;\mathrm{I})\;u_{ol+1}+(35052198441099840+52382895786748800\;\mathrm{I})\;u_{ol+1+1}+(19035197333268480+8565493727831040\;\mathrm{I})\;u_{ol+2+1}+(200881717112384+108170728615488\;\mathrm{I})\;u_{ol+3+1}+8835194720688700\;u_{ol}-201191092688302080\;u_{ol+1}+88546072922929440\;u_{ol+2}\right.\\ \left.-1338355879540736\;u_{ol+3}+1704138477678\;u_{ol+4}-(1599100754567680+3098487290196480\;\mathrm{I})\;u_{ol-1}+(35052198441099840-52382895786748800\;\mathrm{I})\;u_{ol+1-1}+(19035197333268480-8565493727831040\;\mathrm{I})\;u_{ol+2-1}+(200881717112384-108170728615488\;\mathrm{I})\;u_{ol+3-1}+(−192288376123760+114228205543760\;\mathrm{I})\;u_{ol-21}\right.\\ \left.+(−228488284523520+2015451650903040\;\mathrm{I})\;u_{ol+1-21}+(300785054366160-71084240430840\;\mathrm{I})\;u_{ol+2-21}+(−627506963968+2572367004160\;\mathrm{I})\;u_{ol-31}+(4685854599552-6429986127936\;\mathrm{I})\;u_{ol+1-31}+(−5085393989+5546131565\;\mathrm{I})\;u_{ol-41}\right)\Big),\;O(\;\Delta x_{ol}^{11}\;)$$

Formula:, 693, Var.:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 15

Error order:., 10, Error:., 2.5196700192815705279 × 10<sup>−24</sup>, New Error:., 2.4938676536024887300 × 10<sup>−34</sup>

Error order:., 10, Error:., 2.4938676536024887300 × 10<sup>−34</sup>, New Error:., 2.4913010045914057731 × 10<sup>−44</sup>

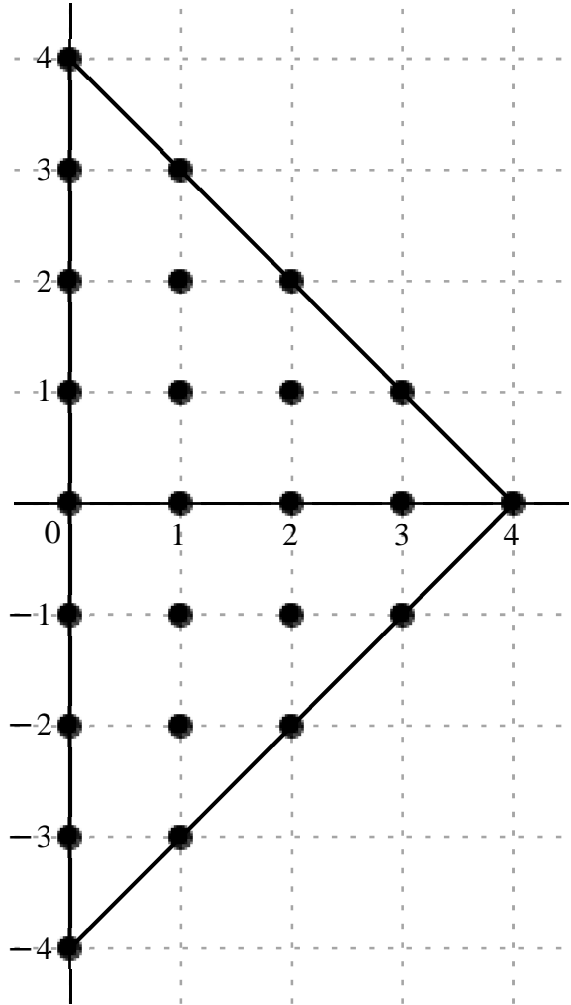
Error order:., 10, Error:., 2.4913010045914057731 × 10<sup>−44</sup>, New Error:., 2.4910444751167351824 × 10<sup>−54</sup>

Error order:., 10, Error:., 2.4910444751167351824 × 10<sup>−54</sup>, New Error:., 2.4910188235230844235 × 10<sup>−64</sup>

Error order:., 10, Error:., 2.4910188235230844235 × 10<sup>−64</sup>, New Error:., 2.4910162583772570626 × 10<sup>−74</sup>

$$x_o+h.,\left[\begin{array}{cccccc}4\;\mathrm{I}&&&&&\\3\;\mathrm{I}&1+3\;\mathrm{I}&&&&\\2\;\mathrm{I}&1+2\;\mathrm{I}&2+2\;\mathrm{I}&&&\\ \mathrm{I}&1+\mathrm{I}&2+\mathrm{I}&3+\mathrm{I}&&\\0&1&2&3&4&\\-\mathrm{I}&1-\mathrm{I}&2-\mathrm{I}&3-\mathrm{I}&&\\-2\;\mathrm{I}&1-2\;\mathrm{I}&2-2\;\mathrm{I}&&&\\-3\;\mathrm{I}&1-3\;\mathrm{I}&&&&\\-4\;\mathrm{I}&&&&&\end{array}\right]$$

$$c = , \left( \begin{array}{cccccc} \frac{25706758077}{171680} + \frac{160179737949 \text{ I}}{858400} & & & & & \\ \frac{955168699716}{69745} + \frac{28301988421476 \text{ I}}{348725} & - \frac{1634243062221}{12025} - \frac{2492984943603 \text{ I}}{12025} & & & & \\ \frac{361750702698}{65} + \frac{246976183377 \text{ I}}{65} & \frac{10788415174152}{2405} + \frac{148966186950504 \text{ I}}{2405} & - \frac{1073449901601}{116} - \frac{713375529867 \text{ I}}{290} & & & \\ \frac{251453544804}{5} - \frac{446899519836 \text{ I}}{5} & - \frac{5110639631559}{5} - \frac{8029950096861 \text{ I}}{5} & - \frac{84232724299416}{145} - \frac{39464866381248 \text{ I}}{145} & - \frac{2018985190992}{325} - \frac{1115336069694 \text{ I}}{325} & & \\ & - \frac{2061042560577}{8} & \frac{30229720256736}{5} & - \frac{13566187963944}{5} & \frac{13505811991056}{325} & - \frac{21366117927}{400} \\ \frac{251453544804}{5} + \frac{446899519836 \text{ I}}{5} & - \frac{5110639631559}{5} + \frac{8029950096861 \text{ I}}{5} & - \frac{84232724299416}{145} + \frac{39464866381248 \text{ I}}{145} & - \frac{2018985190992}{325} + \frac{1115336069694 \text{ I}}{325} & & \\ \frac{361750702698}{65} - \frac{246976183377 \text{ I}}{65} & \frac{10788415174152}{2405} - \frac{148966186950504 \text{ I}}{2405} & - \frac{1073449901601}{116} + \frac{713375529867 \text{ I}}{290} & & & \\ \frac{955168699716}{69745} - \frac{28301988421476 \text{ I}}{348725} & - \frac{1634243062221}{12025} + \frac{2492984943603 \text{ I}}{12025} & & & & \\ \frac{25706758077}{171680} - \frac{160179737949 \text{ I}}{858400} & & & & & \end{array} \right)$$



$$\frac{\mathrm{d}^{15}}{\mathrm{d} x_{o l}^{15}} u\left(x_{o l}\right)=\frac{1}{11159200 \mathcal{A} x_{o l}^{15}}\left(2079\left((803722595+1001604903 \text { I}) u_{o l+41}+(73509856640+435624641408 \text { I}) u_{o l+31}-(729474536672+1112789816096 \text { I}) u_{o l+1+31}+(29872708340160+20394839423840 \text { I}) u_{o l+21}+(24078040600320+332469027152640 \text { I}) u_{o l+1+21}-(49670938207800+13203795281040 \text { I}) u_{o l+2+21}\right.\right. \\ \left.+(269939432147840-479753835666560 \text { I}) u_{o l+1}-(5486353994852640+8620280819710560 \text { I}) u_{o l+1+1}-(3118109890371840+1460902413035520 \text { I}) u_{o l+2+1}-(33344817468928+18420480658496 \text { I}) u_{o l+3+1}-1382851499638700 u_{o l}+32452091802690560 u_{o l+1}-14563521378282240 u_{o l+2}+223057027669504 u_{o l+3}\right. \\ \left.-286710898474 u_{o l+4}+(269939432147840+479753835666560 \text { I}) u_{o l-1}+(-5486353994852640+8620280819710560 \text { I}) u_{o l+1-1}+(-3118109890371840+1460902413035520 \text { I}) u_{o l+2-1}+(-33344817468928+18420480658496 \text { I}) u_{o l+3-1}+(29872708340160-20394839423840 \text { I}) u_{o l-21}+(24078040600320\right. \\ \left.-332469027152640 \text { I}) u_{o l+1-21}+(-49670938207800+13203795281040 \text { I}) u_{o l+2-21}+(73509856640-435624641408 \text { I}) u_{o l-31}+(-729474536672+1112789816096 \text { I}) u_{o l+1-31}+(803722595-1001604903 \text { I}) u_{o l-41}\right)\left.\right), \mathcal{O}\left(\mathcal{A} x_{o l}^{10}\right)$$

Formula:, 694, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 16

*Error order:*, 9, *Error:*,  $1.1470757752813920599 \times 10^{-21}$ , *New Error:*,  $1.1354899100646399830 \times 10^{-30}$

*Error order:*, 9, *Error:*,  $1.1354899100646399830 \times 10^{-30}$ , *New Error:*,  $1.1343373500210837892 \times 10^{-39}$

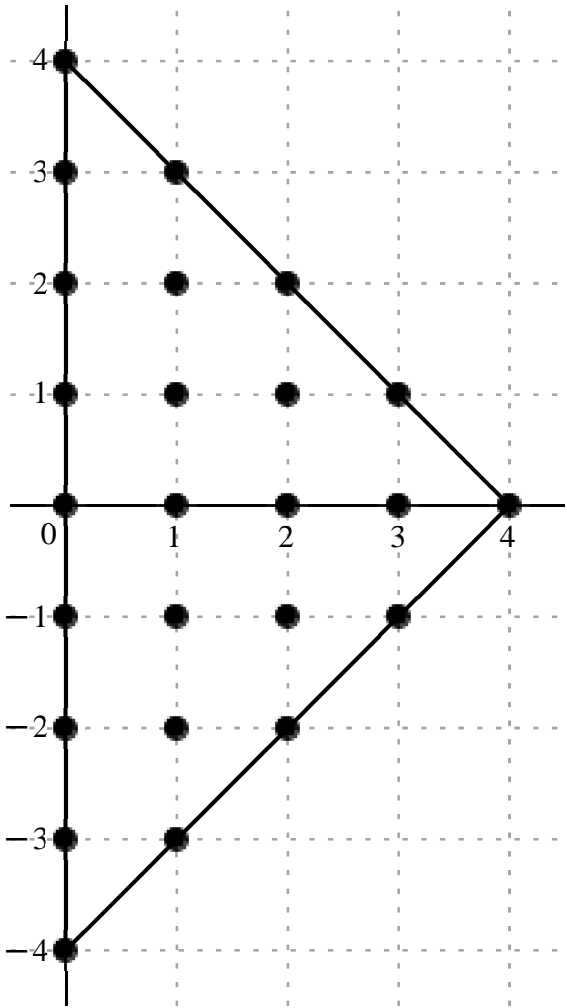
*Error order:*, 9, *Error:*,  $1.1343373500210837892 \times 10^{-39}$ , *New Error:*,  $1.1342221540844659857 \times 10^{-48}$

*Error order:*, 9, *Error:*,  $1.1342221540844659857 \times 10^{-48}$ , *New Error:*,  $1.1342106350912849983 \times 10^{-57}$

*Error order:*, 9, *Error:*,  $1.1342106350912849983 \times 10^{-57}$ , *New Error:*,  $1.1342094831979715110 \times 10^{-66}$

$$x_o \neq h., \left| \begin{array}{cccc} 4\text{ I} & & & \\ 3\text{ I} & 1+3\text{ I} & & \\ 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & \\ \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ 0 & 1 & 2 & 3 & 4 \\ -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & \\ -3\text{ I} & 1-3\text{ I} & & \\ -4\text{ I} & & & \end{array} \right.$$

	$\frac{-69792023763}{107300} - \frac{20180938239\text{ I}}{21460}$								
	$\frac{12482836648128}{348725} - \frac{26638145303616\text{ I}}{69745}$	$\frac{7055167264992}{12025} + \frac{12062457093456\text{ I}}{12025}$							
	$\frac{1568064619044}{65} - \frac{1215328422924\text{ I}}{65}$	$\frac{21985677673344}{2405} - \frac{688194534158208\text{ I}}{2405}$	$\frac{6215747721876}{145} + \frac{1842151949946\text{ I}}{145}$						
	$\frac{-1181762277696}{5} + \frac{1945373322816\text{ I}}{5}$	$4490949854160 + \frac{37077895429344\text{ I}}{5}$	$\frac{387489331063296}{145} + \frac{188866118060928\text{ I}}{145}$	$\frac{9414538510608}{325} + \frac{5337550720656\text{ I}}{325}$					
c = ,	1135558729305	$\frac{-137062000018944}{5}$	$\frac{62695570551768}{5}$	$\frac{-63257950280448}{325}$				$\frac{12631902129}{50}$	
	$\frac{-1181762277696}{5} - \frac{1945373322816\text{ I}}{5}$	$4490949854160 - \frac{37077895429344\text{ I}}{5}$	$\frac{387489331063296}{145} - \frac{188866118060928\text{ I}}{145}$	$\frac{9414538510608}{325} - \frac{5337550720656\text{ I}}{325}$					
	$\frac{-1568064619044}{65} + \frac{1215328422924\text{ I}}{65}$	$\frac{-21985677673344}{2405} + \frac{688194534158208\text{ I}}{2405}$	$\frac{6215747721876}{145} - \frac{1842151949946\text{ I}}{145}$						
	$\frac{-12482836648128}{348725} + \frac{26638145303616\text{ I}}{69745}$	$\frac{7055167264992}{12025} - \frac{12062457093456\text{ I}}{12025}$							
	$\frac{-69792023763}{107300} + \frac{20180938239\text{ I}}{21460}$								



$$\frac{d^{16}}{dx_{ol}^{16}}\,u(x_{ol})=\frac{1}{1394900\,\Delta x_{ol}^{16}}\left(2079\left(-\left(436409961+630957665\,I\right)u_{ol+4I}-\left(24017001728+256259214080\,I\right)u_{ol+3I}+\left(393650506368+673037529024\,I\right)u_{ol+1+3I}-\left(16185986880560+12544948511760\,I\right)u_{ol+2I}-\left(6133570490880+191992703132160\,I\right)u_{ol+1+2I}+\left(28761660935280+8524050869880\,I\right)u_{ol+2+2I}\right.\right.\\ \left.+\left(-158580105931520+261048701105920\,I\right)u_{ol+1}+\left(3013191895896000+4975464774833280\,I\right)u_{ol+1+1}+\left(1793000175482880+873925952739840\,I\right)u_{ol+2+1}+\left(19435882293184+11019128279488\,I\right)u_{ol+3+1}+761900371095500\,u_{ol}-18392283196385280\,u_{ol+1}+8413088154176160\,u_{ol+2}-130593132565504\,u_{ol+3}\right.\\ \left.+169506880998\,u_{ol+4}-\left(158580105931520+261048701105920\,I\right)u_{ol-1}+\left(3013191895896000-4975464774833280\,I\right)u_{ol+1-1}+\left(1793000175482880-873925952739840\,I\right)u_{ol+2-1}+\left(19435882293184-11019128279488\,I\right)u_{ol+3-1}+\left(-16185986880560+12544948511760\,I\right)u_{ol-2I}+\left(-6133570490880\right.\\ \left.+191992703132160\,I\right)u_{ol+1-2I}+\left(28761660935280-8524050869880\,I\right)u_{ol+2-2I}+\left(-24017001728+256259214080\,I\right)u_{ol-3I}+\left(393650506368-673037529024\,I\right)u_{ol+1-3I}+\left(-436409961+630957665\,I\right)u_{ol-4I}\Big)\Big),\,O(\,\Delta x_{ol}^9\,)$$

Formula: 695, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 1

Error order: 24, Error: 1.1349569141894428678 × 10<sup>−63</sup>, New Error: 1.1479369765168332639 × 10<sup>−87</sup>

Error order: 24, Error: 1.1479369765168332639 × 10<sup>−87</sup>, New Error: 1.1492425544228343998 × 10<sup>−111</sup>

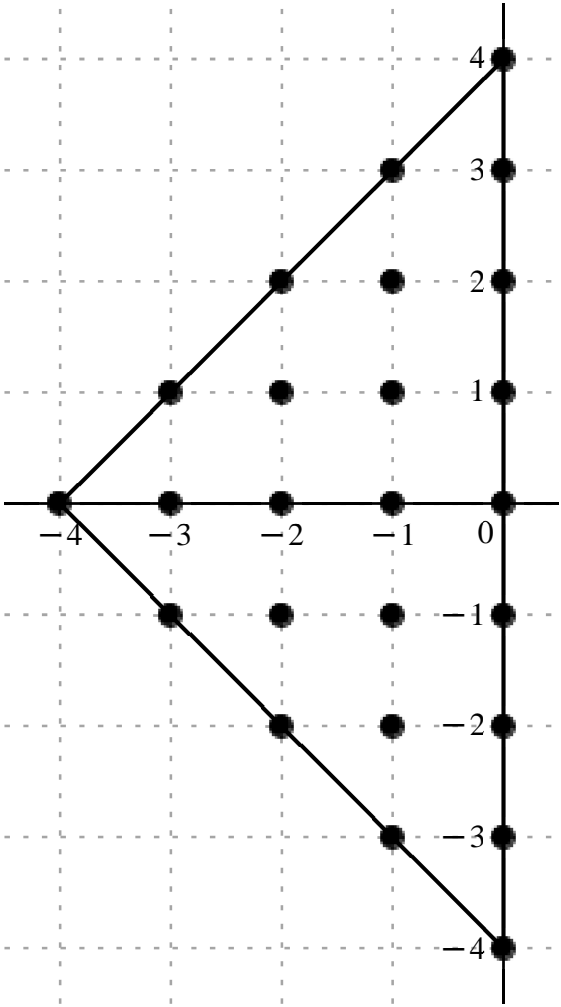
Error order: 24, Error: 1.1492425544228343998 × 10<sup>−111</sup>, New Error: 1.1493731882064667818 × 10<sup>−135</sup>

Error order: 24, Error: 1.1493731882064667818 × 10<sup>−135</sup>, New Error: 1.1493862523450373533 × 10<sup>−159</sup>

Error order: 24, Error: 1.1493862523450373533 × 10<sup>−159</sup>, New Error: 1.1493875587664967609 × 10<sup>−183</sup>

$$x_o+h\,.,\left[\begin{array}{ccccc} & & & & 4\,I \\ & & & -1+3\,I & 3\,I \\ & & -2+2\,I & -1+2\,I & 2\,I \\ -3+I & -2+I & -1+I & I & \\ -4 & -3 & -2 & -1 & 0 \\ -3-I & -2-I & -1-I & -I & \\ & -2-2\,I & -1-2\,I & -2\,I & \\ & & -1-3\,I & -3\,I & \\ & & & & -4\,I \end{array}\right]$$

$$c =, \left[ \begin{array}{cccccc} & & & & -\frac{9}{26558896} + \frac{11 \text{ I}}{132794480} \\ & & & \frac{232}{531505} - \frac{88 \text{ I}}{531505} & -\frac{7360}{64737309} + \frac{24256 \text{ I}}{323686545} \\ & & \frac{279}{12818} + \frac{45 \text{ I}}{12818} & -\frac{54144}{531505} + \frac{3456 \text{ I}}{31265} & -\frac{38}{2873} - \frac{18 \text{ I}}{2873} \\ \frac{224}{14365} - \frac{16 \text{ I}}{2873} & \frac{56448}{32045} - \frac{9216 \text{ I}}{32045} & \frac{1368}{221} - \frac{648 \text{ I}}{221} & \frac{64}{221} - \frac{64 \text{ I}}{221} \\ -\frac{256}{2535} & \frac{108}{13} & -\frac{512}{17} & \frac{67}{12} \\ \frac{224}{14365} + \frac{16 \text{ I}}{2873} & \frac{56448}{32045} + \frac{9216 \text{ I}}{32045} & \frac{1368}{221} + \frac{648 \text{ I}}{221} & \frac{64}{221} + \frac{64 \text{ I}}{221} \\ & \frac{279}{12818} - \frac{45 \text{ I}}{12818} & -\frac{54144}{531505} - \frac{3456 \text{ I}}{31265} & -\frac{38}{2873} + \frac{18 \text{ I}}{2873} \\ & & \frac{232}{531505} + \frac{88 \text{ I}}{531505} & -\frac{7360}{64737309} - \frac{24256 \text{ I}}{323686545} \\ & & & -\frac{9}{26558896} - \frac{11 \text{ I}}{132794480} \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d} x_{ol}}\; u(x_{ol}) = \frac{1}{5178984720 \, \mathcal{A} \mathfrak{x}_{ol}} \, \big( (-1755 + 429 \, \mathrm{I}) \, u_{ol+41} + (2260608 - 857472 \, \mathrm{I}) \, u_{ol-1+31} + (-588800 + 388096 \, \mathrm{I}) \, u_{ol+31} + (112727160 + 18181800 \, \mathrm{I}) \, u_{ol-2+21} + (-527579136 + 572479488 \, \mathrm{I}) \, u_{ol-1+21} - (68500320 + 32447520 \, \mathrm{I}) \, u_{ol+21} + (80758272 - 28842240 \, \mathrm{I}) \, u_{ol-3+1} + (9122899968 - 1489453056 \, \mathrm{I}) \, u_{ol-2+1} + (32058149760 - 15185439360 \, \mathrm{I}) \, u_{ol-1+1} + (1499796480 - 1499796480 \, \mathrm{I}) \, u_{ol+1} + 585858 \, u_{ol-4} - 523005952 \, u_{ol-3} + 43025411520 \, u_{ol-2} - 155978833920 \, u_{ol-1} + 28915998020 \, u_{ol} + (80758272 + 28842240 \, \mathrm{I}) \, u_{ol-3-1} + (9122899968 + 1489453056 \, \mathrm{I}) \, u_{ol-2-1} + (32058149760 + 15185439360 \, \mathrm{I}) \, u_{ol-1-1} + (1499796480 + 1499796480 \, \mathrm{I}) \, u_{ol-1} + (112727160 - 18181800 \, \mathrm{I}) \, u_{ol-2-21} - (527579136 + 572479488 \, \mathrm{I}) \, u_{ol-1-21} + (-68500320 + 32447520 \, \mathrm{I}) \, u_{ol-21} + (2260608 + 857472 \, \mathrm{I}) \, u_{ol-1-31} - (588800 + 388096 \, \mathrm{I}) \, u_{ol-31} - (1755 + 429 \, \mathrm{I}) \, u_{ol-41} \big) \cdot \; O(\; \mathcal{A} \mathfrak{x}_{ol}^{\; 24} \; )$$

*Formula:*, 696, *Var.:*, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

*Error order:*, 23, *Error:*,  $1.1522401417847675262 \times 10^{-60}$ , *New Error:*,  $1.1653387477732158696 \times 10^{-83}$

*Error order*., 23, *Error*.,  $1.1653387477732158696 \times 10^{-83}$ , *New Error*.,  $1.1666562000376138311 \times 10^{-106}$

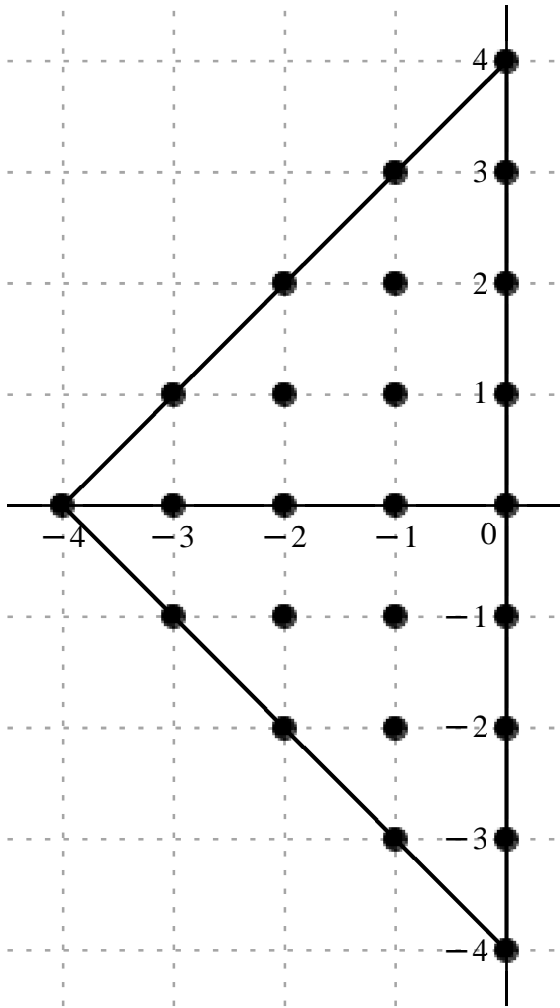
Error order:, 23, Error:,  $1.1666562000376138311 \times 10^{-106}$ , New Error:,  $1.1667880214558183837 \times 10^{-129}$

*Error order:*, 23, *Error:*,  $1.1667880214558183837 \times 10^{-129}$ , *New Error:*,  $1.1668012043598322985 \times 10^{-152}$

*Error order:*, 23, *Error:*,  $1.1668012043598322985 \times 10^{-152}$ , *New Error:*,  $1.1668025226578559005 \times 10^{-175}$

$$x_o \neq h., \quad -4 \left[ \begin{array}{rrrrr} & & & & 4 \text{ I} \\ & & & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & \\ -3 & -2 & -1 & 0 & \\ -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} & \\ & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & \\ & & -1 - 3 \text{ I} & -3 \text{ I} & \\ & & & & -4 \text{ I} \end{array} \right]$$

$$c = , \begin{array}{ccccccc} & & & & & -\frac{71}{18970640} + \frac{109\text{ I}}{99595860} \\ & & & & \frac{37372}{7972575} - \frac{16564\text{ I}}{7972575} & -\frac{9952}{8160165} + \frac{5792\text{ I}}{6346795} \\ & & \frac{5997}{25636} + \frac{681\text{ I}}{25636} & -\frac{157632}{156325} + \frac{3379392\text{ I}}{2657525} & -\frac{1327}{8619} - \frac{163\text{ I}}{2873} \\ & \frac{35264}{215475} - \frac{13352\text{ I}}{215475} & \frac{2907456}{160225} - \frac{590592\text{ I}}{160225} & 60 - 36\text{ I} & \frac{1760}{663} - \frac{2528\text{ I}}{663} \\ c = , & \frac{4}{3315} & -\frac{896}{845} & \frac{1098}{13} & -\frac{14080}{51} & \frac{2347}{72} \\ & \frac{35264}{215475} + \frac{13352\text{ I}}{215475} & \frac{2907456}{160225} + \frac{590592\text{ I}}{160225} & 60 + 36\text{ I} & \frac{1760}{663} + \frac{2528\text{ I}}{663} \\ & & \frac{5997}{25636} - \frac{681\text{ I}}{25636} & -\frac{157632}{156325} - \frac{3379392\text{ I}}{2657525} & -\frac{1327}{8619} + \frac{163\text{ I}}{2873} \\ & & & \frac{37372}{7972575} + \frac{16564\text{ I}}{7972575} & -\frac{9952}{8160165} - \frac{5792\text{ I}}{6346795} \\ & & & & -\frac{71}{18970640} - \frac{109\text{ I}}{99595860} \end{array}$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{77684770800 \, \Delta x_{ol}^2} \big( (-290745 + 85020 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (364152768 - 161399616 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (-94743040 + 70894080 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (18172709100 + 2063634300 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (-78334276608 + 98786386944 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - (11960516400 + 4407454800 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (12713659392 - 4813769856 \, \mathrm{I}) \, u_{ol-3+1} + (1409674226688 - 286347350016 \, \mathrm{I}) \, u_{ol-2+1} + (4661086248000 - 2796651748800 \, \mathrm{I}) \, u_{ol-1+1} + (206222016000 - 296209804800 \, \mathrm{I}) \, u_{ol+1} + 93737280 \, u_{ol-4} - 82373437440 \, u_{ol-3} + 6561375256800 \, u_{ol-2} - 21447089664000 \, u_{ol-1} + 2532307737050 \, u_{ol} + (12713659392 + 4813769856 \, \mathrm{I}) \, u_{ol-3-1} + (1409674226688 + 286347350016 \, \mathrm{I}) \, u_{ol-2-1} + (4661086248000 + 2796651748800 \, \mathrm{I}) \, u_{ol-1-1} + (206222016000 + 296209804800 \, \mathrm{I}) \, u_{ol-1} + (18172709100 - 2063634300 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} - (78334276608 + 98786386944 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + (-11960516400 + 4407454800 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (364152768 + 161399616 \, \mathrm{I}) \, u_{ol-1-3\mathrm{I}} - (94743040 + 70894080 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} - (290745 + 85020 \, \mathrm{I}) \, u_{ol-4\mathrm{I}} \big),$$

$$O(\, \Delta x_{ol}^{\, 23} \,)$$

Formula:, 697, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 22, Error:,  $9.1739952640986970782 \times 10^{-58}$ , New Error:,  $9.2777098458547693144 \times 10^{-80}$

Error order:, 22, Error:,  $9.2777098458547693144 \times 10^{-80}$ , New Error:,  $9.2881410640338886666 \times 10^{-102}$

Error order:, 22, Error:,  $9.2881410640338886666 \times 10^{-102}$ , New Error:,  $9.2891847856040127102 \times 10^{-124}$

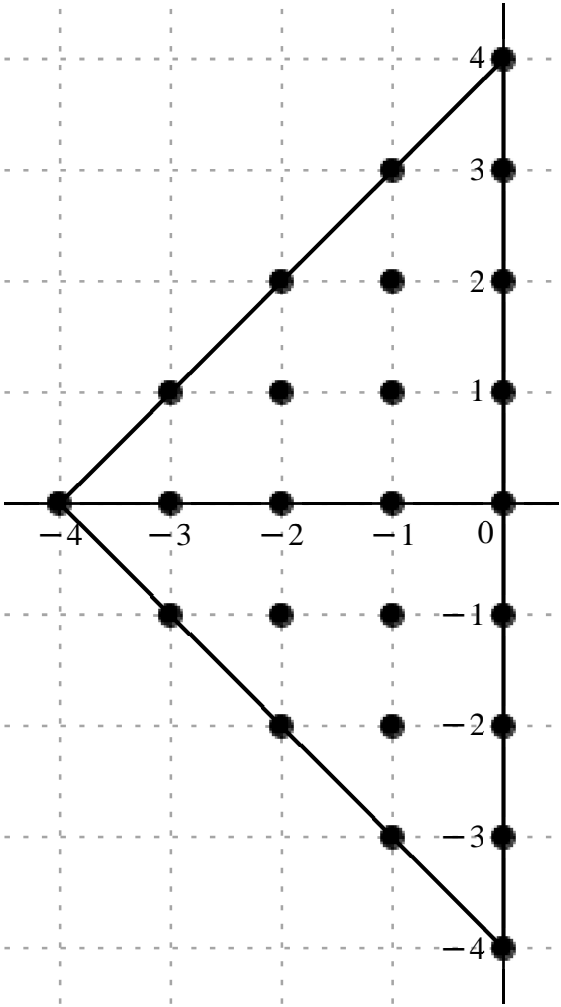
Error order:, 22, Error:,  $9.2891847856040127102 \times 10^{-124}$ , New Error:,  $9.2892891637607048755 \times 10^{-146}$

Error order:, 22, Error:,  $9.2892891637607048755 \times 10^{-146}$ , New Error:,  $9.2892996016363730478 \times 10^{-168}$

$$x_o \neq h. , \left[ \begin{array}{ccccc} & & & & 4 \, \mathrm{I} \\ & & & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ & & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} & \\ -4 & -3 & -2 & -1 & 0 \\ -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & \\ & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & \\ & & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} & \\ & & & & -4 \, \mathrm{I} \end{array} \right]$$



$$c =, \left( \begin{array}{cccccc} & & & & -\frac{2641}{81719680} + \frac{34763 \text{ I}}{3187067520} \\ & & & \frac{1570979}{39862875} - \frac{788753 \text{ I}}{39862875} & -\frac{9910024}{971059635} + \frac{8300392 \text{ I}}{971059635} \\ & & \frac{202323}{102544} + \frac{1167 \text{ I}}{7888} & -\frac{104055216}{13287625} + \frac{149576688 \text{ I}}{13287625} & -\frac{47527}{34476} - \frac{4387 \text{ I}}{11492} \\ \frac{1464184}{1077375} - \frac{579562 \text{ I}}{1077375} & \frac{118787088}{801125} - \frac{27710016 \text{ I}}{801125} & \frac{101955}{221} - \frac{71325 \text{ I}}{221} & \frac{11192}{663} - \frac{24056 \text{ I}}{663} \\ \frac{431}{42432} & -\frac{13408}{1521} & \frac{17829}{26} & -\frac{107968}{51} & \frac{1431421}{7200} \\ \frac{1464184}{1077375} + \frac{579562 \text{ I}}{1077375} & \frac{118787088}{801125} + \frac{27710016 \text{ I}}{801125} & \frac{101955}{221} + \frac{71325 \text{ I}}{221} & \frac{11192}{663} + \frac{24056 \text{ I}}{663} \\ & \frac{202323}{102544} - \frac{1167 \text{ I}}{7888} & -\frac{104055216}{13287625} - \frac{149576688 \text{ I}}{13287625} & -\frac{47527}{34476} + \frac{4387 \text{ I}}{11492} \\ & & \frac{1570979}{39862875} + \frac{788753 \text{ I}}{39862875} & -\frac{9910024}{971059635} - \frac{8300392 \text{ I}}{971059635} \\ & & & -\frac{2641}{81719680} - \frac{34763 \text{ I}}{3187067520} \end{array} \right)$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{3107390832000 \, \Delta x_{ol}^3} \big( (-100424025 + 33893925 \, \text{I}) \, u_{ol+41} + (122460955008 - 61484873856 \, \text{I}) \, u_{ol-1+31} + (-31712076800 + 26561254400 \, \text{I}) \, u_{ol+31} + (6130993869000 + 459726813000 \, \text{I}) \, u_{ol-2+21} + (-24333936592896 + 34979405948928 \, \text{I}) \, u_{ol-1+21} - (4283703564000 + 1186227252000 \, \text{I}) \, u_{ol+21} + (4223034633216 - 1671586629888 \, \text{I}) \, u_{ol-3+1} + (460749456340992 - 107481166700544 \, \text{I}) \, u_{ol-2+1} + (1433547657360000 - 1002871724400000 \, \text{I}) \, u_{ol-1+1} + (52455381888000 - 112747200384000 \, \text{I}) \, u_{ol+1} + 31563099750 \, u_{ol-4} - 27392436736000 \, u_{ol-3} + 2130833505528000 \, u_{ol-2} - 6578407320576000 \, u_{ol-1} + 617775623907260 \, u_{ol} + (4223034633216 + 1671586629888 \, \text{I}) \, u_{ol-3-1} + (460749456340992 + 107481166700544 \, \text{I}) \, u_{ol-2-1} + (1433547657360000 + 1002871724400000 \, \text{I}) \, u_{ol-1-1} + (52455381888000 + 112747200384000 \, \text{I}) \, u_{ol-1} + (6130993869000 - 459726813000 \, \text{I}) \, u_{ol-2-21} - (24333936592896 + 34979405948928 \, \text{I}) \, u_{ol-1-21} + (-4283703564000 + 1186227252000 \, \text{I}) \, u_{ol-21} + (122460955008 + 61484873856 \, \text{I}) \, u_{ol-1-31} - (31712076800 + 26561254400 \, \text{I}) \, u_{ol-31} - (100424025 + 33893925 \, \text{I}) \, u_{ol-41} \big), \, O(\, \Delta x_{ol}^{22} \,)$$

Formula:, 698, Var.: 1

Variavel :,  $x_{oi}$  , Derivada de Ordem :, 4

Error order:, 21, Error:,  $6.7824433338025960163 \times 10^{-55}$ , New Error:,  $6.8587324589574994408 \times 10^{-76}$

Error order:, 21, Error:,  $6.8587324589574994408 \times 10^{-76}$ , New Error:,  $6.8664050961848770462 \times 10^{-97}$

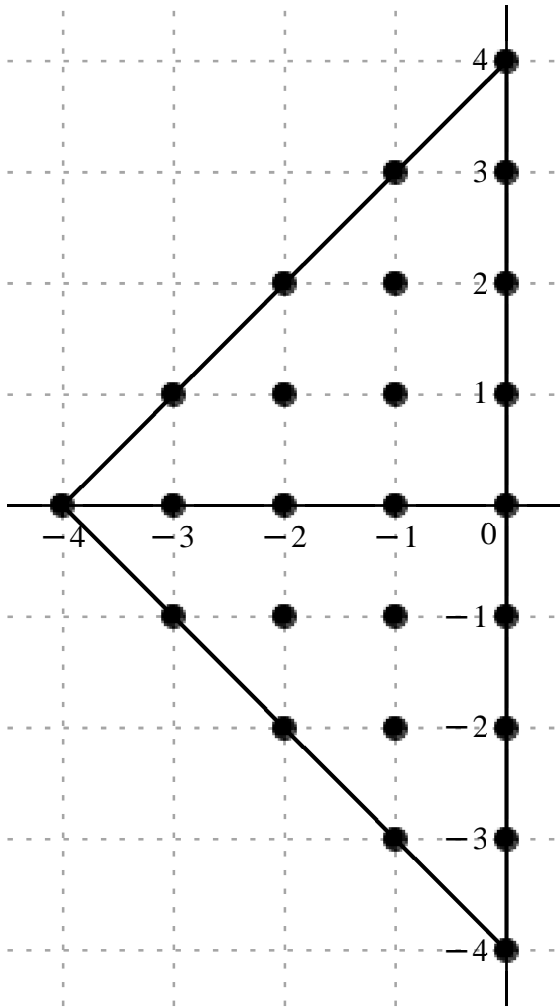
Error order:, 21, Error:,  $6.8664050961848770462 \times 10^{-97}$ , New Error:,  $6.8671727987206707781 \times 10^{-118}$

Error order:, 21, Error:,  $6.8671727987206707781 \times 10^{-118}$ , New Error:,  $6.8672495733639506006 \times 10^{-139}$

Error order:, 21, Error:,  $6.8672495733639506006 \times 10^{-139}$ , New Error:,  $6.8672572508721771576 \times 10^{-160}$

$$x_o + h., \begin{bmatrix} & & & & 4 \text{ I} \\ & & & -1 + 3 \text{ I} & 3 \text{ I} \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & \\ -4 & -3 & -2 & -1 & 0 \\ -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} & \\ & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & \\ & & -1 - 3 \text{ I} & -3 \text{ I} & \\ & & & -4 \text{ I} & \end{bmatrix}$$

$$c =, \begin{bmatrix} & & & & & & -\frac{32191}{124494825} + \frac{5867639 \text{ I}}{59757516000} \\ & & & & \frac{183932617}{597943125} - \frac{102273259 \text{ I}}{597943125} & -\frac{25575544}{323686545} + \frac{592341208 \text{ I}}{8092163625} \\ & & \frac{39695251}{2563600} + \frac{343951 \text{ I}}{512720} & -\frac{3769308592}{66438125} + \frac{6074332656 \text{ I}}{66438125} & -\frac{29171149}{2585700} - \frac{1917913 \text{ I}}{861900} \\ \frac{170566256}{16160625} - \frac{69924038 \text{ I}}{16160625} & \frac{4550033552}{4005625} - \frac{1169577664 \text{ I}}{4005625} & \frac{18532999}{5525} - \frac{14414289 \text{ I}}{5525} & \frac{325736}{3825} - \frac{14808968 \text{ I}}{49725} \\ \frac{317449}{3978000} & -\frac{4344608}{63375} & \frac{3402813}{650} & -\frac{59220544}{3825} & \frac{37453523}{30000} \\ \frac{170566256}{16160625} + \frac{69924038 \text{ I}}{16160625} & \frac{4550033552}{4005625} + \frac{1169577664 \text{ I}}{4005625} & \frac{18532999}{5525} + \frac{14414289 \text{ I}}{5525} & \frac{325736}{3825} + \frac{14808968 \text{ I}}{49725} \\ & \frac{39695251}{2563600} - \frac{343951 \text{ I}}{512720} & -\frac{3769308592}{66438125} - \frac{6074332656 \text{ I}}{66438125} & -\frac{29171149}{2585700} + \frac{1917913 \text{ I}}{861900} \\ & & \frac{183932617}{597943125} + \frac{102273259 \text{ I}}{597943125} & -\frac{25575544}{323686545} - \frac{592341208 \text{ I}}{8092163625} \\ & & & -\frac{32191}{124494825} - \frac{5867639 \text{ I}}{59757516000} \end{bmatrix}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{3884238540000 \, \Delta x_{ol}^4} \big( (-1004359200 + 381396535 \, \mathrm{I}) \, u_{ol+41} + (1194826280032 - 664367090464 \, \mathrm{I}) \, u_{ol-1+31} + (-306906528000 + 284323779840 \, \mathrm{I}) \, u_{ol+31} + (60144259552650 + 2605686788250 \, \mathrm{I}) \, u_{ol-2+21} + (-220368857522688 + 355129784400384 \, \mathrm{I}) \, u_{ol-1+21} - (43820900027800 + 8643266725800 \, \mathrm{I}) \, u_{ol+21} \\ + (40995940762112 - 16806382381376 \, \mathrm{I}) \, u_{ol-3+1} + (4412149335240192 - 1134134782470144 \, \mathrm{I}) \, u_{ol-2+1} + (13029246873770400 - 10133671829954400 \, \mathrm{I}) \, u_{ol-1+1} + (330780738579200 - 1156793649939200 \, \mathrm{I}) \, u_{ol+1} + 309966727070 \, u_{ol-4} - 266279981614080 \, u_{ol-3} + 20334365229250800 \, u_{ol-2} - 60137704409036800 \, u_{ol-1} \\ + 4849280583179214 \, u_{ol} + (40995940762112 + 16806382381376 \, \mathrm{I}) \, u_{ol-3-1} + (4412149335240192 + 1134134782470144 \, \mathrm{I}) \, u_{ol-2-1} + (13029246873770400 + 10133671829954400 \, \mathrm{I}) \, u_{ol-1-1} + (330780738579200 + 1156793649939200 \, \mathrm{I}) \, u_{ol-1} + (60144259552650 - 2605686788250 \, \mathrm{I}) \, u_{ol-2-21} - (220368857522688 \\ + 355129784400384 \, \mathrm{I}) \, u_{ol-1-21} + (-43820900027800 + 8643266725800 \, \mathrm{I}) \, u_{ol-21} + (1194826280032 + 664367090464 \, \mathrm{I}) \, u_{ol-1-31} - (306906528000 + 284323779840 \, \mathrm{I}) \, u_{ol-31} - (1004359200 + 381396535 \, \mathrm{I}) \, u_{ol-41} \big), \, O( \, \Delta x_{ol}^{21} \, )$$

Formula: 699, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 5

Error order: 20, Error: 4.8402364401050635620 × 10<sup>−52</sup>, New Error: 4.8944103224210033543 × 10<sup>−72</sup>

Error order: 20, Error: 4.8944103224210033543 × 10<sup>−72</sup>, New Error: 4.8998586008964054559 × 10<sup>−92</sup>

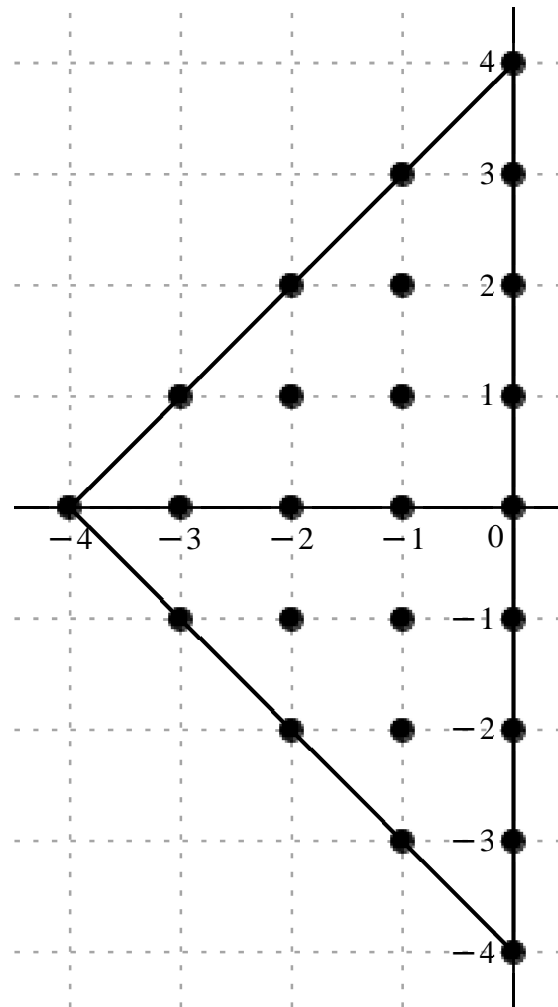
Error order: 20, Error: 4.8998586008964054559 × 10<sup>−92</sup>, New Error: 4.9004037387467752215 × 10<sup>−112</sup>

Error order: 20, Error: 4.9004037387467752215 × 10<sup>−112</sup>, New Error: 4.9004582556329436477 × 10<sup>−132</sup>

Error order: 20, Error: 4.9004582556329436477 × 10<sup>−132</sup>, New Error: 4.9004637073525729082 × 10<sup>−152</sup>

$$x_o + h \, , \left[ \begin{array}{ccccc} & & & & 4 \, \mathrm{I} \\ & & & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ & & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} & \\ -4 & -3 & -2 & -1 & 0 \\ -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & \\ & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & \\ & & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} & \\ & & & & -4 \, \mathrm{I} \end{array} \right]$$

$$c =$$



$$\begin{aligned} \frac{d\mathbf{s}}{d\mathbf{x}} \mathbf{s} u_{ol}^{(x)} = & \frac{1}{31073908320000 \mathcal{A} \mathbf{x}_{ol}^{20}} \left( (-61916967515 + 26111153367 \mathbf{I}) u_{ol+41} + (71916023516288 - 43795794272384 \mathbf{I}) u_{ol-1+31} + (-18261650611200 + 18627649502208 \mathbf{I}) u_{ol+31} + (3646643552140680 + 53473001072400 \mathbf{I}) u_{ol-2+21} + (-12314669893908480 + 22126237115996160 \mathbf{I}) u_{ol-1+21} - (2738443645143360 \right. \\ & + 338855936056960 \mathbf{I}) u_{ol+21} + (2465504979121408 - 1042550673683456 \mathbf{I}) u_{ol-3+1} + (262017276154583040 - 72936302452715520 \mathbf{I}) u_{ol-2+1} + (737432275299108480 - 626659703211185280 \mathbf{I}) u_{ol-1+1} + (9900915961431040 - 69403891502167040 \mathbf{I}) u_{ol+1} + 18842778807034 u_{ol-4} - 16038015697514496 u_{ol-3} \\ & + 1204765935363768960 u_{ol-2} - 3436448667374428160 u_{ol-1} + 246775715202825900 u_{ol} + (2465504979121408 + 1042550673683456 \mathbf{I}) u_{ol-3-1} + (262017276154583040 + 72936302452715520 \mathbf{I}) u_{ol-2-1} + (737432275299108480 + 626659703211185280 \mathbf{I}) u_{ol-1-1} + (9900915961431040 + 69403891502167040 \mathbf{I}) u_{ol-1} \\ & \left. + (3646643552140680 - 53473001072400 \mathbf{I}) u_{ol-2-21} - (12314669893908480 + 22126237115996160 \mathbf{I}) u_{ol-1-21} + (-2738443645143360 + 338855936056960 \mathbf{I}) u_{ol-21} + (71916023516288 + 43795794272384 \mathbf{I}) u_{ol-1-31} - (18261650611200 + 18627649502208 \mathbf{I}) u_{ol-31} - (61916967515 + 26111153367 \mathbf{I}) u_{ol-41} \right), O(\mathcal{A} \mathbf{x}_{ol}^{20}) \end{aligned}$$

Formula:, 700, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

*Error order*., 19, *Error*.,  $3.3590581685700286048 \times 10^{-49}$ , *New Error*.,  $3.3964621593191309190 \times 10^{-68}$

*Error order*., 19, *Error*.,  $3.3964621593191309190 \times 10^{-68}$ , *New Error*.,  $3.4002237742673356769 \times 10^{-87}$

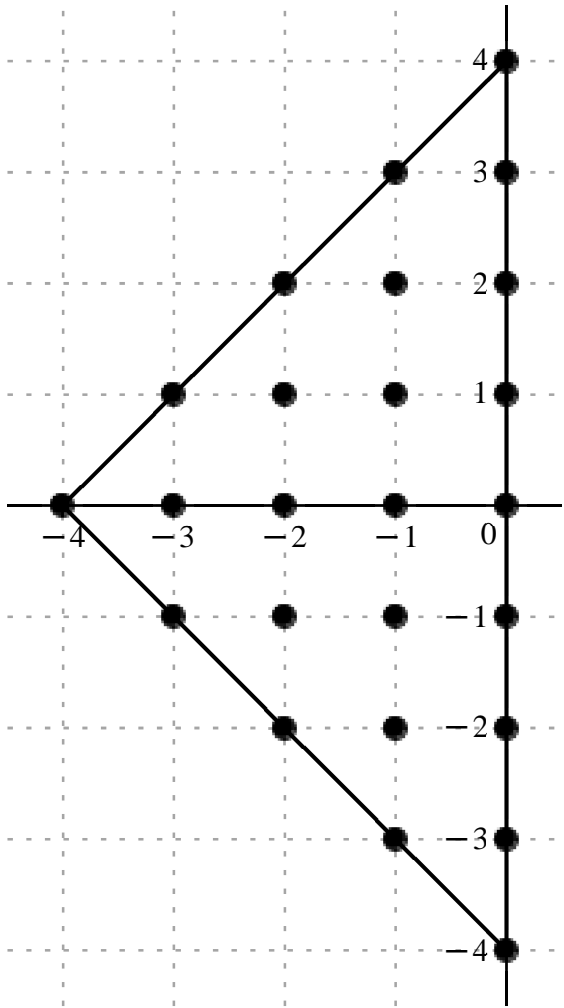
*Error order*:, 19, *Error*:,  $3.4002237742673356769 \times 10^{-87}$ , *New Error*:,  $3.4006001486725575716 \times 10^{-106}$

*Error order:*, 19, *Error:*,  $3.4006001486725575716 \times 10^{-106}$ , *New Error:*,  $3.4006377882429373207 \times 10^{-125}$

*Error order*., 19, *Error*.,  $3.4006377882429373207 \times 10^{-125}$ , *New Error*.,  $3.4006415522212746249 \times 10^{-144}$

$$x_o + h., \quad -4 \begin{vmatrix} & & & & 4\text{I} \\ & & & -1+3\text{I} & 3\text{I} \\ & & -2+2\text{I} & -1+2\text{I} & 2\text{I} \\ -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & \\ -3 & -2 & -1 & 0 & \\ -3-\text{I} & -2-\text{I} & -1-\text{I} & -\text{I} & \\ & -2-2\text{I} & -1-2\text{I} & -2\text{I} & \\ & & -1-3\text{I} & -3\text{I} & \\ & & & & -4\text{I} \end{vmatrix}$$

[illegible]



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{10357969440000 \, \Delta x_{ol}^6} \Big( (-154193953329 + 71841702205 \, \mathrm{I}) \, u_{ol+41} + (174772723600832 - 116106574342976 \, \mathrm{I}) \, u_{ol-1+31} + (-43693546070528 + 49159546903040 \, \mathrm{I}) \, u_{ol+31} + (8946186536228760 - 117353145677040 \, \mathrm{I}) \, u_{ol-2+21} + (-27650841802859520 + 55557893666903040 \, \mathrm{I}) \, u_{ol-1+21} - (6866859540447760$$

$$+ 353768588515440 \, \mathrm{I}) \, u_{ol+21} + (6008359548230144 - 2616203688199808 \, \mathrm{I}) \, u_{ol-3+1} + (630613784590433280 - 188401072825405440 \, \mathrm{I}) \, u_{ol-2+1} + (1691013708344600640 - 1557927897440241600 \, \mathrm{I}) \, u_{ol-1+1} + (4121138018117120 - 162730752945313280 \, \mathrm{I}) \, u_{ol+1} + 46410220370878 \, u_{ol-4} - 39149869686409216 \, u_{ol-3}$$

$$+ 2895507486467799840 \, u_{ol-2} - 7991710451586068480 \, u_{ol-1} + 522673623228547700 \, u_{ol} + (6008359548230144 + 2616203688199808 \, \mathrm{I}) \, u_{ol-3-1} + (630613784590433280 + 188401072825405440 \, \mathrm{I}) \, u_{ol-2-1} + (1691013708344600640 + 1557927897440241600 \, \mathrm{I}) \, u_{ol-1-1} + (4121138018117120 + 162730752945313280 \, \mathrm{I}) \, u_{ol-1}$$

$$+ (8946186536228760 + 117353145677040 \, \mathrm{I}) \, u_{ol-2-21} - (27650841802859520 + 55557893666903040 \, \mathrm{I}) \, u_{ol-1-21} + (-6866859540447760 + 353768588515440 \, \mathrm{I}) \, u_{ol-21} + (174772723600832 + 116106574342976 \, \mathrm{I}) \, u_{ol-1-31} - (43693546070528 + 49159546903040 \, \mathrm{I}) \, u_{ol-31} - (154193953329 + 71841702205 \, \mathrm{I}) \, u_{ol-41} \Big), \, O(\, \Delta x_{ol}^{19} \, )$$

Formula:, 701, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order:., 18, Error:., 2.2638622797565042006 × 10<sup>-46</sup>, New Error:., 2.2889336186335015881 × 10<sup>-64</sup>

Error order:., 18, Error:., 2.2889336186335015881 × 10<sup>-64</sup>, New Error:., 2.2914548940687661234 × 10<sup>-82</sup>

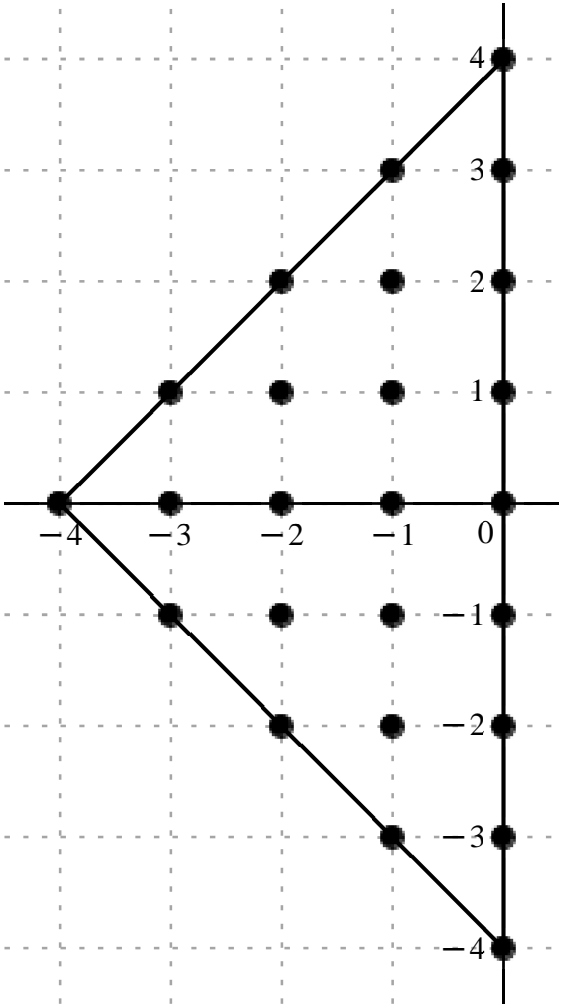
Error order:., 18, Error:., 2.2914548940687661234 × 10<sup>-82</sup>, New Error:., 2.2917071635259451435 × 10<sup>-100</sup>

Error order:., 18, Error:., 2.2917071635259451435 × 10<sup>-100</sup>, New Error:., 2.2917323918912989851 × 10<sup>-118</sup>

Error order:., 18, Error:., 2.2917323918912989851 × 10<sup>-118</sup>, New Error:., 2.2917349147420312282 × 10<sup>-136</sup>

$$x_o \, + h \, . \, , \left[ \begin{array}{ccccc} & & & & 4 \, \mathrm{I} \\ & & & -1 + 3 \, \mathrm{I} & 3 \, \mathrm{I} \\ & & -2 + 2 \, \mathrm{I} & -1 + 2 \, \mathrm{I} & 2 \, \mathrm{I} \\ -3 + \mathrm{I} & -2 + \mathrm{I} & -1 + \mathrm{I} & \mathrm{I} & \\ -4 & -3 & -2 & -1 & 0 \\ -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & \\ & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & \\ & & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} & \\ & & & & -4 \, \mathrm{I} \end{array} \right]$$

$$c = , \frac{1135647009}{35360000} - \frac{8508661588}{316875} + \frac{25429276467}{13000} - \frac{11129699784}{2125} + \frac{3043404217}{9600} + \frac{88626515593}{21547500} - \frac{6617913421 \text{ I}}{3591250} + \frac{341506305462}{801125} + \frac{108866589636 \text{ I}}{801125} - \frac{240594095049}{221000} + \frac{238829574081 \text{ I}}{221000} - \frac{48977593}{6375} - \frac{223288849 \text{ I}}{2125} + \frac{63137687403}{10254400} - \frac{6449485119 \text{ I}}{25636000} - \frac{228906507774}{13287625} + \frac{518359796598 \text{ I}}{13287625} - \frac{82596403463}{17238000} + \frac{924745801 \text{ I}}{8619000} - \frac{4897160849}{45529536000} + \frac{740670017 \text{ I}}{13391040000} - \frac{33622165969}{1156023375} + \frac{209890427381 \text{ I}}{5780116875} - \frac{33622165969}{1156023375} - \frac{209890427381 \text{ I}}{5780116875} - \frac{4897160849}{45529536000} - \frac{740670017 \text{ I}}{13391040000} - \frac{63159443781}{531505000} - \frac{45746756433 \text{ I}}{531505000} - \frac{33622165969}{1156023375} - \frac{209890427381 \text{ I}}{5780116875} - \frac{4897160849}{45529536000} - \frac{740670017 \text{ I}}{13391040000}$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}{}^7} \, u(x_{ol}) = \frac{1}{2959419840000 \, \Delta x_{ol}{}^7} \big( (-318315455185 + 163688073757 \, \mathrm{I}) \, u_{ol+41} + (351671782972608 - 254717939818944 \, \mathrm{I}) \, u_{ol-1+31} + (-86072744880640 + 107463898819072 \, \mathrm{I}) \, u_{ol+31} + (18221536584505800 - 744528562137360 \, \mathrm{I}) \, u_{ol-2+21} + (-50982057411425280 + 115449093898306560 \, \mathrm{I}) \, u_{ol-1+21} + (-14180150546527840 + 317520718231360 \, \mathrm{I}) \, u_{ol+21} + (12172320157604992 - 5453584205362944 \, \mathrm{I}) \, u_{ol-3+1} + (1261551612881064960 - 402161891442554880 \, \mathrm{I}) \, u_{ol-2+1} + (3221805150564960960 - 3198176379701634240 \, \mathrm{I}) \, u_{ol-1+1} - (22736511441512960 + 310967270485347840 \, \mathrm{I}) \, u_{ol+1} + 95046840771246 \, u_{ol-4} - 79465725965674496 \, u_{ol-3} + 5788915791791146560 \, u_{ol-2} - 15499978519535677440 \, u_{ol-1} + 938199043846819300 \, u_{ol} + (12172320157604992 + 5453584205362944 \, \mathrm{I}) \, u_{ol-3-1} + (1261551612881064960 + 402161891442554880 \, \mathrm{I}) \, u_{ol-2-1} + (3221805150564960960 + 3198176379701634240 \, \mathrm{I}) \, u_{ol-1-1} + (-22736511441512960 + 310967270485347840 \, \mathrm{I}) \, u_{ol-1} + (18221536584505800 + 744528562137360 \, \mathrm{I}) \, u_{ol-2-21} - (50982057411425280 + 115449093898306560 \, \mathrm{I}) \, u_{ol-1-21} - (14180150546527840 + 317520718231360 \, \mathrm{I}) \, u_{ol-21} + (351671782972608 + 254717939818944 \, \mathrm{I}) \, u_{ol-1-31} - (86072744880640 + 107463898819072 \, \mathrm{I}) \, u_{ol-31} - (318315455185 + 163688073757 \, \mathrm{I}) \, u_{ol-41} \big), \, O(\, \Delta x_{ol}{}^{18} \, )$$

*Formula:*, 702, *Var:*, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

*Error order*., 17, *Error*.,  $1.4777902679378836157 \times 10^{-43}$ , *New Error*.,  $1.4940599117004880312 \times 10^{-60}$

*Error order*., 17, *Error*.,  $1.4940599117004880312 \times 10^{-60}$ , *New Error*.,  $1.4956959983885450910 \times 10^{-77}$

*Error order*., 17, *Error*.,  $1.4956959983885450910 \times 10^{-77}$ , *New Error*.,  $1.4958596985998922108 \times 10^{-94}$

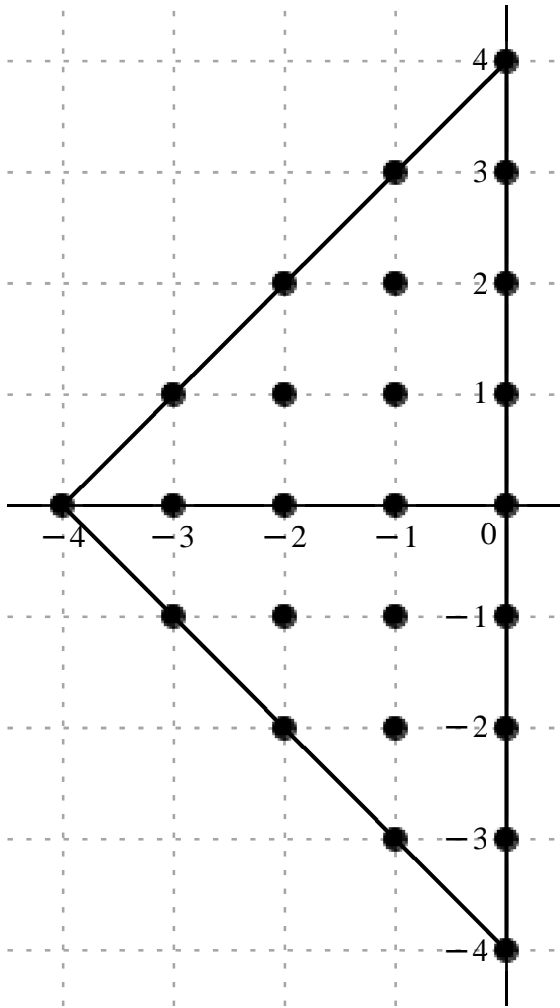
Error order:, 17, Error:,  $1.4958596985998922108 \times 10^{-94}$ , New Error:,  $1.4958760695367725489 \times 10^{-111}$

*Error order.*: 17, *Error.*:  $1.4958760695367725489 \times 10^{-111}$ , *New Error.*:  $1.4958777066396183593 \times 10^{-128}$

$$x_o + h_o, \quad -4 \begin{bmatrix} & & & & 4I \\ & & & -1+3I & 3I \\ & & -2+2I & -1+2I & 2I \\ -3+I & -2+I & -1+I & I & \\ -3 & -2 & -1 & 0 & \\ -3-I & -2-I & -1-I & -I & \\ & -2-2I & -1-2I & -2I & \\ & & -1-3I & -3I & \\ & & & & -4I \end{bmatrix}$$

$$c = \frac{5905040029}{26520000} - \frac{19489227184}{105625} + \frac{86094636831}{6500} - \frac{219831879904}{6375} + \frac{1564141467}{800} - \frac{42616158343}{56911920000} + \frac{967965319}{2276476800} - \frac{368972770828}{1926705625} + \frac{103121302972}{385341125} - \frac{285424417411}{8619000} + \frac{28239617161}{8619000} - \frac{77589306543}{11050} + \frac{412624090263}{55250} - \frac{8798036548}{82875} - \frac{18591471556}{27625} - \frac{151920889729}{5386875} - \frac{23328640076}{1795625} - \frac{2312036638296}{801125} - \frac{60182354736}{61625} - \frac{271648888413}{6409000} - \frac{37267075251}{12818000} - \frac{1407958195224}{13287625} + \frac{3628251911928}{13287625} - \frac{321053783617}{398628750} - \frac{253626176881}{398628750} - \frac{321053783617}{398628750} + \frac{253626176881}{398628750} - \frac{368972770828}{1926705625} - \frac{103121302972}{385341125} - \frac{285424417411}{8619000} - \frac{28239617161}{8619000} - \frac{77589306543}{11050} + \frac{412624090263}{55250} - \frac{8798036548}{82875} + \frac{18591471556}{27625} - \frac{151920889729}{5386875} + \frac{23328640076}{1795625} - \frac{2312036638296}{801125} + \frac{60182354736}{61625} - \frac{271648888413}{6409000} + \frac{37267075251}{12818000} - \frac{1407958195224}{13287625} - \frac{3628251911928}{13287625} - \frac{321053783617}{398628750} + \frac{253626176881}{398628750} - \frac{368972770828}{1926705625} - \frac{103121302972}{385341125} - \frac{42616158343}{56911920000} - \frac{967965319}{2276476800}$$





$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{739854960000 \, \mathcal{A}x_{ol}^8} \Big( (-554010058459 + 314588728675 \, \mathrm{I}) \, u_{ol+4\mathrm{I}} + (595875822393152 - 470730184291136 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + (-141685543997952 + 197992901706240 \, \mathrm{I}) \, u_{ol+3\mathrm{I}} + (31359147678396720 - 2151055583487720 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (-78395112310072320 + 202021066456151040 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} + (-24500831990560240 + 2424088737100240 \, \mathrm{I}) \, u_{ol+2\mathrm{I}} + (20865422678939776 - 9612146227794432 \, \mathrm{I}) \, u_{ol-3+1} + (2135212076199121920 - 722534907195279360 \, \mathrm{I}) \, u_{ol-2+1} + (5195007537447873600 - 5525465697675443520 \, \mathrm{I}) \, u_{ol-1+1} - (78543239557153280 + 497918278530516480 \, \mathrm{I}) \, u_{ol+1} + 164738806729042 \, u_{ol-4} - 136513149336324096 \, u_{ol-3} + 9799622167509851040 \, u_{ol-2} - 25512738307937054720 \, u_{ol-1} + 1446547278127032900 \, u_{ol} + (20865422678939776 + 9612146227794432 \, \mathrm{I}) \, u_{ol-3-1} + (2135212076199121920 + 722534907195279360 \, \mathrm{I}) \, u_{ol-2-1} + (5195007537447873600 + 5525465697675443520 \, \mathrm{I}) \, u_{ol-1-1} + (-78543239557153280 + 497918278530516480 \, \mathrm{I}) \, u_{ol-1} + (31359147678396720 + 2151055583487720 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} - (78395112310072320 + 202021066456151040 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} - (24500831990560240 + 2424088737100240 \, \mathrm{I}) \, u_{ol-2\mathrm{I}} + (595875822393152 + 470730184291136 \, \mathrm{I}) \, u_{ol-1-3\mathrm{I}} - (141685543997952 + 197992901706240 \, \mathrm{I}) \, u_{ol-3\mathrm{I}} - (554010058459 + 314588728675 \, \mathrm{I}) \, u_{ol-4\mathrm{I}} \Big), \, O(\, \mathcal{A}x_{ol}^{17} \, )$$

Formula.: 703, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 9

Error order.: 16, Error.: 9.3218852608763485761 × 10<sup>-41</sup>, New Error.: 9.4238601626611980509 × 10<sup>-57</sup>

Error order.: 16, Error.: 9.4238601626611980509 × 10<sup>-57</sup>, New Error.: 9.4341144650852516202 × 10<sup>-73</sup>

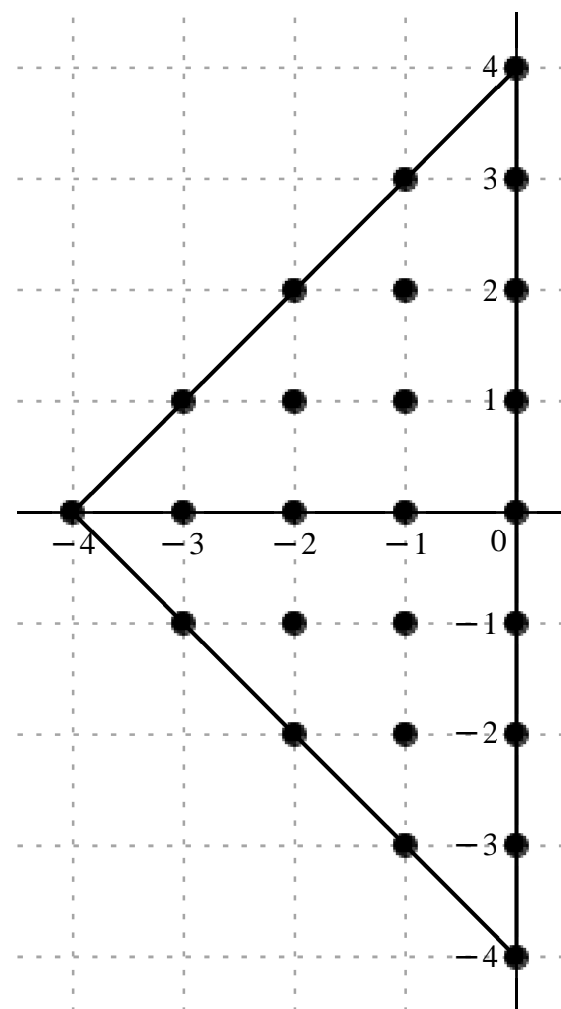
Error order.: 16, Error.: 9.4341144650852516202 × 10<sup>-73</sup>, New Error.: 9.4351404654267351865 × 10<sup>-89</sup>

Error order.: 16, Error.: 9.4351404654267351865 × 10<sup>-89</sup>, New Error.: 9.4352430711638557977 × 10<sup>-105</sup>

Error order.: 16, Error.: 9.4352430711638557977 × 10<sup>-105</sup>, New Error.: 9.4352533317945995634 × 10<sup>-121</sup>

$$x_o + h., \quad \begin{bmatrix} & & & & 4\text{ I} \\ & & & -1+3\text{ I} & 3\text{ I} \\ & & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} \\ -3+\text{ I} & -2+\text{ I} & -1+\text{ I} & \text{ I} & \\ -4 & -3 & -2 & -1 & 0 \\ -3-\text{ I} & -2-\text{ I} & -1-\text{ I} & -\text{ I} & \\ & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & \\ & & -1-3\text{ I} & -3\text{ I} & \\ & & & & -4\text{ I} \end{bmatrix}$$

[illegible]



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9}u\big(x_{ol}\big)=\frac{1}{7253480000\,\Delta x_{ol}^9}\Big(3\,\big(\,(-12104222975+7597850689\,\mathrm{I})\,u_{ol+41}+(12664882055056-10917384403408\,\mathrm{I})\,u_{ol-1+31}+(\,-2895902026880+4577293744256\,\mathrm{I})\,u_{ol+31}+(679658302765260-65401373992500\,\mathrm{I})\,u_{ol-2+21}+(\,-1496211602376960+4436871656152320\,\mathrm{I})\,u_{ol-1+21}+(\,-527083731884920+93749044329080\,\mathrm{I})\,u_{ol+21}+(451053834297696-213495665035072\,\mathrm{I})\,u_{ol-3+1}+(45574537775719680-16295559985635840\,\mathrm{I})\,u_{ol-2+1}+(105704602608018960-119889141538617360\,\mathrm{I})\,u_{ol-1+1}-(2323784103688320+10010775866116480\,\mathrm{I})\,u_{ol+1}+3601525536518\,u_{ol-4}-2958144703693312\,u_{ol-3}+209342900336890320\,u_{ol-2}-530995943193963520\,u_{ol-1}+28462526117916800\,u_{ol}+(451053834297696+213495665035072\,\mathrm{I})\,u_{ol-3-1}+(45574537775719680+16295559985635840\,\mathrm{I})\,u_{ol-2-1}+(105704602608018960+119889141538617360\,\mathrm{I})\,u_{ol-1-1}+(\,-2323784103688320+10010775866116480\,\mathrm{I})\,u_{ol-1}+(679658302765260+65401373992500\,\mathrm{I})\,u_{ol-2-21}-(1496211602376960+4436871656152320\,\mathrm{I})\,u_{ol-1-21}-(527083731884920+93749044329080\,\mathrm{I})\,u_{ol-21}+(12664882055056+10917384403408\,\mathrm{I})\,u_{ol-1-31}-(2895902026880+4577293744256\,\mathrm{I})\,u_{ol-31}-(12104222975+7597850689\,\mathrm{I})\,u_{ol-41}\big)\Big),\,O(\,\Delta x_{ol}^{16}\,)$$

Formula: , 704, Var.: 1

Variavel : , x<sub>ol</sub> , Derivada de Ordem : , 10

Error order.: 15, Error.: 5.6697898162221389098 × 10<sup>−38</sup>, New Error.: 5.7313837538789361556 × 10<sup>−53</sup>

Error order.: 15, Error.: 5.7313837538789361556 × 10<sup>−53</sup>, New Error.: 5.7375772277830557037 × 10<sup>−68</sup>

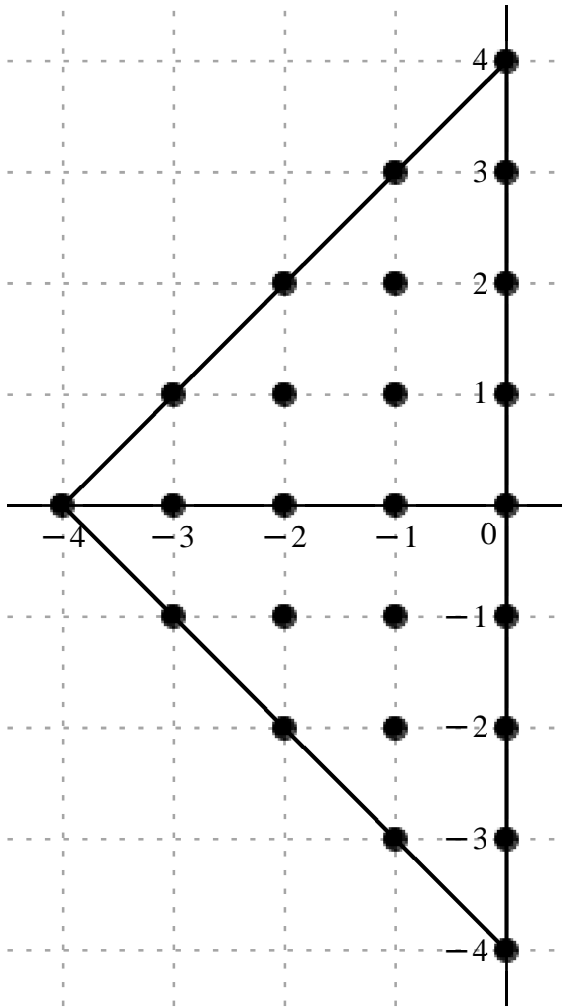
Error order.: 15, Error.: 5.7375772277830557037 × 10<sup>−68</sup>, New Error.: 5.7381969171525497847 × 10<sup>−83</sup>

Error order.: 15, Error.: 5.7381969171525497847 × 10<sup>−83</sup>, New Error.: 5.7382588895104705831 × 10<sup>−98</sup>

Error order.: 15, Error.: 5.7382588895104705831 × 10<sup>−98</sup>, New Error.: 5.7382650867804735577 × 10<sup>−113</sup>

$$x_o+h.,\left[\begin{array}{cccc} & & & 4\,\mathrm{I}\\ & & -1+3\,\mathrm{I} & 3\,\mathrm{I}\\ & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I}\\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I}\\ -4 & -3 & -2 & -1 & 0\\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & \\ & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & \\ & & -1-3\,\mathrm{I} & -3\,\mathrm{I} & \\ & & & -4\,\mathrm{I} & \end{array}\right]$$

$$c=,\left[\begin{array}{cccccccc} & & & & & & & -\frac{7149802641}{223184000}+\frac{993921693\,\mathrm{I}}{44636800}\\ & & & & & & & \frac{25480880292}{781625}-\frac{47975417637\,\mathrm{I}}{1563250}-\frac{160326258492}{22667125}+\frac{11618206212\,\mathrm{I}}{906685}\\ & & & & \frac{16888955328}{9425}-\frac{2573541369\,\mathrm{I}}{11600}-\frac{533705407704}{156325}+\frac{1847410224408\,\mathrm{I}}{156325}-\frac{46074703143}{33800}+\frac{11912998713\,\mathrm{I}}{33800}\\ & & \frac{50180004819}{42250}-\frac{24388472283\,\mathrm{I}}{42250} & \frac{1116754025184}{9425}-\frac{32331620664\,\mathrm{I}}{725} & \frac{170408593341}{650}-\frac{20529284328\,\mathrm{I}}{65} & -\frac{2376829476}{325}-\frac{611991492\,\mathrm{I}}{25} & & \\ & \frac{997646307}{104000} & -\frac{164981995248}{21125} & \frac{708580144377}{1300} & -\frac{33731571552}{25} & \frac{11017787907}{160} & & \\ & \frac{50180004819}{42250}+\frac{24388472283\,\mathrm{I}}{42250} & \frac{1116754025184}{9425}+\frac{32331620664\,\mathrm{I}}{725} & \frac{170408593341}{650}+\frac{20529284328\,\mathrm{I}}{65} & -\frac{2376829476}{325}+\frac{611991492\,\mathrm{I}}{25} & & & \\ & & \frac{16888955328}{9425}+\frac{2573541369\,\mathrm{I}}{11600} & -\frac{533705407704}{156325}-\frac{1847410224408\,\mathrm{I}}{156325} & -\frac{46074703143}{33800}-\frac{11912998713\,\mathrm{I}}{33800} & & & \\ & & & \frac{25480880292}{781625}+\frac{47975417637\,\mathrm{I}}{1563250} & -\frac{160326258492}{22667125}-\frac{11618206212\,\mathrm{I}}{906685} & & & \\ & & & & -\frac{7149802641}{223184000}-\frac{993921693\,\mathrm{I}}{44636800} & & & \end{array}\right]$$



$$\frac{\mathrm{d}^{10}}{\mathrm{d}x_{ol}^{10}}\;u(x_{ol})=\frac{1}{2901392000\,\mathcal{A}\mathfrak{x}_{ol}^{10}}\big(3\left((-30982478111+21534970015\,\mathrm{I})\,u_{ol+4\mathrm{I}}+(31528342547968-29680791711424\,\mathrm{I})\,u_{ol-1+3\mathrm{I}}+(-6840587028992+12392753292800\,\mathrm{I})\,u_{ol+3\mathrm{I}}+(1733032002723840-214564722404760\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(-3301857455662080+11429311255004160\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+(-1318350839265040\right.\\ \left.+340870603174640\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(1148653763643456-558268389539392\,\mathrm{I})\,u_{ol-3+1\mathrm{I}}+(114593853037547520-43129519789224960\,\mathrm{I})\,u_{ol-2+1\mathrm{I}}+(253549809974784960-305453852897356800\,\mathrm{I})\,u_{ol-1+1\mathrm{I}}-(7072937463621120+23675029586091520\,\mathrm{I})\,u_{ol+1\mathrm{I}}+9277445557562\,u_{ol-4}-7553095718447104\,u_{ol-3}\right.\\ \left.+527145836475454560\,u_{ol-2}-1304913491312005120\,u_{ol-1}+66597753523055300\,u_{ol}+(1148653763643456+558268389539392\,\mathrm{I})\,u_{ol-3-1\mathrm{I}}+(114593853037547520+43129519789224960\,\mathrm{I})\,u_{ol-2-1\mathrm{I}}+(253549809974784960+305453852897356800\,\mathrm{I})\,u_{ol-1-1\mathrm{I}}+(-7072937463621120+23675029586091520\,\mathrm{I})\,u_{ol-1}\right.\\ \left.+ (1733032002723840+214564722404760\,\mathrm{I})\,u_{ol-2-2\mathrm{I}}-(3301857455662080+11429311255004160\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}-(1318350839265040+340870603174640\,\mathrm{I})\,u_{ol-2\mathrm{I}}+(31528342547968+29680791711424\,\mathrm{I})\,u_{ol-1-3\mathrm{I}}-(6840587028992+12392753292800\,\mathrm{I})\,u_{ol-3\mathrm{I}}-(30982478111+21534970015\,\mathrm{I})\,u_{ol-4\mathrm{I}}\right)\big),\;O(\,\mathcal{A}\mathfrak{x}_{ol}^{15}\,)$$

Formula:, 705, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 11

Error order:, 14, Error:, 3.3169001759092960820 × 10<sup>−35</sup>, New Error:, 3.3526603690287892704 × 10<sup>−49</sup>

Error order:, 14, Error:, 3.3526603690287892704 × 10<sup>−49</sup>, New Error:, 3.3562560282122691485 × 10<sup>−63</sup>

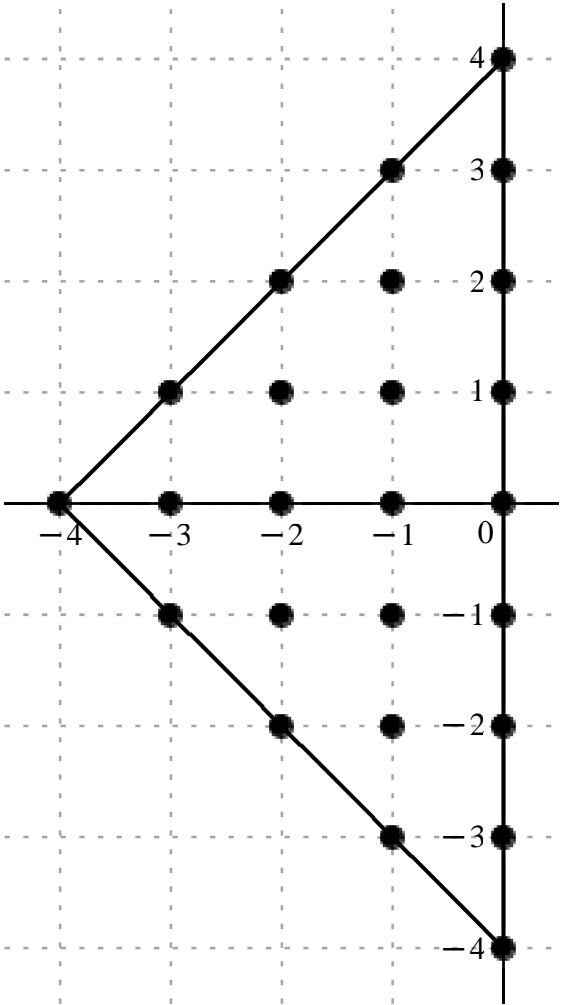
Error order:, 14, Error:, 3.3562560282122691485 × 10<sup>−63</sup>, New Error:, 3.3566157912031299885 × 10<sup>−77</sup>

Error order:, 14, Error:, 3.3566157912031299885 × 10<sup>−77</sup>, New Error:, 3.3566517694736166304 × 10<sup>−91</sup>

Error order:, 14, Error:, 3.3566517694736166304 × 10<sup>−91</sup>, New Error:, 3.3566553673203799757 × 10<sup>−105</sup>

$$x_o\neq h.\, , \left[\begin{array}{ccccc} & & & & 4\,\mathrm{I} \\ & & & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ & & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & \\ -4 & -3 & -2 & -1 & 0 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & \\ & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & \\ & & -1-3\,\mathrm{I} & -3\,\mathrm{I} & \\ & & & & -4\,\mathrm{I} \end{array}\right]$$

$$c = , \begin{array}{cccccc} & & & & & -\frac{8724288903}{44636800} + \frac{33665658279 \text{ I}}{223184000} \\ & & & & \frac{151243529514}{781625} - \frac{155726332377 \text{ I}}{781625} & -\frac{35481152586}{906685} + \frac{1874506022994 \text{ I}}{22667125} \\ & & \frac{66047012955}{6032} - \frac{125047427967 \text{ I}}{75400} & -\frac{2759776558308}{156325} + \frac{11373133333716 \text{ I}}{156325} & -\frac{136556729463}{16900} + \frac{11625604683 \text{ I}}{4225} \\ \frac{153309823128}{21125} - \frac{76472484396 \text{ I}}{21125} & \frac{6737430676284}{9425} - \frac{2660687335152 \text{ I}}{9425} & \frac{490678332606}{325} - \frac{625895446869 \text{ I}}{325} & -\frac{16223214546}{325} - \frac{45146444574 \text{ I}}{325} \\ \frac{474455289}{8000} & -\frac{1011008243784}{21125} & \frac{2141758363437}{650} & -\frac{199285263408}{25} & \frac{62324227119}{160} \\ \frac{153309823128}{21125} + \frac{76472484396 \text{ I}}{21125} & \frac{6737430676284}{9425} + \frac{2660687335152 \text{ I}}{9425} & \frac{490678332606}{325} + \frac{625895446869 \text{ I}}{325} & -\frac{16223214546}{325} + \frac{45146444574 \text{ I}}{325} \\ & \frac{66047012955}{6032} + \frac{125047427967 \text{ I}}{75400} & -\frac{2759776558308}{156325} - \frac{11373133333716 \text{ I}}{156325} & -\frac{136556729463}{16900} - \frac{11625604683 \text{ I}}{4225} \\ & & \frac{151243529514}{781625} + \frac{155726332377 \text{ I}}{781625} & -\frac{35481152586}{906685} - \frac{1874506022994 \text{ I}}{22667125} \\ & & & -\frac{8724288903}{44636800} - \frac{33665658279 \text{ I}}{223184000} \end{array}$$



$$\begin{aligned} \frac{\mathrm{d}^{11}}{\mathrm{d} x_{o l}^{11}} u\left(x_{o l}\right)= & \frac{1}{2901392000 \Delta x_{o l}^{11}}\left(33\left(\left(-17184205415+13262229019 \text { I}\right) u_{o l+4 \text { I}}+\left(17012605501696-17516852902528 \text { I}\right) u_{o l-1+3 \text { I}}+\left(-3440596614400+7270811240704 \text { I}\right) u_{o l+3 \text { I}}\right.\right. \\ & \left.\left.+\left(962685249435000-145812879641520 \text { I}\right) u_{o l-2+2 \text { I}}+\left(-1552165240066560+6396525899205120 \text { I}\right) u_{o l-1+2 \text { I}}+\left(-710426039824480\right.\right. \\ & \left.\left.+241925310542720 \text { I}\right) u_{o l+2 \text { I}}+\left(638066192354304-318273845360128 \text { I}\right) u_{o l-3+1 \text { I}}+\left(62850019981432320-24820181492520960 \text { I}\right) u_{o l-2+1 \text { I}}\right. \\ & \left.\left.+\left(132741276344651520-169321029592740480 \text { I}\right) u_{o l-1+1 \text { I}}-\left(4388802321496320+12213289800974080 \text { I}\right) u_{o l+1 \text { I}}+5214321135842 u_{o l-4}\right.\right. \\ & \left.\left.-4207755037402112 u_{o l-3}+289700726415347520 u_{o l-2}-700854144205895680 u_{o l-1}+34247540524479100 u_{o l}+\left(638066192354304+318273845360128 \text { I}\right) u_{o l-3-1 \text { I}}\right.\right. \\ & \left.\left.+\left(62850019981432320+24820181492520960 \text { I}\right) u_{o l-2-1 \text { I}}+\left(132741276344651520+169321029592740480 \text { I}\right) u_{o l-1-1 \text { I}}+\left(-4388802321496320+12213289800974080 \text { I}\right) u_{o l-1}\right.\right. \\ & \left.\left.+\left(962685249435000+145812879641520 \text { I}\right) u_{o l-2-2 \text { I}}-\left(1552165240066560+6396525899205120 \text { I}\right) u_{o l-1-2 \text { I}}-\left(710426039824480+241925310542720 \text { I}\right) u_{o l-2 \text { I}}\right.\right. \\ & \left.\left.+\left(17012605501696+17516852902528 \text { I}\right) u_{o l-1-3 \text { I}}-\left(3440596614400+7270811240704 \text { I}\right) u_{o l-3 \text { I}}-\left(17184205415+13262229019 \text { I}\right) u_{o l-4 \text { I}}\right)\right) \cdot O\left(\Delta x_{o l}^{14}\right) \end{aligned}$$

Formula:, 706, Var:, 1

*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 12

*Error order:*, 13, *Error:*,  $1.8609460963608619641 \times 10^{-32}$ , *New Error:*,  $1.8808416286317816679 \times 10^{-45}$

*Error order:*, 13, *Error:*,  $1.8808416286317816679 \times 10^{-45}$ , *New Error:*,  $1.8828420208027547508 \times 10^{-58}$

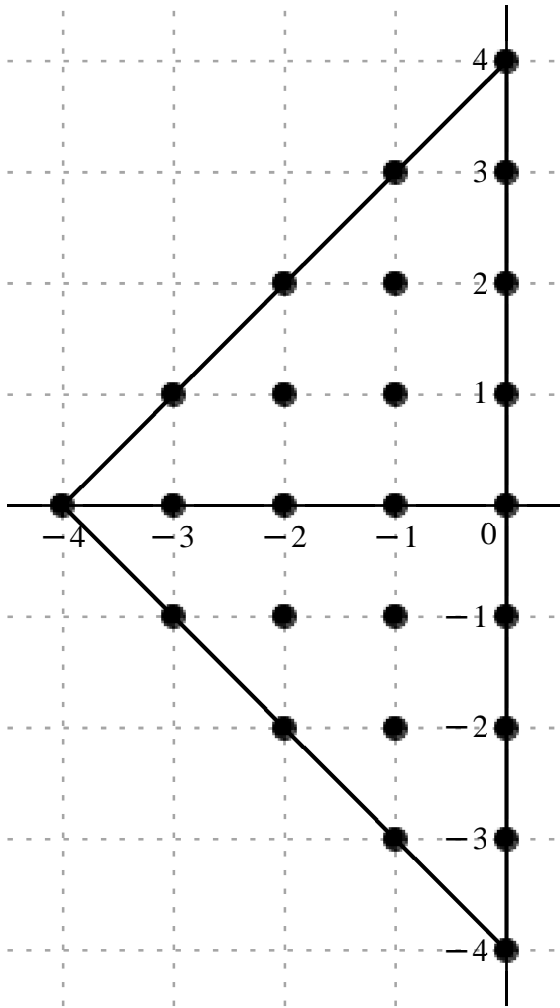
Error order:, 13, Error:,  $1.8828420208027547508 \times 10^{-58}$ , New Error:,  $1.8830421687782789360 \times 10^{-71}$

*Error order*., 13, *Error*.,  $1.8830421687782789360 \times 10^{-71}$ , *New Error*.,  $1.8830621846637854987 \times 10^{-84}$

Error order:, 13, Error:,  $1.8830621846637854987 \times 10^{-84}$ , New Error:,  $1.8830641862632160664 \times 10^{-97}$

[illegible]

[illegible]



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\,u(x_{ol})=\frac{1}{1450696000\,\Delta x_{ol}^{12}}\big(99\,\big((\,-16579779853+14265876885\,\mathrm{I}\,)\,u_{ol+41}+(\,15985220994624-18044757968832\,\mathrm{I}\,)\,u_{ol-1+31}+(\,-2940014500864+7426526095360\,\mathrm{I}\,)\,u_{ol+31}+(936633102153840-167971319301240\,\mathrm{I}\,)\,u_{ol-2+21}+(\,-1239453693757440+6254495576340480\,\mathrm{I}\,)\,u_{ol-1+21}+(\,-664031208726480$$

$$+281288741223280\,\mathrm{I}\,)\,u_{ol+21}+(621580569811712-318104307789184\,\mathrm{I}\,)\,u_{ol-3+1}+(60447562379043840-24982744588139520\,\mathrm{I}\,)\,u_{ol-2+1}+(\,121925345080593600-164256502497272640\,\mathrm{I}\,)\,u_{ol-1+1}-(4590900022159360+11058074936796160\,\mathrm{I}\,)\,u_{ol+1}+5141151767934\,u_{ol-4}-4111887469555712\,u_{ol-3}$$

$$+279335331529843680\,u_{ol-2}-661202387886243840\,u_{ol-1}+31074273006840700\,u_{ol}+(621580569811712+318104307789184\,\mathrm{I}\,)\,u_{ol-3-1}+(60447562379043840+24982744588139520\,\mathrm{I}\,)\,u_{ol-2-1}+(\,121925345080593600+164256502497272640\,\mathrm{I}\,)\,u_{ol-1-1}+(\,-4590900022159360+11058074936796160\,\mathrm{I}\,)\,u_{ol-1}$$

$$+(936633102153840+167971319301240\,\mathrm{I}\,)\,u_{ol-2-21}-(1239453693757440+6254495576340480\,\mathrm{I}\,)\,u_{ol-1-21}-(664031208726480+281288741223280\,\mathrm{I}\,)\,u_{ol-21}+(\,15985220994624+18044757968832\,\mathrm{I}\,)\,u_{ol-1-31}-(2940014500864+7426526095360\,\mathrm{I}\,)\,u_{ol-31}-(16579779853+14265876885\,\mathrm{I}\,)\,u_{ol-41}\big)\big)\cdot\,O(\,\Delta x_{ol}^{13}\,)\,$$

Formula:, 707, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 13

Error order:, 12, Error:, 9.9786910011682395472 × 10<sup>-30</sup>, New Error:, 1.0084380780845030357 × 10<sup>-41</sup>

Error order:, 12, Error:, 1.0084380780845030357 × 10<sup>-41</sup>, New Error:, 1.0095006830281633663 × 10<sup>-53</sup>

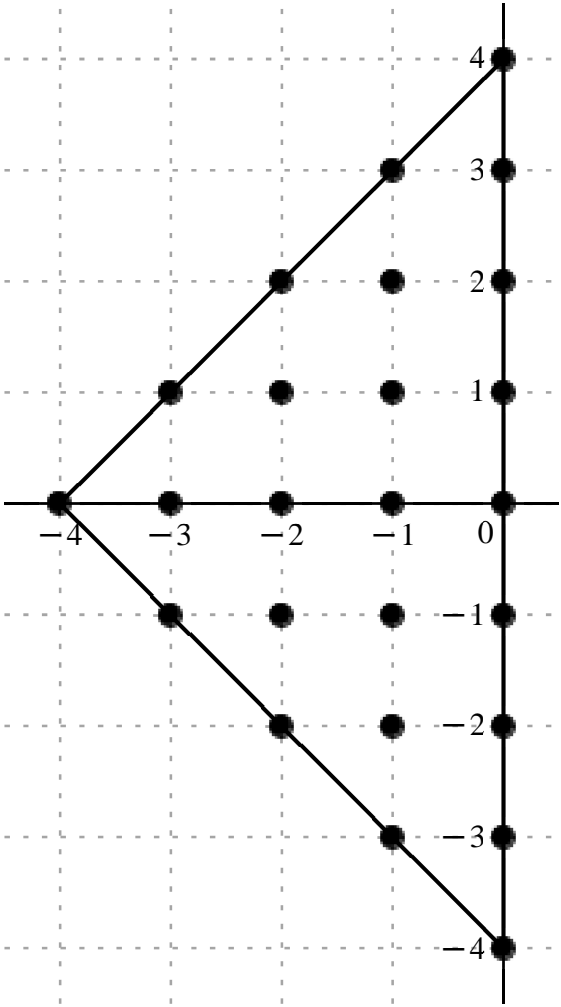
Error order:, 12, Error:, 1.0095006830281633663 × 10<sup>-53</sup>, New Error:, 1.0096070007866695548 × 10<sup>-65</sup>

Error order:, 12, Error:, 1.0096070007866695548 × 10<sup>-65</sup>, New Error:, 1.0096176331353547064 × 10<sup>-77</sup>

Error order:, 12, Error:, 1.0096176331353547064 × 10<sup>-77</sup>, New Error:, 1.0096186963759517601 × 10<sup>-89</sup>

$$x_o+h\cdot,\left[\begin{array}{ccccc} & & & & 4\,\mathrm{I} \\ & & & -1+3\,\mathrm{I} & 3\,\mathrm{I} \\ & & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} \\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & \\ -4 & -3 & -2 & -1 & 0 \\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & \\ & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & \\ & & -1-3\,\mathrm{I} & -3\,\mathrm{I} & \\ & & & & -4\,\mathrm{I} \end{array}\right]$$

$$c = , \left( \begin{array}{cccccc} & & & & -\frac{1325772657}{214600} + \frac{12791895039 \text{ I}}{2146000} \\ & & & \frac{698958956619}{120250} - \frac{867955070367 \text{ I}}{120250} - \frac{327112323516}{348725} + \frac{5118003250668 \text{ I}}{1743625} \\ & & \frac{2059343007183}{5800} - \frac{85491301203 \text{ I}}{1160} - \frac{4436042748984}{12025} + \frac{28588379378328 \text{ I}}{12025} - \frac{311811217641}{1300} + \frac{158381777169 \text{ I}}{1300} \\ \frac{1978280073}{1000} & \frac{\frac{383865345171}{1625} - \frac{201515047272 \text{ I}}{1625}}{1625} & \frac{16441556431608}{725} - \frac{7096482250704 \text{ I}}{725} & \frac{2185086291003}{50} - \frac{3102760300563 \text{ I}}{50} & -\frac{45670803948}{25} - \frac{97764728292 \text{ I}}{25} \\ & -\frac{2548009305072}{1625} & \frac{5255885490471}{50} & -\frac{6092165727648}{25} & \frac{442173999267}{40} \\ \frac{383865345171}{1625} + \frac{201515047272 \text{ I}}{1625} & & \frac{16441556431608}{725} + \frac{7096482250704 \text{ I}}{725} & \frac{2185086291003}{50} + \frac{3102760300563 \text{ I}}{50} & -\frac{45670803948}{25} + \frac{97764728292 \text{ I}}{25} \\ & & \frac{2059343007183}{5800} + \frac{85491301203 \text{ I}}{1160} & -\frac{4436042748984}{12025} - \frac{28588379378328 \text{ I}}{12025} & -\frac{311811217641}{1300} - \frac{158381777169 \text{ I}}{1300} \\ & & & \frac{698958956619}{120250} + \frac{867955070367 \text{ I}}{120250} & -\frac{327112323516}{348725} - \frac{5118003250668 \text{ I}}{1743625} \\ & & & & -\frac{1325772657}{214600} - \frac{12791895039 \text{ I}}{2146000} \end{array} \right)$$



$$\begin{aligned} \frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}{}^{13}}\; u(x_{ol}) = & \frac{1}{27898000\; \Delta x_{ol}{}^{13}}\; \big( 99\; \big( (-1740913590 + 1679743793 \text{ I})\; u_{ol+4\text{I}} + (1637964423592 - 2033995720456 \text{ I})\; u_{ol-1+3\text{I}} + (-264333190720 + 827152040512 \text{ I})\; u_{ol+3\text{I}} + (100054948126770 - 20768341352850 \text{ I})\; u_{ol-2+2\text{I}} + (-103955749269120 + 669949900583040 \text{ I})\; u_{ol-1+2\text{I}} + (-67590593238140 + 34332049879260 \text{ I})\; u_{ol+2\text{I}} \\ & + (66567679251472 - 34945558904704 \text{ I})\; u_{ol-3+1\text{I}} + (6390617085740160 - 2758309464718080 \text{ I})\; u_{ol-2+1\text{I}} + (12315058049778120 - 17487031689920520 \text{ I})\; u_{ol-1+1\text{I}} - (514797611531840 + 1101996117127360 \text{ I})\; u_{ol+1\text{I}} + 557475328046\; u_{ol-4\text{I}} - 441860845954304\; u_{ol-3\text{I}} + 29621958265284840\; u_{ol-2\text{I}} - 68670399785827840\; u_{ol-1\text{I}} \\ & + 3115093492815850\; u_{ol\text{I}} + (66567679251472 + 34945558904704 \text{ I})\; u_{ol-3-1\text{I}} + (6390617085740160 + 2758309464718080 \text{ I})\; u_{ol-2-1\text{I}} + (12315058049778120 + 17487031689920520 \text{ I})\; u_{ol-1-1\text{I}} + (-514797611531840 + 1101996117127360 \text{ I})\; u_{ol-1\text{I}} + (100054948126770 + 20768341352850 \text{ I})\; u_{ol-2-2\text{I}} - (103955749269120 \\ & + 669949900583040 \text{ I})\; u_{ol-1-2\text{I}} - (67590593238140 + 34332049879260 \text{ I})\; u_{ol-2\text{I}} + (1637964423592 + 2033995720456 \text{ I})\; u_{ol-1-3\text{I}} - (264333190720 + 827152040512 \text{ I})\; u_{ol-3\text{I}} - (1740913590 + 1679743793 \text{ I})\; u_{ol-4\text{I}} \big) \big) ,\; O(\; \Delta x_{ol}{}^{12}\; ) \end{aligned}$$



Formula:, 708, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:, 11, Error:,  $5.0932153045035129552 \times 10^{-27}$ , New Error:,  $5.1465948604478506423 \times 10^{-38}$

Error order:, 11, Error:,  $5.1465948604478506423 \times 10^{-38}$ , New Error:,  $5.1519613595982233853 \times 10^{-49}$

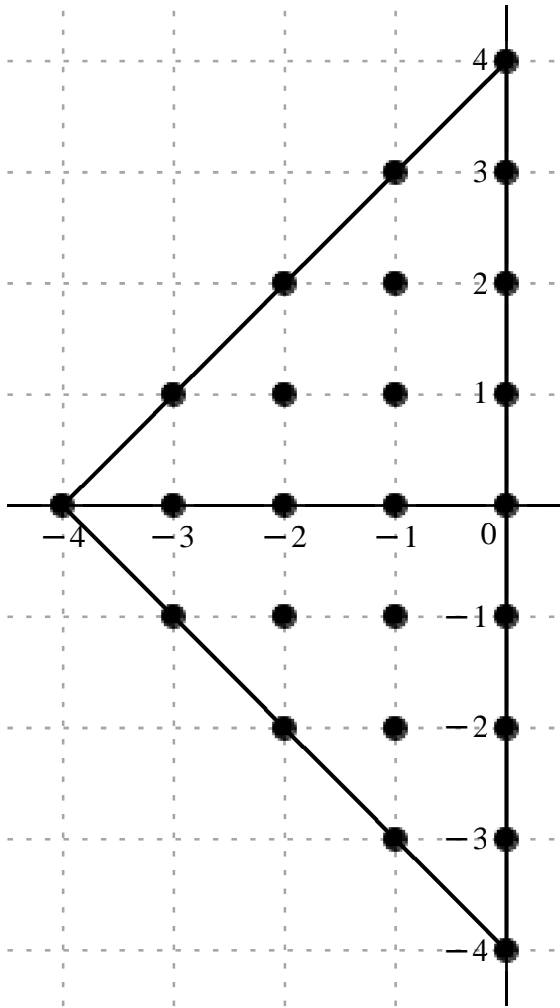
*Error order*., 11, *Error*.,  $5.1519613595982233853 \times 10^{-49}$ , *New Error*.,  $5.1524982959037465939 \times 10^{-60}$

Error order:, 11, Error:,  $5.1524982959037465939 \times 10^{-60}$ , New Error:,  $5.1525519923991609623 \times 10^{-71}$

*Error order:*, 11, *Error:*,  $5.1525519923991609623 \times 10^{-71}$ , *New Error:*,  $5.1525573620773519771 \times 10^{-82}$

[illegible]

[illegible]



$$\frac{\mathrm{d}^{14}}{\mathrm{d}x_{ol}^{14}}\,u(x_{ol})=\frac{1}{111592000\,\Delta x_{ol}^{14}}\left(693\left((\,-5085393989+5546131565\,\mathrm{I})\,u_{ol+4\mathrm{I}}+(4685854599552-6429986127936\,\mathrm{I})\,u_{ol-1+3\mathrm{I}}+(-627506963968+2572367004160\,\mathrm{I})\,u_{ol+3\mathrm{I}}+(300785054366160-71084240430840\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(\,-228488284523520+2015451650903040\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+(\,-192288376123760\right.\\ \left.+114228205543760\,\mathrm{I})\,u_{ol+2\mathrm{I}}+(200881717112384-108170728615488\,\mathrm{I})\,u_{ol-3+1\mathrm{I}}+(19035197333268480-8565493727831040\,\mathrm{I})\,u_{ol-2+1\mathrm{I}}+(35052198441099840-52382895786748800\,\mathrm{I})\,u_{ol-1+1\mathrm{I}}-(1599100754567680+3098487290196480\,\mathrm{I})\,u_{ol+1\mathrm{I}}+1704138477678\,u_{ol-4\mathrm{I}}-1338355879540736\,u_{ol-3\mathrm{I}}\right.\\ \left.+88546072922929440\,u_{ol-2\mathrm{I}}-201191092688302080\,u_{ol-1\mathrm{I}}+8835194720688700\,u_{ol}+(200881717112384+108170728615488\,\mathrm{I})\,u_{ol-3-1\mathrm{I}}+(19035197333268480+8565493727831040\,\mathrm{I})\,u_{ol-2-1\mathrm{I}}+(35052198441099840+52382895786748800\,\mathrm{I})\,u_{ol-1-1\mathrm{I}}+(\,-1599100754567680+3098487290196480\,\mathrm{I})\,u_{ol-1\mathrm{I}}+(300785054366160\right.\\ \left.+71084240430840\,\mathrm{I})\,u_{ol-2-2\mathrm{I}}-(228488284523520+2015451650903040\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}-(192288376123760+114228205543760\,\mathrm{I})\,u_{ol-2\mathrm{I}}+(4685854599552+6429986127936\,\mathrm{I})\,u_{ol-1-3\mathrm{I}}-(627506963968+2572367004160\,\mathrm{I})\,u_{ol-3\mathrm{I}}-(5085393989+5546131565\,\mathrm{I})\,u_{ol-4\mathrm{I}}\Big),\,O(\,\Delta x_{ol}^{11}\,)$$

Formula:, 709, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 15

Error order:., 10, Error:., 2.4626658055671614919 × 10<sup>−24</sup>, New Error:., 2.4881673318777929232 × 10<sup>−34</sup>

Error order:., 10, Error:., 2.4881673318777929232 × 10<sup>−34</sup>, New Error:., 2.4907309725185825059 × 10<sup>−44</sup>

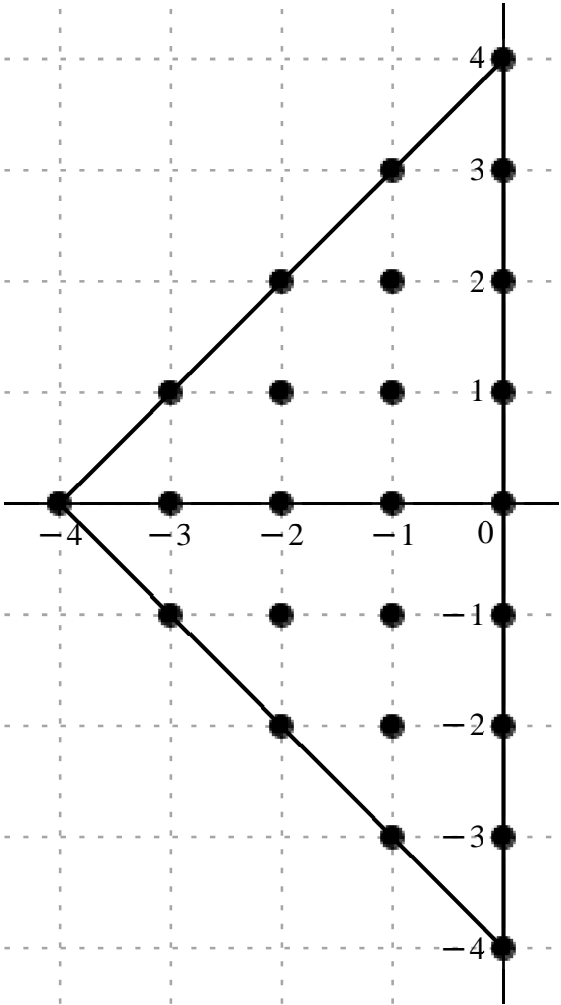
Error order:., 10, Error:., 2.4907309725185825059 × 10<sup>−44</sup>, New Error:., 2.4909874719095525020 × 10<sup>−54</sup>

Error order:., 10, Error:., 2.4909874719095525020 × 10<sup>−54</sup>, New Error:., 2.4910131232023662551 × 10<sup>−64</sup>

Error order:., 10, Error:., 2.4910131232023662551 × 10<sup>−64</sup>, New Error:., 2.4910156883451852459 × 10<sup>−74</sup>

$$x_o\,+h\,.,\left[\begin{array}{ccccc} & & & & 4\,\mathrm{I}\\ & & & -1+3\,\mathrm{I} & 3\,\mathrm{I}\\ & & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I}\\ -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & \\ -4 & -3 & -2 & -1 & 0\\ -3-\mathrm{I} & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & \\ & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & \\ & & -1-3\,\mathrm{I} & -3\,\mathrm{I} & \\ & & & & -4\,\mathrm{I}\end{array}\right]$$

$$c = , \begin{array}{cccccc} & & & & & -\frac{25706758077}{171680} + \frac{160179737949 \text{ I}}{858400} \\ & & & & \frac{1634243062221}{12025} - \frac{2492984943603 \text{ I}}{12025} & -\frac{955168699716}{69745} + \frac{28301988421476 \text{ I}}{348725} \\ & & \frac{1073449901601}{116} - \frac{713375529867 \text{ I}}{290} & -\frac{10788415174152}{2405} + \frac{148966186950504 \text{ I}}{2405} & -\frac{361750702698}{65} + \frac{246976183377 \text{ I}}{65} \\ \frac{2018985190992}{325} - \frac{1115336069694 \text{ I}}{325} & \frac{84232724299416}{145} - \frac{39464866381248 \text{ I}}{145} & \frac{5110639631559}{5} - \frac{8029950096861 \text{ I}}{5} & -\frac{251453544804}{5} - \frac{446899519836 \text{ I}}{5} \\ \frac{21366117927}{400} & -\frac{13505811991056}{325} & \frac{13566187963944}{5} & -\frac{30229720256736}{5} & \frac{2061042560577}{8} \\ \frac{2018985190992}{325} + \frac{1115336069694 \text{ I}}{325} & \frac{84232724299416}{145} + \frac{39464866381248 \text{ I}}{145} & \frac{5110639631559}{5} + \frac{8029950096861 \text{ I}}{5} & -\frac{251453544804}{5} + \frac{446899519836 \text{ I}}{5} \\ & \frac{1073449901601}{116} + \frac{713375529867 \text{ I}}{290} & -\frac{10788415174152}{2405} - \frac{148966186950504 \text{ I}}{2405} & -\frac{361750702698}{65} - \frac{246976183377 \text{ I}}{65} \\ & & \frac{1634243062221}{12025} + \frac{2492984943603 \text{ I}}{12025} & -\frac{955168699716}{69745} - \frac{28301988421476 \text{ I}}{348725} \\ & & & -\frac{25706758077}{171680} - \frac{160179737949 \text{ I}}{858400} \end{array}$$



$$\begin{array}{l} \frac{\mathrm{d}^{15}}{\mathrm{d} x_{o l}^{15}} u\left(x_{o l}\right)=\frac{1}{11159200 \Delta x_{o l}^{15}}\left(2079\left((-803722595+1001604903 \text { I}) u_{o l+41}+(729474536672-1112789816096 \text { I}) u_{o l-1+31}+(-73509856640+435624641408 \text { I}) u_{o l+31}+(49670938207800-13203795281040 \text { I}) u_{o l-2+21}+\right.\right. \\ \left.(-24078040600320+332469027152640 \text { I}) u_{o l-1+21}+(-29872708340160+20394839423840 \text { I}) u_{o l+21}\right. \\ \left.+(33344817468928-18420480658496 \text { I}) u_{o l-3+1}+(3118109890371840-1460902413035520 \text { I}) u_{o l-2+1}+(5486353994852640-8620280819710560 \text { I}) u_{o l-1+1}\right. \\ \left.-(269939432147840+479753835666560 \text { I}) u_{o l+1}+286710898474 u_{o l-4}-223057027669504 u_{o l-3}+14563521378282240 u_{o l-2}-32452091802690560 u_{o l-1}\right. \\ \left.+1382851499638700 u_{o l}+(33344817468928+18420480658496 \text { I}) u_{o l-3-1}+(3118109890371840+1460902413035520 \text { I}) u_{o l-2-1}+(5486353994852640+8620280819710560 \text { I}) u_{o l-1-1}+\right. \\ \left.(-269939432147840+479753835666560 \text { I}) u_{o l-1}+(49670938207800+13203795281040 \text { I}) u_{o l-2-21}-(24078040600320\right. \\ \left.+332469027152640 \text { I}) u_{o l-1-21}-(29872708340160+20394839423840 \text { I}) u_{o l-21}+(729474536672+1112789816096 \text { I}) u_{o l-1-31}-(73509856640+435624641408 \text { I}) u_{o l-31}\right. \\ \left.-(803722595+1001604903 \text { I}) u_{o l-41}\right), O\left(\Delta x_{o l}^{10}\right) \end{array}$$

Formula:, 710, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 16

*Error order:*, 9, *Error:*,  $1.1214777193208170188 \times 10^{-21}$ , *New Error:*,  $1.1329301481867981470 \times 10^{-30}$

*Error order:*, 9, *Error:*,  $1.1329301481867981470 \times 10^{-30}$ , *New Error:*,  $1.1340813738770176347 \times 10^{-39}$

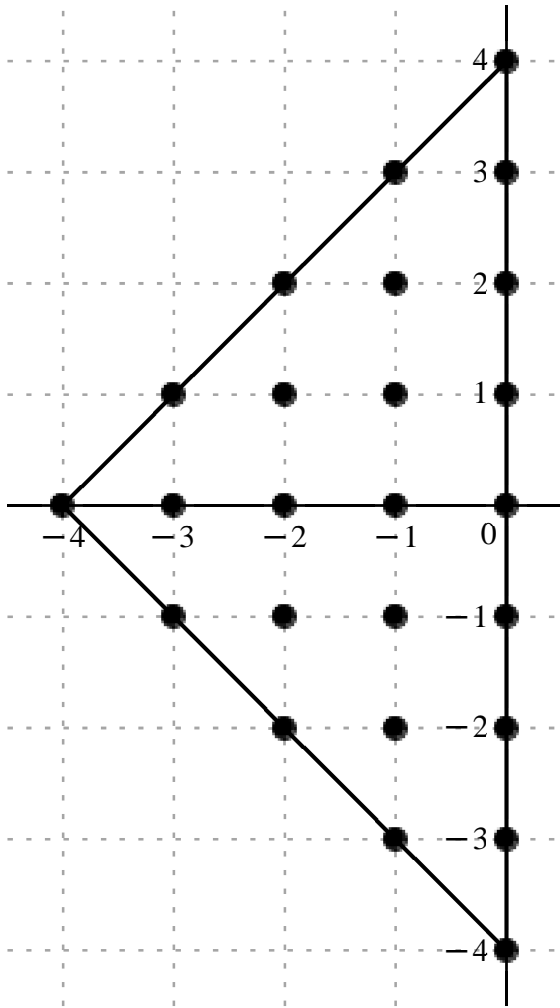
*Error order:*, 9, *Error:*,  $1.1340813738770176347 \times 10^{-39}$ , *New Error:*,  $1.1341965564701030883 \times 10^{-48}$

*Error order:*, 9, *Error:*,  $1.1341965564701030883 \times 10^{-48}$ , *New Error:*,  $1.1342080753298487523 \times 10^{-57}$

*Error order:*, 9, *Error:*,  $1.1342080753298487523 \times 10^{-57}$ , *New Error:*,  $1.1342092272218278864 \times 10^{-66}$

					4 I
					-1 + 3 I    3 I
			-2 + 2 I	-1 + 2 I	2 I
		-3 + I	-2 + I	-1 + I	I
$x_o \neq h.$ ,	-4	-3	-2	-1	0
		-3 - I	-2 - I	-1 - I	-I
			-2 - 2 I	-1 - 2 I	-2 I
				-1 - 3 I	-3 I
					-4 I

[illegible]



$$\frac{\mathrm{d}^{16}}{\mathrm{d}x_{ol}^{16}}\,u(x_{ol})=\frac{1}{1394900\,\Delta x_{ol}^{16}}\left(2079\left((-436409961+630957665\,\mathrm{I})\,u_{ol+41}+(393650506368-673037529024\,\mathrm{I})\,u_{ol-1+31}+(-24017001728+256259214080\,\mathrm{I})\,u_{ol+31}+(28761660935280-8524050869880\,\mathrm{I})\,u_{ol-2+21}+(-6133570490880+191992703132160\,\mathrm{I})\,u_{ol-1+21}+(-16185986880560+12544948511760\,\mathrm{I})\,u_{ol+21}\right.\right.\\
\left.+ (19435882293184-11019128279488\,\mathrm{I})\,u_{ol-3+1}+(1793000175482880-873925952739840\,\mathrm{I})\,u_{ol-2+1}+(3013191895896000-4975464774833280\,\mathrm{I})\,u_{ol-1+1}-(158580105931520+261048701105920\,\mathrm{I})\,u_{ol+1}+169506880998\,u_{ol-4}-130593132565504\,u_{ol-3}+8413088154176160\,u_{ol-2}-18392283196385280\,u_{ol-1}\right.\\
\left.+761900371095500\,u_{ol}+(19435882293184+11019128279488\,\mathrm{I})\,u_{ol-3-1}+(1793000175482880+873925952739840\,\mathrm{I})\,u_{ol-2-1}+(3013191895896000+4975464774833280\,\mathrm{I})\,u_{ol-1-1}+(-158580105931520+261048701105920\,\mathrm{I})\,u_{ol-1}+(28761660935280+8524050869880\,\mathrm{I})\,u_{ol-2-21}-(6133570490880\right.\\
\left.+191992703132160\,\mathrm{I})\,u_{ol-1-21}-(16185986880560+12544948511760\,\mathrm{I})\,u_{ol-21}+(393650506368+673037529024\,\mathrm{I})\,u_{ol-1-31}-(24017001728+256259214080\,\mathrm{I})\,u_{ol-31}-(436409961+630957665\,\mathrm{I})\,u_{ol-41}\right)\Big)\cdot O(\,\Delta x_{ol}^9\,)$$

Formula:, 711, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 1

Error order:, 24, Error:, 1.1462785449638679319 × 10<sup>−63</sup>, New Error:, 1.1490844607013853817 × 10<sup>−87</sup>

Error order:, 24, Error:, 1.1490844607013853817 × 10<sup>−87</sup>, New Error:, 1.1493574563875096191 × 10<sup>−111</sup>

Error order:, 24, Error:, 1.1493574563875096191 × 10<sup>−111</sup>, New Error:, 1.1493846799387316515 × 10<sup>−135</sup>

Error order:, 24, Error:, 1.1493846799387316515 × 10<sup>−135</sup>, New Error:, 1.1493874015336221489 × 10<sup>−159</sup>

Error order:, 24, Error:, 1.1493874015336221489 × 10<sup>−159</sup>, New Error:, 1.1493876736855088239 × 10<sup>−183</sup>

$$x_o+h.\,,\left[\begin{array}{cccccccc} & & & & 4\,\mathrm{I} & & & \\ & & & & -1+3\,\mathrm{I} & 3\,\mathrm{I} & 1+3\,\mathrm{I} & \\ & & & & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ & & & & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4\end{array}\right]$$

$$\mathcal{C} =$$



$$\frac{d}{dx_{ol}}$$

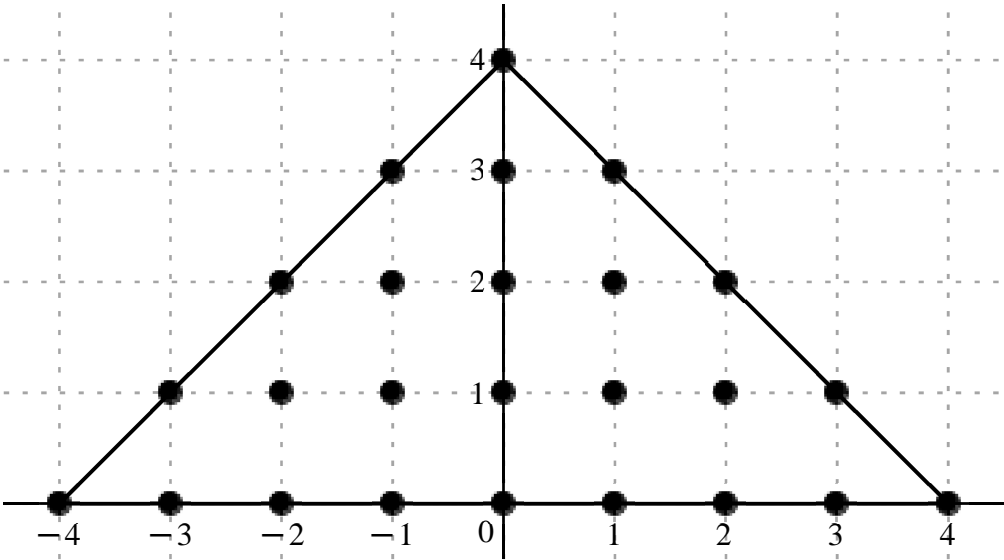
*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 2

*Error order:*, 23, *Error:*,  $1.1664966746827090619 \times 10^{-83}$ , *New Error:*,  $1.1667721466761550711 \times 10^{-106}$

*Error order.*: 23, *Error.*:  $1.1667996176594821237 \times 10^{-129}$ , *New Error.*:  $1.1668023639955971024 \times 10^{-152}$

$$c =, \left[ \begin{array}{cccccccc} & & & & 4 \text{ I} & & & \\ & & & & -1 + 3 \text{ I} & 3 \text{ I} & 1 + 3 \text{ I} & \\ & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} & \\ & -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$\left[ \begin{array}{cccccccccccc} & & & & & & -\frac{4}{3315} & & & & & \\ & & & & & & -\frac{35264}{215475} - \frac{13352 \text{ I}}{215475} & & \frac{896}{845} & & -\frac{35264}{215475} + \frac{13352 \text{ I}}{215475} & \\ & & & & & & -\frac{5997}{25636} + \frac{681 \text{ I}}{25636} & & -\frac{2907456}{160225} - \frac{590592 \text{ I}}{160225} & & -\frac{1098}{13} & & -\frac{2907456}{160225} + \frac{590592 \text{ I}}{160225} & & -\frac{5997}{25636} - \frac{681 \text{ I}}{25636} & \\ & & & & & & -\frac{37372}{7972575} - \frac{16564 \text{ I}}{7972575} & & \frac{157632}{156325} + \frac{3379392 \text{ I}}{2657525} & & -60 - 36 \text{ I} & & \frac{14080}{51} & & -60 + 36 \text{ I} & & \frac{157632}{156325} - \frac{3379392 \text{ I}}{2657525} & & -\frac{37372}{7972575} + \frac{16564 \text{ I}}{7972575} & \\ \frac{71}{18970640} + \frac{109 \text{ I}}{99595860} & & & & & & \frac{9952}{8160165} + \frac{5792 \text{ I}}{6346795} & & \frac{1327}{8619} - \frac{163 \text{ I}}{2873} & & -\frac{1760}{663} - \frac{2528 \text{ I}}{663} & & -\frac{2347}{72} & & -\frac{1760}{663} + \frac{2528 \text{ I}}{663} & & \frac{1327}{8619} + \frac{163 \text{ I}}{2873} & & \frac{9952}{8160165} - \frac{5792 \text{ I}}{6346795} & & \frac{71}{18970640} - \frac{109 \text{ I}}{99595860} \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{77684770800 \, \Delta x_{ol}^2} \, \big( -93737280 \, u_{ol+4l} - (12713659392 + 4813769856 \, \mathrm{I}) \, u_{ol-1+3l} + 82373437440 \, u_{ol+3l} + (-12713659392 + 4813769856 \, \mathrm{I}) \, u_{ol+1+3l} + (-18172709100 + 2063634300 \, \mathrm{I}) \, u_{ol-2+2l} - (1409674226688 + 286347350016 \, \mathrm{I}) \, u_{ol-1+2l} - 6561375256800 \, u_{ol+2l} + (-1409674226688 + 286347350016 \, \mathrm{I}) \, u_{ol+1+2l} \\ - (18172709100 + 2063634300 \, \mathrm{I}) \, u_{ol+2+2l} - (364152768 + 161399616 \, \mathrm{I}) \, u_{ol-3+l} + (78334276608 + 98786386944 \, \mathrm{I}) \, u_{ol-2+l} - (4661086248000 + 2796651748800 \, \mathrm{I}) \, u_{ol-1+l} + 21447089664000 \, u_{ol+l} + (-4661086248000 + 2796651748800 \, \mathrm{I}) \, u_{ol+1+l} + (78334276608 - 98786386944 \, \mathrm{I}) \, u_{ol+2+l} + (-364152768 \\ + 161399616 \, \mathrm{I}) \, u_{ol+3+l} + (290745 + 85020 \, \mathrm{I}) \, u_{ol-4} + (94743040 + 70894080 \, \mathrm{I}) \, u_{ol-3} + (11960516400 - 4407454800 \, \mathrm{I}) \, u_{ol-2} - (206222016000 + 296209804800 \, \mathrm{I}) \, u_{ol-1} - 2532307737050 \, u_{ol} + (-206222016000 + 296209804800 \, \mathrm{I}) \, u_{ol+1} + (11960516400 + 4407454800 \, \mathrm{I}) \, u_{ol+2} + (94743040 - 70894080 \, \mathrm{I}) \, u_{ol+3} + (290745 \\ - 85020 \, \mathrm{I}) \, u_{ol+4} \big), \, \, O(\, \Delta x_{ol}^{\, 23} \, )$$

Formula:, 713, Var.: 1

*Variavel* :,  $x_{oi}$ , *Derivada de Ordem* :, 3

*Error order.*: 22, *Error.*:  $9.2644679159236694365 \times 10^{-58}$ , *New Error.*:  $9.2868780314813664929 \times 10^{-80}$

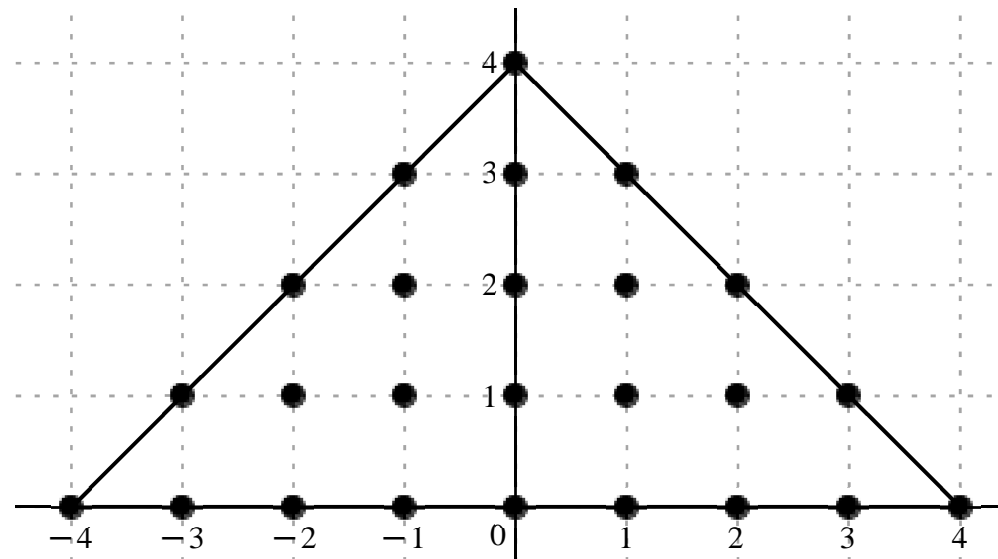
*Error order*., 22, *Error*.,  $9.2868780314813664929 \times 10^{-80}$ , *New Error*.,  $9.2890590944114589038 \times 10^{-102}$

*Error order*., 22, *Error*.,  $9.2890590944114589038 \times 10^{-102}$ , *New Error*.,  $9.2892766007625292992 \times 10^{-124}$

Error order:, 22, Error:;, 9.2892766007625292992  $\times 10^{-124}$ , New Error:;, 9.2892983453977667405  $\times 10^{-146}$

*Error order:*, 22, *Error:*,  $9.2892983453977667405 \times 10^{-146}$ , *New Error:*,  $9.2893005198012913390 \times 10^{-168}$

[illegible]





$$\frac{d^3}{dx_{ol}^3} u(x_{ol}) = \frac{1}{3107390832000 \mathcal{A}_{ol}^{x_{ol}^3}} \left( (-31563099750 I_{u_{ol+41}} + (1671586629888 - 4223034633216 I) u_{ol-1+31} + 27392436736000 I_{u_{ol+31}} - (1671586629888 + 4223034633216 I) u_{ol+1+31} - (459726813000 + 6130993869000 I) u_{ol-2+21} + (107481166700544 - 460749456340992 I) u_{ol-1+21} - 2130833505528000 I_{u_{ol+21}} \right. \\ \left. - (107481166700544 + 460749456340992 I) u_{ol+1+21} + (459726813000 - 6130993869000 I) u_{ol+2+21} + (61484873856 - 122460955008 I) u_{ol-3+1} + (-34979405948928 + 24333936592896 I) u_{ol-2+1} + (1002871724400000 - 1433547657360000 I) u_{ol-1+1} + 6578407320576000 I_{u_{ol+1}} - (1002871724400000 \right. \\ \left. + 1433547657360000 I) u_{ol+1+1} + (34979405948928 + 24333936592896 I) u_{ol+2+1} - (61484873856 + 122460955008 I) u_{ol+3+1} + (-33893925 + 100424025 I) u_{ol-4} + (-26561254400 + 31712076800 I) u_{ol-3} + (1186227252000 + 4283703564000 I) u_{ol-2} + (112747200384000 - 52455381888000 I) u_{ol-1} - 617775623907260 I_{u_{ol}} \right. \\ \left. - (112747200384000 + 52455381888000 I) u_{ol+1} + (-1186227252000 + 4283703564000 I) u_{ol+2} + (26561254400 + 31712076800 I) u_{ol+3} + (33893925 + 100424025 I) u_{ol+4} \right), \quad O(\mathcal{A}_{ol}^{x_{ol}^{22}})$$

Formula:, 714, Var:, 1

Variavel :,  $x_{oi}$ , Derivada de Ordem :, 4

*Error order*., 21, *Error*.,  $6.8489950876937405014 \times 10^{-55}$ , *New Error*.,  $6.8654761076482449175 \times 10^{-76}$

*Error order:*, 21, *Error:*,  $6.8654761076482449175 \times 10^{-76}$ , *New Error:*,  $6.8670803476863313411 \times 10^{-97}$

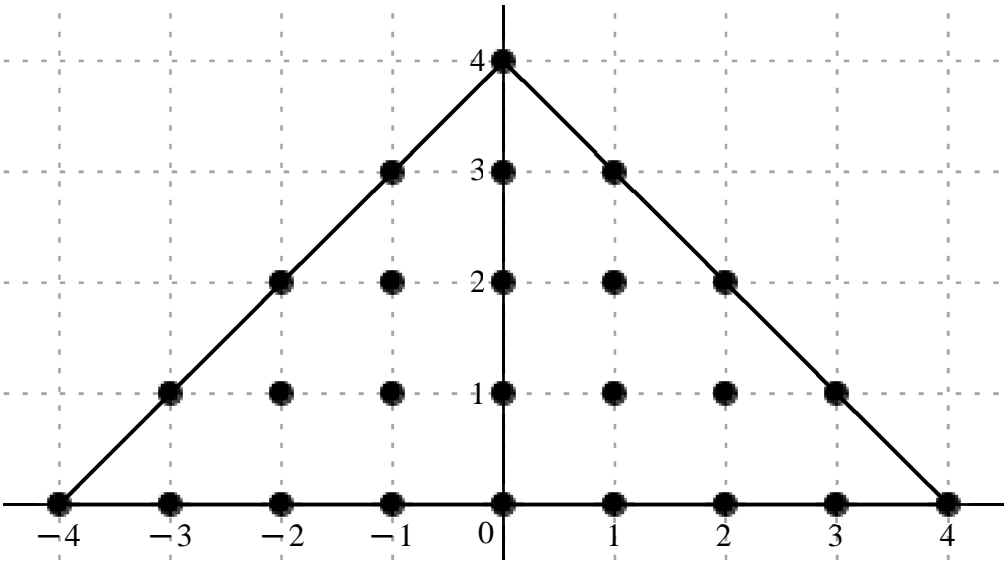
*Error order*:, 21, *Error*:,  $6.8670803476863313411 \times 10^{-97}$ , *New Error*:,  $6.8672403327390393618 \times 10^{-118}$

*Error order*., 21, *Error*.,  $6.8672403327390393618 \times 10^{-118}$ , *New Error*.,  $6.8672563268544715899 \times 10^{-139}$

*Error order.*: 21, *Error.*:  $6.8672563268544715899 \times 10^{-139}$ , *New Error.*:  $6.8672579262221160998 \times 10^{-160}$

$$x_o + h., \left[ \begin{array}{cccccccc} & & & & 4\text{ I} & & & \\ & & & & -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & \\ & & & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ & -3+1 & -2+1 & -1+1 & 1 & 1+1 & 2+1 & 3+1 \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

[illegible]



$$\frac{d^4}{dx_{ol}^4} u(x_{ol}) = \frac{1}{3884238540000 \Delta x_{ol}^4} \left( 309966727070 u_{ol+4l} + (40995940762112 + 16806382381376 I) u_{ol-1+3l} - 266279981614080 u_{ol+3l} + (40995940762112 - 16806382381376 I) u_{ol+1+3l} + (60144259552650 - 2605686788250 I) u_{ol-2+2l} + (4412149335240192 + 1134134782470144 I) u_{ol-1+2l} + 20334365229250800 u_{ol+2l} \right.$$
  
$$+ (4412149335240192 - 1134134782470144 I) u_{ol+1+2l} + (60144259552650 + 2605686788250 I) u_{ol+2+2l} + (1194826280032 + 664367090464 I) u_{ol-3+l} - (220368857522688 + 355129784400384 I) u_{ol-2+l} + (13029246873770400 + 10133671829954400 I) u_{ol-1+l} - 60137704409036800 u_{ol+l} + (13029246873770400$$
  
$$- 10133671829954400 I) u_{ol+1+l} + (-220368857522688 + 355129784400384 I) u_{ol+2+l} + (1194826280032 - 664367090464 I) u_{ol+3+l} - (1004359200 + 381396535 I) u_{ol-4} - (306906528000 + 284323779840 I) u_{ol-3} + (-43820900027800 + 8643266725800 I) u_{ol-2} + (330780738579200 + 1156793649939200 I) u_{ol-1}$$
  
$$+ 4849280583179214 u_{ol} + (330780738579200 - 1156793649939200 I) u_{ol+1} - (43820900027800 + 8643266725800 I) u_{ol+2} + (-306906528000 + 284323779840 I) u_{ol+3} + (-1004359200 + 381396535 I) u_{ol+4} \Big), O(\Delta x_{ol}^{21})$$

Formula:, 715, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 20, Error:,  $4.8874977206113474604 \times 10^{-52}$ , New Error:,  $4.8991989537718560608 \times 10^{-72}$

Error order:, 20, Error:,  $4.8991989537718560608 \times 10^{-72}$ , New Error:,  $4.9003380903991647652 \times 10^{-92}$

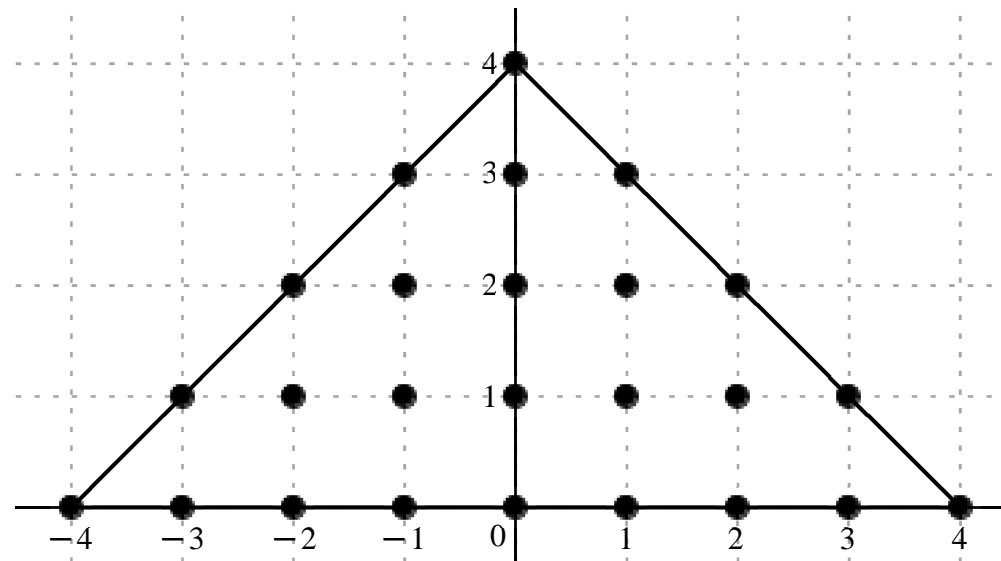
Error order:, 20, Error:,  $4.9003380903991647652 \times 10^{-92}$ , New Error:,  $4.9004516939620625599 \times 10^{-112}$

Error order:, 20, Error:,  $4.9004516939620625599 \times 10^{-112}$ , New Error:,  $4.9004630512171238302 \times 10^{-132}$

Error order:, 20, Error:,  $4.9004630512171238302 \times 10^{-132}$ , New Error:,  $4.9004641869116174423 \times 10^{-152}$

$$x_o \neq h., \left[ \begin{array}{cccccccc} & & & & 4 I & & & \\ & & & & -1 + 3 I & 3 I & 1 + 3 I & \\ & & & & -2 + 2 I & -1 + 2 I & 2 I & 1 + 2 I & 2 + 2 I \\ & & & & -3 + I & -2 + I & -1 + I & I & 1 + I & 2 + I & 3 + I \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$c =$ ,	$\frac{7422163 \text{ I}}{12240000}$															
	$-\frac{542199916}{16160625} + \frac{1282236563 \text{ I}}{16160625} - \frac{163547056 \text{ I}}{316875} \quad \frac{542199916}{16160625} + \frac{1282236563 \text{ I}}{16160625}$															
	$\frac{4411527}{2563600} + \frac{3008483939 \text{ I}}{25636000} - \frac{144645456}{61625} + \frac{6755139656 \text{ I}}{801125} \quad \frac{126005691 \text{ I}}{3250} \quad \frac{144645456}{61625} + \frac{6755139656 \text{ I}}{801125} - \frac{4411527}{2563600} + \frac{3008483939 \text{ I}}{25636000}$															
	$-\frac{1685490851}{1195886250} + \frac{2767704107 \text{ I}}{1195886250} \quad \frac{556557608}{781625} - \frac{5265920008 \text{ I}}{13287625} - \frac{1114212871}{55250} + \frac{1311168611 \text{ I}}{55250} - \frac{2115024608 \text{ I}}{19125} \quad \frac{1114212871}{55250} + \frac{1311168611 \text{ I}}{55250} - \frac{556557608}{781625} - \frac{5265920008 \text{ I}}{13287625} \quad \frac{1685490851}{1195886250} + \frac{2767704107 \text{ I}}{1195886250}$															
$\frac{223172251}{265588960000} - \frac{952568731 \text{ I}}{478060128000} \quad \frac{24254751956}{40460818125} - \frac{951127636 \text{ I}}{1618432725} - \frac{70491599}{6464250} - \frac{126594127 \text{ I}}{1436500} - \frac{555306476}{248625} + \frac{79218076 \text{ I}}{248625} \quad \frac{12706517 \text{ I}}{1600} \quad \frac{555306476}{248625} + \frac{79218076 \text{ I}}{248625} \quad \frac{70491599}{6464250} - \frac{126594127 \text{ I}}{1436500} - \frac{24254751956}{40460818125} - \frac{951127636 \text{ I}}{1618432725} - \frac{223172251}{265588960000} - \frac{952568731 \text{ I}}{478060128000}$																



$$\frac{d^5}{dx_{ol}^5} u(x_{ol}) = \frac{1}{31073908320000 \Delta x_{ol}^5} (18842778807034 I_{u_{ol+41}} + (-1042550673683456 + 2465504979121408 I) u_{ol-1+31} - 16038015697514496 I_{u_{ol+31}} + (1042550673683456 + 2465504979121408 I) u_{ol+1+31} + (53473001072400 + 3646643552140680 I) u_{ol-2+21} + (-72936302452715520 + 262017276154583040 I) u_{ol-1+21} + 1204765935363768960 I_{u_{ol+21}} + (72936302452715520 + 262017276154583040 I) u_{ol+1+21} + (-53473001072400 + 3646643552140680 I) u_{ol+2+21} + (-43795794272384 + 71916023516288 I) u_{ol-3+1} + (22126237115996160 - 12314669893908480 I) u_{ol-2+1} + (-626659703211185280 + 737432275299108480 I) u_{ol-1+1} - 3436448667374428160 I_{u_{ol+1}} + (626659703211185280 + 737432275299108480 I) u_{ol+1+1} - (22126237115996160 + 12314669893908480 I) u_{ol+2+1} + (43795794272384 + 71916023516288 I) u_{ol+3+1} + (26111153367 - 61916967515 I) u_{ol-4} + (18627649502208 - 18261650611200 I) u_{ol-3} - (338855936056960 + 2738443645143360 I) u_{ol-2} + (-69403891502167040 + 9900915961431040 I) u_{ol-1} + 246775715202825900 I_{u_{ol}} + (69403891502167040 + 9900915961431040 I) u_{ol+1} + (338855936056960 - 2738443645143360 I) u_{ol+2} - (18627649502208 + 18261650611200 I) u_{ol+3} - (26111153367 + 61916967515 I) u_{ol+4}), O(\Delta x_{ol}^{20})$$

*Formula:*, 716, *Var:*, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

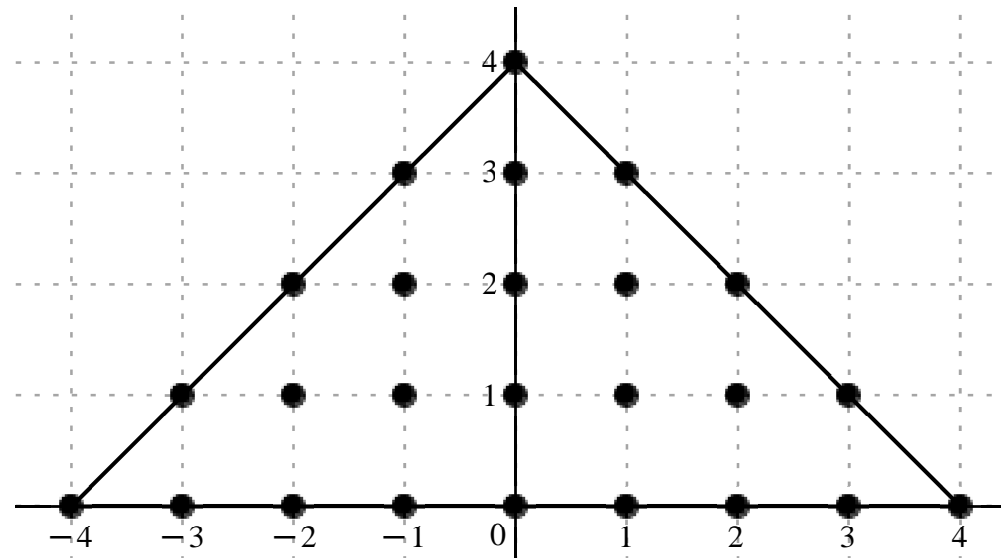
Error order:, 19, Error:,  $3.3916908289523597107 \times 10^{-49}$ , New Error:,  $3.3997683531758664285 \times 10^{-68}$

*Error order*., 19, *Error*.,  $3.3997683531758664285 \times 10^{-68}$ , *New Error*.,  $3.4005548238428840547 \times 10^{-87}$

*Error order*., 19, *Error*.,  $3.4006410992120028640 \times 10^{-125}$ , *New Error*.,  $3.4006418833186114703 \times 10^{-144}$

$$x_o \neq h_o, \begin{bmatrix} & & & & 4\text{I} & & & & \\ & & & & -1+3\text{I} & 3\text{I} & 1+3\text{I} & & \\ & & & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} & \\ & & -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{bmatrix}$$

[illegible]



$$\frac{d_6}{dx_{ol}^6} u(x_{ol}) = \frac{1}{10357969440000 \mathcal{A}_{ol}^6} \left( -46410220370878 u_{ol+41} - (6008359548230144 + 2616203688199808 \text{ I}) u_{ol-1+31} + 39149869686409216 u_{ol+31} + (-6008359548230144 + 2616203688199808 \text{ I}) u_{ol+1+31} - (8946186536228760 + 117353145677040 \text{ I}) u_{ol-2+21} - (630613784590433280 + 188401072825405440 \text{ I}) u_{ol-1+21} \right. \\ \left. - 2895507486467799840 u_{ol+21} + (-630613784590433280 + 188401072825405440 \text{ I}) u_{ol+1+21} + (-8946186536228760 + 117353145677040 \text{ I}) u_{ol+2+21} - (174772723600832 + 116106574342976 \text{ I}) u_{ol-3+1} + (27650841802859520 + 55557893666903040 \text{ I}) u_{ol-2+1} - (1691013708344600640 + 1557927897440241600 \text{ I}) u_{ol-1+1} \right. \\ \left. + 7991710451586068480 u_{ol+1} + (-1691013708344600640 + 1557927897440241600 \text{ I}) u_{ol+1+1} + (27650841802859520 - 55557893666903040 \text{ I}) u_{ol+2+1} + (-174772723600832 + 116106574342976 \text{ I}) u_{ol+3+1} + (154193953329 + 71841702205 \text{ I}) u_{ol-4} + (43693546070528 + 49159546903040 \text{ I}) u_{ol-3} + (6866859540447760 \right. \\ \left. - 353768588515440 \text{ I}) u_{ol-2} - (4121138018117120 + 162730752945313280 \text{ I}) u_{ol-1} - 522673623228547700 u_{ol} + (-4121138018117120 + 162730752945313280 \text{ I}) u_{ol+1} + (6866859540447760 + 353768588515440 \text{ I}) u_{ol+2} + (43693546070528 - 49159546903040 \text{ I}) u_{ol+3} + (154193953329 - 71841702205 \text{ I}) u_{ol+4} \right), \quad \mathcal{O}(\mathcal{A}_{ol}^{19})$$

Formula:, 717, Var.: 1

Variavel :,  $x_o$  , Derivada de Ordem :, 7

Error order:, 18, Error:,  $2.2857364755600391678 \times 10^{-46}$ , New Error:,  $2.2911496517131613736 \times 10^{-64}$

Error order:, 18, Error:,  $2.2911496517131613736 \times 10^{-64}$ , New Error:,  $2.2916767841159487068 \times 10^{-82}$

Error order:, 18, Error:,  $2.2916767841159487068 \times 10^{-82}$ , New Error:,  $2.2917293553986597893 \times 10^{-100}$

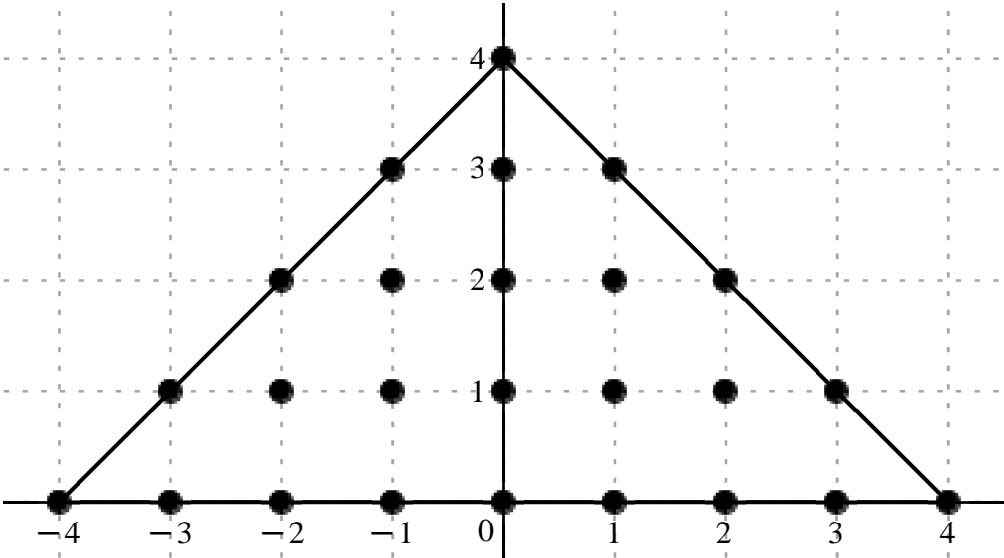
Error order:, 18, Error:,  $2.2917293553986597893 \times 10^{-100}$ , New Error:,  $2.2917346111072510178 \times 10^{-118}$

Error order:, 18, Error:,  $2.2917346111072510178 \times 10^{-118}$ , New Error:,  $2.2917351366639132378 \times 10^{-136}$

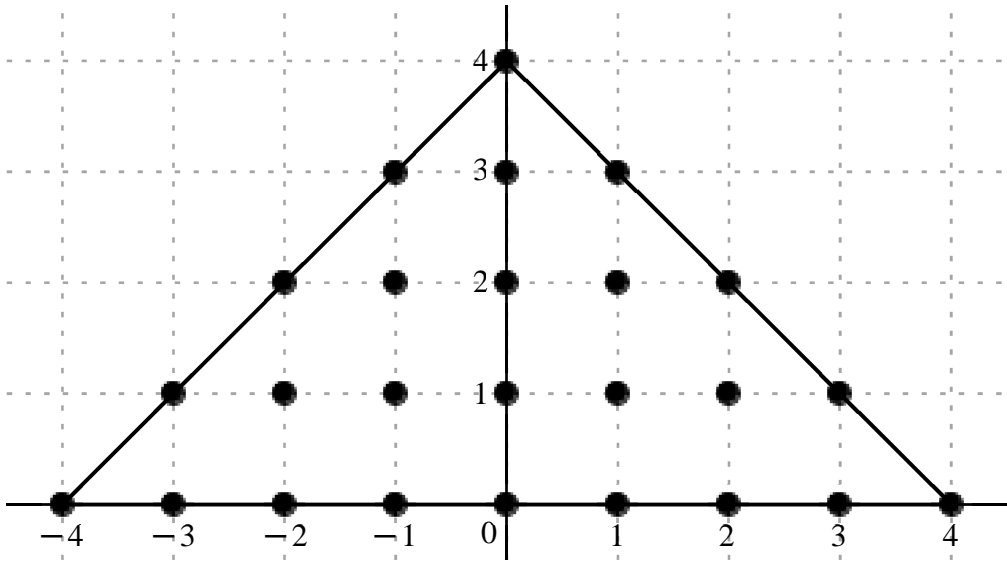
$$x_o+h., \left[ \begin{array}{cccccccc} & & & & & & & 4 \text{ I} \\ & & & & & & -1+3 \text{ I} & 3 \text{ I} & 1+3 \text{ I} \\ & & & & -2+2 \text{ I} & -1+2 \text{ I} & 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} \\ & & -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = ,$$

$$\begin{aligned} & -\frac{740670017}{13391040000} + \frac{4897160849 \text{ I}}{45529536000} - \frac{209890427381}{5780116875} + \frac{33622165969 \text{ I}}{1156023375} - \frac{518359796598}{13287625} + \frac{228906507774 \text{ I}}{13287625} - \frac{238829574081}{221000} + \frac{240594095049 \text{ I}}{221000} - \frac{11129699784 \text{ I}}{2125} - \frac{238829574081}{221000} - \frac{240594095049 \text{ I}}{221000} + \frac{518359796598}{13287625} + \frac{228906507774 \text{ I}}{13287625} - \frac{45746756433}{531505000} - \frac{63159443781 \text{ I}}{531505000} \\ & -\frac{6449485119}{25636000} - \frac{63137687403 \text{ I}}{10254400} - \frac{108866589636}{801125} - \frac{341506305462 \text{ I}}{801125} - \frac{25429276467 \text{ I}}{13000} - \frac{108866589636}{801125} - \frac{341506305462 \text{ I}}{801125} - \frac{6449485119}{25636000} - \frac{63137687403 \text{ I}}{10254400} \\ & -\frac{1135647009 \text{ I}}{35360000} - \frac{6617913421}{3591250} - \frac{88626515593 \text{ I}}{21547500} - \frac{8508661588 \text{ I}}{316875} - \frac{6617913421}{3591250} - \frac{88626515593 \text{ I}}{21547500} \\ & -\frac{209890427381}{5780116875} + \frac{33622165969 \text{ I}}{1156023375} - \frac{518359796598}{13287625} + \frac{228906507774 \text{ I}}{13287625} - \frac{238829574081}{221000} + \frac{240594095049 \text{ I}}{221000} - \frac{11129699784 \text{ I}}{2125} - \frac{238829574081}{221000} - \frac{240594095049 \text{ I}}{221000} + \frac{518359796598}{13287625} + \frac{228906507774 \text{ I}}{13287625} \\ & -\frac{924745801}{8619000} + \frac{82596403463 \text{ I}}{17238000} - \frac{223288849}{2125} + \frac{48977593 \text{ I}}{6375} - \frac{3043404217 \text{ I}}{9600} - \frac{223288849}{2125} + \frac{48977593 \text{ I}}{6375} - \frac{924745801}{8619000} + \frac{82596403463 \text{ I}}{17238000} \\ & -\frac{6449485119}{25636000} - \frac{63137687403 \text{ I}}{10254400} - \frac{108866589636}{801125} - \frac{341506305462 \text{ I}}{801125} - \frac{25429276467 \text{ I}}{13000} - \frac{108866589636}{801125} - \frac{341506305462 \text{ I}}{801125} - \frac{6449485119}{25636000} - \frac{63137687403 \text{ I}}{10254400} \\ & -\frac{1135647009 \text{ I}}{35360000} - \frac{6617913421}{3591250} - \frac{88626515593 \text{ I}}{21547500} - \frac{8508661588 \text{ I}}{316875} - \frac{6617913421}{3591250} - \frac{88626515593 \text{ I}}{21547500} \end{aligned}$$







$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{739854960000 \, \Delta x_{ol}^8} \, (164738806729042 \, u_{ol+4\mathrm{I}} + (20865422678939776 + 9612146227794432 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} - 136513149336324096 \, u_{ol+3\mathrm{I}} + (20865422678939776 - 9612146227794432 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (31359147678396720 + 2151055583487720 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (2135212076199121920 + 722534907195279360 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}}$$

$$+ 9799622167509851040 \, u_{ol+2\mathrm{I}} + (2135212076199121920 - 722534907195279360 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (31359147678396720 - 2151055583487720 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (595875822393152 + 470730184291136 \, \mathrm{I}) \, u_{ol-3+\mathrm{I}} - (78395112310072320 + 202021066456151040 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} + (5195007537447873600 + 5525465697675443520 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}}$$

$$- 25512738307937054720 \, u_{ol+1} + (5195007537447873600 - 5525465697675443520 \, \mathrm{I}) \, u_{ol+1+1} + (-78395112310072320 + 202021066456151040 \, \mathrm{I}) \, u_{ol+2+1} + (595875822393152 - 470730184291136 \, \mathrm{I}) \, u_{ol+3+1} - (554010058459 + 314588728675 \, \mathrm{I}) \, u_{ol-4} - (141685543997952 + 197992901706240 \, \mathrm{I}) \, u_{ol-3} - (24500831990560240$$

$$+ 2424088737100240 \, \mathrm{I}) \, u_{ol-2} + (-78543239557153280 + 497918278530516480 \, \mathrm{I}) \, u_{ol-1} + 1446547278127032900 \, u_{ol} - (78543239557153280 + 497918278530516480 \, \mathrm{I}) \, u_{ol+1} + (-24500831990560240 + 2424088737100240 \, \mathrm{I}) \, u_{ol+2} + (-141685543997952 + 197992901706240 \, \mathrm{I}) \, u_{ol+3} + (-554010058459$$

$$+ 314588728675 \, \mathrm{I}) \, u_{ol+4}), \, O(\, \Delta x_{ol}^{17} \, )$$

Formula.: 719, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 9

Error order.: 16, Error.: 9.4108651465372639135 × 10<sup>-41</sup>, New Error.: 9.4328731008695538044 × 10<sup>-57</sup>

Error order.: 16, Error.: 9.4328731008695538044 × 10<sup>-57</sup>, New Error.: 9.4350169107998162196 × 10<sup>-73</sup>

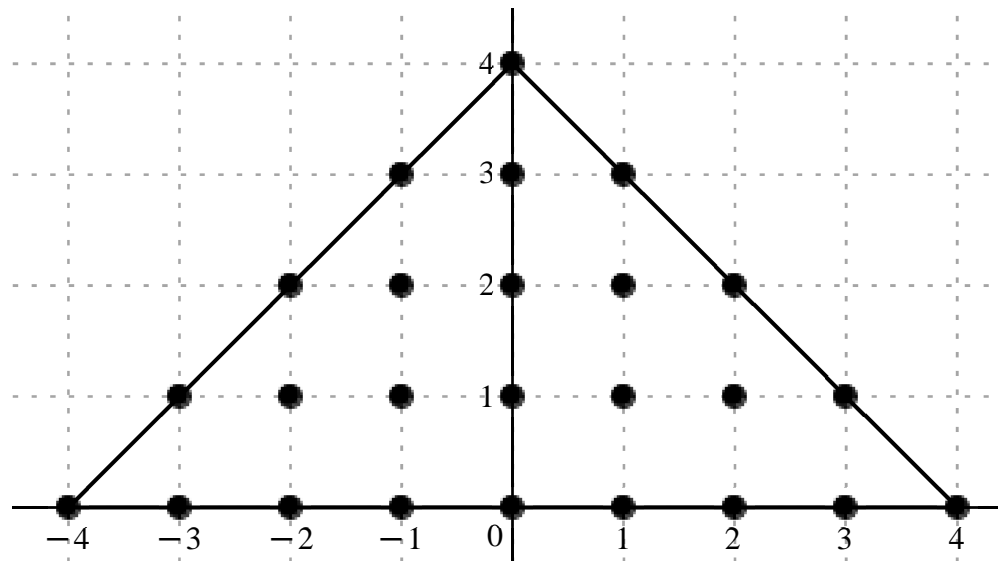
Error order.: 16, Error.: 9.4350169107998162196 × 10<sup>-73</sup>, New Error.: 9.4352307215195262350 × 10<sup>-89</sup>

Error order.: 16, Error.: 9.4352307215195262350 × 10<sup>-89</sup>, New Error.: 9.4352520968883506458 × 10<sup>-105</sup>

Error order.: 16, Error.: 9.4352520968883506458 × 10<sup>-105</sup>, New Error.: 9.4352542343682012080 × 10<sup>-121</sup>

$$x_o + h., \left[ \begin{array}{cccccccc} & & & & 4 \, \mathrm{I} & & & \\ & & & & -1+3 \, \mathrm{I} & 3 \, \mathrm{I} & 1+3 \, \mathrm{I} & \\ & & & -2+2 \, \mathrm{I} & -1+2 \, \mathrm{I} & 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} \\ & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

c =,	$\frac{387288573 \text{ I}}{260000}$													
	$-\frac{9326756103}{105625} + \frac{39409410033 \text{ I}}{211250} - \frac{129229294488 \text{ I}}{105625} + \frac{9326756103}{105625} + \frac{39409410033 \text{ I}}{211250}$													
	$-\frac{163163511}{6032} + \frac{211951653669 \text{ I}}{754000} - \frac{317610966456}{47125} + \frac{888277113612 \text{ I}}{47125} - \frac{562790075463 \text{ I}}{6500} + \frac{317610966456}{47125} + \frac{888277113612 \text{ I}}{47125} - \frac{163163511}{6032} + \frac{211951653669 \text{ I}}{754000}$													
	$-\frac{70586537091}{15632500} + \frac{81885013287 \text{ I}}{15632500} - \frac{143433509532}{781625} - \frac{483689095596 \text{ I}}{781625} - \frac{322305742899}{6500} + \frac{284172528339 \text{ I}}{6500} - \frac{27452130384 \text{ I}}{125} + \frac{322305742899}{6500} + \frac{284172528339 \text{ I}}{6500} - \frac{143433509532}{781625} - \frac{483689095596 \text{ I}}{781625} - \frac{70586537091}{15632500} + \frac{81885013287 \text{ I}}{15632500}$													
	$\frac{1753350159}{557960000} - \frac{111731289 \text{ I}}{22318400}$	$\frac{214560644262}{113335625} - \frac{27149081502 \text{ I}}{22667125}$	$\frac{6552822297}{169000} - \frac{36841826553 \text{ I}}{169000}$	$-\frac{6728154258}{1625} - \frac{1561794822 \text{ I}}{1625}$	$\frac{294298662 \text{ I}}{25}$	$\frac{6728154258}{1625} - \frac{1561794822 \text{ I}}{1625}$	$-\frac{6552822297}{169000} - \frac{36841826553 \text{ I}}{169000}$	$-\frac{214560644262}{113335625} - \frac{27149081502 \text{ I}}{22667125}$	$-\frac{1753350159}{557960000} - \frac{111731289 \text{ I}}{22318400}$					



$$\frac{d^9}{dx_{ol}^9} u(x_{ol}) = \frac{1}{7253480000 \mathcal{A}_{ol}^9} \left( 3 \left( 3601525536518 I_{u_{ol+41}} + (-213495665035072 + 451053834297696 I) u_{ol-1+31} - 2958144703693312 I u_{ol+31} + (213495665035072 + 451053834297696 I) u_{ol+1+31} + (-65401373992500 + 679658302765260 I) u_{ol-2+21} + (-16295559985635840 + 45574537775719680 I) u_{ol-1+21} \right. \right. \\ \left. \left. + 209342900336890320 I u_{ol+21} + (16295559985635840 + 45574537775719680 I) u_{ol+1+21} + (65401373992500 + 679658302765260 I) u_{ol+2+21} + (-10917384403408 + 12664882055056 I) u_{ol-3+1} + (4436871656152320 - 1496211602376960 I) u_{ol-2+1} + (-119889141538617360 + 105704602608018960 I) u_{ol-1+1} \right. \right. \\ \left. \left. - 530995943193963520 I u_{ol+1} + (119889141538617360 + 105704602608018960 I) u_{ol+1+1} - (4436871656152320 + 1496211602376960 I) u_{ol+2+1} + (10917384403408 + 12664882055056 I) u_{ol+3+1} + (7597850689 - 12104222975 I) u_{ol-4} + (4577293744256 - 2895902026880 I) u_{ol-3} + (93749044329080 \right. \right. \\ \left. \left. - 527083731884920 I) u_{ol-2} - (10010775866116480 + 2323784103688320 I) u_{ol-1} + 28462526117916800 I u_{ol} + (10010775866116480 - 2323784103688320 I) u_{ol+1} - (93749044329080 + 527083731884920 I) u_{ol+2} - (4577293744256 + 2895902026880 I) u_{ol+3} - (7597850689 + 12104222975 I) u_{ol+4} \right) \right), O(\mathcal{A}_{ol}^{16})$$

Formula:, 720, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

*Error order:*, 15, *Error:*,  $5.7235376200830452423 \times 10^{-38}$ , *New Error:*,  $5.7368274887464156044 \times 10^{-53}$

*Error order*:, 15, *Error*:,  $5.7368274887464156044 \times 10^{-53}$ , *New Error*:,  $5.7381222922429394994 \times 10^{-68}$





Variavel :,  $x_{oi}$ , Derivada de Ordem :, 11

*Error order:*, 14, *Error:*,  $3.3481069277714454438 \times 10^{-35}$ , *New Error:*,  $3.3558207812084453422 \times 10^{-49}$

*Error order*:, 14, *Error*:,  $3.3558207812084453422 \times 10^{-49}$ , *New Error*:,  $3.3565724676173419130 \times 10^{-63}$

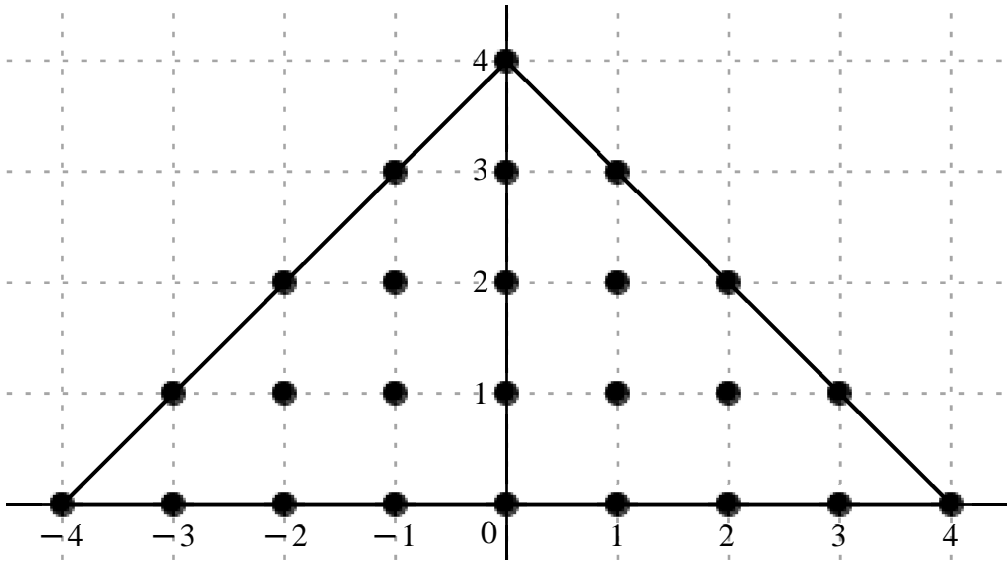
*Error order:*, 14, *Error:*,  $3.3565724676173419130 \times 10^{-63}$ , *New Error:*,  $3.3566474391263255065 \times 10^{-77}$

*Error order:*, 14, *Error:*,  $3.3566474391263255065 \times 10^{-77}$ , *New Error:*,  $3.3566549343057638818 \times 10^{-91}$

*Error order:*, 14, *Error:*,  $3.3566549343057638818 \times 10^{-91}$ , *New Error:*,  $3.3566556838039929787 \times 10^{-105}$

$$x_o + h, \begin{bmatrix} & & & & 4\text{ I} & & & & \\ & & & & -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & & & \\ & & & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & & \\ & & -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 & \end{bmatrix}$$

												$-\frac{474455289\text{ I}}{8000}$																								
												$\frac{76472484396}{21125}$	$-\frac{153309823128\text{ I}}{21125}$	$\frac{1011008243784\text{ I}}{21125}$	$-\frac{76472484396}{21125}$	$-\frac{153309823128\text{ I}}{21125}$																				
												$\frac{125047427967}{75400}$	$-\frac{66047012955\text{ I}}{6032}$	$\frac{2660687335152}{9425}$	$-\frac{6737430676284\text{ I}}{9425}$	$-\frac{2141758363437\text{ I}}{650}$	$-\frac{2660687335152}{9425}$	$-\frac{6737430676284\text{ I}}{9425}$	$-\frac{125047427967}{75400}$	$-\frac{66047012955\text{ I}}{6032}$																
												$\frac{155726332377}{781625}$	$-\frac{151243529514\text{ I}}{781625}$	$-\frac{1137313333716}{156325}$	$+\frac{2759776558308\text{ I}}{156325}$	$\frac{625895446869}{325}$	$-\frac{490678332606\text{ I}}{325}$	$\frac{199285263408\text{ I}}{25}$	$-\frac{625895446869}{325}$	$-\frac{490678332606\text{ I}}{325}$	$\frac{1137313333716}{156325}$	$+\frac{2759776558308\text{ I}}{156325}$	$-\frac{155726332377}{781625}$	$-\frac{151243529514\text{ I}}{781625}$												
$-\frac{33665658279}{223184000}$	$+\frac{8724288903\text{ I}}{44636800}$	$-\frac{1874506022994}{22667125}$	$+\frac{35481152586\text{ I}}{906685}$	$-\frac{11625604683}{4225}$	$+\frac{136556729463\text{ I}}{16900}$	$\frac{45146444574}{325}$	$+\frac{16223214546\text{ I}}{325}$	$-\frac{62324227119\text{ I}}{160}$	$-\frac{45146444574}{325}$	$+\frac{16223214546\text{ I}}{325}$	$\frac{11625604683}{4225}$	$+\frac{136556729463\text{ I}}{16900}$	$\frac{1874506022994}{22667125}$	$+\frac{35481152586\text{ I}}{906685}$	$\frac{33665658279}{223184000}$	$+$	$8\text{ I}$																			



$$\frac{\mathrm{d}^{11}}{\mathrm{d}x_{ol}^{11}}\;u(x_{ol})=\frac{1}{2901392000\;\Delta x_{ol}^{11}}\Big(33\left(-5214321135842\;\mathrm{I}\,u_{ol+4\mathrm{I}}+(318273845360128-638066192354304\;\mathrm{I})\,u_{ol-1+3\mathrm{I}}+4207755037402112\;\mathrm{I}\,u_{ol+3\mathrm{I}}-(318273845360128+638066192354304\;\mathrm{I})\,u_{ol+1+3\mathrm{I}}+(145812879641520-962685249435000\;\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(24820181492520960-62850019981432320\;\mathrm{I})\,u_{ol-1+2\mathrm{I}}\right.\\
\left.-289700726415347520\;\mathrm{I}\,u_{ol+2\mathrm{I}}-(24820181492520960+62850019981432320\;\mathrm{I})\,u_{ol+1+2\mathrm{I}}-(145812879641520+962685249435000\;\mathrm{I})\,u_{ol+2+2\mathrm{I}}+(17516852902528-17012605501696\;\mathrm{I})\,u_{ol-3+1\mathrm{I}}+(-6396525899205120+1552165240066560\;\mathrm{I})\,u_{ol-2+1\mathrm{I}}+(169321029592740480-132741276344651520\;\mathrm{I})\,u_{ol-1+1\mathrm{I}}\right.\\
\left.+700854144205895680\;\mathrm{I}\,u_{ol+1\mathrm{I}}-(169321029592740480+132741276344651520\;\mathrm{I})\,u_{ol+1+1\mathrm{I}}+(6396525899205120+1552165240066560\;\mathrm{I})\,u_{ol+2+1\mathrm{I}}-(17516852902528+17012605501696\;\mathrm{I})\,u_{ol+3+1\mathrm{I}}+(-13262229019+17184205415\;\mathrm{I})\,u_{ol-4\mathrm{I}}+(-7270811240704+3440596614400\;\mathrm{I})\,u_{ol-3\mathrm{I}}+(-241925310542720\right.\\
\left.+710426039824480\;\mathrm{I})\,u_{ol-2\mathrm{I}}+(12213289800974080+4388802321496320\;\mathrm{I})\,u_{ol-1\mathrm{I}}-34247540524479100\;\mathrm{I}\,u_{ol\mathrm{I}}+(-12213289800974080+4388802321496320\;\mathrm{I})\,u_{ol+1\mathrm{I}}+(241925310542720+710426039824480\;\mathrm{I})\,u_{ol+2\mathrm{I}}+(7270811240704+3440596614400\;\mathrm{I})\,u_{ol+3\mathrm{I}}+(13262229019+17184205415\;\mathrm{I})\,u_{ol+4\mathrm{I}}\Big)\Big),\;O(\;\Delta x_{ol}^{14}\;)$$

Formula:, 722, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

Error order:., 13, Error:., 1.8783093970720186472 × 10<sup>−32</sup>, New Error:., 1.8825998886832500313 × 10<sup>−45</sup>

Error order:., 13, Error:., 1.8825998886832500313 × 10<sup>−45</sup>, New Error:., 1.8830180665552005334 × 10<sup>−58</sup>

Error order:., 13, Error:., 1.8830180665552005334 × 10<sup>−58</sup>, New Error:., 1.8830597755514439977 × 10<sup>−71</sup>

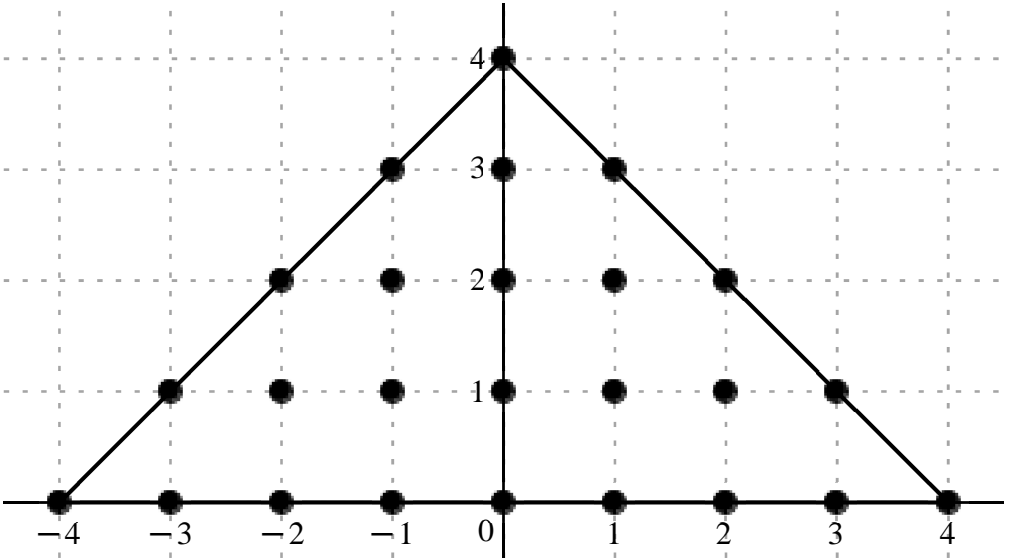
Error order:., 13, Error:., 1.8830597755514439977 × 10<sup>−71</sup>, New Error:., 1.8830639453630816572 × 10<sup>−84</sup>

Error order:., 13, Error:., 1.8830639453630816572 × 10<sup>−84</sup>, New Error:., 1.8830643623333654792 × 10<sup>−97</sup>

$$x_o\neq h\;,\;\left[\begin{array}{cccccccc} & & & & 4\;\mathrm{I} & & & \\ & & & & -1+3\;\mathrm{I} & 3\;\mathrm{I} & 1+3\;\mathrm{I} & \\ & & & & -2+2\;\mathrm{I} & -1+2\;\mathrm{I} & 2\;\mathrm{I} & 1+2\;\mathrm{I} & 2+2\;\mathrm{I} \\ & & & & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array}\right]$$

c=,

$$\begin{aligned}
& -\frac{126261400419}{111592000} - \frac{21728027871 \text{ I}}{22318400} - \frac{852659956071}{781625} + \frac{962516723553 \text{ I}}{781625} - \frac{13222620224352}{156325} - \frac{66723605825184 \text{ I}}{156325} - \frac{765832824603}{16900} - \frac{324412690833 \text{ I}}{16900} - \frac{540836671221}{65} + \frac{3643046487927 \text{ I}}{325} - \frac{1128062605824}{25} - \frac{169648390989}{80} - \frac{101821614048}{325} - \frac{245257146288 \text{ I}}{325} \\
& \frac{2409736931217}{37700} + \frac{66484729773 \text{ I}}{5800} - \frac{38879344305648}{9425} + \frac{1236052551888 \text{ I}}{725} - \frac{12390761802573}{650} - \frac{38879344305648}{9425} - \frac{1236052551888 \text{ I}}{725} - \frac{2409736931217}{37700} - \frac{66484729773 \text{ I}}{5800} - \frac{13222620224352}{156325} + \frac{66723605825184 \text{ I}}{156325} - \frac{852659956071}{781625} - \frac{962516723553 \text{ I}}{781625} - \frac{13222620224352}{156325} + \frac{66723605825184 \text{ I}}{156325} - \frac{765832824603}{16900} + \frac{324412690833 \text{ I}}{16900} - \frac{540836671221}{65} - \frac{3643046487927 \text{ I}}{325} - \frac{1128062605824}{25} - \frac{169648390989}{80} - \frac{101821614048}{325} - \frac{245257146288 \text{ I}}{325} \\
& \frac{896092678404}{21125} + \frac{458590494978 \text{ I}}{21125} - \frac{5927843363904}{21125} - \frac{896092678404}{21125} - \frac{458590494978 \text{ I}}{21125} - \frac{18244104417}{52000}
\end{aligned}$$



$$\begin{aligned}
\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}} \, u(x_{ol}) = & \frac{1}{1450696000 \, \mathcal{A}x_{ol}^{12}} \Big( 99 \, (5141151767934 \, u_{ol+41} + (621580569811712 + 318104307789184 \, \text{I}) \, u_{ol-1+31} - 4111887469555712 \, u_{ol+31} + (621580569811712 - 318104307789184 \, \text{I}) \, u_{ol+1+31} + (936633102153840 + 167971319301240 \, \text{I}) \, u_{ol-2+21} + (60447562379043840 + 24982744588139520 \, \text{I}) \, u_{ol-1+21} \\
& + 279335331529843680 \, u_{ol+21} + (60447562379043840 - 24982744588139520 \, \text{I}) \, u_{ol+1+21} + (936633102153840 - 167971319301240 \, \text{I}) \, u_{ol+2+21} + (15985220994624 + 18044757968832 \, \text{I}) \, u_{ol-3+1} - (1239453693757440 + 6254495576340480 \, \text{I}) \, u_{ol-2+1} + (121925345080593600 + 164256502497272640 \, \text{I}) \, u_{ol-1+1} \\
& - 661202387886243840 \, u_{ol+1} + (121925345080593600 - 164256502497272640 \, \text{I}) \, u_{ol+1+1} + (-1239453693757440 + 6254495576340480 \, \text{I}) \, u_{ol+2+1} + (15985220994624 - 18044757968832 \, \text{I}) \, u_{ol+3+1} - (16579779853 + 14265876885 \, \text{I}) \, u_{ol-4} - (2940014500864 + 7426526095360 \, \text{I}) \, u_{ol-3} - (664031208726480 \\
& + 281288741223280 \, \text{I}) \, u_{ol-2} + (-4590900022159360 + 11058074936796160 \, \text{I}) \, u_{ol-1} + 31074273006840700 \, u_{ol} - (4590900022159360 + 11058074936796160 \, \text{I}) \, u_{ol+1} + (-664031208726480 + 281288741223280 \, \text{I}) \, u_{ol+2} + (-2940014500864 + 7426526095360 \, \text{I}) \, u_{ol+3} + (-16579779853 + 14265876885 \, \text{I}) \, u_{ol+4} \Big) \Big), \, O(\, \mathcal{A}x_{ol}^{13} \, )
\end{aligned}$$

Formula.: 723, Var.: 1

Variavel :, x\_{ol}, Derivada de Ordem :, 13

Error order.: 12, Error.: 1.0070935433929837240 × 10−29, New Error.: 1.0093720692983151725 × 10−41

Error order.: 12, Error.: 1.0093720692983151725 × 10−41, New Error.: 1.0095941978520666529 × 10−53



Formula:, 724, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:, 11, Error:,  $5.1398077478317406845 \times 10^{-27}$ , New Error:,  $5.1513118542581383345 \times 10^{-38}$

*Error order:*, 11, *Error:*,  $5.1513118542581383345 \times 10^{-38}$ , *New Error:*,  $5.1524336376320803999 \times 10^{-49}$

*Error order*., 11, *Error*.,  $5.1524336376320803999 \times 10^{-49}$ , *New Error*.,  $5.1525455294948186277 \times 10^{-60}$

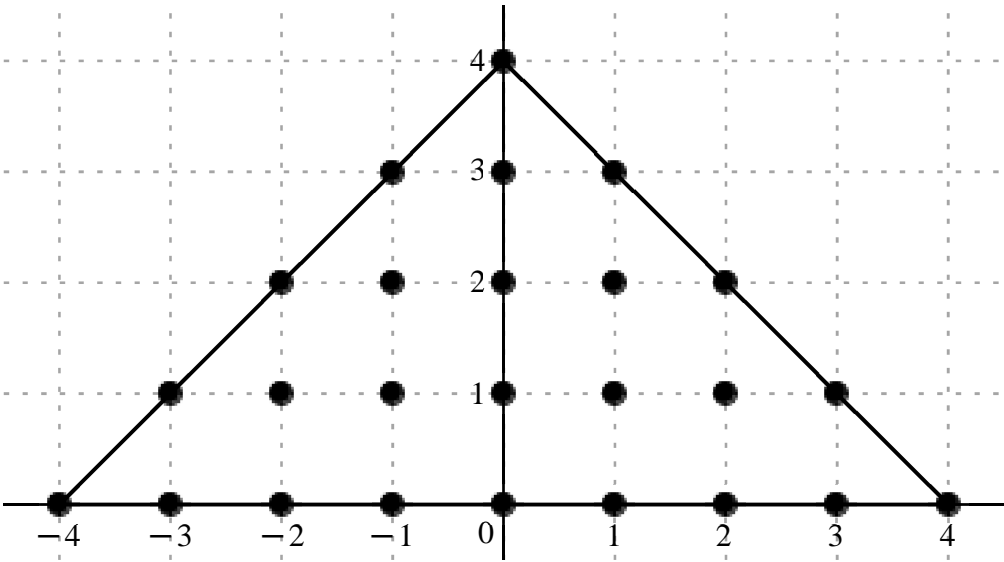
*Error order:*, 11, *Error:*,  $5.1525455294948186277 \times 10^{-60}$ , *New Error:*,  $5.1525567158161461871 \times 10^{-71}$

*Error order*., 11, *Error*.,  $5.1525567158161461871 \times 10^{-71}$ , *New Error*.,  $5.1525578344196292809 \times 10^{-82}$

$$x_o + h, \left[ \begin{array}{cccccccc} & & & & 4\text{ I} & & & \\ & & & & -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & \\ & & & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ & & -3+\text{ I} & -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} & 3+\text{ I} \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

$$c = ,$$

							$-\frac{42331635423}{4000}$										...
							$-\frac{2027187645021}{1625}$	$-\frac{1091599413597}{1625}$	$\frac{13505950380384}{1625}$	$-\frac{2027187645021}{1625}$	$+\frac{1091599413597}{1625}$						...
				$-\frac{5416944975981}{2900}$	$-\frac{2560362714063}{5800}$	$-\frac{85702908991392}{725}$	$-\frac{38564755414416}{725}$	$-\frac{27494098383213}{50}$	$-\frac{85702908991392}{725}$	$+\frac{38564755414416}{725}$	$-\frac{5416944975981}{2900}$	$+\frac{2560362714063}{5800}$					...
		$-\frac{1749621356406}{60125}$	$-\frac{2400851501433}{60125}$	$\frac{17062756592112}{12025}$	$+\frac{150507326947824}{12025}$	$-\frac{5441961233709}{25}$	$-\frac{1626521022126}{5}$	$\frac{31235533737408}{25}$	$-\frac{5441961233709}{25}$	$+\frac{1626521022126}{5}$	$\frac{17062756592112}{12025}$	$-\frac{150507326947824}{12025}$	$-\frac{1749621356406}{60125}$	$+\frac{2400851501433}{60125}$			...
$\frac{271090618029}{8584000}$	$+\frac{59130294993}{1716800}$	$\frac{6794723844216}{1743625}$	$+\frac{5570782293384}{348725}$	$\frac{1552374704727}{1300}$	$+\frac{922182507477}{1300}$	$\frac{248265292968}{25}$	$-\frac{481049647848}{25}$	$-\frac{4389411385359}{80}$	$\frac{248265292968}{25}$	$+\frac{481049647848}{25}$	$\frac{1552374704727}{1300}$	$-\frac{922182507477}{1300}$	$\frac{6794723844216}{1743625}$	$-\frac{5570782293384}{348725}$	$\frac{271090618029}{8}$		...



$$\frac{d^{14}}{dx_{ol}^{14}} u(x_{ol}) = \frac{1}{111592000 \Delta x_{ol}^{14}} \Big( 693 \Big( -1704138477678 u_{ol+4I} - (200881717112384 + 108170728615488 I) u_{ol-1+3I} + 1338355879540736 u_{ol+3I} + (-200881717112384 + 108170728615488 I) u_{ol+1+3I} - (300785054366160 + 71084240430840 I) u_{ol-2+2I} - (19035197333268480 + 8565493727831040 I) u_{ol-1+2I}$$
  
$$- 88546072922929440 u_{ol+2I} + (-19035197333268480 + 8565493727831040 I) u_{ol+1+2I} + (-300785054366160 + 71084240430840 I) u_{ol+2+2I} - (4685854599552 + 6429986127936 I) u_{ol-3+I} + (228488284523520 + 2015451650903040 I) u_{ol-2+I} - (35052198441099840 + 52382895786748800 I) u_{ol-1+I}$$
  
$$+ 201191092688302080 u_{ol+1} + (-35052198441099840 + 52382895786748800 I) u_{ol+1+I} + (228488284523520 - 2015451650903040 I) u_{ol+2+I} + (-4685854599552 + 6429986127936 I) u_{ol+3+I} + (5085393989 + 5546131565 I) u_{ol-4} + (627506963968 + 2572367004160 I) u_{ol-3} + (192288376123760 + 114228205543760 I) u_{ol-2}$$
  
$$+ (1599100754567680 - 3098487290196480 I) u_{ol-1} - 8835194720688700 u_{ol} + (1599100754567680 + 3098487290196480 I) u_{ol+1} + (192288376123760 - 114228205543760 I) u_{ol+2} + (627506963968 - 2572367004160 I) u_{ol+3} + (5085393989 - 5546131565 I) u_{ol+4} \Big) \Big), \quad O(\Delta x_{ol}^{11})$$

Formula:, 725, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 15

Error order:, 10, Error:,  $2.4849267496694900756 \times 10^{-24}$ , New Error:,  $2.4904207149043494784 \times 10^{-34}$

Error order:, 10, Error:,  $2.4904207149043494784 \times 10^{-34}$ , New Error:,  $2.49095658424922229635 \times 10^{-44}$

Error order:, 10, Error:,  $2.49095658424922229635 \times 10^{-44}$ , New Error:,  $2.4910100358174382156 \times 10^{-54}$

Error order:, 10, Error:,  $2.4910100358174382156 \times 10^{-54}$ , New Error:,  $2.4910153796205035850 \times 10^{-64}$

Error order:, 10, Error:,  $2.4910153796205035850 \times 10^{-64}$ , New Error:,  $2.4910159139872724670 \times 10^{-74}$

c = ,

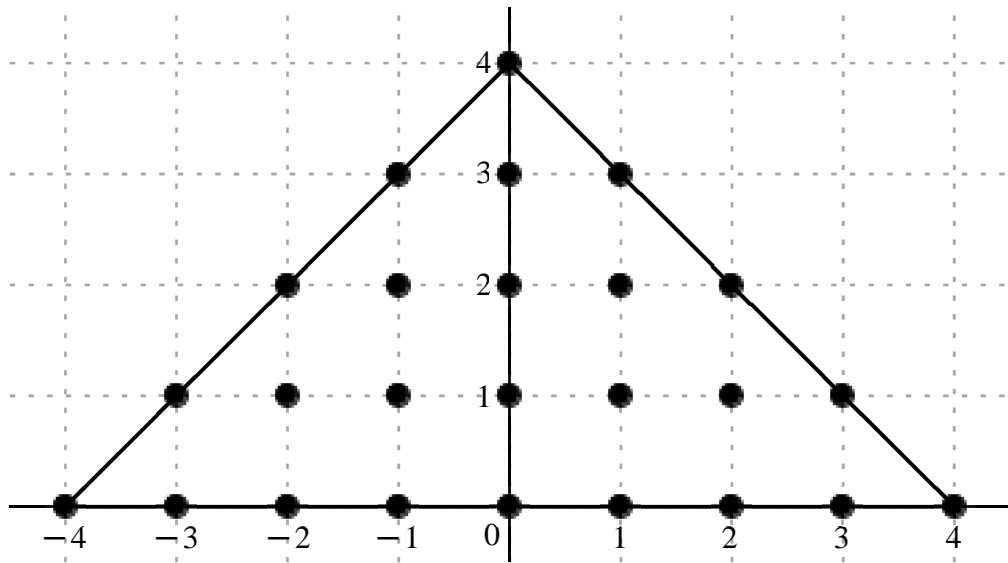
$$x_o + h \cdot , \left[ \begin{array}{cccccccc} & & & & 4 I & & & \\ & & & & -1 + 3 I & 3 I & 1 + 3 I & \\ & & & -2 + 2 I & -1 + 2 I & 2 I & 1 + 2 I & 2 + 2 I \\ & & -3 + I & -2 + I & -1 + I & I & 1 + I & 2 + I & 3 + I \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array} \right]$$





*Error order:*, 9, *Error:*,  $1.1342090885872623214 \times 10^{-57}$ , *New Error:*,  $1.1342093285476905481 \times 10^{-66}$

$$x_o \neq h. , \left[ \begin{array}{cccccccc} & & & & 4 \text{ I} & & & \\ & & & & -1+3 \text{ I} & 3 \text{ I} & 1+3 \text{ I} & \\ & & & -2+2 \text{ I} & -1+2 \text{ I} & 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} \\ & & -3+ \text{ I} & -2+ \text{ I} & -1+ \text{ I} & 1 & 1+ \text{ I} & 2+ \text{ I} & 3+ \text{ I} \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \end{array} \right]$$

[illegible]

$$\frac{1}{\mathfrak{d}\mathfrak{x}_{ol}^{16}} u_{ol}^{(16)} = \frac{1}{1394900 \mathfrak{d}\mathfrak{x}_{ol}^{16}} \left( 2079 \left( 169506880998 u_{ol+41} + (19435882293184 + 11019128279488 \text{ I}) u_{ol-1+31} - 130593132565504 u_{ol+31} + (19435882293184 - 11019128279488 \text{ I}) u_{ol+1+31} + (28761660935280 + 8524050869880 \text{ I}) u_{ol-2+21} + (1793000175482880 + 873925952739840 \text{ I}) u_{ol-1+21} + 8413088154176160 u_{ol+21} \right. \right. \\ + (1793000175482880 - 873925952739840 \text{ I}) u_{ol+1+21} + (28761660935280 - 8524050869880 \text{ I}) u_{ol+2+21} + (393650506368 + 673037529024 \text{ I}) u_{ol-3+1} - (6133570490880 + 191992703132160 \text{ I}) u_{ol-2+1} + (3013191895896000 + 4975464774833280 \text{ I}) u_{ol-1+1} - 18392283196385280 u_{ol+1} + (3013191895896000 \\ - 4975464774833280 \text{ I}) u_{ol+1+1} + (-6133570490880 + 191992703132160 \text{ I}) u_{ol+2+1} + (393650506368 - 673037529024 \text{ I}) u_{ol+3+1} - (436409961 + 630957665 \text{ I}) u_{ol-4} - (24017001728 + 256259214080 \text{ I}) u_{ol-3} - (16185986880560 + 12544948511760 \text{ I}) u_{ol-2} + (-158580105931520 + 261048701105920 \text{ I}) u_{ol-1} \\ \left. \left. + 761900371095500 u_{ol} - (158580105931520 + 261048701105920 \text{ I}) u_{ol+1} + (-16185986880560 + 12544948511760 \text{ I}) u_{ol+2} + (-24017001728 + 256259214080 \text{ I}) u_{ol+3} + (-436409961 + 630957665 \text{ I}) u_{ol+4} \right) \right), \quad O(\mathfrak{d}\mathfrak{x}_{ol}^9)$$

Formula:, 727, Var:, 1

*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 1

*Error order*., 24, *Error*.,  $1.1523262161989771938 \times 10^{-63}$ , *New Error*.,  $1.1496892406649450238 \times 10^{-87}$

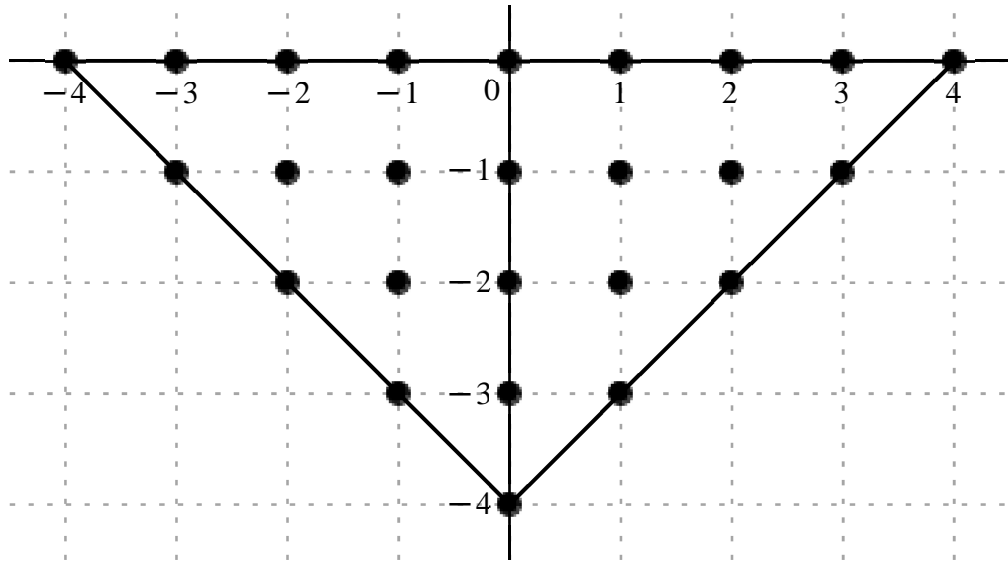
Error order:, 24, Error:,  $1.1496892406649450238 \times 10^{-87}$ , New Error:,  $1.1494179343967056977 \times 10^{-111}$

*Error order*., 24, *Error*.,  $1.1494179343967056977 \times 10^{-111}$ , *New Error*.,  $1.1493907277396640995 \times 10^{-135}$

*Error order:*, 24, *Error:*,  $1.1493907277396640995 \times 10^{-135}$ , *New Error:*,  $1.1493880063137154065 \times 10^{-159}$

*Error order*., 24, *Error*.,  $1.1493880063137154065 \times 10^{-159}$ , *New Error*.,  $1.1493877341635181496 \times 10^{-183}$

$$c =, \left[ \begin{array}{cccccccccccccccc} \frac{11}{132794480} + \frac{9 \text{ I}}{26558896} & \frac{24256}{323686545} + \frac{7360 \text{ I}}{64737309} & -\frac{18}{2873} + \frac{38 \text{ I}}{2873} & -\frac{64}{221} - \frac{64 \text{ I}}{221} & -\frac{67 \text{ I}}{12} & \frac{64}{221} - \frac{64 \text{ I}}{221} & \frac{18}{2873} + \frac{38 \text{ I}}{2873} & -\frac{24256}{323686545} + \frac{7360 \text{ I}}{64737309} & -\frac{11}{132794480} + \frac{9 \text{ I}}{26558896} & \\ & -\frac{88}{531505} - \frac{232 \text{ I}}{531505} & \frac{3456}{31265} + \frac{54144 \text{ I}}{531505} & -\frac{648}{221} - \frac{1368 \text{ I}}{221} & \frac{512 \text{ I}}{17} & \frac{648}{221} - \frac{1368 \text{ I}}{221} & -\frac{3456}{31265} + \frac{54144 \text{ I}}{531505} & \frac{88}{531505} - \frac{232 \text{ I}}{531505} & & \\ & & \frac{45}{12818} - \frac{279 \text{ I}}{12818} & -\frac{9216}{32045} - \frac{56448 \text{ I}}{32045} & -\frac{108 \text{ I}}{13} & \frac{9216}{32045} - \frac{56448 \text{ I}}{32045} & -\frac{45}{12818} - \frac{279 \text{ I}}{12818} & & & \\ & & & -\frac{16}{2873} - \frac{224 \text{ I}}{14365} & \frac{256 \text{ I}}{2535} & \frac{16}{2873} - \frac{224 \text{ I}}{14365} & & & & \\ & & & & -\frac{\text{I}}{8840} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{5178984720\,\Delta x_{ol}}\left((429+1755\,\mathrm{I})\,u_{ol-4}+(388096+588800\,\mathrm{I})\,u_{ol-3}+(-32447520+68500320\,\mathrm{I})\,u_{ol-2}-(1499796480+1499796480\,\mathrm{I})\,u_{ol-1}-28915998020\,\mathrm{I}\,u_{ol}+(1499796480-1499796480\,\mathrm{I})\,u_{ol+1}+(32447520+68500320\,\mathrm{I})\,u_{ol+2}+(-388096+588800\,\mathrm{I})\,u_{ol+3}+(-429+1755\,\mathrm{I})\,u_{ol+4}-(857472+2260608\,\mathrm{I})\,u_{ol+3-1}+(572479488+527579136\,\mathrm{I})\,u_{ol+2-1}-(15185439360+32058149760\,\mathrm{I})\,u_{ol+1-1}+155978833920\,\mathrm{I}\,u_{ol-1}+(15185439360-32058149760\,\mathrm{I})\,u_{ol+1-1}+(-572479488+527579136\,\mathrm{I})\,u_{ol+2-1}+(857472-2260608\,\mathrm{I})\,u_{ol+3-1}+(18181800-112727160\,\mathrm{I})\,u_{ol-2-21}-(1489453056+9122899968\,\mathrm{I})\,u_{ol-1-21}-43025411520\,\mathrm{I}\,u_{ol-21}+(1489453056-9122899968\,\mathrm{I})\,u_{ol+1-21}-(18181800+112727160\,\mathrm{I})\,u_{ol+2-21}-(28842240+80758272\,\mathrm{I})\,u_{ol-1-31}+523005952\,\mathrm{I}\,u_{ol-31}+(28842240-80758272\,\mathrm{I})\,u_{ol+1-31}-585858\,\mathrm{I}\,u_{ol-41}\right),\,\,O(\,\,\Delta x_{ol}^{\,24}\,\,)$$

Formula:, 728, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 2

Error order:, 23, Error:, 1.1697684487908505713 × 10<sup>-60</sup>, New Error:, 1.1671069526476779656 × 10<sup>-83</sup>

Error order:, 23, Error:, 1.1671069526476779656 × 10<sup>-83</sup>, New Error:, 1.1668331744854364908 × 10<sup>-106</sup>

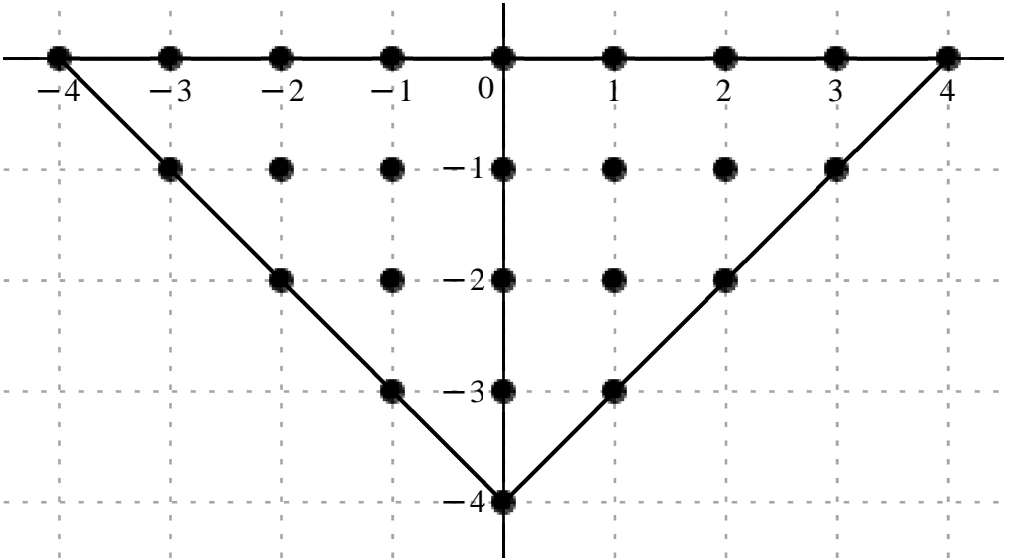
Error order:, 23, Error:, 1.1668331744854364908 × 10<sup>-106</sup>, New Error:, 1.1668057204404230502 × 10<sup>-129</sup>

Error order:, 23, Error:, 1.1668057204404230502 × 10<sup>-129</sup>, New Error:, 1.1668029742736912078 × 10<sup>-152</sup>

Error order:, 23, Error:, 1.1668029742736912078 × 10<sup>-152</sup>, New Error:, 1.1668026996493957761 × 10<sup>-175</sup>

$$x_o\,+h\,.,\left[\begin{array}{cccccccc} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3\,-\mathrm{I} & -2\,-\mathrm{I} & -1\,-\mathrm{I} & -\mathrm{I} & 1\,-\mathrm{I} & 2\,-\mathrm{I} & 3\,-\mathrm{I} & \\ & & -2\,-2\,\mathrm{I} & -1\,-2\,\mathrm{I} & -2\,\mathrm{I} & 1\,-2\,\mathrm{I} & 2\,-2\,\mathrm{I} & & \\ & & & -1\,-3\,\mathrm{I} & -3\,\mathrm{I} & 1\,-3\,\mathrm{I} & & & \\ & & & & -4\,\mathrm{I} & & & & \end{array}\right]$$

$$c = , \left[ \begin{array}{cccccccccccc} \frac{71}{18970640} - \frac{109 \text{ I}}{99595860} & \frac{9952}{8160165} - \frac{5792 \text{ I}}{6346795} & \frac{1327}{8619} + \frac{163 \text{ I}}{2873} & -\frac{1760}{663} + \frac{2528 \text{ I}}{663} & -\frac{2347}{72} & -\frac{1760}{663} - \frac{2528 \text{ I}}{663} & \frac{1327}{8619} - \frac{163 \text{ I}}{2873} & \frac{9952}{8160165} + \frac{5792 \text{ I}}{6346795} & \frac{71}{18970640} + \frac{109 \text{ I}}{99595860} \\ & -\frac{37372}{7972575} + \frac{16564 \text{ I}}{7972575} & \frac{157632}{156325} - \frac{3379392 \text{ I}}{2657525} & -60 + 36 \text{ I} & \frac{14080}{51} & -60 - 36 \text{ I} & \frac{157632}{156325} + \frac{3379392 \text{ I}}{2657525} & -\frac{37372}{7972575} - \frac{16564 \text{ I}}{7972575} & \\ & & -\frac{5997}{25636} - \frac{681 \text{ I}}{25636} & -\frac{2907456}{160225} + \frac{590592 \text{ I}}{160225} & -\frac{1098}{13} & -\frac{2907456}{160225} - \frac{590592 \text{ I}}{160225} & -\frac{5997}{25636} + \frac{681 \text{ I}}{25636} & \\ & & & -\frac{35264}{215475} + \frac{13352 \text{ I}}{215475} & \frac{896}{845} & -\frac{35264}{215475} - \frac{13352 \text{ I}}{215475} & \\ & & & & -\frac{4}{3315} & \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \, u(x_{ol}) = \frac{1}{77684770800 \, \Delta x_{ol}^2} \, \big( (290745 - 85020 \, \text{I}) \, u_{ol-4} + (94743040 - 70894080 \, \text{I}) \, u_{ol-3} + (11960516400 + 4407454800 \, \text{I}) \, u_{ol-2} + (-206222016000 + 296209804800 \, \text{I}) \, u_{ol-1} - 2532307737050 \, u_{ol} - (206222016000 + 296209804800 \, \text{I}) \, u_{ol+1} + (11960516400 - 4407454800 \, \text{I}) \, u_{ol+2} + (94743040 + 70894080 \, \text{I}) \, u_{ol+3} + (290745 + 85020 \, \text{I}) \, u_{ol+4} + (-364152768 + 161399616 \, \text{I}) \, u_{ol-3-1} + (78334276608 - 98786386944 \, \text{I}) \, u_{ol-2-1} + (-4661086248000 + 2796651748800 \, \text{I}) \, u_{ol-1-1} + 21447089664000 \, u_{ol-1} - (4661086248000 + 2796651748800 \, \text{I}) \, u_{ol+1-1} + (78334276608 + 98786386944 \, \text{I}) \, u_{ol+2-1} - (364152768 + 161399616 \, \text{I}) \, u_{ol+3-1} - (18172709100 + 2063634300 \, \text{I}) \, u_{ol-2-21} + (-1409674226688 + 286347350016 \, \text{I}) \, u_{ol-1-21} - 6561375256800 \, u_{ol-21} - (1409674226688 + 286347350016 \, \text{I}) \, u_{ol+1-21} + (-18172709100 + 2063634300 \, \text{I}) \, u_{ol+2-21} + (-12713659392 + 4813769856 \, \text{I}) \, u_{ol-1-31} + 82373437440 \, u_{ol-31} - (12713659392 + 4813769856 \, \text{I}) \, u_{ol+1-31} - 93737280 \, u_{ol-41} \big),$$

$$O(\, \Delta x_{ol}^{23} \,)$$

Formula.: 729, Var.: 1

Variavel .:  $x_{ol}$  , Derivada de Ordem .: 3

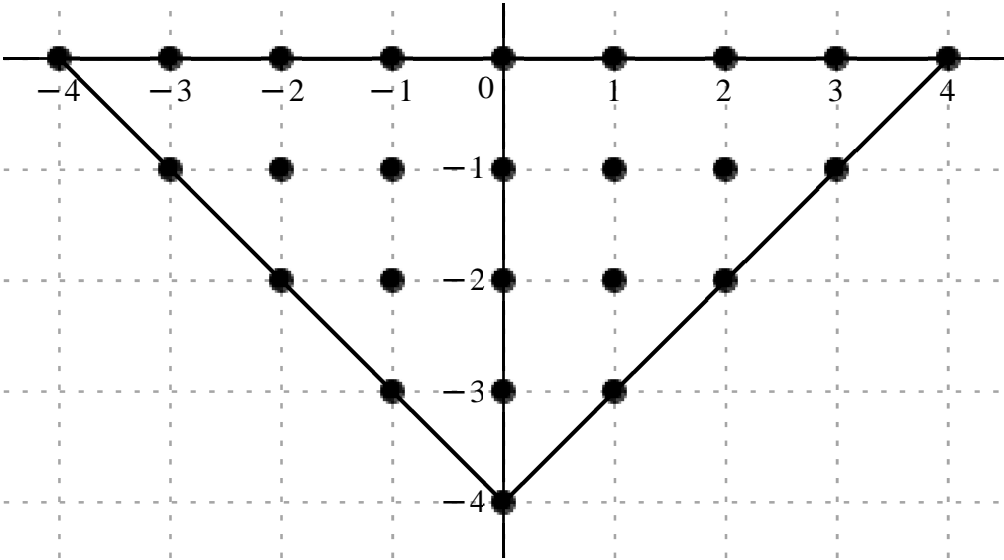
Error order.: 22, Error.: 9.3127868358901871148 × 10<sup>−58</sup>, New Error.: 9.2917100234889757724 × 10<sup>−80</sup>

Error order.: 22, Error.: 9.2917100234889757724 × 10<sup>−80</sup>, New Error.: 9.2895422937122312868 × 10<sup>−102</sup>

Error order.: 22, Error.: 9.2895422937122312868 × 10<sup>−102</sup>, New Error.: 9.2893249206927065490 × 10<sup>−124</sup>

*Error order: 22, Error:  $9.2893249206927065490 \times 10^{-124}$ , New Error:  $9.2893031773907845655 \times 10^{-146}$*   
*Error order: 22, Error:  $9.2893031773907845655 \times 10^{-146}$ , New Error:  $9.2893010030005931216 \times 10^{-168}$*

$$c =, \left[ \begin{array}{cccccccccccccccccccc}
-\frac{34763}{3187067520} - \frac{2641 \text{ I}}{81719680} & -\frac{8300392}{971059635} - \frac{9910024 \text{ I}}{971059635} & \frac{4387}{11492} - \frac{47527 \text{ I}}{34476} & \frac{24056}{663} + \frac{11192 \text{ I}}{663} & \frac{1431421 \text{ I}}{7200} & -\frac{24056}{663} + \frac{11192 \text{ I}}{663} & -\frac{4387}{11492} - \frac{47527 \text{ I}}{34476} & \frac{8300392}{971059635} - \frac{9910024 \text{ I}}{971059635} & \frac{34763}{3187067520} - \frac{2641 \text{ I}}{81719680} \\
& \frac{788753}{39862875} + \frac{1570979 \text{ I}}{39862875} & -\frac{149576688}{13287625} - \frac{104055216 \text{ I}}{13287625} & \frac{71325}{221} + \frac{101955 \text{ I}}{221} & -\frac{107968 \text{ I}}{51} & -\frac{71325}{221} + \frac{101955 \text{ I}}{221} & \frac{149576688}{13287625} - \frac{104055216 \text{ I}}{13287625} & -\frac{788753}{39862875} + \frac{1570979 \text{ I}}{39862875} \\
& -\frac{1167}{7888} + \frac{202323 \text{ I}}{102544} & \frac{27710016}{801125} + \frac{118787088 \text{ I}}{801125} & \frac{17829 \text{ I}}{26} & -\frac{27710016}{801125} + \frac{118787088 \text{ I}}{801125} & \frac{1167}{7888} + \frac{202323 \text{ I}}{102544} \\
& \frac{579562}{1077375} + \frac{1464184 \text{ I}}{1077375} & -\frac{13408 \text{ I}}{1521} & -\frac{579562}{1077375} + \frac{1464184 \text{ I}}{1077375} \\
& & \frac{431 \text{ I}}{42432}
\end{array} \right]$$



$$\begin{aligned}
\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = & \frac{1}{3107390832000 \Delta x_{ol}^3} \big( -(33893925 + 100424025 \text{ I}) u_{ol-4} - (26561254400 + 31712076800 \text{ I}) u_{ol-3} + (1186227252000 - 4283703564000 \text{ I}) u_{ol-2} \\
& + (112747200384000 + 52455381888000 \text{ I}) u_{ol-1} + 617775623907260 \text{ I} u_{ol} + (-112747200384000 + 52455381888000 \text{ I}) u_{ol+1} - (1186227252000 + 4283703564000 \text{ I}) u_{ol+2} \\
& + (26561254400 - 31712076800 \text{ I}) u_{ol+3} + (33893925 - 100424025 \text{ I}) u_{ol+4} + (61484873856 + 122460955008 \text{ I}) u_{ol+3-1} - (34979405948928 + 24333936592896 \text{ I}) u_{ol-2-1} \\
& + (1002871724400000 + 1433547657360000 \text{ I}) u_{ol-1-1} - 6578407320576000 \text{ I} u_{ol-1} + (-1002871724400000 + 1433547657360000 \text{ I}) u_{ol+1-1} \\
& + (34979405948928 - 24333936592896 \text{ I}) u_{ol+2-1} + (-61484873856 + 122460955008 \text{ I}) u_{ol+3-1} + (-459726813000 + 6130993869000 \text{ I}) u_{ol-2-21} \\
& + (107481166700544 + 460749456340992 \text{ I}) u_{ol-1-21} + 2130833505528000 \text{ I} u_{ol-21} + (-107481166700544 + 460749456340992 \text{ I}) u_{ol+1-21} \\
& + (459726813000 + 6130993869000 \text{ I}) u_{ol+2-21} + (1671586629888 + 4223034633216 \text{ I}) u_{ol-1-31} - 27392436736000 \text{ I} u_{ol-31} + (-1671586629888 + 4223034633216 \text{ I}) u_{ol+1-31} \\
& + 31563099750 \text{ I} u_{ol-41} \big), \quad O(\Delta x_{ol}^{22})
\end{aligned}$$

Formula:, 730, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 4

*Error order*., 21, *Error*.,  $6.8845357474884650490 \times 10^{-55}$ , *New Error*.,  $6.8690302463951532730 \times 10^{-76}$

*Error order:*, 21, *Error:*,  $6.8690302463951532730 \times 10^{-76}$ , *New Error:*,  $6.8674357616337899708 \times 10^{-97}$

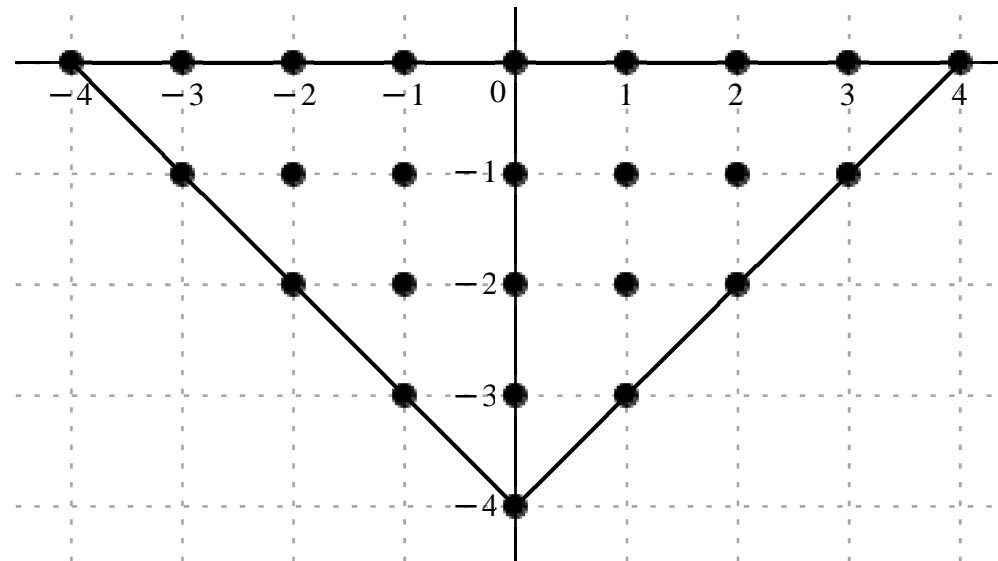
*Error order*., 21, *Error*.,  $6.8674357616337899708 \times 10^{-97}$ , *New Error*.,  $6.8672758741338579925 \times 10^{-118}$

Error order:, 21, Error:,  $6.8672758741338579925 \times 10^{-118}$ , New Error:,  $6.8672598809939535257 \times 10^{-139}$

*Error order*., 21, *Error*.,  $6.8672598809939535257 \times 10^{-139}$ , *New Error*.,  $6.8672582816360642934 \times 10^{-160}$

$$x_o + h. , \left[ \begin{array}{cccccccc} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I & \\ & & -2-2I & -1-2I & -2I & 1-2I & 2-2I & & \\ & & & -1-3I & -3I & 1-3I & & & \\ & & & & -4I & & & & \end{array} \right]$$

$$c = , \quad \begin{array}{cccccccccccccccc} -\frac{32191}{124494825} + \frac{5867639 \text{ I}}{59757516000} & -\frac{25575544}{323686545} + \frac{592341208 \text{ I}}{8092163625} & -\frac{29171149}{2585700} - \frac{1917913 \text{ I}}{861900} & \frac{325736}{3825} - \frac{14808968 \text{ I}}{49725} & \frac{37453523}{30000} & \frac{325736}{3825} + \frac{14808968 \text{ I}}{49725} & -\frac{29171149}{2585700} + \frac{1917913 \text{ I}}{861900} & -\frac{25575544}{323686545} - \frac{592341208 \text{ I}}{8092163625} & -\frac{32191}{124494825} - \frac{5867639 \text{ I}}{59757516000} \\ \frac{183932617}{597943125} - \frac{102273259 \text{ I}}{597943125} & -\frac{3769308592}{66438125} + \frac{6074332656 \text{ I}}{66438125} & \frac{18532999}{5525} - \frac{14414289 \text{ I}}{5525} & -\frac{59220544}{3825} & \frac{18532999}{5525} + \frac{14414289 \text{ I}}{5525} & -\frac{3769308592}{66438125} - \frac{6074332656 \text{ I}}{66438125} & \frac{183932617}{597943125} + \frac{102273259 \text{ I}}{597943125} \\ \frac{39695251}{2563600} + \frac{343951 \text{ I}}{512720} & \frac{4550033552}{4005625} - \frac{1169577664 \text{ I}}{4005625} & \frac{3402813}{650} & \frac{4550033552}{4005625} + \frac{1169577664 \text{ I}}{4005625} & \frac{39695251}{2563600} - \frac{343951 \text{ I}}{512720} \\ \frac{170566256}{16160625} - \frac{69924038 \text{ I}}{16160625} & -\frac{4344608}{63375} & \frac{170566256}{16160625} + \frac{69924038 \text{ I}}{16160625} \\ \frac{317449}{3978000} \end{array}$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u\big(x_{ol}\big) = \frac{1}{3884238540000 \, \Delta x_{ol}^4} \Big( \big( -1004359200 + 381396535 \, \mathrm{I} \big) \, u_{ol-4} + \big( -306906528000 + 284323779840 \, \mathrm{I} \big) \, u_{ol-3} - \big( 43820900027800 + 8643266725800 \, \mathrm{I} \big) \, u_{ol-2} + \big( 330780738579200 - 1156793649939200 \, \mathrm{I} \big) \, u_{ol-1} + 4849280583179214 \, u_{ol} + \big( 330780738579200 + 1156793649939200 \, \mathrm{I} \big) \, u_{ol+1} + \big( -43820900027800$$

$$+ 8643266725800 \, \mathrm{I} \big) \, u_{ol+2} - \big( 306906528000 + 284323779840 \, \mathrm{I} \big) \, u_{ol+3} - \big( 1004359200 + 381396535 \, \mathrm{I} \big) \, u_{ol+4} + \big( 1194826280032 - 664367090464 \, \mathrm{I} \big) \, u_{ol-3-1} + \big( -220368857522688 + 355129784400384 \, \mathrm{I} \big) \, u_{ol-2-1} + \big( 13029246873770400 - 10133671829954400 \, \mathrm{I} \big) \, u_{ol-1-1} - 60137704409036800 \, u_{ol-1} + \big( 13029246873770400$$

$$+ 10133671829954400 \, \mathrm{I} \big) \, u_{ol+1-1} - \big( 220368857522688 + 355129784400384 \, \mathrm{I} \big) \, u_{ol+2-1} + \big( 1194826280032 + 664367090464 \, \mathrm{I} \big) \, u_{ol+3-1} + \big( 60144259552650 + 2605686788250 \, \mathrm{I} \big) \, u_{ol-2-21} + \big( 4412149335240192 - 1134134782470144 \, \mathrm{I} \big) \, u_{ol-1-21} + 20334365229250800 \, u_{ol-21} + \big( 4412149335240192 + 1134134782470144 \, \mathrm{I} \big) \, u_{ol+1-21}$$

$$+ \big( 60144259552650 - 2605686788250 \, \mathrm{I} \big) \, u_{ol+2-21} + \big( 40995940762112 - 16806382381376 \, \mathrm{I} \big) \, u_{ol-1-31} - 266279981614080 \, u_{ol-31} + \big( 40995940762112 + 16806382381376 \, \mathrm{I} \big) \, u_{ol+1-31} + 309966727070 \, u_{ol-41} \Big), \, \, O( \, \Delta x_{ol}^{21} \, )$$

Formula:, 731, Var.: 1

Variavel .:,  $x_{ol}$  , Derivada de Ordem .:, 5

Error order:., 20, Error:., 4.9127347829531355825 × 10<sup>−52</sup>, New Error:., 4.9017227111392991823 × 10<sup>−72</sup>

Error order:., 20, Error:., 4.9017227111392991823 × 10<sup>−72</sup>, New Error:., 4.9005904661870425909 × 10<sup>−92</sup>

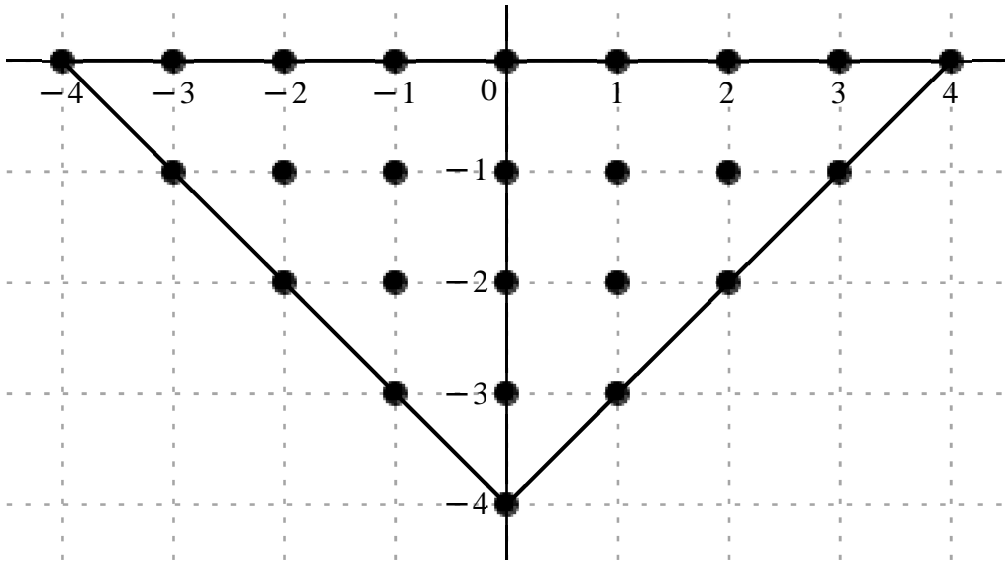
Error order:., 20, Error:., 4.9005904661870425909 × 10<sup>−92</sup>, New Error:., 4.9004769315409014759 × 10<sup>−112</sup>

Error order:., 20, Error:., 4.9004769315409014759 × 10<sup>−112</sup>, New Error:., 4.9004655749750077730 × 10<sup>−132</sup>

Error order:., 20, Error:., 4.9004655749750077730 × 10<sup>−132</sup>, New Error:., 4.9004644392874058366 × 10<sup>−152</sup>

$$x_o \, + h \, , \, \left[ \begin{array}{cccccccccc} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 & \\ & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & 3 - \mathrm{I} & & \\ & & -2 - 2 \, \mathrm{I} & -1 - 2 \, \mathrm{I} & -2 \, \mathrm{I} & 1 - 2 \, \mathrm{I} & 2 - 2 \, \mathrm{I} & & & \\ & & & -1 - 3 \, \mathrm{I} & -3 \, \mathrm{I} & 1 - 3 \, \mathrm{I} & & & & \\ & & & & -4 \, \mathrm{I} & & & & & \end{array} \right]$$

$$c = , \, \left[ \begin{array}{cccccccccccccccc} \frac{223172251}{265588960000} + \frac{952568731 \, \mathrm{I}}{478060128000} & & \frac{24254751956}{40460818125} + \frac{951127636 \, \mathrm{I}}{1618432725} & & -\frac{70491599}{6464250} + \frac{126594127 \, \mathrm{I}}{1436500} & & -\frac{555306476}{248625} - \frac{79218076 \, \mathrm{I}}{248625} & & -\frac{12706517 \, \mathrm{I}}{1600} & & \frac{555306476}{248625} - \frac{79218076 \, \mathrm{I}}{248625} & & \frac{70491599}{6464250} + \frac{126594127 \, \mathrm{I}}{1436500} & & -\frac{24254751956}{40460818125} + \frac{951127636 \, \mathrm{I}}{1618432725} & & -\frac{223172251}{265588960000} + \frac{952568731 \, \mathrm{I}}{478060128000} \\ & & -\frac{1685490851}{1195886250} - \frac{2767704107 \, \mathrm{I}}{1195886250} & & \frac{556557608}{781625} + \frac{5265920008 \, \mathrm{I}}{13287625} & & -\frac{1114212871}{55250} - \frac{1311168611 \, \mathrm{I}}{55250} & & \frac{2115024608 \, \mathrm{I}}{19125} & & \frac{1114212871}{55250} - \frac{1311168611 \, \mathrm{I}}{55250} & & -\frac{556557608}{781625} + \frac{5265920008 \, \mathrm{I}}{13287625} & & \frac{1685490851}{1195886250} - \frac{2767704107 \, \mathrm{I}}{1195886250} & & \\ & & & & \frac{4411527}{2563600} - \frac{3008483939 \, \mathrm{I}}{25636000} & & -\frac{144645456}{61625} - \frac{6755139656 \, \mathrm{I}}{801125} & & -\frac{126005691 \, \mathrm{I}}{3250} & & \frac{144645456}{61625} - \frac{6755139656 \, \mathrm{I}}{801125} & & -\frac{4411527}{2563600} - \frac{3008483939 \, \mathrm{I}}{25636000} & & & & \\ & & & & & & -\frac{542199916}{16160625} - \frac{1282236563 \, \mathrm{I}}{16160625} & & \frac{163547056 \, \mathrm{I}}{316875} & & \frac{542199916}{16160625} - \frac{1282236563 \, \mathrm{I}}{16160625} & & & & & & \\ & & & & & & & & -\frac{7422163 \, \mathrm{I}}{12240000} & & & & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{31073908320000 \, \Delta x_{ol}^5} \Big( (26111153367 + 61916967515 \, \mathrm{I}) \, u_{ol-4} + (18627649502208 + 18261650611200 \, \mathrm{I}) \, u_{ol-3} + (-338855936056960 + 2738443645143360 \, \mathrm{I}) \, u_{ol-2} - (69403891502167040 + 9900915961431040 \, \mathrm{I}) \, u_{ol-1} - 246775715202825900 \, \mathrm{I} u_{ol} + (69403891502167040 - 9900915961431040 \, \mathrm{I}) \, u_{ol+1} \\ + (338855936056960 + 2738443645143360 \, \mathrm{I}) \, u_{ol+2} + (-18627649502208 + 18261650611200 \, \mathrm{I}) \, u_{ol+3} + (-26111153367 + 61916967515 \, \mathrm{I}) \, u_{ol+4} - (43795794272384 + 71916023516288 \, \mathrm{I}) \, u_{ol-3-1} + (22126237115996160 + 12314669893908480 \, \mathrm{I}) \, u_{ol-2-1} - (626659703211185280 + 737432275299108480 \, \mathrm{I}) \, u_{ol-1-1} \\ + 3436448667374428160 \, \mathrm{I} u_{ol-1} + (626659703211185280 - 737432275299108480 \, \mathrm{I}) \, u_{ol+1-1} + (-22126237115996160 + 12314669893908480 \, \mathrm{I}) \, u_{ol+2-1} + (43795794272384 - 71916023516288 \, \mathrm{I}) \, u_{ol+3-1} + (53473001072400 - 3646643552140680 \, \mathrm{I}) \, u_{ol-2-21} - (72936302452715520 + 262017276154583040 \, \mathrm{I}) \, u_{ol-1-21} \\ - 1204765935363768960 \, \mathrm{I} u_{ol-21} + (72936302452715520 - 262017276154583040 \, \mathrm{I}) \, u_{ol+1-21} - (53473001072400 + 3646643552140680 \, \mathrm{I}) \, u_{ol+2-21} - (1042550673683456 + 2465504979121408 \, \mathrm{I}) \, u_{ol-1-31} + 16038015697514496 \, \mathrm{I} u_{ol-31} + (1042550673683456 - 2465504979121408 \, \mathrm{I}) \, u_{ol+1-31} - 18842778807034 \, \mathrm{I} u_{ol-41} \Big), \\ O( \, \Delta x_{ol}^{20} \, )$$

Formula:, 732, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 6

Error order:, 19, Error:, 3.4091150148534941032 × 10<sup>-49</sup>, New Error:, 3.4015108066941770212 × 10<sup>-68</sup>

Error order:, 19, Error:, 3.4015108066941770212 × 10<sup>-68</sup>, New Error:, 3.4007290692296434796 × 10<sup>-87</sup>

Error order:, 19, Error:, 3.4007290692296434796 × 10<sup>-87</sup>, New Error:, 3.4006506824716337151 × 10<sup>-106</sup>

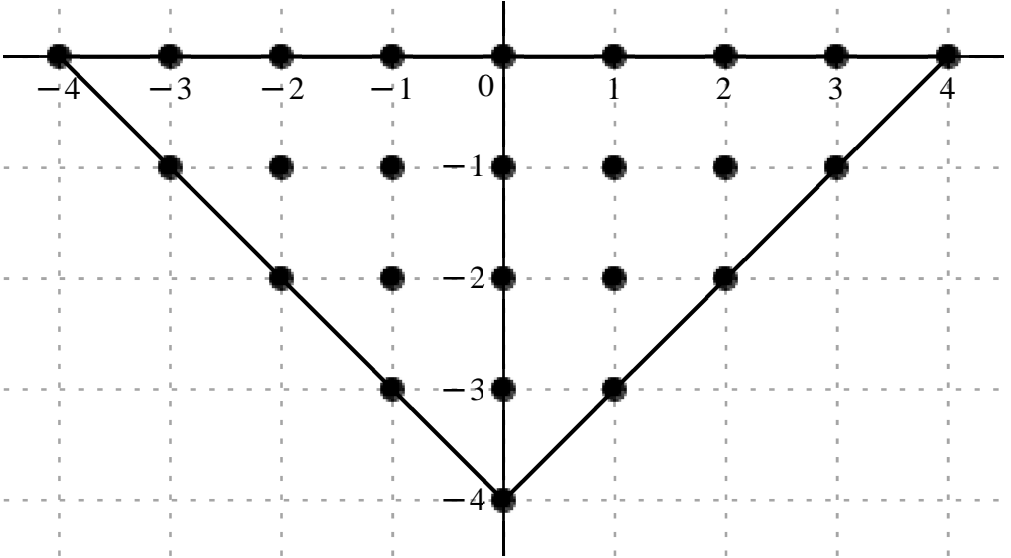
Error order:, 19, Error:, 3.4006506824716337151 × 10<sup>-106</sup>, New Error:, 3.4006428416658739860 × 10<sup>-125</sup>

Error order:, 19, Error:, 3.4006428416658739860 × 10<sup>-125</sup>, New Error:, 3.4006420575639985826 × 10<sup>-144</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccccccc} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3 - \mathrm{I} & -2 - \mathrm{I} & -1 - \mathrm{I} & -\mathrm{I} & 1 - \mathrm{I} & 2 - \mathrm{I} & 3 - \mathrm{I} & \\ & & -2 - 2 \mathrm{I} & -1 - 2 \mathrm{I} & -2 \mathrm{I} & 1 - 2 \mathrm{I} & 2 - 2 \mathrm{I} & & \\ & & & -1 - 3 \mathrm{I} & -3 \mathrm{I} & 1 - 3 \mathrm{I} & & & \\ & & & & -4 \mathrm{I} & & & & \end{array} \right]$$



$$c = \left[ \begin{array}{cccccccccccccccc} \frac{3953691111}{265588960000} - \frac{157893851 \text{ I}}{22764768000} & & \frac{346202666}{82070625} - \frac{11128918 \text{ I}}{2344875} & & \frac{11428004827}{17238000} + \frac{196250271 \text{ I}}{5746000} & & -\frac{32973578}{82875} + \frac{1302022682 \text{ I}}{82875} & & -\frac{242212859}{4800} & & -\frac{32973578}{82875} - \frac{1302022682 \text{ I}}{82875} & & \frac{11428004827}{17238000} - \frac{196250271 \text{ I}}{5746000} & & \frac{346202666}{82070625} + \frac{11128918 \text{ I}}{2344875} & & \frac{3953691111}{265588960000} + \frac{157893851 \text{ I}}{22764768000} \\ -\frac{13452334021}{797257500} + \frac{8936774503 \text{ I}}{797257500} & & \frac{2086566228}{781625} - \frac{71271928452 \text{ I}}{13287625} & & -\frac{1061172189}{6500} + \frac{195531207 \text{ I}}{1300} & & \frac{4918643024}{6375} & & -\frac{1061172189}{6500} - \frac{195531207 \text{ I}}{1300} & & \frac{2086566228}{781625} + \frac{71271928452 \text{ I}}{13287625} & & -\frac{13452334021}{797257500} - \frac{8936774503 \text{ I}}{797257500} \\ & & -\frac{763511511}{884000} + \frac{5007747 \text{ I}}{442000} & & -\frac{48774083676}{801125} + \frac{14571660048 \text{ I}}{801125} & & -\frac{3634071093}{13000} & & -\frac{48774083676}{801125} - \frac{14571660048 \text{ I}}{801125} & & -\frac{763511511}{884000} - \frac{5007747 \text{ I}}{442000} \\ & & & & -\frac{3124770934}{5386875} + \frac{2721221051 \text{ I}}{10773750} & & \frac{1197687928}{316875} & & -\frac{3124770934}{5386875} - \frac{2721221051 \text{ I}}{10773750} \\ & & & & & & -\frac{237652573}{53040000} \end{array} \right]$$



$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} \, u(x_{ol}) = \frac{1}{10357969440000 \, \mathcal{A}_{ol}^6} \Big( (154193953329 - 71841702205 \, \text{I}) \, u_{ol-4} + (43693546070528 - 49159546903040 \, \text{I}) \, u_{ol-3} + (6866859540447760 + 353768588515440 \, \text{I}) \, u_{ol-2} + (-4121138018117120 + 162730752945313280 \, \text{I}) \, u_{ol-1} - 522673623228547700 \, u_{ol} - (4121138018117120 + 162730752945313280 \, \text{I}) \, u_{ol+1} \\ + (6866859540447760 - 353768588515440 \, \text{I}) \, u_{ol+2} + (43693546070528 + 49159546903040 \, \text{I}) \, u_{ol+3} + (154193953329 + 71841702205 \, \text{I}) \, u_{ol+4} + (-174772723600832 + 116106574342976 \, \text{I}) \, u_{ol+3-1} + (27650841802859520 - 55557893666903040 \, \text{I}) \, u_{ol+2-1} + (-1691013708344600640 + 1557927897440241600 \, \text{I}) \, u_{ol+1-1} \\ + 7991710451586068480 \, u_{ol-1} - (1691013708344600640 + 1557927897440241600 \, \text{I}) \, u_{ol+1-1} + (27650841802859520 + 55557893666903040 \, \text{I}) \, u_{ol+2-1} - (174772723600832 + 116106574342976 \, \text{I}) \, u_{ol+3-1} + (-8946186536228760 + 117353145677040 \, \text{I}) \, u_{ol+2-21} + (-630613784590433280 + 188401072825405440 \, \text{I}) \, u_{ol+1-21} \\ - 2895507486467799840 \, u_{ol-21} - (630613784590433280 + 188401072825405440 \, \text{I}) \, u_{ol+1-21} - (8946186536228760 + 117353145677040 \, \text{I}) \, u_{ol+2-21} + (-6008359548230144 + 2616203688199808 \, \text{I}) \, u_{ol+1-31} + 39149869686409216 \, u_{ol-31} - (6008359548230144 + 2616203688199808 \, \text{I}) \, u_{ol+1-31} - 46410220370878 \, u_{ol-41} \Big), \\ O(\, \mathcal{A}_{ol}^{19} \,)$$

Formula: 733, Var: 1

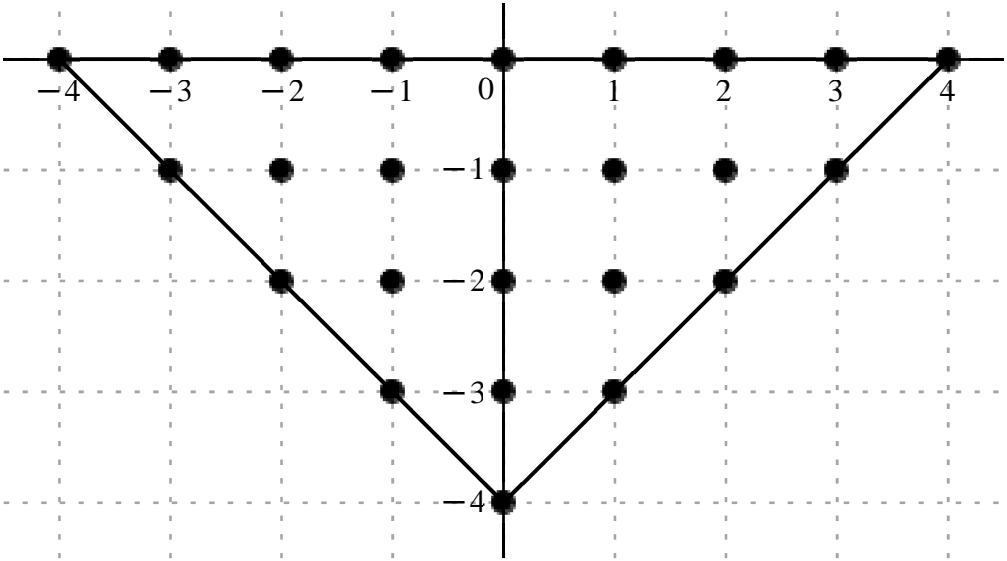
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

Error order: 18, Error: 2.2974152436188114668 × 10<sup>−46</sup>, New Error: 2.2923175516677463726 × 10<sup>−64</sup>

*Error order:*, 18, *Error:*,  $2.2923175516677463726 \times 10^{-64}$ , *New Error:*,  $2.2917935741345560250 \times 10^{-82}$   
*Error order:*, 18, *Error:*,  $2.2917935741345560250 \times 10^{-82}$ , *New Error:*,  $2.2917410344005436699 \times 10^{-100}$   
*Error order:*, 18, *Error:*,  $2.2917410344005436699 \times 10^{-100}$ , *New Error:*,  $2.2917357790074394290 \times 10^{-118}$   
*Error order:*, 18, *Error:*,  $2.2917357790074394290 \times 10^{-118}$ , *New Error:*,  $2.2917352534539320789 \times 10^{-136}$

$$x_o + h \cdot , \left[ \begin{array}{ccccccccc} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3 -I & -2 -I & -1 -I & -I & 1 -I & 2 -I & 3 -I & \\ & & -2 -2 I & -1 -2 I & -2 I & 1 -2 I & 2 -2 I & & \\ & & & -1 -3 I & -3 I & 1 -3 I & & & \\ & & & & -4 I & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccccccccccc} -\frac{740670017}{13391040000} & -\frac{4897160849 I}{45529536000} & -\frac{209890427381}{5780116875} & -\frac{33622165969 I}{1156023375} & -\frac{924745801}{8619000} & -\frac{82596403463 I}{17238000} & \frac{223288849}{2125} & -\frac{48977593 I}{6375} & \frac{3043404217 I}{9600} & -\frac{223288849}{2125} & -\frac{48977593 I}{6375} & \frac{924745801}{8619000} & -\frac{82596403463 I}{17238000} & \frac{209890427381}{5780116875} & -\frac{33622165969 I}{1156023375} & \frac{740670017}{13391040000} & -\frac{4897160849 I}{45529536000} \\ & & \frac{45746756433}{531505000} & +\frac{63159443781 I}{531505000} & -\frac{518359796598}{13287625} & -\frac{228906507774 I}{13287625} & \frac{238829574081}{221000} & +\frac{240594095049 I}{221000} & -\frac{11129699784 I}{2125} & -\frac{238829574081}{221000} & +\frac{240594095049 I}{221000} & \frac{518359796598}{13287625} & -\frac{228906507774 I}{13287625} & -\frac{45746756433}{531505000} & +\frac{63159443781 I}{531505000} & & \\ & & & & \frac{6449485119}{25636000} & +\frac{63137687403 I}{10254400} & \frac{108866589636}{801125} & +\frac{341506305462 I}{801125} & \frac{25429276467 I}{13000} & -\frac{108866589636}{801125} & +\frac{341506305462 I}{801125} & -\frac{6449485119}{25636000} & +\frac{63137687403 I}{10254400} & & & & \\ & & & & & & \frac{6617913421}{3591250} & +\frac{88626515593 I}{21547500} & -\frac{8508661588 I}{316875} & -\frac{6617913421}{3591250} & +\frac{88626515593 I}{21547500} & & & & & & \\ & & & & & & & & \frac{1135647009 I}{35360000} & & & & & & & & & \end{array} \right]$$



$$\frac{d^7}{dx_{ol}^7} u(x_{ol}) = \frac{1}{2959419840000 \Delta x_{ol}^7} \Big( -(163688073757 + 318315455185 I) u_{ol-4} - (107463898819072 + 86072744880640 I) u_{ol-3} - (317520718231360 + 14180150546527840 I) u_{ol-2} + (310967270485347840 - 22736511441512960 I) u_{ol-1} + 938199043846819300 I u_{ol} - (310967270485347840 + 22736511441512960 I) u_{ol+1}$$

$$+ (317520718231360 - 14180150546527840 I) u_{ol+2} + (107463898819072 - 86072744880640 I) u_{ol+3} + (163688073757 - 318315455185 I) u_{ol+4} + (254717939818944 + 351671782972608 I) u_{ol-3-1} - (115449093898306560 + 50982057411425280 I) u_{ol-2-1} + (3198176379701634240 + 3221805150564960960 I) u_{ol-1-1}$$

$$- 15499978519535677440 I u_{ol-1} + (-3198176379701634240 + 3221805150564960960 I) u_{ol+1-1} + (115449093898306560 - 50982057411425280 I) u_{ol+2-1} + (-254717939818944 + 351671782972608 I) u_{ol+3-1} + (744528562137360 + 18221536584505800 I) u_{ol-2-21} + (402161891442554880$$

$$+ 1261551612881064960 I) u_{ol-1-21} + 5788915791791146560 I u_{ol-21} + (-402161891442554880 + 1261551612881064960 I) u_{ol+1-21} + (-744528562137360 + 18221536584505800 I) u_{ol+2-21} + (5453584205362944 + 12172320157604992 I) u_{ol-1-31} - 79465725965674496 I u_{ol-31} + (-5453584205362944$$

$$+ 12172320157604992 I) u_{ol+1-31} + 95046840771246 I u_{ol-41} \Big), \quad O(\Delta x_{ol}^{18})$$

Formula:, 734, Var:, 1

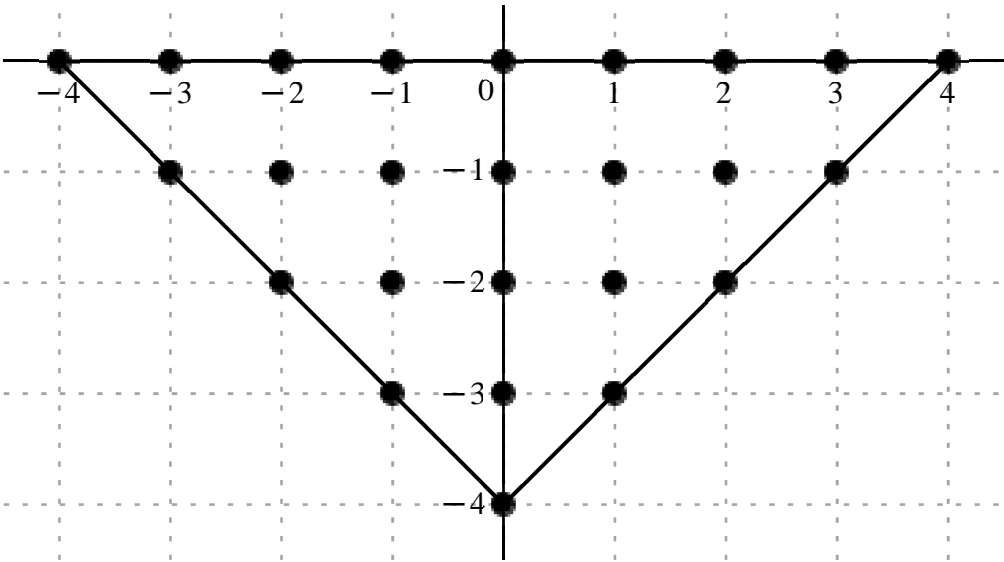
Variavel :,  $x_{oi}$  , Derivada de Ordem :, 8

Error order:, 17, Error:,  $1.4995643432118721969 \times 10^{-43}$ , New Error:,  $1.4962557916549962579 \times 10^{-60}$   
Error order:, 17, Error:,  $1.4962557916549962579 \times 10^{-60}$ , New Error:,  $1.4959157713620985203 \times 10^{-77}$   
Error order:, 17, Error:,  $1.4959157713620985203 \times 10^{-77}$ , New Error:,  $1.4958816777472824093 \times 10^{-94}$   
Error order:, 17, Error:,  $1.4958816777472824093 \times 10^{-94}$ , New Error:,  $1.4958782674700121711 \times 10^{-111}$   
Error order:, 17, Error:,  $1.4958782674700121711 \times 10^{-111}$ , New Error:,  $1.4958779264331273278 \times 10^{-128}$

$$x_o + h \cdot \begin{bmatrix} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3 - I & -2 - I & -1 - I & -I & 1 - I & 2 - I & 3 - I & \\ & & -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I & & \\ & & & -1 - 3 I & -3 I & 1 - 3 I & & & \\ & & & & -4 I & & & & \end{bmatrix}$$

$c = ,$

$$\left[ \begin{array}{cccccccccccccccccccc} -\frac{42616158343}{56911920000} & +\frac{967965319 I}{2276476800} & -\frac{368972770828}{1926705625} & +\frac{103121302972 I}{385341125} & -\frac{285424417411}{8619000} & +\frac{28239617161 I}{8619000} & -\frac{8798036548}{82875} & -\frac{18591471556 I}{27625} & \frac{1564141467}{800} & -\frac{8798036548}{82875} & +\frac{18591471556 I}{27625} & -\frac{285424417411}{8619000} & -\frac{28239617161 I}{8619000} & -\frac{368972770828}{1926705625} & -\frac{103121302972 I}{385341125} & -\frac{42616158343}{56911920000} & -\frac{967965319 I}{2276476800} \\ & & \frac{321053783617}{398628750} & -\frac{253626176881 I}{398628750} & -\frac{1407958195224}{13287625} & +\frac{3628251911928 I}{13287625} & \frac{77589306543}{11050} & -\frac{412624090263 I}{55250} & -\frac{219831879904}{6375} & \frac{77589306543}{11050} & +\frac{412624090263 I}{55250} & -\frac{1407958195224}{13287625} & -\frac{3628251911928 I}{13287625} & \frac{321053783617}{398628750} & +\frac{253626176881 I}{398628750} & & \\ & & & & \frac{271648888413}{6409000} & -\frac{37267075251 I}{12818000} & \frac{2312036638296}{801125} & -\frac{60182354736 I}{61625} & \frac{86094636831}{6500} & \frac{2312036638296}{801125} & +\frac{60182354736 I}{61625} & \frac{271648888413}{6409000} & +\frac{37267075251 I}{12818000} & & & & \\ & & & & & & \frac{151920889729}{5386875} & -\frac{23328640076 I}{1795625} & -\frac{19489227184}{105625} & \frac{151920889729}{5386875} & +\frac{23328640076 I}{1795625} & & & & & & \\ & & & & & & & & \frac{5905040029}{26520000} & & & & & & & & \end{array} \right]$$



$$\frac{d^8}{dx_{ol}^8} u(x_{ol}) = \frac{1}{739854960000 \Delta x_{ol}^8} ((-554010058459 + 314588728675 \text{ I}) u_{ol-4} + (-141685543997952 + 197992901706240 \text{ I}) u_{ol-3} + (-24500831990560240 + 2424088737100240 \text{ I}) u_{ol-2} - (78543239557153280 + 497918278530516480 \text{ I}) u_{ol-1} + 1446547278127032900 u_{ol} + (-78543239557153280 + 497918278530516480 \text{ I}) u_{ol+1} - (24500831990560240 + 2424088737100240 \text{ I}) u_{ol+2} - (141685543997952 + 197992901706240 \text{ I}) u_{ol+3} - (554010058459 + 314588728675 \text{ I}) u_{ol+4} + (595875822393152 - 470730184291136 \text{ I}) u_{ol-3-1} + (-78395112310072320 + 202021066456151040 \text{ I}) u_{ol-2-1} + (5195007537447873600 - 5525465697675443520 \text{ I}) u_{ol-1-1} - 25512738307937054720 u_{ol-1} + (5195007537447873600 + 5525465697675443520 \text{ I}) u_{ol+1-1} - (78395112310072320 + 202021066456151040 \text{ I}) u_{ol+2-1} + (595875822393152 + 470730184291136 \text{ I}) u_{ol+3-1} + (31359147678396720 - 2151055583487720 \text{ I}) u_{ol-2-21} + (2135212076199121920 - 722534907195279360 \text{ I}) u_{ol-1-21} + 9799622167509851040 u_{ol-21} + (2135212076199121920 + 722534907195279360 \text{ I}) u_{ol+1-21} + (31359147678396720 + 2151055583487720 \text{ I}) u_{ol+2-21} + (20865422678939776 - 9612146227794432 \text{ I}) u_{ol-1-31} - 136513149336324096 u_{ol-31} + (20865422678939776 + 9612146227794432 \text{ I}) u_{ol+1-31} + 164738806729042 u_{ol-41}),$$
  
 $O(\Delta x_{ol}^{17})$

Formula:, 735, Var:, 1

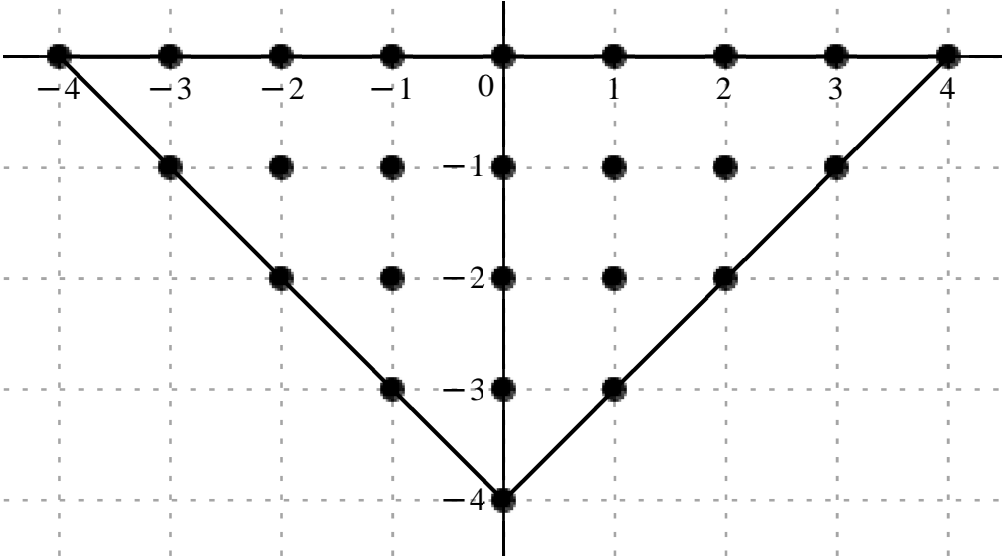
Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 9

Error order:, 16, Error:, 9.4583636302310648300 × 10<sup>-41</sup>, New Error:, 9.4376230410833440792 × 10<sup>-57</sup>  
Error order:, 16, Error:, 9.4376230410833440792 × 10<sup>-57</sup>, New Error:, 9.4354919049130400864 × 10<sup>-73</sup>  
Error order:, 16, Error:, 9.4354919049130400864 × 10<sup>-73</sup>, New Error:, 9.4352782209309404665 × 10<sup>-89</sup>  
Error order:, 16, Error:, 9.4352782209309404665 × 10<sup>-89</sup>, New Error:, 9.4352568468294921608 × 10<sup>-105</sup>  
Error order:, 16, Error:, 9.4352568468294921608 × 10<sup>-105</sup>, New Error:, 9.4352547093623153596 × 10<sup>-121</sup>

$$x_o + h \cdot , \left[ \begin{array}{cccccccc} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} & 3 - \text{I} & \\ & & -2 - 2 \text{I} & -1 - 2 \text{I} & -2 \text{I} & 1 - 2 \text{I} & 2 - 2 \text{I} & & \\ & & & -1 - 3 \text{I} & -3 \text{I} & 1 - 3 \text{I} & & & \\ & & & & -4 \text{I} & & & & \end{array} \right]$$

$$c = ,$$

$\frac{1753350159}{557960000} + \frac{111731289 \text{ I}}{22318400}$	$\frac{214560644262}{113335625} + \frac{27149081502 \text{ I}}{22667125}$	$\frac{6552822297}{169000} + \frac{36841826553 \text{ I}}{169000}$	$-\frac{6728154258}{1625} + \frac{1561794822 \text{ I}}{1625}$	$-\frac{294298662 \text{ I}}{25}$	$\frac{6728154258}{1625} + \frac{1561794822 \text{ I}}{1625}$	$-\frac{6552822297}{169000} + \frac{36841826553 \text{ I}}{169000}$	$-\frac{214560644262}{113335625} + \frac{27149081502 \text{ I}}{22667125}$	$-\frac{1753350159}{557960000} + \frac{111731289 \text{ I}}{22318400}$
$-\frac{70586537091}{15632500} - \frac{81885013287 \text{ I}}{15632500}$	$\frac{1434333509532}{781625} + \frac{483689095596 \text{ I}}{781625}$	$-\frac{322305742899}{6500} - \frac{284172528339 \text{ I}}{6500}$	$\frac{27452130384 \text{ I}}{125}$	$\frac{322305742899}{6500} - \frac{284172528339 \text{ I}}{6500}$	$-\frac{1434333509532}{781625} + \frac{483689095596 \text{ I}}{781625}$	$\frac{70586537091}{15632500} - \frac{81885013287 \text{ I}}{15632500}$		
	$-\frac{163163511}{6032} - \frac{211951653669 \text{ I}}{754000}$	$-\frac{317610966456}{47125} - \frac{888277113612 \text{ I}}{47125}$	$-\frac{562790075463 \text{ I}}{6500}$	$\frac{317610966456}{47125} - \frac{888277113612 \text{ I}}{47125}$	$\frac{163163511}{6032} - \frac{211951653669 \text{ I}}{754000}$			
		$-\frac{9326756103}{105625} - \frac{39409410033 \text{ I}}{211250}$	$\frac{129229294488 \text{ I}}{105625}$	$\frac{9326756103}{105625} - \frac{39409410033 \text{ I}}{211250}$				
			$-\frac{387288573 \text{ I}}{260000}$					



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} \, u(x_{ol}) = \frac{1}{7253480000 \, \mathcal{A}x_{ol}^9} \Big( 3 \, \Big( (7597850689 + 12104222975 \, \text{I}) \, u_{ol-4} + (4577293744256 + 2895902026880 \, \text{I}) \, u_{ol-3} + (93749044329080 + 527083731884920 \, \text{I}) \, u_{ol-2} + (-10010775866116480 + 2323784103688320 \, \text{I}) \, u_{ol-1} - 28462526117916800 \, \text{I} \, u_{ol} + (10010775866116480 + 2323784103688320 \, \text{I}) \, u_{ol+1} + (-93749044329080$$

$$+ 527083731884920 \, \text{I}) \, u_{ol+2} + (-4577293744256 + 2895902026880 \, \text{I}) \, u_{ol+3} + (-7597850689 + 12104222975 \, \text{I}) \, u_{ol+4} - (10917384403408 + 12664882055056 \, \text{I}) \, u_{ol-3-1} + (4436871656152320 + 1496211602376960 \, \text{I}) \, u_{ol-2-1} - (119889141538617360 + 105704602608018960 \, \text{I}) \, u_{ol-1-1} + 530995943193963520 \, \text{I} \, u_{ol-1}$$

$$+ (119889141538617360 - 105704602608018960 \, \text{I}) \, u_{ol+1-1} + (-4436871656152320 + 1496211602376960 \, \text{I}) \, u_{ol+2-1} + (10917384403408 - 12664882055056 \, \text{I}) \, u_{ol+3-1} - (65401373992500 + 679658302765260 \, \text{I}) \, u_{ol-2-21} - (16295559985635840 + 45574537775719680 \, \text{I}) \, u_{ol-1-21} - 209342900336890320 \, \text{I} \, u_{ol-21}$$

$$+ (16295559985635840 - 45574537775719680 \, \text{I}) \, u_{ol+1-21} + (65401373992500 - 679658302765260 \, \text{I}) \, u_{ol+2-21} - (213495665035072 + 451053834297696 \, \text{I}) \, u_{ol-1-31} + 2958144703693312 \, \text{I} \, u_{ol-31} + (213495665035072 - 451053834297696 \, \text{I}) \, u_{ol+1-31} - 3601525536518 \, \text{I} \, u_{ol-41} \Big) \Big), \, O(\, \mathcal{A}x_{ol}^{16} \, )$$

Formula.: 736, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

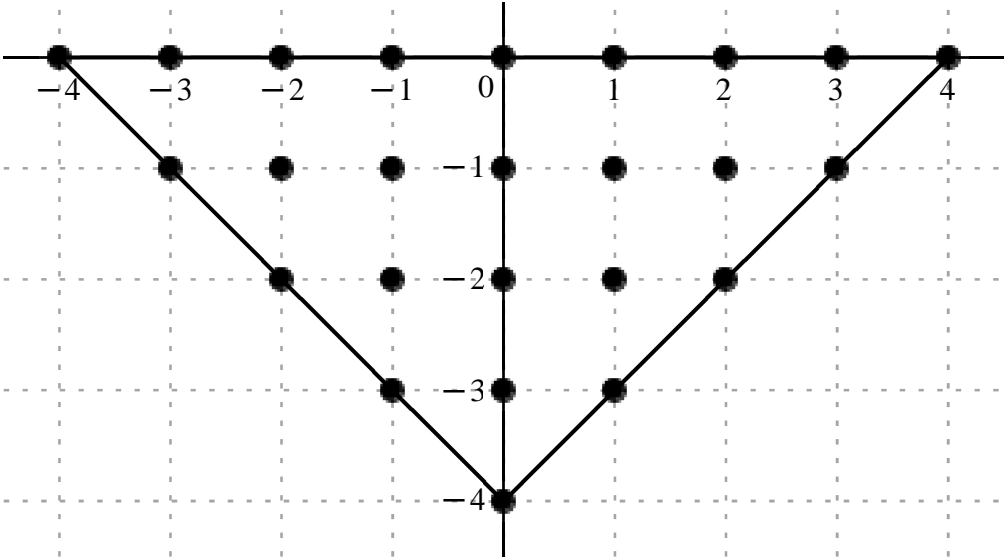
Error order.: 15, Error.: 5.7522260128513898073 × 10<sup>−38</sup>, New Error.: 5.7396963827444160139 × 10<sup>−53</sup>

Error order.: 15, Error.: 5.7396963827444160139 × 10<sup>−53</sup>, New Error.: 5.7384091816974609591 × 10<sup>−68</sup>

*Error order:*, 15, *Error:*, 5.7384091816974609591 × 10<sup>−68</sup>, *New Error:*, 5.7382801194552047074 × 10<sup>−83</sup>  
*Error order:*, 15, *Error:*, 5.7382801194552047074 × 10<sup>−83</sup>, *New Error:*, 5.7382672098098491552 × 10<sup>−98</sup>  
*Error order:*, 15, *Error:*, 5.7382672098098491552 × 10<sup>−98</sup>, *New Error:*, 5.7382659188111025467 × 10<sup>−113</sup>

$$x_o + h \cdot \begin{bmatrix} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3 - I & -2 - I & -1 - I & -I & 1 - I & 2 - I & 3 - I & \\ & & -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I & & \\ & & & -1 - 3 I & -3 I & 1 - 3 I & & & \\ & & & & -4 I & & & & \end{bmatrix}$$

$$c =, \begin{bmatrix} \frac{7149802641}{223184000} - \frac{993921693 I}{44636800} & \frac{160326258492}{22667125} - \frac{11618206212 I}{906685} & \frac{46074703143}{33800} - \frac{11912998713 I}{33800} & \frac{2376829476}{325} + \frac{611991492 I}{25} & -\frac{11017787907}{160} & \frac{2376829476}{325} - \frac{611991492 I}{25} & \frac{46074703143}{33800} + \frac{11912998713 I}{33800} & \frac{160326258492}{22667125} + \frac{11618206212 I}{906685} & \frac{7149802641}{223184000} + \frac{993921693 I}{44636800} \\ & -\frac{25480880292}{781625} + \frac{47975417637 I}{1563250} & \frac{533705407704}{156325} - \frac{1847410224408 I}{156325} & -\frac{170408593341}{650} + \frac{20529284328 I}{65} & \frac{33731571552}{25} & -\frac{170408593341}{650} - \frac{20529284328 I}{65} & \frac{533705407704}{156325} + \frac{1847410224408 I}{156325} & -\frac{25480880292}{781625} - \frac{47975417637 I}{1563250} & \\ & & -\frac{16888955328}{9425} + \frac{2573541369 I}{11600} & -\frac{1116754025184}{9425} + \frac{32331620664 I}{725} & -\frac{708580144377}{1300} & -\frac{1116754025184}{9425} - \frac{32331620664 I}{725} & -\frac{16888955328}{9425} - \frac{2573541369 I}{11600} & & \\ & & & -\frac{50180004819}{42250} + \frac{24388472283 I}{42250} & \frac{164981995248}{21125} & -\frac{50180004819}{42250} - \frac{24388472283 I}{42250} & & & \\ & & & & & & & & -\frac{997646307}{104000} \end{bmatrix}$$



$$\frac{d^{10}}{dx_{ol}^{10}} \, u(x_{ol}) = \frac{1}{2901392000 \, \Delta x_{ol}^{10}} \Big( 3 \Big( (30982478111 - 21534970015 \, I) \, u_{ol-4} + (6840587028992 - 12392753292800 \, I) \, u_{ol-3} + (1318350839265040 - 340870603174640 \, I) \, u_{ol-2} + (7072937463621120 + 23675029586091520 \, I) \, u_{ol-1} - 66597753523055300 \, u_{ol} + (7072937463621120 - 23675029586091520 \, I) \, u_{ol+1} + (1318350839265040$$

$$+ 340870603174640 \, I) \, u_{ol+2} + (6840587028992 + 12392753292800 \, I) \, u_{ol+3} + (30982478111 + 21534970015 \, I) \, u_{ol+4} + (-31528342547968 + 29680791711424 \, I) \, u_{ol-3-1} + (3301857455662080 - 11429311255004160 \, I) \, u_{ol-2-1} + (-253549809974784960 + 305453852897356800 \, I) \, u_{ol-1-1} + 1304913491312005120 \, u_{ol-1}$$

$$- (253549809974784960 + 305453852897356800 \, I) \, u_{ol+1-1} + (3301857455662080 + 11429311255004160 \, I) \, u_{ol+2-1} - (31528342547968 + 29680791711424 \, I) \, u_{ol+3-1} + (-1733032002723840 + 214564722404760 \, I) \, u_{ol-2-21} + (-114593853037547520 + 43129519789224960 \, I) \, u_{ol-1-21} - 527145836475454560 \, u_{ol-21}$$

$$- (114593853037547520 + 43129519789224960 \, I) \, u_{ol+1-21} - (1733032002723840 + 214564722404760 \, I) \, u_{ol+2-21} + (-1148653763643456 + 558268389539392 \, I) \, u_{ol-1-31} + 7553095718447104 \, u_{ol-31} - (1148653763643456 + 558268389539392 \, I) \, u_{ol+1-31} - 9277445557562 \, u_{ol-41} \Big) \Big), \, O(\, \Delta x_{ol}^{15} \, )$$

Formula:, 737, Var.: 1

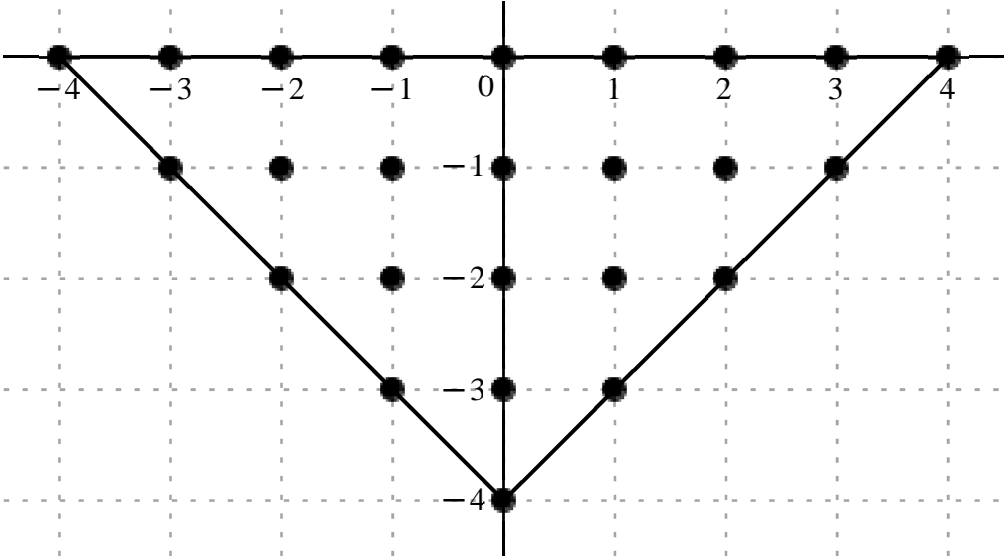
Variavel :,  $x_o$ !, Derivada de Ordem :, 11

Error order:, 14, Error:,  $3.3647620790616241098 \times 10^{-35}$ , New Error:,  $3.3574863276445850285 \times 10^{-49}$   
Error order:, 14, Error:,  $3.3574863276445850285 \times 10^{-49}$ , New Error:,  $3.3567390222922631463 \times 10^{-63}$   
Error order:, 14, Error:,  $3.3567390222922631463 \times 10^{-63}$ , New Error:,  $3.3566640945938489372 \times 10^{-77}$   
Error order:, 14, Error:,  $3.3566640945938489372 \times 10^{-77}$ , New Error:,  $3.3566565998525162561 \times 10^{-91}$   
Error order:, 14, Error:,  $3.3566565998525162561 \times 10^{-91}$ , New Error:,  $3.3566558503586682162 \times 10^{-105}$

$$x_o + h \cdot \begin{bmatrix} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ -3 -I & -2 -I & -1 -I & -I & 1 -I & 2 -I & 3 -I & & \\ & -2 -2 I & -1 -2 I & -2 I & 1 -2 I & 2 -2 I & & & \\ & & -1 -3 I & -3 I & 1 -3 I & & & & \\ & & & -4 I & & & & & \end{bmatrix}$$

c = ,

$-\frac{33665658279}{223184000} - \frac{8724288903 I}{44636800} - \frac{1874506022994}{22667125} - \frac{35481152586 I}{906685} - \frac{11625604683}{4225} - \frac{136556729463 I}{16900} - \frac{45146444574}{325} - \frac{16223214546 I}{325} - \frac{62324227119 I}{160} - \frac{45146444574}{325} - \frac{16223214546 I}{325} - \frac{11625604683}{4225} - \frac{136556729463 I}{16900} - \frac{1874506022994}{22667125} - \frac{35481152586 I}{906685} - \frac{33665658279}{223184000} - \frac{8}{\dots}$
$\frac{155726332377}{781625} + \frac{151243529514 I}{781625} - \frac{11373133333716}{156325} - \frac{2759776558308 I}{156325} - \frac{625895446869}{325} + \frac{490678332606 I}{325} - \frac{199285263408 I}{25} - \frac{625895446869}{325} + \frac{490678332606 I}{325} - \frac{11373133333716}{156325} - \frac{2759776558308 I}{156325} - \frac{155726332377}{781625} + \frac{151243529514 I}{781625} \dots$
$\frac{125047427967}{75400} + \frac{66047012955 I}{6032} - \frac{2660687335152}{9425} + \frac{6737430676284 I}{9425} - \frac{2141758363437 I}{650} - \frac{2660687335152}{9425} + \frac{6737430676284 I}{9425} - \frac{125047427967}{75400} + \frac{66047012955 I}{6032} \dots$
$\frac{76472484396}{21125} + \frac{153309823128 I}{21125} - \frac{1011008243784 I}{21125} - \frac{76472484396}{21125} + \frac{153309823128 I}{21125} \dots$
$\frac{474455289 I}{8000} \dots$



$$\frac{d^{11}}{dx_{ol}^{11}} u(x_{ol}) = \frac{1}{2901392000 \Delta x_{ol}^{11}} \left( 33 \left( - (13262229019 + 17184205415 I) u_{ol-4} - (7270811240704 + 3440596614400 I) u_{ol-3} - (241925310542720 + 710426039824480 I) u_{ol-2} + (12213289800974080 - 4388802321496320 I) u_{ol-1} + 34247540524479100 I u_{ol} - (12213289800974080 + 4388802321496320 I) u_{ol+1} \right. \right.$$

$$+ (241925310542720 - 710426039824480 I) u_{ol+2} + (7270811240704 - 3440596614400 I) u_{ol+3} + (13262229019 - 17184205415 I) u_{ol+4} + (17516852902528 + 17012605501696 I) u_{ol-3-I} - (6396525899205120 + 1552165240066560 I) u_{ol-2-I} + (169321029592740480 + 132741276344651520 I) u_{ol-1-I}$$

$$- 700854144205895680 I u_{ol-1} + (-169321029592740480 + 132741276344651520 I) u_{ol+1-I} + (6396525899205120 - 1552165240066560 I) u_{ol+2-I} + (-17516852902528 + 17012605501696 I) u_{ol+3-I} + (145812879641520 + 962685249435000 I) u_{ol-2-2I} + (24820181492520960 + 62850019981432320 I) u_{ol-1-2I}$$

$$+ 289700726415347520 I u_{ol-2I} + (-24820181492520960 + 62850019981432320 I) u_{ol+1-2I} + (-145812879641520 + 962685249435000 I) u_{ol+2-2I} + (318273845360128 + 638066192354304 I) u_{ol-1-3I} - 4207755037402112 I u_{ol-3I} + (-318273845360128 + 638066192354304 I) u_{ol+1-3I} + 5214321135842 I u_{ol-4I} \Big) \Big), O(\Delta x_{ol}^{14})$$

Formula:, 738, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

Error order:., 13, Error:.,  $1.8875752033410790927 \times 10^{-32}$ , New Error:.,  $1.8835264864543829687 \times 10^{-45}$

Error order:., 13, Error:.,  $1.8835264864543829687 \times 10^{-45}$ , New Error:.,  $1.8831107263494581314 \times 10^{-58}$

Error order:., 13, Error:.,  $1.8831107263494581314 \times 10^{-58}$ , New Error:.,  $1.8830690415308869018 \times 10^{-71}$

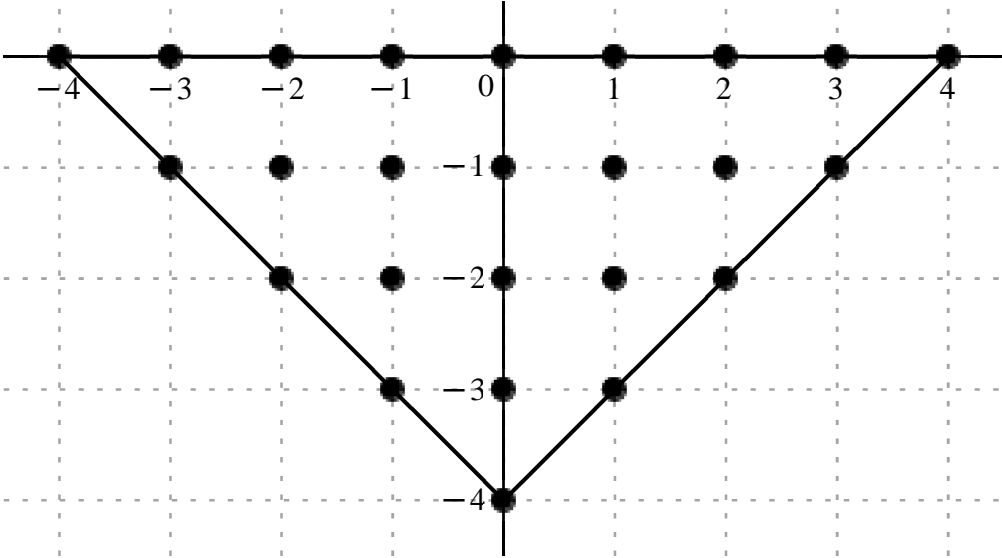
Error order:., 13, Error:.,  $1.8830690415308869018 \times 10^{-71}$ , New Error:.,  $1.8830648719610259648 \times 10^{-84}$

Error order:., 13, Error:.,  $1.8830648719610259648 \times 10^{-84}$ , New Error:.,  $1.8830644549931599100 \times 10^{-97}$

c =,



$-\frac{126261400419}{111592000} + \frac{21728027871 \text{ I}}{22318400}$	$-\frac{4547834931024}{22667125} + \frac{2297581510752 \text{ I}}{4533425}$	$-\frac{765832824603}{16900} + \frac{324412690833 \text{ I}}{16900}$	$-\frac{101821614048}{325} - \frac{245257146288 \text{ I}}{325}$	$\frac{169648390989}{80}$	$-\frac{101821614048}{325} + \frac{245257146288 \text{ I}}{325}$	$-\frac{765832824603}{16900} - \frac{324412690833 \text{ I}}{16900}$	$-\frac{4547834931024}{22667125} - \frac{2297581510752 \text{ I}}{4533425}$	$-\frac{126261400419}{111592000}$	...
	$\frac{852659956071}{781625} - \frac{962516723553 \text{ I}}{781625}$	$-\frac{13222620224352}{156325} + \frac{66723605825184 \text{ I}}{156325}$	$\frac{540836671221}{65} - \frac{3643046487927 \text{ I}}{325}$	$-\frac{1128062605824}{25}$	$\frac{540836671221}{65} + \frac{3643046487927 \text{ I}}{325}$	$-\frac{13222620224352}{156325} - \frac{66723605825184 \text{ I}}{156325}$	$\frac{852659956071}{781625} + \frac{962516723553 \text{ I}}{781625}$		...
		$\frac{2409736931217}{37700} - \frac{66484729773 \text{ I}}{5800}$	$\frac{38879344305648}{9425} - \frac{1236052551888 \text{ I}}{725}$	$\frac{12390761802573}{650}$	$\frac{38879344305648}{9425} + \frac{1236052551888 \text{ I}}{725}$	$\frac{2409736931217}{37700} + \frac{66484729773 \text{ I}}{5800}$			...
			$\frac{896092678404}{21125} - \frac{458590494978 \text{ I}}{21125}$	$-\frac{5927843363904}{21125}$	$\frac{896092678404}{21125} + \frac{458590494978 \text{ I}}{21125}$				...
				$\frac{18244104417}{52000}$					...



$$\frac{\mathrm{d}^{12}}{\mathrm{d}x_{ol}^{12}}\,u(x_{ol})=\frac{1}{1450696000\,\Delta x_{ol}^{12}}\big(99\,\big((\,-16579779853+14265876885\,\text{I}\,)\,u_{ol-4}+(\,-2940014500864+7426526095360\,\text{I}\,)\,u_{ol-3}+(\,-664031208726480+281288741223280\,\text{I}\,)\,u_{ol-2}-(4590900022159360+11058074936796160\,\text{I}\,)\,u_{ol-1}+31074273006840700\,u_{ol}+(\,-4590900022159360+11058074936796160\,\text{I}\,)\,u_{ol+1}-(664031208726480+281288741223280\,\text{I}\,)\,u_{ol+2}-(2940014500864+7426526095360\,\text{I}\,)\,u_{ol+3}-(16579779853+14265876885\,\text{I}\,)\,u_{ol+4}+(15985220994624-18044757968832\,\text{I}\,)\,u_{ol-3-1}+(\,-1239453693757440+6254495576340480\,\text{I}\,)\,u_{ol-2-1}+(121925345080593600-164256502497272640\,\text{I}\,)\,u_{ol-1-1}-661202387886243840\,u_{ol-1}+(121925345080593600+164256502497272640\,\text{I}\,)\,u_{ol+1-1}-(1239453693757440+6254495576340480\,\text{I}\,)\,u_{ol+2-1}+(15985220994624+18044757968832\,\text{I}\,)\,u_{ol+3-1}+(936633102153840-167971319301240\,\text{I}\,)\,u_{ol-2-21}+(60447562379043840-24982744588139520\,\text{I}\,)\,u_{ol-1-21}+279335331529843680\,u_{ol-21}+(60447562379043840+24982744588139520\,\text{I}\,)\,u_{ol+1-21}+(936633102153840+167971319301240\,\text{I}\,)\,u_{ol+2-21}+(621580569811712-318104307789184\,\text{I}\,)\,u_{ol-1-31}-4111887469555712\,u_{ol-31}+(621580569811712+318104307789184\,\text{I}\,)\,u_{ol+1-31}+5141151767934\,u_{ol-41}\big)\big)\,,\,O(\,\Delta x_{ol}^{13}\,)\,$$

Formula.: 739, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 13

Error order.: 12, Error.: 1.0120154994657155265 × 10<sup>−29</sup>, New Error.: 1.0098642738574618065 × 10<sup>−41</sup>

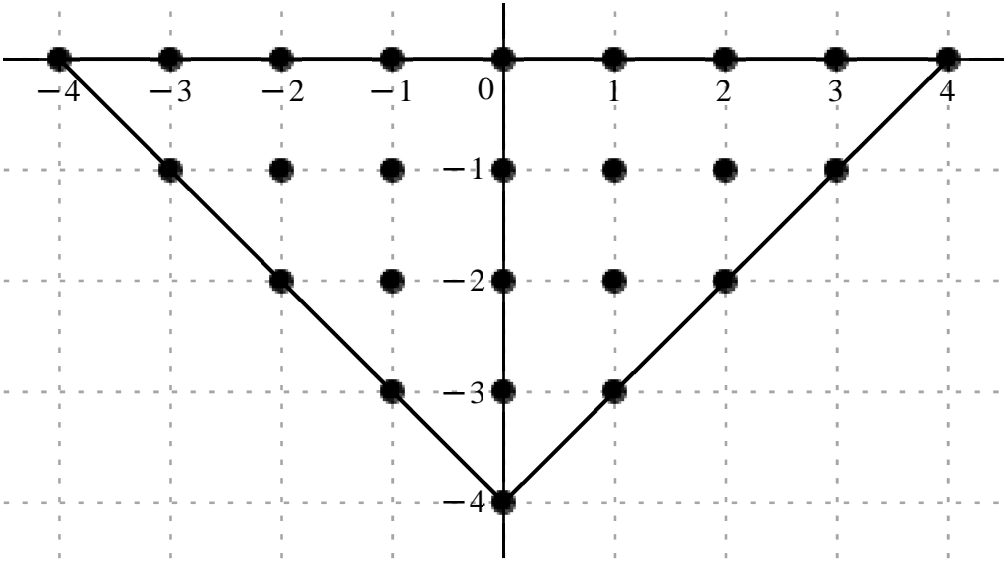
Error order.: 12, Error.: 1.0098642738574618065 × 10<sup>−41</sup>, New Error.: 1.0096434183169332296 × 10<sup>−53</sup>

*Error order*:, 12,    *Error*:, 1.0096434183169332296 × 10<sup>−53</sup>,    *New Error*:, 1.0096212754728143732 × 10<sup>−65</sup>  
*Error order*:, 12,    *Error*:, 1.0096212754728143732 × 10<sup>−65</sup>,    *New Error*:, 1.0096190606155420196 × 10<sup>−77</sup>  
*Error order*:, 12,    *Error*:, 1.0096190606155420196 × 10<sup>−77</sup>,    *New Error*:, 1.0096188391240862199 × 10<sup>−89</sup>

$$x_o + h \cdot \begin{bmatrix} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3 - \mathbf{I} & -2 - \mathbf{I} & -1 - \mathbf{I} & -\mathbf{I} & 1 - \mathbf{I} & 2 - \mathbf{I} & 3 - \mathbf{I} & \\ & & -2 - 2 \mathbf{I} & -1 - 2 \mathbf{I} & -2 \mathbf{I} & 1 - 2 \mathbf{I} & 2 - 2 \mathbf{I} & & \\ & & & -1 - 3 \mathbf{I} & -3 \mathbf{I} & 1 - 3 \mathbf{I} & & & \\ & & & & -4 \mathbf{I} & & & & \end{bmatrix}$$

$c = ,$

$$\left[ \begin{array}{cccccccccccccccc} \frac{12791895039}{2146000} + \frac{1325772657 \mathbf{I}}{214600} & \frac{5118003250668}{1743625} + \frac{327112323516 \mathbf{I}}{348725} & \frac{158381777169}{1300} + \frac{311811217641 \mathbf{I}}{1300} & -\frac{97764728292}{25} + \frac{45670803948 \mathbf{I}}{25} & -\frac{442173999267 \mathbf{I}}{40} & \frac{97764728292}{25} + \frac{45670803948 \mathbf{I}}{25} & -\frac{158381777169}{1300} + \frac{311811217641 \mathbf{I}}{1300} & -\frac{5118003250668}{1743625} + \frac{327112323516 \mathbf{I}}{348725} & -\frac{12791895039}{2146000} & \dots \\ -\frac{867955070367}{120250} - \frac{698958956619 \mathbf{I}}{120250} & \frac{28588379378328}{12025} + \frac{4436042748984 \mathbf{I}}{12025} & -\frac{3102760300563}{50} - \frac{2185086291003 \mathbf{I}}{50} & \frac{6092165727648 \mathbf{I}}{25} & \frac{3102760300563}{50} - \frac{2185086291003 \mathbf{I}}{50} & -\frac{28588379378328}{12025} + \frac{4436042748984 \mathbf{I}}{12025} & \frac{867955070367}{120250} - \frac{698958956619 \mathbf{I}}{120250} & \dots \\ -\frac{85491301203}{1160} - \frac{2059343007183 \mathbf{I}}{5800} & -\frac{7096482250704}{725} - \frac{16441556431608 \mathbf{I}}{725} & -\frac{5255885490471 \mathbf{I}}{50} & \frac{7096482250704}{725} - \frac{16441556431608 \mathbf{I}}{725} & \frac{85491301203}{1160} - \frac{2059343007183 \mathbf{I}}{5800} & \dots \\ -\frac{201515047272}{1625} - \frac{383865345171 \mathbf{I}}{1625} & \frac{2548009305072 \mathbf{I}}{1625} & \frac{201515047272}{1625} - \frac{383865345171 \mathbf{I}}{1625} & \dots \\ -\frac{1978280073 \mathbf{I}}{1000} & \dots \end{array} \right]$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}} \; u(x_{ol}) = \frac{1}{27898000 \; \Delta x_{ol}^{13}} \; \Big( 99 \; \Big( (1679743793 + 1740913590 \mathbf{I}) \; u_{ol-4} + (827152040512 + 264333190720 \mathbf{I}) \; u_{ol-3} + (34332049879260 + 67590593238140 \mathbf{I}) \; u_{ol-2} + (-1101996117127360 + 514797611531840 \mathbf{I}) \; u_{ol-1} - 3115093492815850 \mathbf{I} \; u_{ol} + (1101996117127360 + 514797611531840 \mathbf{I}) \; u_{ol+1} + (-34332049879260 + 67590593238140 \mathbf{I}) \; u_{ol+2} + (-827152040512 + 264333190720 \mathbf{I}) \; u_{ol+3} + (-1679743793 + 1740913590 \mathbf{I}) \; u_{ol+4} - (2033995720456 + 1637964423592 \mathbf{I}) \; u_{ol-3-1} + (669949900583040 + 103955749269120 \mathbf{I}) \; u_{ol-2-1} - (17487031689920520 + 12315058049778120 \mathbf{I}) \; u_{ol-1-1} + 68670399785827840 \mathbf{I} \; u_{ol-1} + (17487031689920520 - 12315058049778120 \mathbf{I}) \; u_{ol+1-1} + (-669949900583040 + 103955749269120 \mathbf{I}) \; u_{ol+2-1} + (2033995720456 - 1637964423592 \mathbf{I}) \; u_{ol+3-1} - (20768341352850 + 100054948126770 \mathbf{I}) \; u_{ol-2-21} - (2758309464718080 + 6390617085740160 \mathbf{I}) \; u_{ol-1-21} - 29621958265284840 \mathbf{I} \; u_{ol-21} + (2758309464718080 - 6390617085740160 \mathbf{I}) \; u_{ol+1-21} + (20768341352850 - 100054948126770 \mathbf{I}) \; u_{ol+2-21} - (34945558904704 + 66567679251472 \mathbf{I}) \; u_{ol-1-31} + 441860845954304 \mathbf{I} \; u_{ol-31} + (34945558904704 - 66567679251472 \mathbf{I}) \; u_{ol+1-31} - 557475328046 \mathbf{I} \; u_{ol-41} \Big) \Big) , \; O( \; \Delta x_{ol}^{12} \; )$$

Formula:, 740, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:, 11, Error:,  $5.1646650841221806837 \times 10^{-27}$ , New Error:,  $5.1537976322539775795 \times 10^{-38}$

*Error order:*, 11, *Error:*,  $5.1537976322539775795 \times 10^{-38}$ , *New Error:*,  $5.1526822154760313145 \times 10^{-49}$

*Error order*., 11, *Error*.,  $5.1526822154760313145 \times 10^{-49}$ , *New Error*.,  $5.1525703872792580862 \times 10^{-60}$

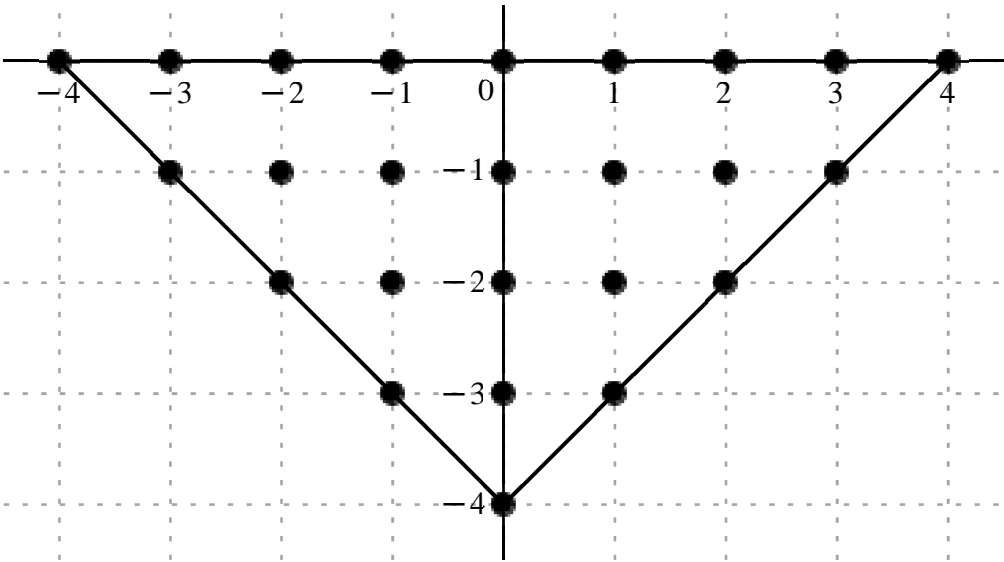
*Error order:*, 11, *Error:*,  $5.1525703872792580862 \times 10^{-60}$ , *New Error:*,  $5.1525592015945901773 \times 10^{-71}$

*Error order*., 11, *Error*.,  $5.1525592015945901773 \times 10^{-71}$ , *New Error*.,  $5.1525580829974736800 \times 10^{-82}$

$$x_o \neq h, \left[ \begin{array}{cccccccccc} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I & \\ & & -2-2I & -1-2I & -2I & 1-2I & 2-2I & & \\ & & & -1-3I & -3I & 1-3I & & & \\ & & & & -4I & & & & \end{array} \right]$$

$$c = ,$$

$\frac{271090618029}{8584000} - \frac{59130294993 \text{ I}}{1716800}$	$\frac{6794723844216}{1743625} - \frac{5570782293384 \text{ I}}{348725}$	$\frac{1552374704727}{1300} - \frac{922182507477 \text{ I}}{1300}$	$\frac{248265292968}{25} + \frac{481049647848 \text{ I}}{25}$	$\frac{4389411385359}{80}$	$\frac{248265292968}{25} - \frac{481049647848 \text{ I}}{25}$	$\frac{1552374704727}{1300} + \frac{922182507477 \text{ I}}{1300}$	$\frac{6794723844216}{1743625} + \frac{5570782293384 \text{ I}}{348725}$	$\frac{271090618029}{8584000}$
$-\frac{1749621356406}{60125} + \frac{2400851501433 \text{ I}}{60125}$	$\frac{17062756592112}{12025} - \frac{150507326947824 \text{ I}}{12025}$	$-\frac{5441961233709}{25} + \frac{1626521022126 \text{ I}}{5}$	$\frac{31235533737408}{25}$	$-\frac{5441961233709}{25} - \frac{1626521022126 \text{ I}}{5}$	$\frac{17062756592112}{12025} + \frac{150507326947824 \text{ I}}{12025}$	$-\frac{1749621356406}{60125} - \frac{2400851501433 \text{ I}}{60125}$		
$-\frac{5416944975981}{2900} + \frac{2560362714063 \text{ I}}{5800}$	$-\frac{85702908991392}{725} + \frac{38564755414416 \text{ I}}{725}$	$-\frac{27494098383213}{50}$	$-\frac{85702908991392}{725} - \frac{38564755414416 \text{ I}}{725}$	$-\frac{5416944975981}{2900} - \frac{2560362714063 \text{ I}}{5800}$				
	$-\frac{2027187645021}{1625} + \frac{1091599413597 \text{ I}}{1625}$	$\frac{13505950380384}{1625}$	$-\frac{2027187645021}{1625} - \frac{1091599413597 \text{ I}}{1625}$					
		$-\frac{42331635423}{4000}$						



$$\frac{d^{14}}{dx_{ol}^{14}} u(x_{ol}) = \frac{1}{111592000 \Delta x_{ol}^{14}} \left( 693 \left( (5085393989 - 5546131565 I) u_{ol-4} + (627506963968 - 2572367004160 I) u_{ol-3} + (192288376123760 - 114228205543760 I) u_{ol-2} + (1599100754567680 + 3098487290196480 I) u_{ol-1} - 8835194720688700 u_{ol} + (1599100754567680 - 3098487290196480 I) u_{ol+1} + (192288376123760 \right.$$
  
$$+ 114228205543760 I) u_{ol+2} + (627506963968 + 2572367004160 I) u_{ol+3} + (5085393989 + 5546131565 I) u_{ol+4} + (-4685854599552 + 6429986127936 I) u_{ol-3-1} + (228488284523520 - 2015451650903040 I) u_{ol-2-1} + (-35052198441099840 + 52382895786748800 I) u_{ol-1-1} + 201191092688302080 u_{ol-1}$$
  
$$- (35052198441099840 + 52382895786748800 I) u_{ol+1-1} + (228488284523520 + 2015451650903040 I) u_{ol+2-1} - (4685854599552 + 6429986127936 I) u_{ol+3-1} + (-300785054366160 + 71084240430840 I) u_{ol-2-21} + (-19035197333268480 + 8565493727831040 I) u_{ol-1-21} - 88546072922929440 u_{ol-21} - (19035197333268480$$
  
$$+ 8565493727831040 I) u_{ol+1-21} - (300785054366160 + 71084240430840 I) u_{ol+2-21} + (-200881717112384 + 108170728615488 I) u_{ol-1-31} + 1338355879540736 u_{ol-31} - (200881717112384 + 108170728615488 I) u_{ol+1-31} - 1704138477678 u_{ol-41} \Big) \Big), O(\Delta x_{ol}^{11})$$

Formula:, 741, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 15

Error order:, 10, Error:,  $2.4968013236525408491 \times 10^{-24}$ , New Error:,  $2.4916081930606653042 \times 10^{-34}$

Error order:, 10, Error:,  $2.4916081930606653042 \times 10^{-34}$ , New Error:,  $2.4910753320856126467 \times 10^{-44}$

Error order:, 10, Error:,  $2.4910753320856126467 \times 10^{-44}$ , New Error:,  $2.4910219106010979420 \times 10^{-54}$

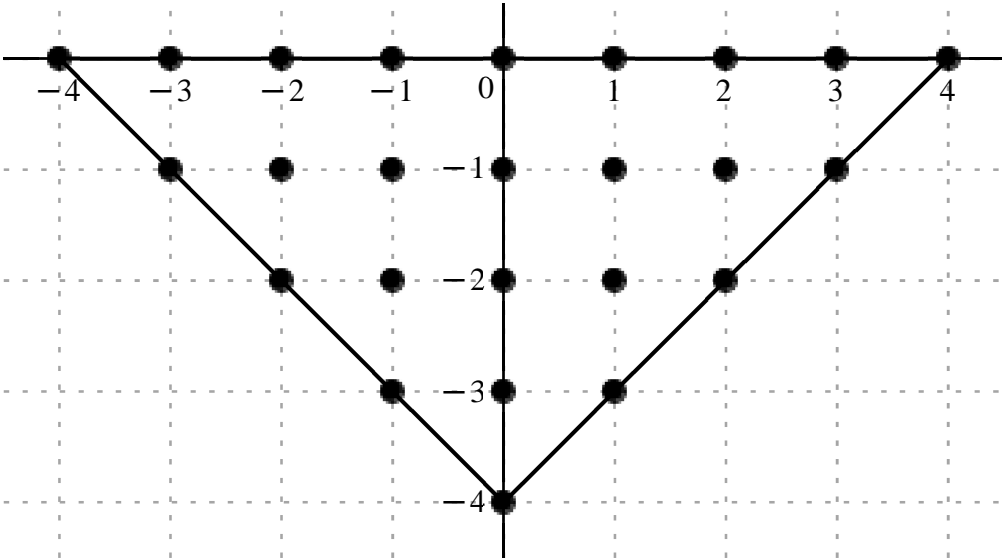
Error order:, 10, Error:,  $2.4910219106010979420 \times 10^{-54}$ , New Error:,  $2.4910165670988695784 \times 10^{-64}$

Error order:, 10, Error:,  $2.4910165670988695784 \times 10^{-64}$ , New Error:,  $2.4910160327351090664 \times 10^{-74}$

$$x_o + h \cdot , \left[ \begin{array}{cccccccc} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3 - I & -2 - I & -1 - I & -I & 1 - I & 2 - I & 3 - I & \\ & & -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I & & \\ & & & -1 - 3 I & -3 I & 1 - 3 I & & & \\ & & & & -4 I & & & & \end{array} \right]$$

c = ,

$-\frac{160179737949}{858400}$	$-\frac{25706758077 \text{ I}}{171680}$	$-\frac{28301988421476}{348725}$	$-\frac{955168699716 \text{ I}}{69745}$	$-\frac{246976183377}{65}$	$-\frac{361750702698 \text{ I}}{65}$	$\frac{446899519836}{5}$	$-\frac{251453544804 \text{ I}}{5}$	$\frac{2061042560577 \text{ I}}{8}$	$-\frac{446899519836}{5}$	$-\frac{251453544804 \text{ I}}{5}$	$\frac{246976183377}{65}$	$-\frac{361750702698 \text{ I}}{65}$	$\frac{28301988421476}{348725}$	$-\frac{955168699716 \text{ I}}{69745}$	$\frac{1}{\dots}$	
		$\frac{2492984943603}{12025}$	$+\frac{1634243062221 \text{ I}}{12025}$	$-\frac{148966186950504}{2405}$	$-\frac{10788415174152 \text{ I}}{2405}$	$\frac{8029950096861}{5}$	$+\frac{5110639631559 \text{ I}}{5}$	$-\frac{30229720256736 \text{ I}}{5}$	$-\frac{8029950096861}{5}$	$+\frac{5110639631559 \text{ I}}{5}$	$\frac{148966186950504}{2405}$	$-\frac{10788415174152 \text{ I}}{2405}$	$-\frac{2492984943603}{12025}$	$+\frac{1634243062221 \text{ I}}{12025}$	$\dots$	
				$\frac{713375529867}{290}$	$+\frac{1073449901601 \text{ I}}{116}$	$\frac{39464866381248}{145}$	$+\frac{84232724299416 \text{ I}}{145}$	$\frac{13566187963944 \text{ I}}{5}$	$-\frac{39464866381248}{145}$	$+\frac{84232724299416 \text{ I}}{145}$	$-\frac{713375529867}{290}$	$+\frac{1073449901601 \text{ I}}{116}$			$\dots$	
						$\frac{1115336069694}{325}$	$+\frac{2018985190992 \text{ I}}{325}$	$-\frac{13505811991056 \text{ I}}{325}$	$-\frac{1115336069694}{325}$	$+\frac{2018985190992 \text{ I}}{325}$					$\dots$	
								$\frac{21366117927 \text{ I}}{400}$								$\dots$



$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}}\; u(x_{ol}) = \frac{1}{11159200 \; \mathcal{A}x_{ol}^{15}} \left( 2079 \left( - (1001604903 + 803722595 \; \text{I}) \; u_{ol-4} - (435624641408 + 73509856640 \; \text{I}) \; u_{ol-3} - (20394839423840 + 29872708340160 \; \text{I}) \; u_{ol-2} + (479753835666560 - 269939432147840 \; \text{I}) \; u_{ol-1} + 1382851499638700 \; \text{I} u_{ol} - (479753835666560 + 269939432147840 \; \text{I}) \; u_{ol+1} + (20394839423840 \right. \\ \left. - 29872708340160 \; \text{I}) \; u_{ol+2} + (435624641408 - 73509856640 \; \text{I}) \; u_{ol+3} + (1001604903 - 803722595 \; \text{I}) \; u_{ol+4} + (1112789816096 + 729474536672 \; \text{I}) \; u_{ol-3-1} - (332469027152640 + 24078040600320 \; \text{I}) \; u_{ol-2-1} + (8620280819710560 + 5486353994852640 \; \text{I}) \; u_{ol-1-1} - 32452091802690560 \; \text{I} u_{ol-1} + (-8620280819710560 \right. \\ \left. + 5486353994852640 \; \text{I}) \; u_{ol+1-1} + (332469027152640 - 24078040600320 \; \text{I}) \; u_{ol+2-1} + (-1112789816096 + 729474536672 \; \text{I}) \; u_{ol+3-1} + (13203795281040 + 49670938207800 \; \text{I}) \; u_{ol-2-21} + (1460902413035520 + 3118109890371840 \; \text{I}) \; u_{ol-1-21} + 14563521378282240 \; \text{I} u_{ol-21} + (-1460902413035520 \right. \\ \left. + 3118109890371840 \; \text{I}) \; u_{ol+1-21} + (-13203795281040 + 49670938207800 \; \text{I}) \; u_{ol+2-21} + (18420480658496 + 33344817468928 \; \text{I}) \; u_{ol-1-31} - 223057027669504 \; \text{I} u_{ol-31} + (-18420480658496 + 33344817468928 \; \text{I}) \; u_{ol+1-31} + 286710898474 \; \text{I} u_{ol-41} \right) \Big), \; O(\; \mathcal{A}x_{ol}^{10} \; )$$

Formula: 742, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 16

Error order.: 9, Error.: 1.1368081377173940524 × 10<sup>−21</sup>, New Error.: 1.1344753032048958490 × 10<sup>−30</sup>

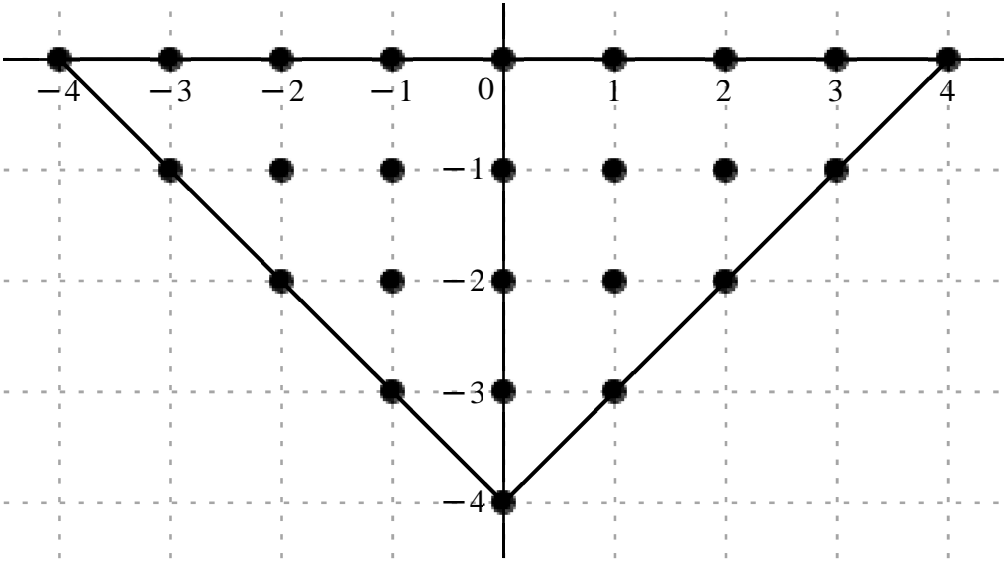
Error order.: 9, Error.: 1.1344753032048958490 × 10<sup>−30</sup>, New Error.: 1.1342360106663614639 × 10<sup>−39</sup>

Error order:, 9, Error:, 1.1342360106663614639 × 10<sup>−39</sup>, New Error:, 1.1342120213620685603 × 10<sup>−48</sup>  
Error order:, 9, Error:, 1.1342120213620685603 × 10<sup>−48</sup>, New Error:, 1.1342096218311757661 × 10<sup>−57</sup>  
Error order:, 9, Error:, 1.1342096218311757661 × 10<sup>−57</sup>, New Error:, 1.1342093818720818926 × 10<sup>−66</sup>

$$x_o + h \cdot \begin{bmatrix} -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3 - I & -2 - I & -1 - I & -I & 1 - I & 2 - I & 3 - I & \\ & & -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I & & \\ & & & -1 - 3 I & -3 I & 1 - 3 I & & & \\ & & & & -4 I & & & & \end{bmatrix}$$

c = ,

$$\begin{bmatrix} -\frac{69792023763}{107300} + \frac{20180938239 I}{21460} & -\frac{12482836648128}{348725} + \frac{26638145303616 I}{69745} & -\frac{1568064619044}{65} + \frac{1215328422924 I}{65} & -\frac{1181762277696}{5} - \frac{1945373322816 I}{5} & 1135558729305 & -\frac{1181762277696}{5} + \frac{1945373322816 I}{5} & -\frac{1568064619044}{65} - \frac{1215328422924 I}{65} & -\frac{12482836648128}{348725} - \frac{266381453036}{69745} \dots \\ \frac{7055167264992}{12025} - \frac{12062457093456 I}{12025} & -\frac{21985677673344}{2405} + \frac{688194534158208 I}{2405} & 4490949854160 - \frac{37077895429344 I}{5} & -\frac{137062000018944}{5} & 4490949854160 + \frac{37077895429344 I}{5} & -\frac{21985677673344}{2405} - \frac{688194534158208 I}{2405} & \frac{7055167264992}{12025} + \frac{12062457093456}{12025} \dots \\ \frac{6215747721876}{145} - \frac{1842151949946 I}{145} & \frac{387489331063296}{145} - \frac{188866118060928 I}{145} & \frac{62695570551768}{5} & \frac{387489331063296}{145} + \frac{188866118060928 I}{145} & \frac{6215747721876}{145} + \frac{1842151949946 I}{145} & \dots & \dots \\ \frac{9414538510608}{325} - \frac{5337550720656 I}{325} & -\frac{63257950280448}{325} & \frac{9414538510608}{325} + \frac{5337550720656 I}{325} & \dots & \dots & \dots & \dots \\ & & \frac{12631902129}{50} & & & & \dots \end{bmatrix}$$



$$\frac{\mathrm{d}^{16}}{\mathrm{d}x_{ol}^{16}}\; u(x_{ol}) = \frac{1}{1394900\; \Delta x_{ol}^{16}} \Big( (2079\; \big( (-436409961 + 630957665\; I)\; u_{ol-4} + (-24017001728 + 256259214080\; I)\; u_{ol-3} + (-16185986880560 + 12544948511760\; I)\; u_{ol-2} - (158580105931520 + 261048701105920\; I)\; u_{ol-1} + 761900371095500\; u_{ol} + (-158580105931520 + 261048701105920\; I)\; u_{ol+1} - (16185986880560 + 12544948511760\; I)\; u_{ol+2} - (24017001728 + 256259214080\; I)\; u_{ol+3} - (436409961 + 630957665\; I)\; u_{ol+4} + (393650506368 - 673037529024\; I)\; u_{ol-3-1} + (-6133570490880 + 191992703132160\; I)\; u_{ol-2-1} + (3013191895896000 - 4975464774833280\; I)\; u_{ol-1-1} - 18392283196385280\; u_{ol-1} + (3013191895896000 + 4975464774833280\; I)\; u_{ol+1-1} - (6133570490880 + 191992703132160\; I)\; u_{ol+2-1} + (393650506368 + 673037529024\; I)\; u_{ol+3-1} + (28761660935280 - 8524050869880\; I)\; u_{ol-2-21} + (1793000175482880 - 873925952739840\; I)\; u_{ol-1-21} + 8413088154176160\; u_{ol-21} + (1793000175482880 + 873925952739840\; I)\; u_{ol+1-21} + (28761660935280 + 8524050869880\; I)\; u_{ol+2-21} + (19435882293184 - 11019128279488\; I)\; u_{ol-1-31} - 130593132565504\; u_{ol-31} + (19435882293184 + 11019128279488\; I)\; u_{ol+1-31} + 169506880998\; u_{ol-41} \big) \Big),\; O(\; \Delta x_{ol}^{\; 9} \; )$$

*Formula:*, 743, *Var:*, 1

*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 1

*Error order*., 40, *Error*.,  $2.1706035461838194475 \times 10^{-113}$ , *New Error*.,  $2.1706035461809622880 \times 10^{-15}$

*Error order*., 40, *Error*.,  $2.1706035461809622880 \times 10^{-153}$ , *New Error*.,  $2.1706035461809620023 \times 10^{-19}$ .

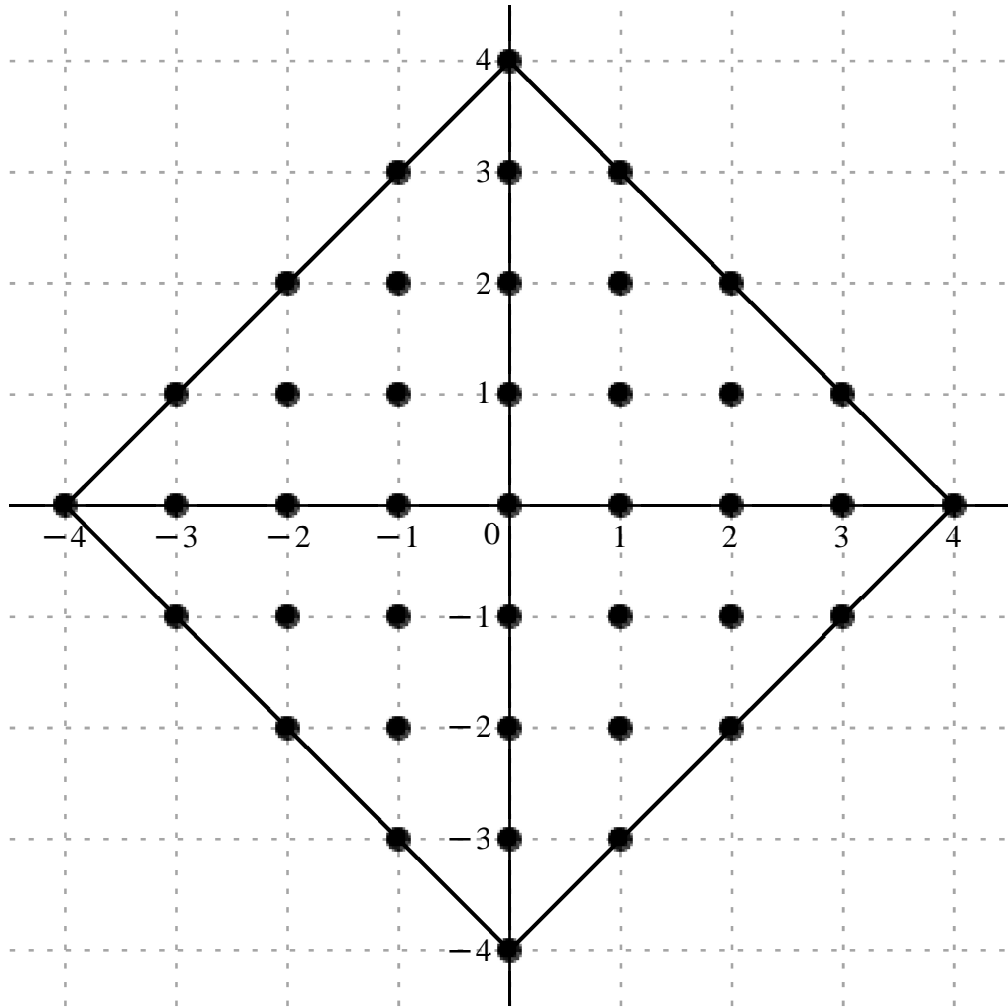
*Error order:*, 40, *Error:*,  $2.1706035461809620023 \times 10^{-193}$ , *New Error:*,  $2.1706035461809620023 \times 10^{-23}$ .

*Error order:*, 40, *Error:*,  $2.1706035461809620023 \times 10^{-233}$ , *New Error:*,  $2.1706035461809620023 \times 10^{-27}$ .

*Error order*., 40, *Error*.,  $2.1706035461809620023 \times 10^{-273}$ , *New Error*.,  $2.1706035461809620023 \times 10^{-31}$ .

$$x_o \neq h., \quad \begin{bmatrix} & & & & 4\text{ I} & & & & \\ & & & & -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & & \\ & & & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & \\ & -3+\text{ I} & -2+\text{ I} & -1+\text{ I} & 1 & 1+\text{ I} & 2+\text{ I} & 3+\text{ I} & \\ x_o \neq h., & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ & -3-\text{ I} & -2-\text{ I} & -1-\text{ I} & -1 & 1-\text{ I} & 2-\text{ I} & 3-\text{ I} & \\ & & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & & \\ & & & -1-3\text{ I} & -3\text{ I} & 1-3\text{ I} & & & \\ & & & & & -4\text{ I} & & & \end{bmatrix}$$

$$c = \frac{1}{29347580080} - \frac{2048}{4207925085} + \frac{40}{37349} - \frac{60}{17032077725} - \frac{512 I}{17032077725} - \frac{2684928}{17032077725} + \frac{24576 I}{587313025}$$



$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{5722778115600 \Delta x_{ol}} \left( 195 I u_{ol+4I} + (172032 - 310464 I) u_{ol-1+3I} - 2785280 I u_{ol+3I} - (172032 + 310464 I) u_{ol+1+3I} + (3030300 + 3030300 I) u_{ol-2+2I} - (239468544 + 902135808 I) u_{ol-1+2I} + 6128976000 I u_{ol+2I} + (239468544 - 902135808 I) u_{ol+1+2I} + (-3030300 + 3030300 I) u_{ol+2+2I} + (-310464 \right. \\ \left. + 172032 I) u_{ol-3+I} - (902135808 + 239468544 I) u_{ol-2+I} - (119515032000 + 119515032000 I) u_{ol-1+I} - 1199837184000 I u_{ol+I} + (119515032000 - 119515032000 I) u_{ol+1+I} + (902135808 - 239468544 I) u_{ol+2+I} + (310464 + 172032 I) u_{ol+3+I} + 195 u_{ol-4} - 2785280 u_{ol-3} + 6128976000 u_{ol-2} - 1199837184000 u_{ol-1} \right. \\ \left. + 1199837184000 u_{ol+1} - 6128976000 u_{ol+2} + 2785280 u_{ol+3} - 195 u_{ol+4} - (310464 + 172032 I) u_{ol-3-I} + (-902135808 + 239468544 I) u_{ol-2-I} + (-119515032000 + 119515032000 I) u_{ol-1-I} + 1199837184000 I u_{ol-I} + (119515032000 + 119515032000 I) u_{ol+1-I} + (902135808 + 239468544 I) u_{ol+2-I} + (310464 \right. \\ \left. - 172032 I) u_{ol+3-I} + (3030300 - 3030300 I) u_{ol-2-2I} + (-239468544 + 902135808 I) u_{ol-1-2I} - 6128976000 I u_{ol-2I} + (239468544 + 902135808 I) u_{ol+1-2I} - (3030300 + 3030300 I) u_{ol+2-2I} + (172032 + 310464 I) u_{ol-1-3I} + 2785280 I u_{ol-3I} + (-172032 + 310464 I) u_{ol+1-3I} - 195 I u_{ol-4I} \right), \quad O(\Delta x_{ol}^{40})$$

Formula:, 744, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 40, Error:,  $1.0284783445551153632 \times 10^{-114}$ , New Error:,  $1.0284783445538793002 \times 10^{-154}$

Error order:, 40, Error:,  $1.0284783445538793002 \times 10^{-154}$ , New Error:,  $1.0284783445538791766 \times 10^{-194}$

Error order:, 40, Error:,  $1.0284783445538791766 \times 10^{-194}$ , New Error:,  $1.0284783445538791766 \times 10^{-234}$

Error order:, 40, Error:,  $1.0284783445538791766 \times 10^{-234}$ , New Error:,  $1.0284783445538791766 \times 10^{-274}$

Error order:, 40, Error:,  $1.0284783445538791766 \times 10^{-274}$ , New Error:,  $1.0284783445538791766 \times 10^{-314}$

$$x_o + h \cdot, \begin{vmatrix} & & & & 4 I \\ & & & -1 + 3 I & 3 I & 1 + 3 I \\ & & -2 + 2 I & -1 + 2 I & 2 I & 1 + 2 I & 2 + 2 I \\ -3 + I & -2 + I & -1 + I & I & 1 + I & 2 + I & 3 + I \\ -3 - I & -2 - I & -1 - I & -I & 1 - I & 2 - I & 3 - I \\ & -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I \\ & & -1 - 3 I & -3 I & 1 - 3 I \\ & & & & -4 I \end{vmatrix}$$





Formula:, 745, Var:, 1

*Variavel* :,  $x_{oi}$ , *Derivada de Ordem* :, 3

*Error order*., 40, *Error*.,  $7.1397316525859781729 \times 10^{-116}$ , *New Error*.,  $7.1397316525781276621 \times 10^{-156}$

*Error order*., 40, *Error*.,  $7.1397316525781276621 \times 10^{-156}$ , *New Error*.,  $7.1397316525781268770 \times 10^{-196}$

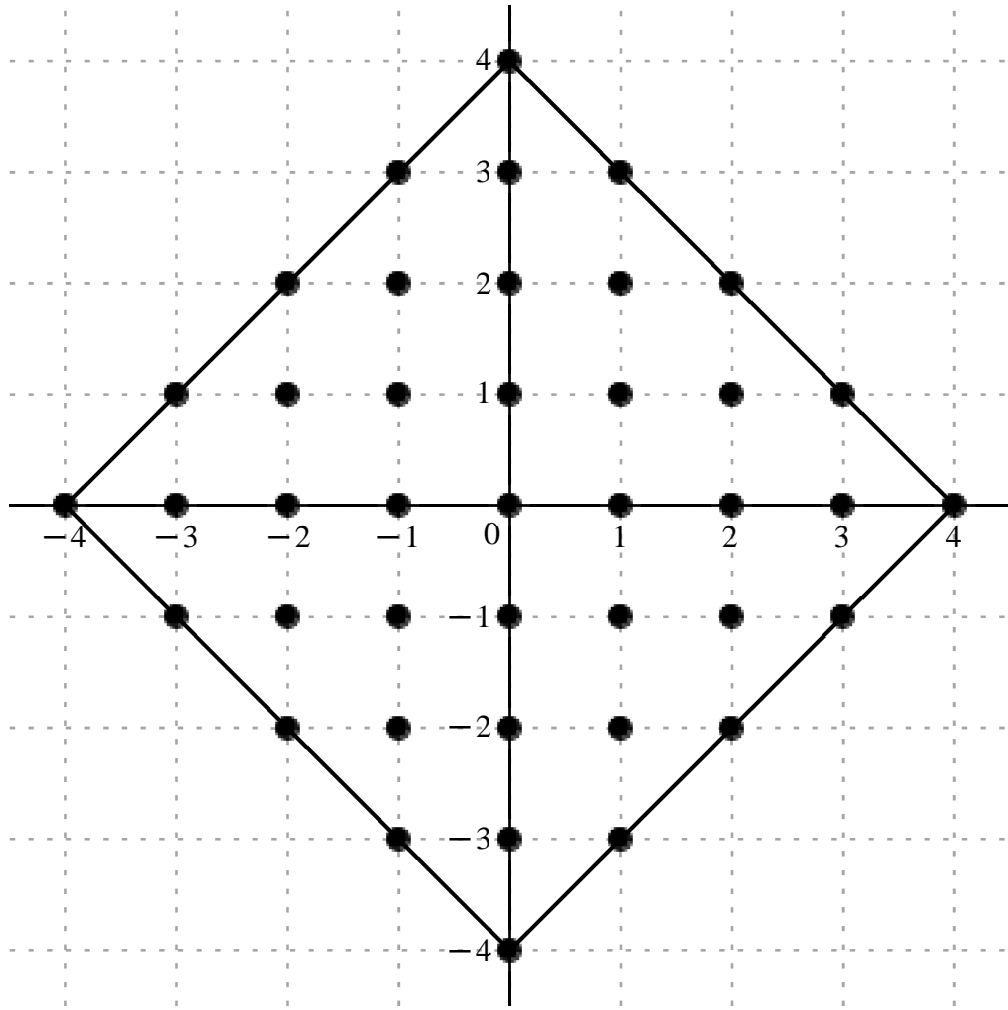
*Error order:*, 40, *Error:*,  $7.1397316525781268770 \times 10^{-196}$ , *New Error:*,  $7.1397316525781268770 \times 10^{-236}$

*Error order*., 40, *Error*.,  $7.1397316525781268770 \times 10^{-236}$ , *New Error*.,  $7.1397316525781268770 \times 10^{-276}$

*Error order*., 40, *Error*.,  $7.1397316525781268770 \times 10^{-276}$ , *New Error*.,  $7.1397316525781268770 \times 10^{-316}$

$$x_o + h., \quad -4 \begin{array}{ccccccc} & & & & 4\text{I} \\ & & & -1+3\text{I} & 3\text{I} & 1+3\text{I} \\ & & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} \\ -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ -3-\text{I} & -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ & -2-2\text{I} & -1-2\text{I} & -2\text{I} & 1-2\text{I} & 2-2\text{I} \\ & & -1-3\text{I} & -3\text{I} & 1-3\text{I} \\ & & & & -4\text{I} \end{array}$$

$$c = \frac{3}{234780640640} - \frac{4096}{12623775255} - \frac{60}{37349} - \frac{15696}{425801943125} + \frac{2172 I}{425801943125} - \frac{31223808}{425801943125} - \frac{77266944 I}{425801943125} - \frac{180}{2873} - \frac{180 I}{2873} - \frac{61440}{48841} - \frac{61440 I}{48841} - \frac{180}{2873} + \frac{180 I}{2873} - \frac{31223808}{425801943125} + \frac{77266944 I}{425801943125} - \frac{15696}{425801943125} + \frac{2172 I}{425801943125}$$



$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} u(x_{ol}) = \frac{1}{3433666869360000 \mathcal{A}x_{ol}^3} \big( -43875 \operatorname{I} u_{ol+4\operatorname{I}} + (17515008 + 126572544 \operatorname{I}) u_{ol-1+3\operatorname{I}} + 1114112000 \operatorname{I} u_{ol+3\operatorname{I}} + (-17515008 + 126572544 \operatorname{I}) u_{ol+1+3\operatorname{I}} + (-1363635000 + 1363635000 \operatorname{I}) u_{ol-2+2\operatorname{I}} + (623080636416 + 251788787712 \operatorname{I}) u_{ol-1+2\operatorname{I}} - 5516078400000 \operatorname{I} u_{ol+2\operatorname{I}} + (-623080636416 + 251788787712 \operatorname{I}) u_{ol+1+2\operatorname{I}}$$

$$+ (1363635000 + 1363635000 \operatorname{I}) u_{ol+2+2\operatorname{I}} - (126572544 + 17515008 \operatorname{I}) u_{ol-3+1} - (251788787712 + 623080636416 \operatorname{I}) u_{ol-2+1} + (215127057600000 - 215127057600000 \operatorname{I}) u_{ol-1+1} + 4319413862400000 \operatorname{I} u_{ol+1} - (215127057600000 + 215127057600000 \operatorname{I}) u_{ol+1+1} + (251788787712 - 623080636416 \operatorname{I}) u_{ol+2+1} + (126572544$$

$$- 17515008 \operatorname{I}) u_{ol+3+1} + 43875 u_{ol-4} - 1114112000 u_{ol-3} + 5516078400000 u_{ol-2} - 4319413862400000 u_{ol-1} + 4319413862400000 u_{ol+1} - 5516078400000 u_{ol+2} + 1114112000 u_{ol+3} - 43875 u_{ol+4} + (-126572544 + 17515008 \operatorname{I}) u_{ol-3-1} + (-251788787712 + 623080636416 \operatorname{I}) u_{ol-2-1} + (215127057600000$$

$$+ 215127057600000 \operatorname{I}) u_{ol-1-1} - 4319413862400000 \operatorname{I} u_{ol-1} + (-215127057600000 + 215127057600000 \operatorname{I}) u_{ol+1-1} + (251788787712 + 623080636416 \operatorname{I}) u_{ol+2-1} + (126572544 + 17515008 \operatorname{I}) u_{ol+3-1} - (1363635000 + 1363635000 \operatorname{I}) u_{ol-2-2\operatorname{I}} + (623080636416 - 251788787712 \operatorname{I}) u_{ol-1-2\operatorname{I}} + 5516078400000 \operatorname{I} u_{ol-2\operatorname{I}}$$

$$- (623080636416 + 251788787712 \operatorname{I}) u_{ol+1-2\operatorname{I}} + (1363635000 - 1363635000 \operatorname{I}) u_{ol+2-2\operatorname{I}} + (17515008 - 126572544 \operatorname{I}) u_{ol-1-3\operatorname{I}} - 1114112000 \operatorname{I} u_{ol-3\operatorname{I}} - (17515008 + 126572544 \operatorname{I}) u_{ol+1-3\operatorname{I}} + 43875 \operatorname{I} u_{ol-4\operatorname{I}} \big), \mathcal{O}(\mathcal{A}x_{ol}^{40})$$

Formula.: 746, Var.: 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 4

Error order.: 40, Error.: 6.4583732723521699667 × 10<sup>-117</sup>, New Error.: 6.4583732723456604221 × 10<sup>-157</sup>

Error order.: 40, Error.: 6.4583732723456604221 × 10<sup>-157</sup>, New Error.: 6.4583732723456597712 × 10<sup>-197</sup>

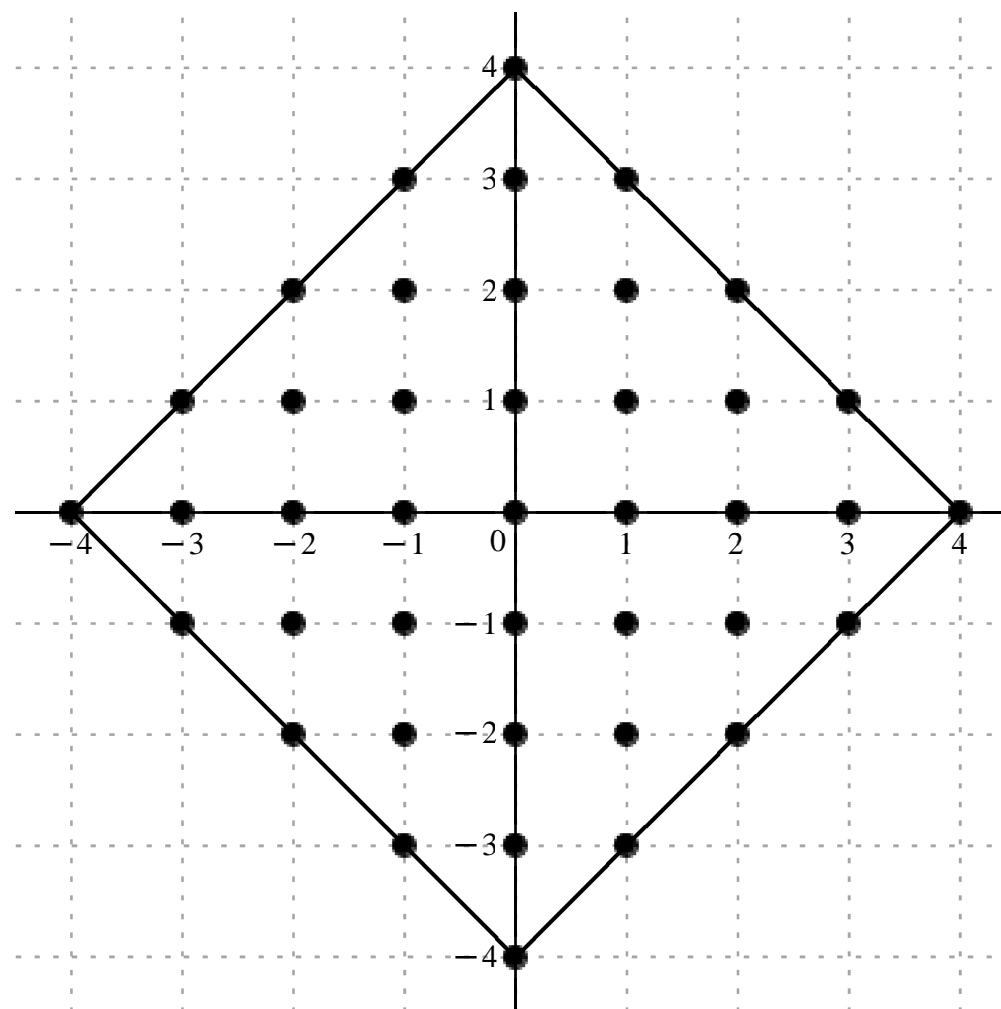
Error order.: 40, Error.: 6.4583732723456597712 × 10<sup>-197</sup>, New Error.: 6.4583732723456597711 × 10<sup>-237</sup>

Error order.: 40, Error.: 6.4583732723456597711 × 10<sup>-237</sup>, New Error.: 6.4583732723456597711 × 10<sup>-277</sup>

Error order.: 40, Error.: 6.4583732723456597711 × 10<sup>-277</sup>, New Error.: 6.4583732723456597711 × 10<sup>-317</sup>

					4 I				
				-1+3 I	3 I	1+3 I			
		-2+2 I	-1+2 I	2 I	1+2 I	2+2 I			
	-3+I	-2+I	-1+I	I	1+I	2+I	3+I		
$x_o \neq h.$ ,	-4	-3	-2	-1	0	1	2	3	4
		-3-I	-2-I	-1-I	-I	1-I	2-I	3-I	
			-2-2 I	-1-2 I	-2 I	1-2 I	2-2 I		
				-1-3 I	-3 I	1-3 I			
					-4 I				

[illegible]



$$\frac{d^4}{dx_{ol}^4} u(x_{ol}) = \frac{1}{51505003040400000 \Delta x_{ol}^4} \left( (-658125 u_{ol+4l} + (2173215744 - 1074705408 I) u_{ol-1+3l} + 22282240000 u_{ol+3l} + (2173215744 + 1074705408 I) u_{ol+1+3l} + 40909050000 u_{ol-2+2l} - (1434036731904 + 17975400726528 I) u_{ol-1+2l} - 165482352000000 u_{ol+2l} + (-1434036731904 + 17975400726528 I) u_{ol+1+2l} + 40909050000 u_{ol+2+2l} + (2173215744 + 1074705408 I) u_{ol-3+1} + (-1434036731904 + 17975400726528 I) u_{ol-2+1} - 12907623456000000 u_{ol-1+1} + 259164831744000000 u_{ol+1} - 12907623456000000 u_{ol+1+1} - (1434036731904 + 17975400726528 I) u_{ol+2+1} + (2173215744 - 1074705408 I) u_{ol+3+1} - 658125 u_{ol-4} + 22282240000 u_{ol-3} - 165482352000000 u_{ol-2} + 259164831744000000 u_{ol-1} - 984355701598398220 u_{ol} + 259164831744000000 u_{ol+1} - 165482352000000 u_{ol+2} + 22282240000 u_{ol+3} - 658125 u_{ol+4} + (2173215744 - 1074705408 I) u_{ol-3-1} - (1434036731904 + 17975400726528 I) u_{ol-2-1} - 12907623456000000 u_{ol-1-1} + 259164831744000000 u_{ol-1} - 12907623456000000 u_{ol+1-1} + (-1434036731904 + 17975400726528 I) u_{ol+2-1} + (2173215744 + 1074705408 I) u_{ol+3-1} + 40909050000 u_{ol-2-2l} + (-1434036731904 + 17975400726528 I) u_{ol-1-2l} - 165482352000000 u_{ol-2l} - (1434036731904 + 17975400726528 I) u_{ol+1-2l} + 40909050000 u_{ol+2-2l} + (2173215744 + 1074705408 I) u_{ol-1-3l} + 22282240000 u_{ol-3l} + (2173215744 - 1074705408 I) u_{ol+1-3l} - 658125 u_{ol-4l} \right) \cdot O(\Delta x_{ol}^{40})$$

Formula:, 747, Var:, 1

*Variavel* :,  $x_{oI}$ , *Derivada de Ordem* :, 5

*Error order:*, 36, *Error:*,  $1.4167147512075892136 \times 10^{-103}$ , *New Error:*,  $1.4167147512057315354 \times 10^{-13}$

*Error order:*, 36, *Error:*,  $1.4167147512057315354 \times 10^{-139}$ , *New Error:*,  $1.4167147512057313497 \times 10^{-17}$

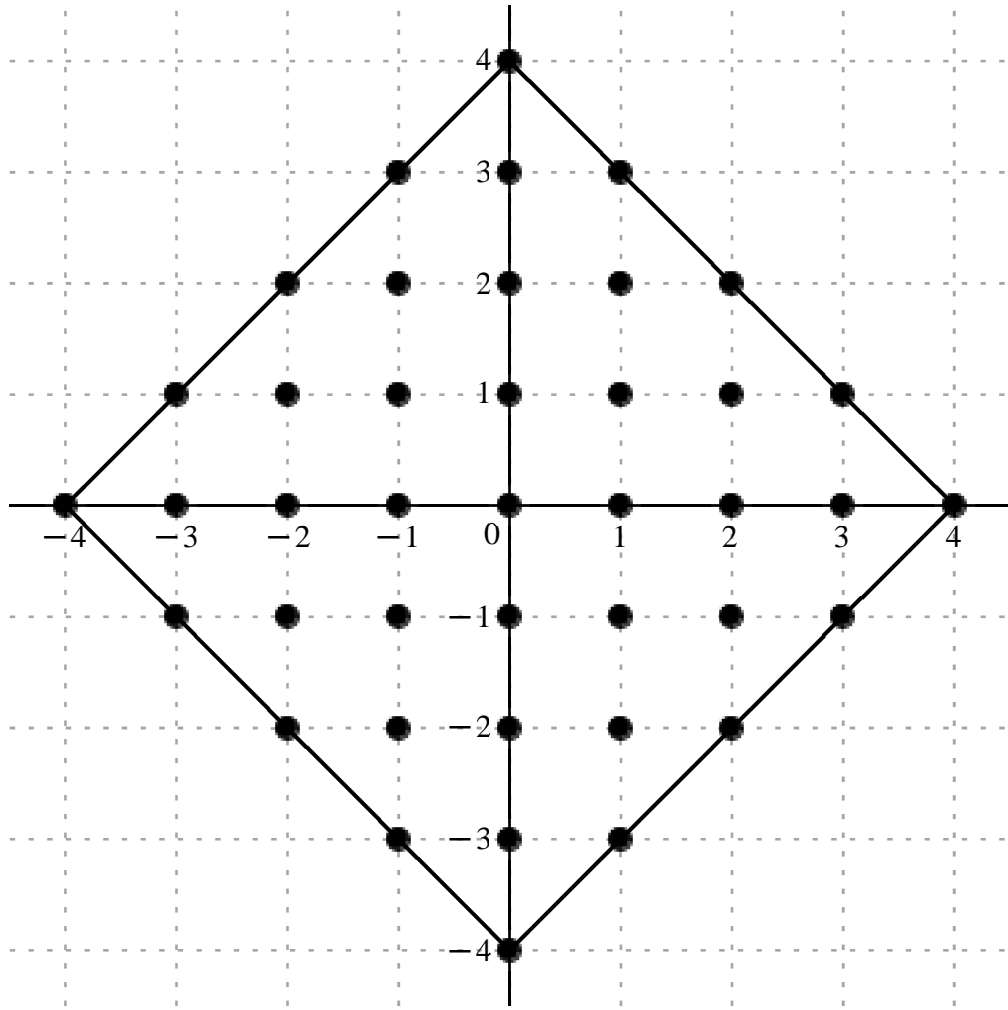
*Error order*., 36, *Error*.,  $1.4167147512057313497 \times 10^{-175}$ , *New Error*.,  $1.4167147512057313496 \times 10^{-21}$

*Error order*:, 36, *Error*:,  $1.4167147512057313496 \times 10^{-211}$ , *New Error*:,  $1.4167147512057313496 \times 10^{-24}$

*Error order*:, 36, *Error*:,  $1.4167147512057313496 \times 10^{-247}$ , *New Error*:,  $1.4167147512057313496 \times 10^{-28}$ .

$$x_o + h, \quad \begin{array}{cccccccc} & & & & 4\text{I} & & & \\ & & & & -1+3\text{I} & 3\text{I} & 1+3\text{I} & \\ & & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} & \\ -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ -3-\text{I} & -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} & \\ & -2-2\text{I} & -1-2\text{I} & -2\text{I} & 1-2\text{I} & 2-2\text{I} & & \\ & & -1-3\text{I} & -3\text{I} & 1-3\text{I} & & & \\ & & & & -4\text{I} & & & \end{array}$$

[illegible]



$$\frac{\mathrm{d}s}{\mathrm{d}x_{ol}^5} u(x_{ol}) = \frac{1}{3961923310800000 \mathcal{A}x_{ol}^5} \left( -12837215 \operatorname{I} u_{ol+41} + (-11588605952 + 20329756944 \operatorname{I}) u_{ol-1+31} + 181407375360 \operatorname{I} u_{ol+31} + (11588605952 + 20329756944 \operatorname{I}) u_{ol+1+31} - (204407274225 + 204407274225 \operatorname{I}) u_{ol-2+21} + (13187238887424 + 61285393440768 \operatorname{I}) u_{ol-1+21} - 373647403612000 \operatorname{I} u_{ol+21} + (-13187238887424 \right. \\ \left. + 61285393440768 \operatorname{I}) u_{ol+1+21} + (204407274225 - 204407274225 \operatorname{I}) u_{ol+2+21} + (20329756944 - 11588605952 \operatorname{I}) u_{ol-3+1} + (61285393440768 + 13187238887424 \operatorname{I}) u_{ol-2+1} + (10388918470434000 + 10388918470434000 \operatorname{I}) u_{ol-1+1} - 20301883528192000 \operatorname{I} u_{ol+1} + (-10388918470434000 + 10388918470434000 \operatorname{I}) u_{ol+1+1} \right. \\ \left. + (-61285393440768 + 13187238887424 \operatorname{I}) u_{ol+2+1} - (20329756944 + 11588605952 \operatorname{I}) u_{ol+3+1} - 12837215 u_{ol-4} + 181407375360 u_{ol-3} - 373647403612000 u_{ol-2} - 20301883528192000 u_{ol-1} + 20301883528192000 u_{ol+1} + 373647403612000 u_{ol+2} - 181407375360 u_{ol+3} + 12837215 u_{ol+4} + (20329756944 \right. \\ \left. + 11588605952 \operatorname{I}) u_{ol-3-1} + (61285393440768 - 13187238887424 \operatorname{I}) u_{ol-2-1} + (10388918470434000 - 10388918470434000 \operatorname{I}) u_{ol-1-1} + 20301883528192000 \operatorname{I} u_{ol-1} - (10388918470434000 + 10388918470434000 \operatorname{I}) u_{ol+1-1} - (61285393440768 + 13187238887424 \operatorname{I}) u_{ol+2-1} + (-20329756944 + 11588605952 \operatorname{I}) u_{ol+3-1} \right. \\ \left. + (-204407274225 + 204407274225 \operatorname{I}) u_{ol-2-21} + (13187238887424 - 61285393440768 \operatorname{I}) u_{ol-1-21} + 373647403612000 \operatorname{I} u_{ol-21} - (13187238887424 + 61285393440768 \operatorname{I}) u_{ol+1-21} + (204407274225 + 204407274225 \operatorname{I}) u_{ol+2-21} - (11588605952 + 20329756944 \operatorname{I}) u_{ol-1-31} - 181407375360 \operatorname{I} u_{ol-31} + (11588605952 \right. \\ \left. - 20329756944 \operatorname{I}) u_{ol+1-31} + 12837215 \operatorname{I} u_{ol-41} \right), \quad O(\mathcal{A}x_{ol}^{36})$$

Formula: 748, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 6

Error order: 36, Error:  $2.0138091701598118837 \times 10^{-104}$ , New Error:  $2.0138091701574008803 \times 10^{-140}$

Error order: 36, Error:  $2.0138091701574008803 \times 10^{-140}$ , New Error:  $2.0138091701574006392 \times 10^{-176}$

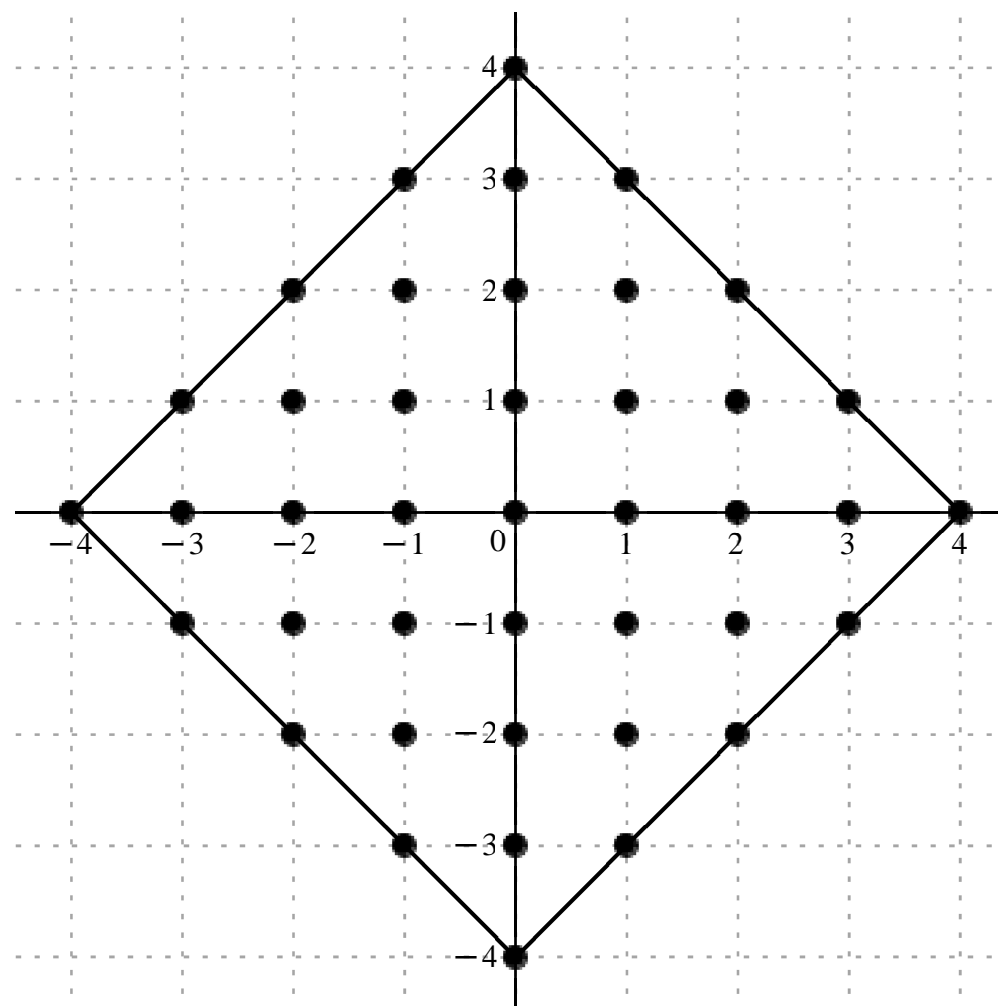
Error order: 36, Error:  $2.0138091701574006392 \times 10^{-176}$ , New Error:  $2.0138091701574006392 \times 10^{-212}$

Error order: 36, Error:  $2.0138091701574006392 \times 10^{-212}$ , New Error:  $2.0138091701574006392 \times 10^{-248}$

Error order: 36, Error:  $2.0138091701574006392 \times 10^{-248}$ , New Error:  $2.0138091701574006392 \times 10^{-284}$

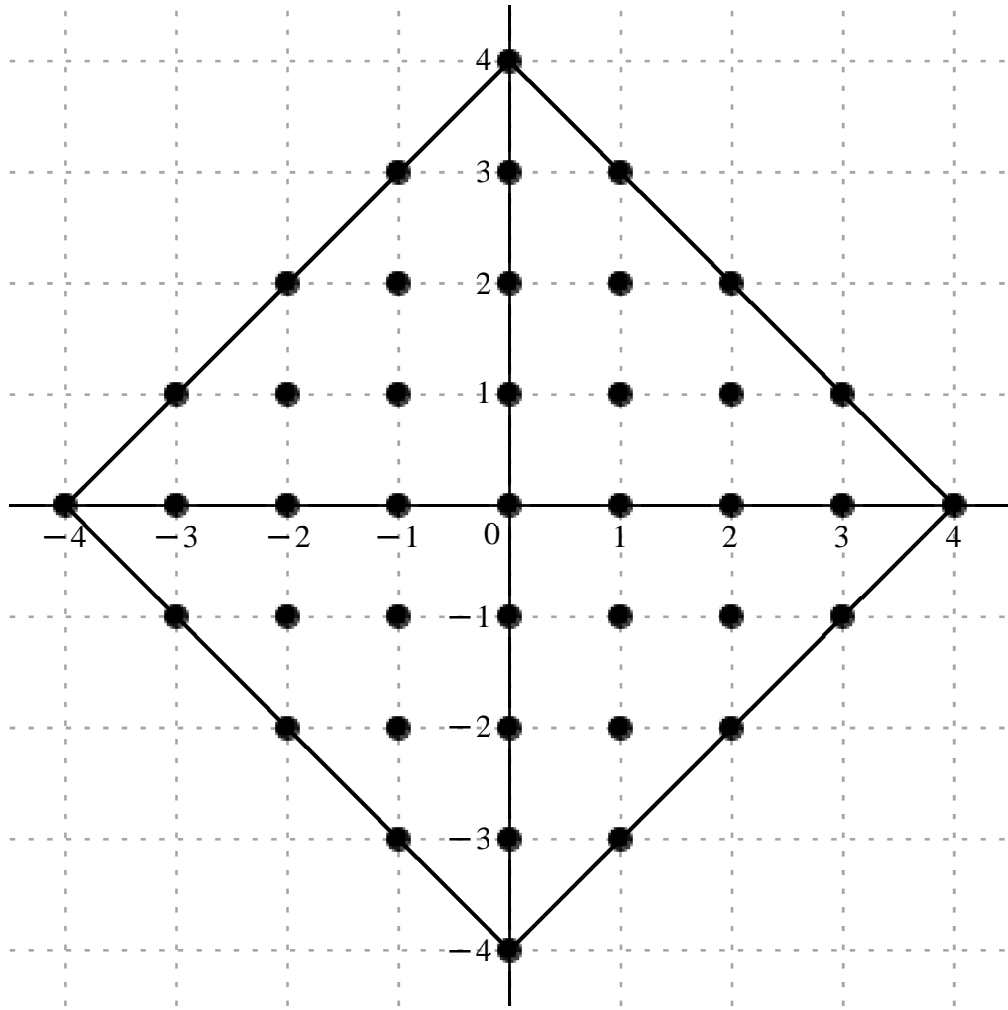
[illegible]

[illegible]









$$\frac{d^7}{dx_{ol}^7} u(x_{ol}) = \frac{1}{37732602960000000 \Delta x_{ol}^7} \left( 320930375 \text{I} u_{ol+4\text{I}} - (117078776192 + 928678765056 \text{I}) u_{ol-1+3\text{I}} - 8062550016000 \text{I} u_{ol+3\text{I}} + (117078776192 - 928678765056 \text{I}) u_{ol+1+3\text{I}} + (10220363711250 - 10220363711250 \text{I}) u_{ol-2+2\text{I}} - (4555252646805504 + 2097715596361728 \text{I}) u_{ol-1+2\text{I}} + 37364740361200000 \text{I} u_{ol+2\text{I}} \right. \\ + (4555252646805504 - 2097715596361728 \text{I}) u_{ol+1+2\text{I}} - (10220363711250 + 10220363711250 \text{I}) u_{ol+2+2\text{I}} + (928678765056 + 117078776192 \text{I}) u_{ol-3+1\text{I}} + (2097715596361728 + 4555252646805504 \text{I}) u_{ol-2+1\text{I}} + (-2077783694086800000 + 2077783694086800000 \text{I}) u_{ol-1+1\text{I}} + 8120753411276800000 \text{I} u_{ol+1\text{I}} \\ + (2077783694086800000 + 2077783694086800000 \text{I}) u_{ol+1+1\text{I}} + (-2097715596361728 + 4555252646805504 \text{I}) u_{ol+2+1\text{I}} + (-928678765056 + 117078776192 \text{I}) u_{ol+3+1\text{I}} - 320930375 u_{ol-4\text{I}} + 8062550016000 u_{ol-3\text{I}} - 37364740361200000 u_{ol-2\text{I}} - 8120753411276800000 u_{ol-1\text{I}} + 8120753411276800000 u_{ol+1\text{I}} \\ + 37364740361200000 u_{ol+2\text{I}} - 8062550016000 u_{ol+3\text{I}} + 320930375 u_{ol+4\text{I}} + (928678765056 - 117078776192 \text{I}) u_{ol-3-1\text{I}} + (2097715596361728 - 4555252646805504 \text{I}) u_{ol-2-1\text{I}} - (2077783694086800000 + 2077783694086800000 \text{I}) u_{ol-1-1\text{I}} - 8120753411276800000 \text{I} u_{ol-1\text{I}} + (2077783694086800000 \\ - 2077783694086800000 \text{I}) u_{ol+1-1\text{I}} - (2097715596361728 + 4555252646805504 \text{I}) u_{ol+2-1\text{I}} - (928678765056 + 117078776192 \text{I}) u_{ol+3-1\text{I}} + (10220363711250 + 10220363711250 \text{I}) u_{ol-2-2\text{I}} + (-4555252646805504 + 2097715596361728 \text{I}) u_{ol-1-2\text{I}} - 37364740361200000 \text{I} u_{ol-2\text{I}} + (4555252646805504 \\ + 2097715596361728 \text{I}) u_{ol+1-2\text{I}} + (-10220363711250 + 10220363711250 \text{I}) u_{ol+2-2\text{I}} + (-117078776192 + 928678765056 \text{I}) u_{ol-1-3\text{I}} + 8062550016000 \text{I} u_{ol-3\text{I}} + (117078776192 + 928678765056 \text{I}) u_{ol+1-3\text{I}} - 320930375 \text{I} u_{ol-4\text{I}} \Big), \mathcal{O}(\Delta x_{ol}^{36})$$

Formula:, 750, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 36, Error:,  $5.9013732746200146273 \times 10^{-106}$ , New Error:,  $5.9013732746140892687 \times 10^{-142}$

Error order:, 36, Error:,  $5.9013732746140892687 \times 10^{-142}$ , New Error:,  $5.9013732746140886761 \times 10^{-178}$

Error order:, 36, Error:,  $5.9013732746140886761 \times 10^{-178}$ , New Error:,  $5.9013732746140886761 \times 10^{-214}$

Error order:, 36, Error:,  $5.9013732746140886761 \times 10^{-214}$ , New Error:,  $5.9013732746140886761 \times 10^{-250}$

Error order:, 36, Error:,  $5.9013732746140886761 \times 10^{-250}$ , New Error:,  $5.9013732746140886761 \times 10^{-286}$

$$c = ,$$

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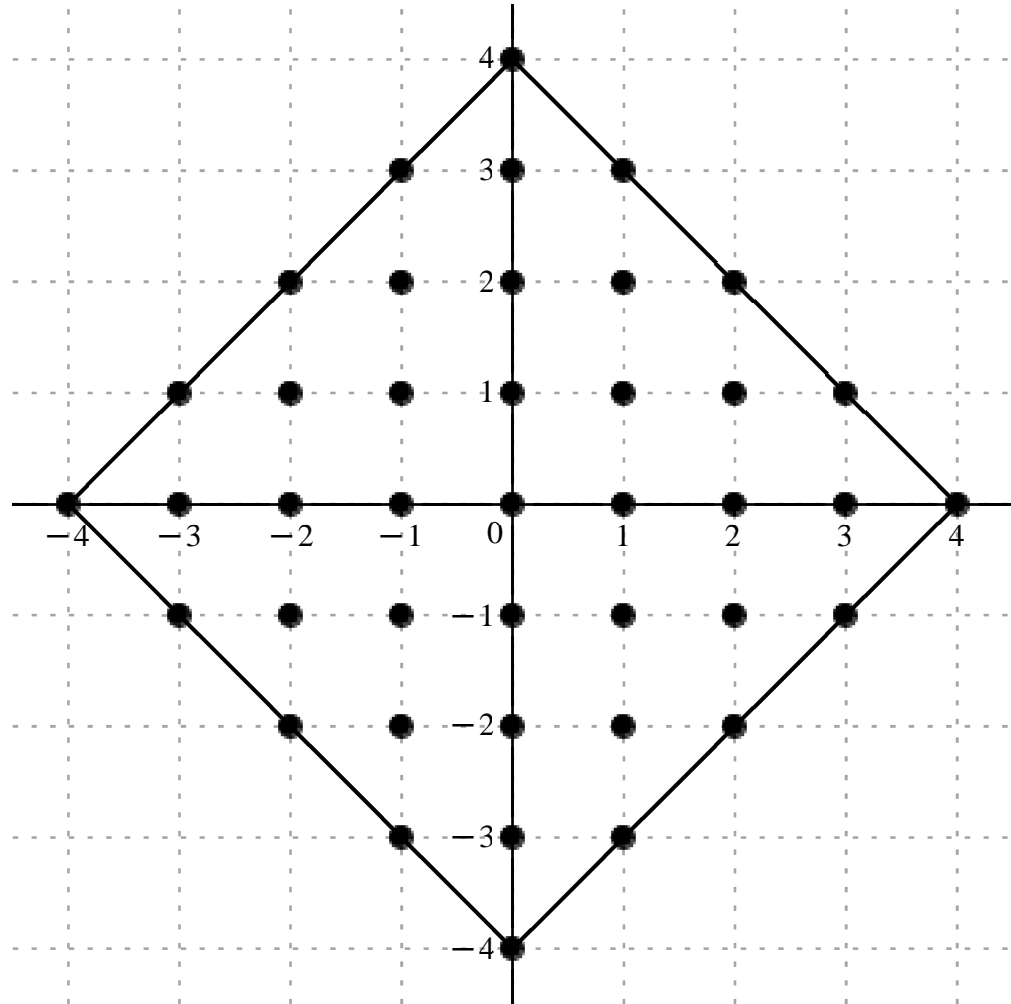
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$$\frac{1}{\mathfrak{d}x_{o_l}^8} u(x_{o_l}) = \frac{1}{94331507400000000 \Delta \mathfrak{x}_{o_l}^8} (1604651875 u_{o_l+41} + (-5337915037952 + 2559830187264 \mathfrak{I}) u_{o_l-1+31} - 53750333440000 u_{o_l+31} - (5337915037952 + 2559830187264 \mathfrak{I}) u_{o_l+1+31} - 102203637112500 u_{o_l-2+21} + (1439285816328192 + 44832883559890944 \mathfrak{I}) u_{o_l-1+21} + 373647403612000000 u_{o_l+21} + (1439285816328192 - 44832883559890944 \mathfrak{I}) u_{o_l+1+21} - 102203637112500 u_{o_l+2+21} - (5337915037952 + 2559830187264 \mathfrak{I}) u_{o_l-3+1} + (1439285816328192 - 44832883559890944 \mathfrak{I}) u_{o_l-2+1} + 41555673881736000000 u_{o_l-1+1} + 162415068225536000000 u_{o_l+1} + 41555673881736000000 u_{o_l+1+1} + (1439285816328192 + 44832883559890944 \mathfrak{I}) u_{o_l+2+1} + (-5337915037952 + 2559830187264 \mathfrak{I}) u_{o_l+3+1} + 1604651875 u_{o_l-4} - 53750333440000 u_{o_l-3} + 373647403612000000 u_{o_l-2} + 162415068225536000000 u_{o_l-1} - 817388405817282719420 u_{o_l} + 162415068225536000000 u_{o_l+1} + 373647403612000000 u_{o_l+2} - 53750333440000 u_{o_l+3} + 1604651875 u_{o_l+4} + (-5337915037952 + 2559830187264 \mathfrak{I}) u_{o_l-3-1} + (1439285816328192 + 44832883559890944 \mathfrak{I}) u_{o_l-2-1} + 41555673881736000000 u_{o_l-1-1} + 162415068225536000000 u_{o_l-1} + 41555673881736000000 u_{o_l+1-1} + (1439285816328192 - 44832883559890944 \mathfrak{I}) u_{o_l+2-1} - (5337915037952 + 2559830187264 \mathfrak{I}) u_{o_l+3-1} - 102203637112500 u_{o_l-2-21} + (1439285816328192 - 44832883559890944 \mathfrak{I}) u_{o_l-1-21} + 373647403612000000 u_{o_l-21} + (1439285816328192 + 44832883559890944 \mathfrak{I}) u_{o_l+1-21} - 102203637112500 u_{o_l+2-21} - (5337915037952 + 2559830187264 \mathfrak{I}) u_{o_l-1-31} - 53750333440000 u_{o_l-31} + (-5337915037952 + 2559830187264 \mathfrak{I}) u_{o_l+1-31} + 1604651875 u_{o_l-41}),$$

$$O(\Delta \mathfrak{x}_{o_l}^{36})$$

*Formula:*, 751, *Var:*, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 9

*Error order:*, 32, *Error:*,  $7.8968381159936037446 \times 10^{-93}$ , *New Error:*,  $7.8968381159830917299 \times 10^{-125}$

*Error order*:, 32, *Error*:,  $7.8968381159830917299 \times 10^{-125}$ , *New Error*:,  $7.8968381159830906787 \times 10^{-15}$

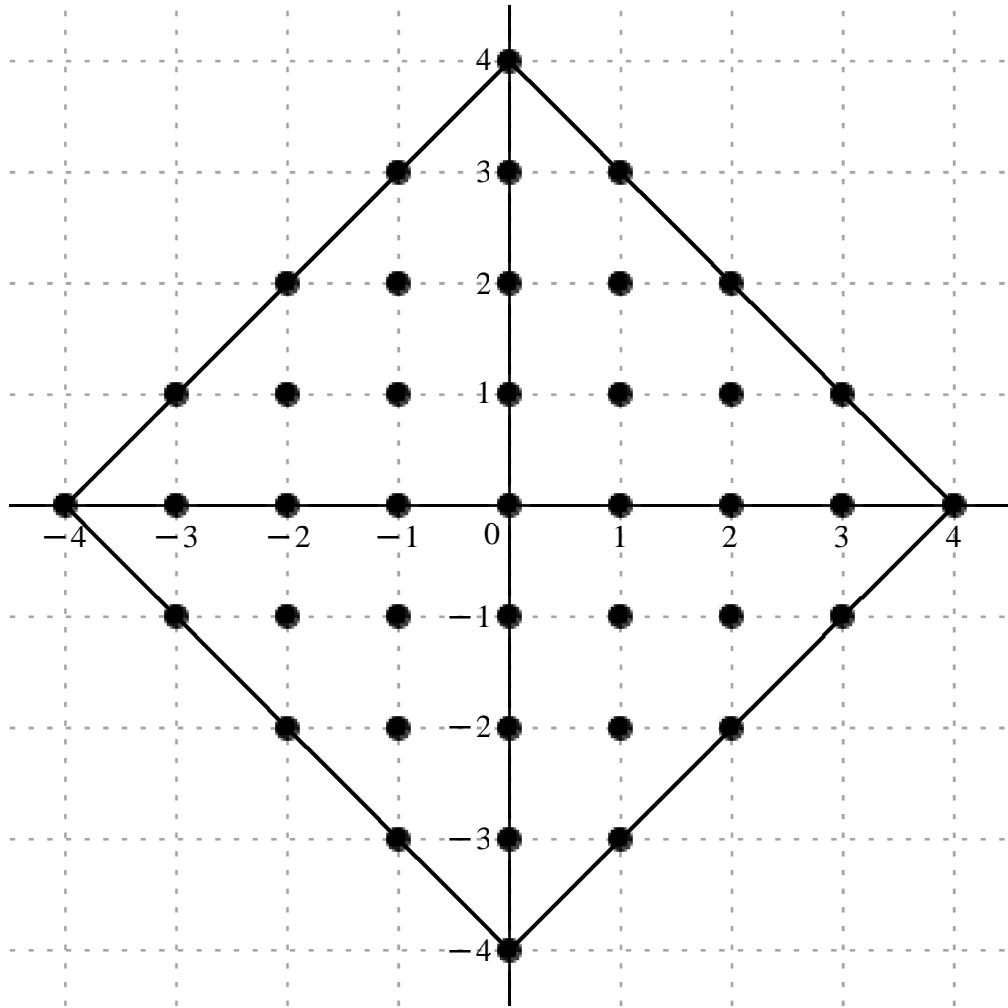
*Error order*:, 32, *Error*:,  $7.8968381159830906787 \times 10^{-157}$ , *New Error*:,  $7.8968381159830906786 \times 10^{-18}$

*Error order:*, 32, *Error:*,  $7.8968381159830906786 \times 10^{-189}$ , *New Error:*,  $7.8968381159830906786 \times 10^{-22}$

*Error order:*, 32, *Error:*,  $7.8968381159830906786 \times 10^{-221}$ , *New Error:*,  $7.8968381159830906786 \times 10^{-25}$ .

$$x_o + h, \quad \begin{array}{cccccccc} & & & & 4\text{I} & & & \\ & & & & -1+3\text{I} & 3\text{I} & 1+3\text{I} & \\ & & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} & \\ -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} & \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ -3-\text{I} & -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} & \\ & -2-2\text{I} & -1-2\text{I} & -2\text{I} & 1-2\text{I} & 2-2\text{I} & & \\ & & -1-3\text{I} & -3\text{I} & 1-3\text{I} & & & \\ & & & & -4\text{I} & & & \end{array}$$

[illegible]



$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9} u(x_{ol}) = \frac{1}{154136450000000 \Delta x_{ol}^9} \left( 3 \left( -138495831 \operatorname{I} u_{ol+41} + (-114067208192 + 223966578556 \operatorname{I}) u_{ol-1+31} + 2037942503424 \operatorname{I} u_{ol+31} + (114067208192 + 223966578556 \operatorname{I}) u_{ol+1+31} - (1996416479365 + 1996416479365 \operatorname{I}) u_{ol-2+21} + (254160569098240 + 584854892984320 \operatorname{I}) u_{ol-1+21} - 5207008019145800 \operatorname{I} u_{ol+21} \right. \right. \\ + (-254160569098240 + 584854892984320 \operatorname{I}) u_{ol+1+21} + (1996416479365 - 1996416479365 \operatorname{I}) u_{ol+2+21} + (223966578556 - 114067208192 \operatorname{I}) u_{ol-3+1} + (584854892984320 + 254160569098240 \operatorname{I}) u_{ol-2+1} - (18173633460406900 + 18173633460406900 \operatorname{I}) u_{ol-1+1} + 43914298976307200 \operatorname{I} u_{ol+1} + (18173633460406900 \\ - 18173633460406900 \operatorname{I}) u_{ol+1+1} + (-584854892984320 + 254160569098240 \operatorname{I}) u_{ol+2+1} - (223966578556 + 114067208192 \operatorname{I}) u_{ol+3+1} - 138495831 u_{ol-4} + 2037942503424 u_{ol-3} - 5207008019145800 u_{ol-2} + 43914298976307200 u_{ol-1} - 43914298976307200 u_{ol+1} + 5207008019145800 u_{ol+2} - 2037942503424 u_{ol+3} \\ + 138495831 u_{ol+4} + (223966578556 + 114067208192 \operatorname{I}) u_{ol-3-1} + (584854892984320 - 254160569098240 \operatorname{I}) u_{ol-2-1} + (-18173633460406900 + 18173633460406900 \operatorname{I}) u_{ol-1-1} - 43914298976307200 \operatorname{I} u_{ol-1} + (18173633460406900 + 18173633460406900 \operatorname{I}) u_{ol+1-1} - (584854892984320 + 254160569098240 \operatorname{I}) u_{ol+2-1} \\ + (-223966578556 + 114067208192 \operatorname{I}) u_{ol+3-1} + (-1996416479365 + 1996416479365 \operatorname{I}) u_{ol-2-21} + (254160569098240 - 584854892984320 \operatorname{I}) u_{ol-1-21} + 5207008019145800 \operatorname{I} u_{ol-21} - (254160569098240 + 584854892984320 \operatorname{I}) u_{ol+1-21} + (1996416479365 + 1996416479365 \operatorname{I}) u_{ol+2-21} - (114067208192 \\ + 223966578556 \operatorname{I}) u_{ol-1-31} - 2037942503424 \operatorname{I} u_{ol-31} + (114067208192 - 223966578556 \operatorname{I}) u_{ol+1-31} + 138495831 \operatorname{I} u_{ol-41} \Big) \Big), \quad O(\Delta x_{ol}^{32})$$

Formula: 752, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

Error order: 32, Error:  $1.8708453248028167650 \times 10^{-93}$ , New Error:  $1.8708453248005429136 \times 10^{-125}$

Error order: 32, Error:  $1.8708453248005429136 \times 10^{-125}$ , New Error:  $1.8708453248005426863 \times 10^{-157}$

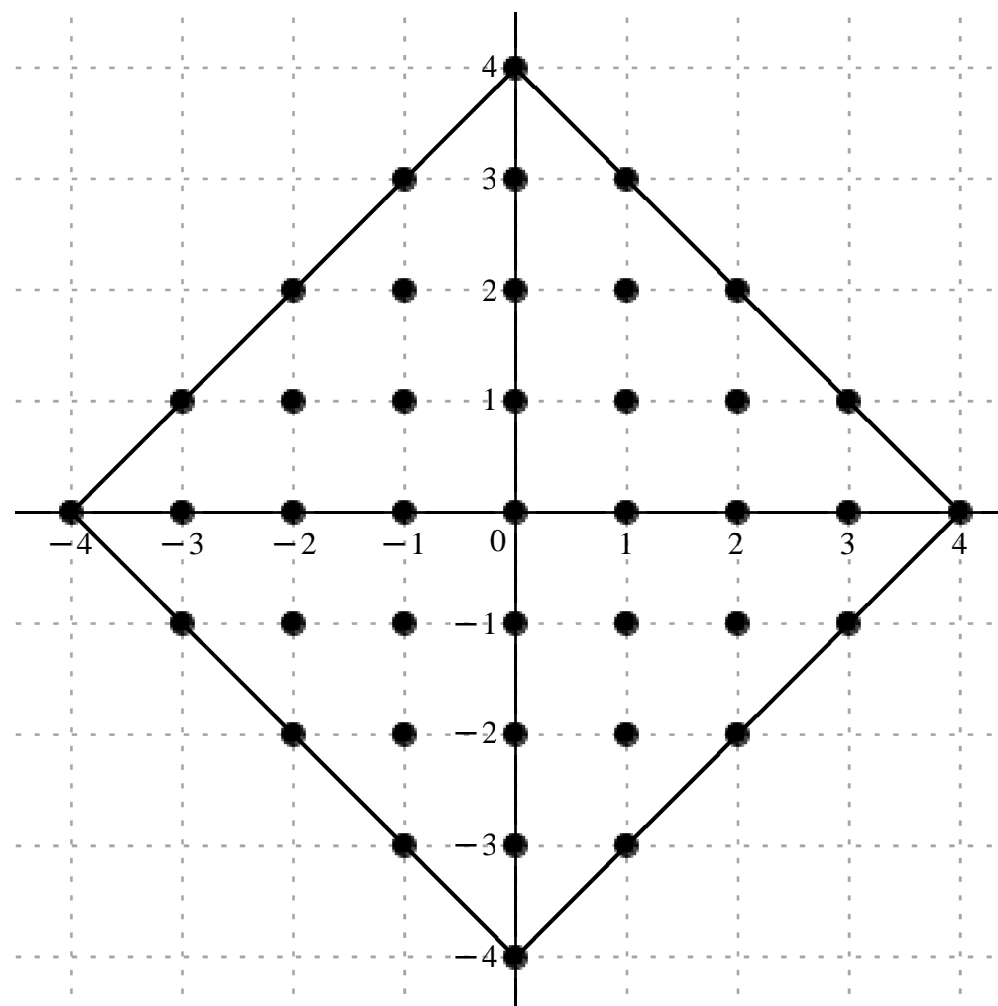
Error order: 32, Error:  $1.8708453248005426863 \times 10^{-157}$ , New Error:  $1.8708453248005426862 \times 10^{-189}$

Error order: 32, Error:  $1.8708453248005426862 \times 10^{-189}$ , New Error:  $1.8708453248005426862 \times 10^{-221}$

Error order: 32, Error:  $1.8708453248005426862 \times 10^{-221}$ , New Error:  $1.8708453248005426862 \times 10^{-253}$

					4 I				
				-1+3 I	3 I	1+3 I			
		-2+2 I	-1+2 I	2 I	1+2 I	2+2 I			
	-3+I	-2+I	-1+I	I	1+I	2+I	3+I		
$x_o \neq h.$ ,	-4	-3	-2	-1	0	1	2	3	4
		-3-I	-2-I	-1-I	-I	1-I	2-I	3-I	
			-2-2 I	-1-2 I	-2 I	1-2 I	2-2 I		
				-1-3 I	-3 I	1-3 I			
					-4 I				

[illegible]



$$\frac{d^{10}}{dx_{ol}^{10}} u(x_{ol}) = \frac{1}{6165458000000 \mathcal{A}_{ol}^{10}} \left( 3 \left( -138495831 u_{ol+41} + (314386777544 + 47294018408 \text{ I}) u_{ol-1+31} + 2717256671232 u_{ol+31} + (314386777544 - 47294018408 \text{ I}) u_{ol+1+31} + 3992832958730 \text{ I} u_{ol-2+21} + (732439373496320 - 874540824944640 \text{ I}) u_{ol-1+21} - 10414016038291600 u_{ol+21} + (732439373496320 \right. \\ \left. + 874540824944640 \text{ I}) u_{ol+1+21} - 3992832958730 \text{ I} u_{ol+2+21} + (-314386777544 + 47294018408 \text{ I}) u_{ol-3+1} - (732439373496320 + 874540824944640 \text{ I}) u_{ol-2+1} + 72694533841627600 \text{ I} u_{ol-1+1} + 175657195905228800 u_{ol+1} - 72694533841627600 \text{ I} u_{ol+1+1} + (-732439373496320 + 874540824944640 \text{ I}) u_{ol+2+1} - (314386777544 \right. \\ \left. + 47294018408 \text{ I}) u_{ol+3+1} + 138495831 u_{ol-4} - 2717256671232 u_{ol-3} + 10414016038291600 u_{ol-2} - 175657195905228800 u_{ol-1} - 175657195905228800 u_{ol+1} + 10414016038291600 u_{ol+2} - 2717256671232 u_{ol+3} + 138495831 u_{ol+4} - (314386777544 + 47294018408 \text{ I}) u_{ol-3-1} + (-732439373496320 \right. \\ \left. + 874540824944640 \text{ I}) u_{ol-2-1} - 72694533841627600 \text{ I} u_{ol-1-1} + 175657195905228800 u_{ol-1} + 72694533841627600 \text{ I} u_{ol+1-1} - (732439373496320 + 874540824944640 \text{ I}) u_{ol+2-1} + (-314386777544 + 47294018408 \text{ I}) u_{ol+3-1} - 3992832958730 \text{ I} u_{ol-2-21} + (732439373496320 + 874540824944640 \text{ I}) u_{ol-1-21} \right. \\ \left. - 10414016038291600 u_{ol-21} + (732439373496320 - 874540824944640 \text{ I}) u_{ol+1-21} + 3992832958730 \text{ I} u_{ol+2-21} + (314386777544 - 47294018408 \text{ I}) u_{ol-1-31} + 2717256671232 u_{ol-31} + (314386777544 + 47294018408 \text{ I}) u_{ol+1-31} - 138495831 u_{ol-41} \right) \Big), \mathcal{O}(\mathcal{A}_{ol}^{32})$$

Formula:, 753, Var:, 1

*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 11

*Error order:*, 32, *Error:*,  $4.7620730239104143214 \times 10^{-94}$ , *New Error:*,  $4.7620730239051190182 \times 10^{-126}$

*Error order*., 32, *Error*.,  $4.7620730239051190182 \times 10^{-126}$ , *New Error*.,  $4.7620730239051184887 \times 10^{-15}$

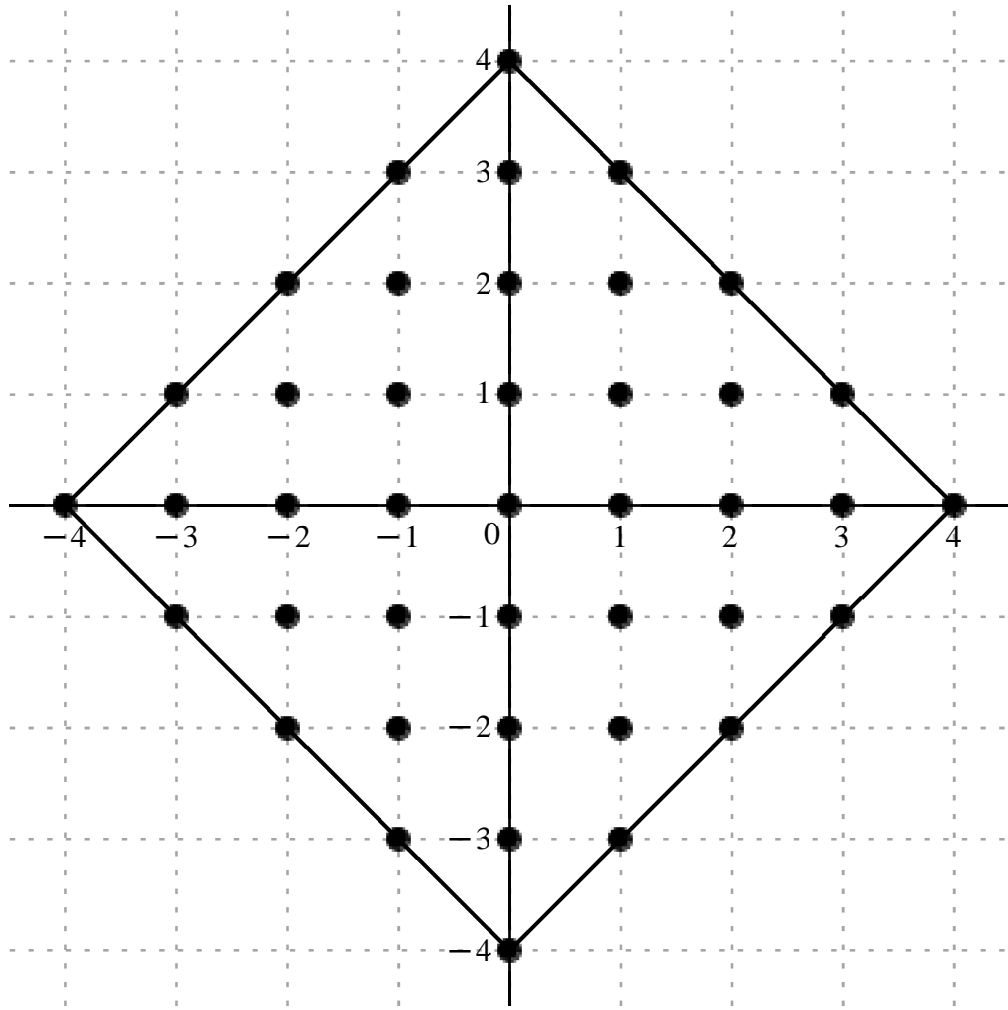
*Error order.*: 32, *Error.*:  $4.7620730239051184887 \times 10^{-158}$ , *New Error.*:  $4.7620730239051184886 \times 10^{-190}$

*Error order*., 32, *Error*.,  $4.7620730239051184886 \times 10^{-190}$ , *New Error*.,  $4.7620730239051184886 \times 10^{-22}$ .

*Error order*:, 32, *Error*:,  $4.7620730239051184886 \times 10^{-222}$ , *New Error*:,  $4.7620730239051184886 \times 10^{-25}$

					4 I				
				-1+3 I	3 I	1+3 I			
		-2+2 I	-1+2 I	2 I	1+2 I	2+2 I			
	-3+I	-2+I	-1+I	I	1+I	2+I	3+I		
$x_o + h.$ ,	-4	-3	-2	-1	0	1	2	3	4
		-3-I	-2-I	-1-I	-I	1-I	2-I	3-I	
			-2-2 I	-1-2 I	-2 I	1-2 I	2-2 I		
				-1-3 I	-3 I	1-3 I			
					-4 I				

[illegible]



$$\frac{d^{11}}{dx_{ol}^{11}} u(x_{ol}) = \frac{1}{246618320000000 \Delta x_{ol}^{11}} \left( 33 \left( 138495831 I u_{ol+4I} - (69001888928 + 396181740416 I) u_{ol-1+3I} - 3623008894976 I u_{ol+3I} + (69001888928 - 396181740416 I) u_{ol+1+3I} + (3992832958730 - 3992832958730 I) u_{ol-2+2I} - (1985216818708480 + 472270337638400 I) u_{ol-1+2I} + 20828032076583200 I u_{ol+2I} \right. \right. \\ \left. + (1985216818708480 - 472270337638400 I) u_{ol+1+2I} - (3992832958730 + 3992832958730 I) u_{ol+2+2I} + (396181740416 + 69001888928 I) u_{ol-3+I} + (472270337638400 + 1985216818708480 I) u_{ol-2+I} + (145389067683255200 - 145389067683255200 I) u_{ol-1+I} - 702628783620915200 I u_{ol+I} - (145389067683255200 \right. \\ \left. + 145389067683255200 I) u_{ol+1+I} + (-472270337638400 + 1985216818708480 I) u_{ol+2+I} + (-396181740416 + 69001888928 I) u_{ol+3+I} - 138495831 u_{ol-4} + 3623008894976 u_{ol-3} - 20828032076583200 u_{ol-2} + 702628783620915200 u_{ol-1} - 702628783620915200 u_{ol+1} + 20828032076583200 u_{ol+2} - 3623008894976 u_{ol+3} \right. \\ \left. + 138495831 u_{ol+4} + (396181740416 - 69001888928 I) u_{ol-3-I} + (472270337638400 - 1985216818708480 I) u_{ol-2-I} + (145389067683255200 + 145389067683255200 I) u_{ol-1-I} + 702628783620915200 I u_{ol-I} + (-145389067683255200 + 145389067683255200 I) u_{ol+1-I} - (472270337638400 + 1985216818708480 I) u_{ol+2-I} \right. \\ \left. - (396181740416 + 69001888928 I) u_{ol+3-I} + (3992832958730 + 3992832958730 I) u_{ol-2-2I} + (-1985216818708480 + 472270337638400 I) u_{ol-1-2I} - 20828032076583200 I u_{ol-2I} + (1985216818708480 + 472270337638400 I) u_{ol+1-2I} + (-3992832958730 + 3992832958730 I) u_{ol+2-2I} + (-69001888928 \right. \\ \left. + 396181740416 I) u_{ol-1-3I} + 3623008894976 I u_{ol-3I} + (69001888928 + 396181740416 I) u_{ol+1-3I} - 138495831 I u_{ol-4I} \right), O(\Delta x_{ol}^{32})$$

Formula:, 754, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

Error order:, 32, Error:,  $1.2922857595413766627 \times 10^{-94}$ , New Error:,  $1.2922857595400594231 \times 10^{-126}$

Error order:, 32, Error:,  $1.2922857595400594231 \times 10^{-126}$ , New Error:,  $1.2922857595400592914 \times 10^{-158}$

Error order:, 32, Error:,  $1.2922857595400592914 \times 10^{-158}$ , New Error:,  $1.2922857595400592913 \times 10^{-190}$

Error order:, 32, Error:,  $1.2922857595400592913 \times 10^{-190}$ , New Error:,  $1.2922857595400592913 \times 10^{-222}$

Error order:, 32, Error:,  $1.2922857595400592913 \times 10^{-222}$ , New Error:,  $1.2922857595400592913 \times 10^{-254}$

$c = ,$

$$\frac{13711087269}{246618320000000}$$

$$-\frac{692717436873}{3853411250000}-\frac{74644441641\text{ I}}{770682250000}$$

$$-\frac{692717436873}{3853411250000}+\frac{74644441641\text{ I}}{770682250000}$$

$$\frac{80489795468544}{240838203125}-\frac{343615385570688\text{ I}}{240838203125}$$

$$\frac{80489795468544}{240838203125}+\frac{343615385570688\text{ I}}{240838203125}$$

$$-\frac{1068352602471}{333268000000}$$

$$-\frac{692717436873}{3853411250000}+\frac{74644441641\text{ I}}{770682250000}$$

$$\frac{80489795468544}{240838203125}+\frac{343615385570688\text{ I}}{240838203125}$$

$$-\frac{16767844478847}{71825000}$$

$$\frac{80489795468544}{240838203125}-\frac{343615385570688\text{ I}}{240838203125}$$

$$-\frac{692717436873}{3853411250000}-\frac{74644441641\text{ I}}{770682250000}$$

$$\frac{13711087269}{246618320000000}$$

$$-\frac{467028490368}{240838203125}$$

$$-\frac{10129346688384}{8978125}$$

$$\frac{21508710829683}{4000000}$$

$$-\frac{10129346688384}{8978125}$$

$$\frac{2402114603427}{143650000}$$

$$-\frac{467028490368}{240838203125}$$

$$\frac{13711087269}{246618320000000}$$

$$-\frac{692717436873}{3853411250000}-\frac{74644441641\text{ I}}{770682250000}$$

$$\frac{80489795468544}{240838203125}-\frac{343615385570688\text{ I}}{240838203125}$$

$$-\frac{16767844478847}{71825000}$$

$$\frac{80489795468544}{240838203125}+\frac{343615385570688\text{ I}}{240838203125}$$

$$-\frac{692717436873}{3853411250000}+\frac{74644441641\text{ I}}{770682250000}$$

$$-\frac{1068352602471}{333268000000}$$

$$\frac{80489795468544}{240838203125}+\frac{343615385570688\text{ I}}{240838203125}$$

$$-\frac{467028490368}{240838203125}$$

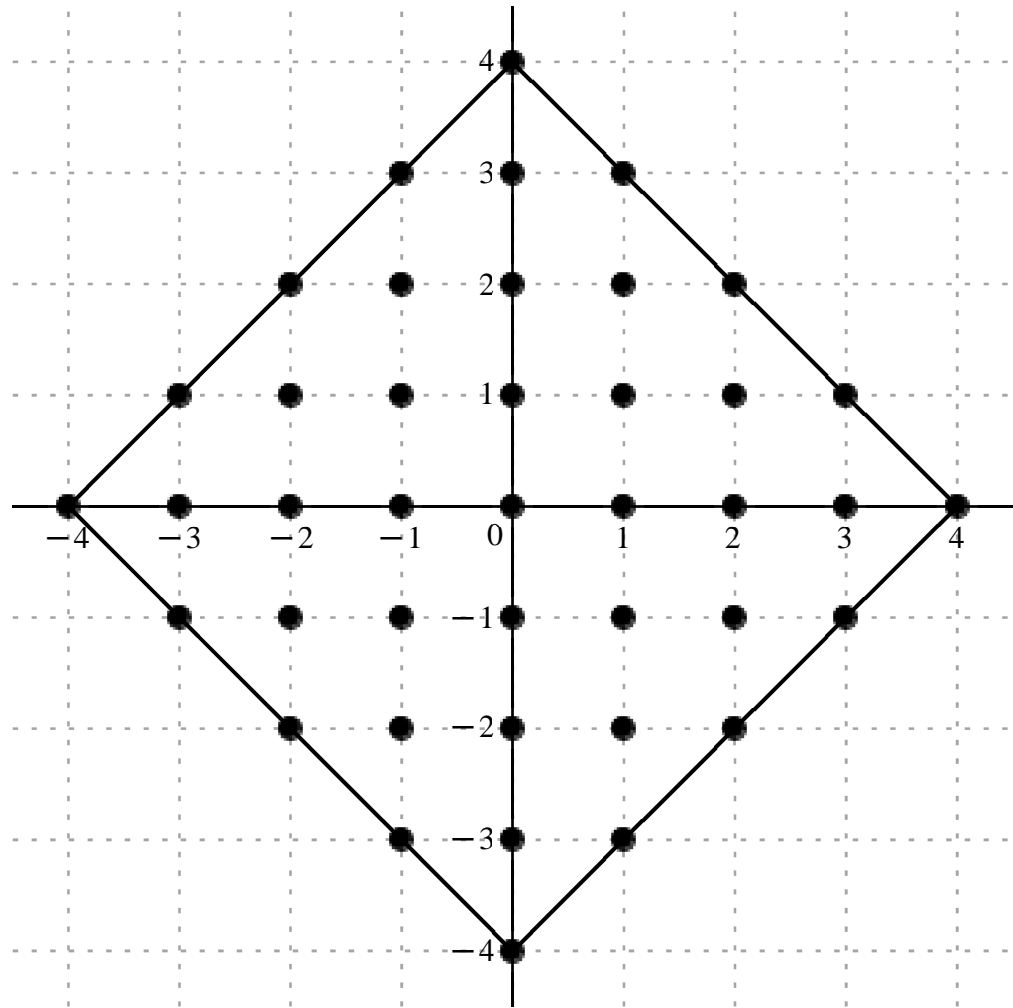
$$\frac{80489795468544}{240838203125}-\frac{343615385570688\text{ I}}{240838203125}$$

$$-\frac{1068352602471}{333268000000}$$

$$-\frac{692717436873}{3853411250000}+\frac{74644441641\text{ I}}{770682250000}$$

$$-\frac{692717436873}{3853411250000}-\frac{74644441641\text{ I}}{770682250000}$$

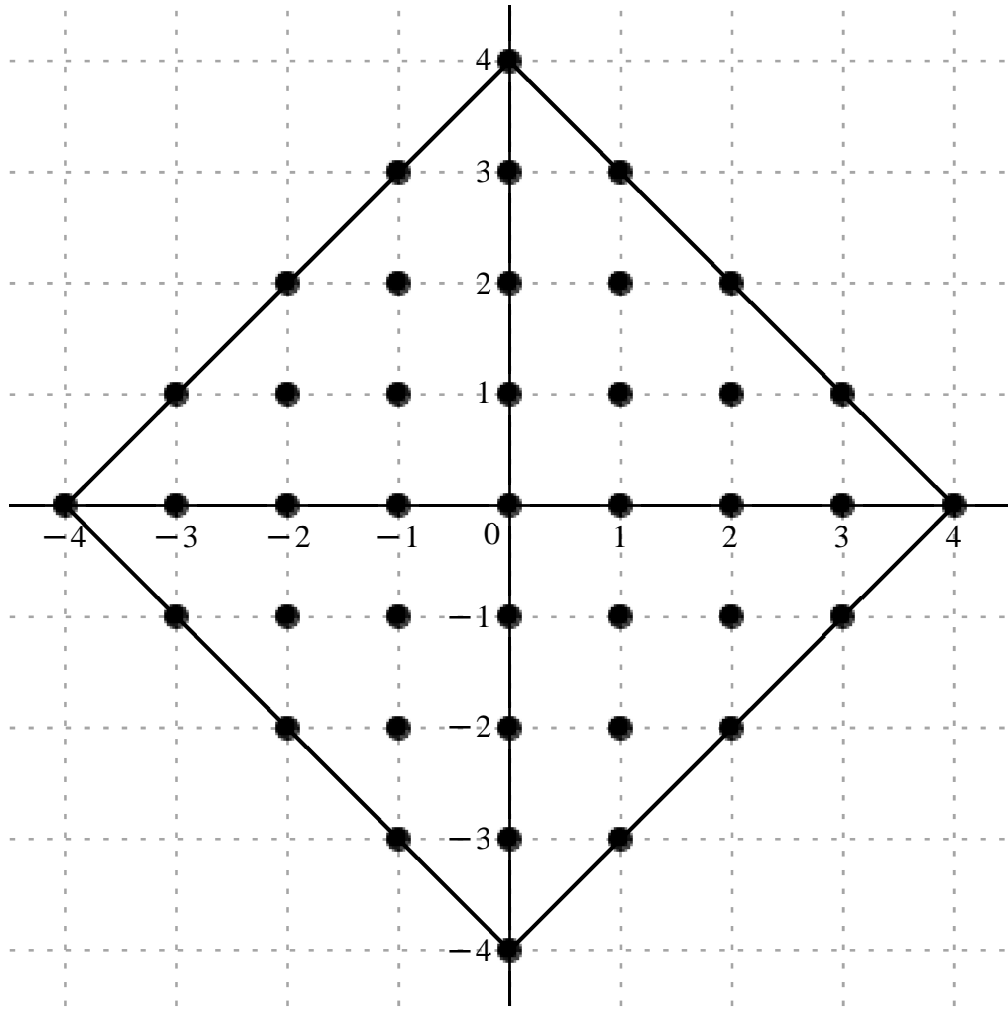
$$\frac{13711087269}{246618320000000}$$





$$\frac{d^{12}}{dx_{ol}^{12}} u(x_{ol}) = \frac{1}{24661832000000 \Delta x_{ol}^{12}} \left( 33 \left( 415487493 u_{ol+41} + (-1343451998784 + 723824888640 I) u_{ol-1+31} - 14492035579904 u_{ol+31} - (1343451998784 + 723824888640 I) u_{ol+1+31} - 23956997752380 u_{ol-2+21} + (2497622744236032 + 10662489540132864 I) u_{ol-1+21} + 124968192459499200 u_{ol+21} + (2497622744236032 - 10662489540132864 I) u_{ol+1+21} - 23956997752380 u_{ol+2+21} - (1343451998784 + 723824888640 I) u_{ol-3+1} + (2497622744236032 - 10662489540132864 I) u_{ol-2+1} - 1744668812199062400 u_{ol-1+1} - 8431545403450982400 u_{ol+1} - 1744668812199062400 u_{ol+1+1} + (2497622744236032 + 10662489540132864 I) u_{ol+2+1} + (-1343451998784 + 723824888640 I) u_{ol+3+1} + 415487493 u_{ol-4} - 14492035579904 u_{ol-3} + 124968192459499200 u_{ol-2} - 8431545403450982400 u_{ol-1} + 40185167652895663580 u_{ol} - 8431545403450982400 u_{ol+1} + 124968192459499200 u_{ol+2} - 14492035579904 u_{ol+3} + 415487493 u_{ol+4} + (-1343451998784 + 723824888640 I) u_{ol-3-1} + (2497622744236032 + 10662489540132864 I) u_{ol-2-1} - 1744668812199062400 u_{ol-1-1} - 8431545403450982400 u_{ol-1} - 1744668812199062400 u_{ol+1-1} + (2497622744236032 - 10662489540132864 I) u_{ol+2-1} - (1343451998784 + 723824888640 I) u_{ol+3-1} - 23956997752380 u_{ol-2-21} + (2497622744236032 - 10662489540132864 I) u_{ol-1-21} + 124968192459499200 u_{ol-21} + (2497622744236032 + 10662489540132864 I) u_{ol+1-21} - 23956997752380 u_{ol+2-21} - (1343451998784 + 723824888640 I) u_{ol-1-31} - 14492035579904 u_{ol-31} + (-1343451998784 + 723824888640 I) u_{ol+1-31} + 415487493 u_{ol-41} \right) \Bigg) .$$

[illegible]



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}} u(x_{ol}) = \frac{1}{531505000000 \Delta x_{ol}^{13}} \left( 33 \left( 35453353 \operatorname{I} u_{ol+4\operatorname{I}} + (43692774496 - 51815515353 \operatorname{I}) u_{ol-1+3\operatorname{I}} - 412623078912 \operatorname{I} u_{ol+3\operatorname{I}} - (43692774496 + 51815515353 \operatorname{I}) u_{ol+1+3\operatorname{I}} + (763971912795 + 763971912795 \operatorname{I}) u_{ol-2+2\operatorname{I}} + (58385989294080 - 265220066818560 \operatorname{I}) u_{ol-1+2\operatorname{I}} - 544840641742600 \operatorname{I} u_{ol+2\operatorname{I}} - (58385989294080 \right. \\ \left. + 265220066818560 \operatorname{I}) u_{ol+1+2\operatorname{I}} + (-763971912795 + 763971912795 \operatorname{I}) u_{ol+2+2\operatorname{I}} + (-51815515353 + 43692774496 \operatorname{I}) u_{ol-3+1} + (-265220066818560 + 58385989294080 \operatorname{I}) u_{ol-2+1} + (927472007628075 + 927472007628075 \operatorname{I}) u_{ol-1+1} + 177250904230400 \operatorname{I} u_{ol+1} + (-927472007628075 + 927472007628075 \operatorname{I}) u_{ol+1+1} \right. \\ \left. + (265220066818560 + 58385989294080 \operatorname{I}) u_{ol+2+1} + (51815515353 + 43692774496 \operatorname{I}) u_{ol+3+1} + 35453353 u_{ol-4} - 412623078912 u_{ol-3} - 544840641742600 u_{ol-2} + 177250904230400 u_{ol-1} - 177250904230400 u_{ol+1} + 544840641742600 u_{ol+2} + 412623078912 u_{ol+3} - 35453353 u_{ol+4} - (51815515353 + 43692774496 \operatorname{I}) u_{ol-3-1} \right. \\ \left. - (265220066818560 + 58385989294080 \operatorname{I}) u_{ol-2-1} + (927472007628075 - 927472007628075 \operatorname{I}) u_{ol-1-1} - 177250904230400 \operatorname{I} u_{ol-1} - (927472007628075 + 927472007628075 \operatorname{I}) u_{ol+1-1} + (265220066818560 - 58385989294080 \operatorname{I}) u_{ol+2-1} + (51815515353 - 43692774496 \operatorname{I}) u_{ol+3-1} + (763971912795 - 763971912795 \operatorname{I}) u_{ol-2-2\operatorname{I}} \right. \\ \left. + (58385989294080 + 265220066818560 \operatorname{I}) u_{ol-1-2\operatorname{I}} + 544840641742600 \operatorname{I} u_{ol-2\operatorname{I}} + (-58385989294080 + 265220066818560 \operatorname{I}) u_{ol+1-2\operatorname{I}} - (763971912795 + 763971912795 \operatorname{I}) u_{ol+2-2\operatorname{I}} + (43692774496 + 51815515353 \operatorname{I}) u_{ol-1-3\operatorname{I}} + 412623078912 \operatorname{I} u_{ol-3\operatorname{I}} + (-43692774496 + 51815515353 \operatorname{I}) u_{ol+1-3\operatorname{I}} - 35453353 \operatorname{I} u_{ol-4\operatorname{I}} \right) \Bigg), \\ O(\Delta x_{ol}^{28})$$

Formula: 756, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 14

Error order.: 28, Error.:  $1.6035359894823523662 \times 10^{-82}$ , New Error.:  $1.6035359894805376602 \times 10^{-110}$

Error order.: 28, Error.:  $1.6035359894805376602 \times 10^{-110}$ , New Error.:  $1.6035359894805374788 \times 10^{-138}$

Error order.: 28, Error.:  $1.6035359894805374788 \times 10^{-138}$ , New Error.:  $1.6035359894805374788 \times 10^{-166}$

Error order.: 28, Error.:  $1.6035359894805374788 \times 10^{-166}$ , New Error.:  $1.6035359894805374788 \times 10^{-194}$

Error order.: 28, Error.:  $1.6035359894805374788 \times 10^{-194}$ , New Error.:  $1.6035359894805374788 \times 10^{-222}$

$$c = , -\frac{629978811}{81770000000}$$

$$x_o + h . , \begin{pmatrix} 4 I \\ -1 + 3 I & 3 I & 1 + 3 I \\ -2 + 2 I & -1 + 2 I & 2 I & 1 + 2 I & 2 + 2 I \\ -3 + I & -2 + I & -1 + I & I & 1 + I & 2 + I & 3 + I \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ -3 - I & -2 - I & -1 - I & -I & 1 - I & 2 - I & 3 - I \\ -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I \\ -1 - 3 I & -3 I & 1 - 3 I \\ -4 I \end{pmatrix}$$

$$-\frac{9200236609641}{531505000000} - \frac{3661941735837 I}{531505000000} - \frac{992874283632}{8304765625} - \frac{9200236609641}{531505000000} + \frac{3661941735837 I}{531505000000}$$

$$-\frac{170023542996384}{1660953125} + \frac{42864385476528 I}{1660953125} - \frac{17007863276019}{71825000} - \frac{170023542996384}{1660953125} - \frac{42864385476528 I}{1660953125}$$

$$\frac{73379422809 I}{221000000}$$

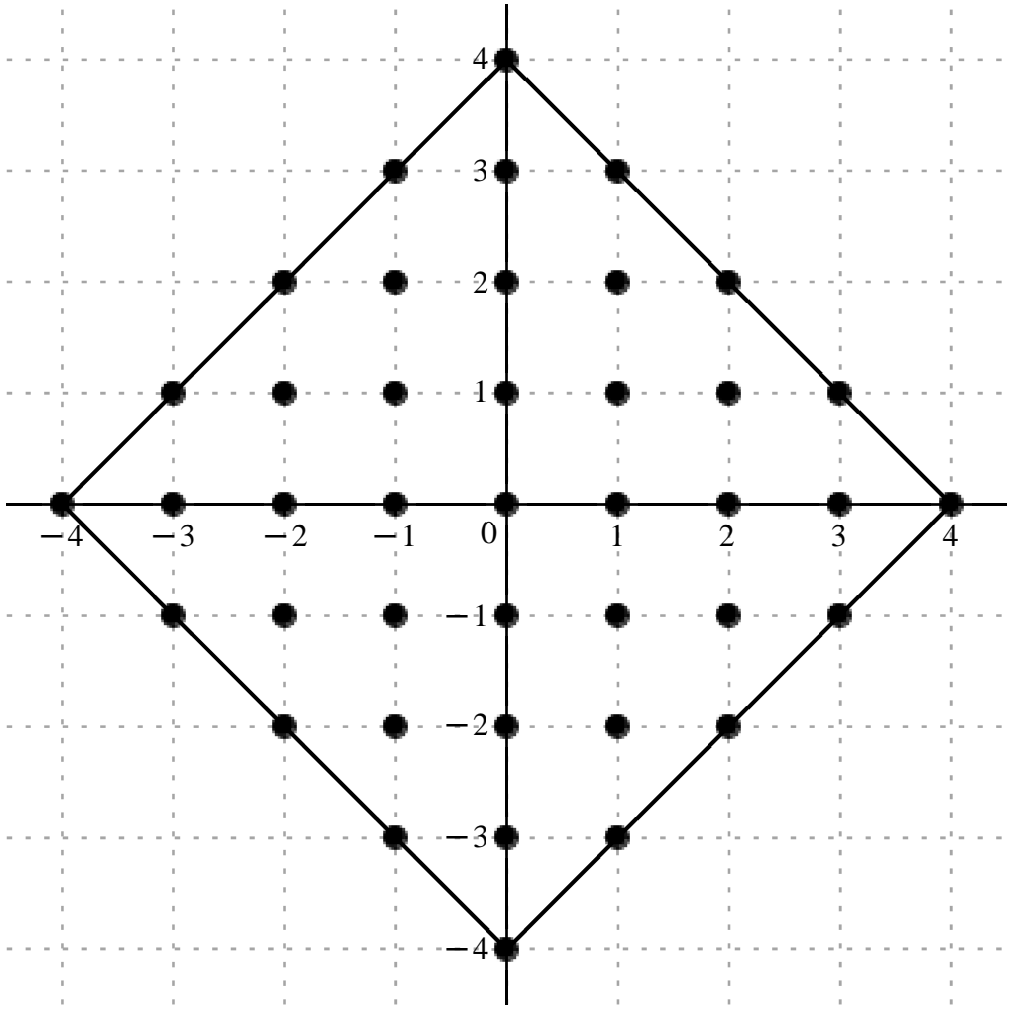
$$\frac{9200236609641}{531505000000} - \frac{3661941735837 I}{531505000000} - \frac{170023542996384}{1660953125} + \frac{42864385476528 I}{1660953125} - \frac{17816717984373 I}{22100000} - \frac{106405818288}{690625} - \frac{17816717984373 I}{22100000}$$

$$\frac{17007863276019}{71825000}$$

$$\frac{170023542996384}{1660953125} - \frac{42864385476528 I}{1660953125} - \frac{17007863276019}{71825000} - \frac{170023542996384}{1660953125} - \frac{42864385476528 I}{1660953125}$$

$$\frac{9200236609641}{531505000000} + \frac{3661941735837 I}{531505000000}$$

$$-\frac{629978811}{81770000000}$$



$$\frac{d^{14}}{dx_{ol}^{14}} u(x_{ol}) = \frac{1}{1063010000000 \mathcal{A}_{ol}^{14}} (231 (35453353 u_{ol+41} - (79655728222 + 31705123254 \text{ I}) u_{ol-1+31} - 550164105216 u_{ol+31} + (-79655728222 + 31705123254 \text{ I}) u_{ol+1+31} - 1527943825590 \text{ I} u_{ol-2+21} + (-471060898344960 + 118758470584320 \text{ I}) u_{ol-1+21} - 1089681283485200 u_{ol+21} - (471060898344960 + 118758470584320 \text{ I}) u_{ol+1+21} + 1527943825590 \text{ I} u_{ol+2+21} + (79655728222 - 31705123254 \text{ I}) u_{ol-3+1} + (471060898344960 + 118758470584320 \text{ I}) u_{ol-2+1} - 3709888030512300 \text{ I} u_{ol-1+1} + 709003616921600 u_{ol+1} + 3709888030512300 \text{ I} u_{ol+1+1} + (471060898344960 - 118758470584320 \text{ I}) u_{ol+2+1} + (79655728222 + 31705123254 \text{ I}) u_{ol+3+1} - 35453353 u_{ol-4} + 550164105216 u_{ol-3} + 1089681283485200 u_{ol-2} - 709003616921600 u_{ol-1} - 709003616921600 u_{ol+1} + 1089681283485200 u_{ol+2} + 550164105216 u_{ol+3} - 35453353 u_{ol+4} + (79655728222 + 31705123254 \text{ I}) u_{ol-3-1} + (471060898344960 - 118758470584320 \text{ I}) u_{ol-2-1} + 3709888030512300 \text{ I} u_{ol-1-1} + 709003616921600 u_{ol-1} - 3709888030512300 \text{ I} u_{ol+1-1} + (471060898344960 + 118758470584320 \text{ I}) u_{ol+2-1} + (79655728222 - 31705123254 \text{ I}) u_{ol+3-1} + 1527943825590 \text{ I} u_{ol-2-21} - (471060898344960 + 118758470584320 \text{ I}) u_{ol-1-21} - 1089681283485200 u_{ol-21} + (-471060898344960 + 118758470584320 \text{ I}) u_{ol+1-21} - 1527943825590 \text{ I} u_{ol+2-21} + (-79655728222 + 31705123254 \text{ I}) u_{ol-1-31} - 550164105216 u_{ol-31} - (79655728222 + 31705123254 \text{ I}) u_{ol+1-31} + 35453353 u_{ol-41})), O(\mathcal{A}_{ol}^{28})$$

Formula:, 757, Var:, 1

*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 15

*Error order:*, 28, *Error:*,  $5.5659006924061017276 \times 10^{-83}$ , *New Error:*,  $5.5659006924003389268 \times 10^{-111}$

*Error order*., 28, *Error*.,  $5.5659006924003389268 \times 10^{-111}$ , *New Error*.,  $5.5659006924003383505 \times 10^{-139}$

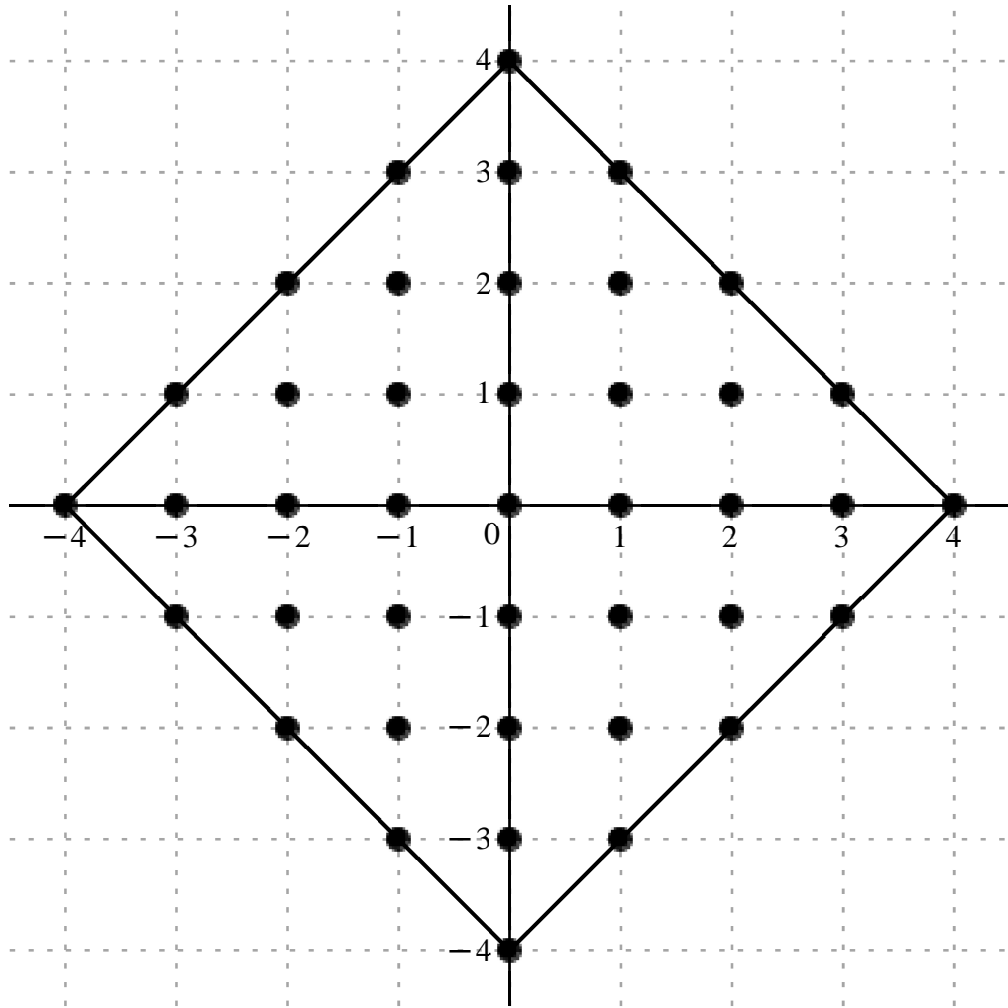
*Error order*., 28, *Error*.,  $5.5659006924003383505 \times 10^{-139}$ , *New Error*.,  $5.5659006924003383504 \times 10^{-167}$

*Error order*:, 28, *Error*:,  $5.5659006924003383504 \times 10^{-167}$ , *New Error*:,  $5.5659006924003383504 \times 10^{-195}$

*Error order*., 28, *Error*.,  $5.5659006924003383504 \times 10^{-195}$ , *New Error*.,  $5.5659006924003383504 \times 10^{-223}$

					4 I				
				-1+3 I	3 I	1+3 I			
		-2+2 I	-1+2 I	2 I	1+2 I	2+2 I			
	-3+I	-2+I	-1+I	I	1+I	2+I	3+I		
$x_o + h.$ ,	-4	-3	-2	-1	0	1	2	3	4
		-3-I	-2-I	-1-I	-I	1-I	2-I	3-I	
			-2-2 I	-1-2 I	-2 I	1-2 I	2-2 I		
				-1-3 I	-3 I	1-3 I			
					-4 I				

[illegible]



$$\frac{d^{15}}{dx_{ol}^{15}} u(x_{ol}) = \frac{1}{850408000000 \Delta x_{ol}^{15}} \left( 693 \left( -35453353 I u_{ol+41} + (-6183856616 + 108268923168 I) u_{ol-1+31} + 733552140288 I u_{ol+31} + (6183856616 + 108268923168 I) u_{ol+1+31} + (-1527943825590 + 1527943825590 I) u_{ol-2+21} + (566862271610880 + 658690660884480 I) u_{ol-1+21} + 2179362566970400 I u_{ol+21} \right. \right. \\ \left. \left. + (-566862271610880 + 658690660884480 I) u_{ol+1+21} + (1527943825590 + 1527943825590 I) u_{ol+2+21} + (-108268923168 + 6183856616 I) u_{ol-3+1} - (658690660884480 + 566862271610880 I) u_{ol-2+1} + (-7419776061024600 + 7419776061024600 I) u_{ol-1+1} - 2836014467686400 I u_{ol+1} + (7419776061024600 \right. \right. \\ \left. \left. + 7419776061024600 I) u_{ol+1+1} + (658690660884480 - 566862271610880 I) u_{ol+2+1} + (108268923168 + 6183856616 I) u_{ol+3+1} + 35453353 u_{ol-4} - 733552140288 u_{ol-3} - 2179362566970400 u_{ol-2} + 2836014467686400 u_{ol-1} - 2836014467686400 u_{ol+1} + 2179362566970400 u_{ol+2} + 733552140288 u_{ol+3} - 35453353 u_{ol+4} \right. \right. \\ \left. \left. - (108268923168 + 6183856616 I) u_{ol-3-1} + (-658690660884480 + 566862271610880 I) u_{ol-2-1} - (7419776061024600 + 7419776061024600 I) u_{ol-1-1} + 2836014467686400 I u_{ol-1} + (7419776061024600 - 7419776061024600 I) u_{ol+1-1} + (658690660884480 + 566862271610880 I) u_{ol+2-1} + (108268923168 \right. \right. \\ \left. \left. - 6183856616 I) u_{ol+3-1} - (1527943825590 + 1527943825590 I) u_{ol-2-21} + (566862271610880 - 658690660884480 I) u_{ol-1-21} - 2179362566970400 I u_{ol-21} - (566862271610880 + 658690660884480 I) u_{ol+1-21} + (1527943825590 - 1527943825590 I) u_{ol+2-21} - (6183856616 + 108268923168 I) u_{ol-1-31} \right. \right. \\ \left. \left. - 733552140288 I u_{ol-31} + (6183856616 - 108268923168 I) u_{ol+1-31} + 35453353 I u_{ol-41} \right) \right), O(\Delta x_{ol}^{28})$$

Formula:, 758, Var.: 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 17

Error order:., 24, Error:.,  $2.5023627816859197069 \times 10^{-72}$ , New Error:.,  $2.5023627816901952912 \times 10^{-96}$

Error order:., 24, Error:.,  $2.5023627816901952912 \times 10^{-96}$ , New Error:.,  $2.5023627816901957188 \times 10^{-120}$

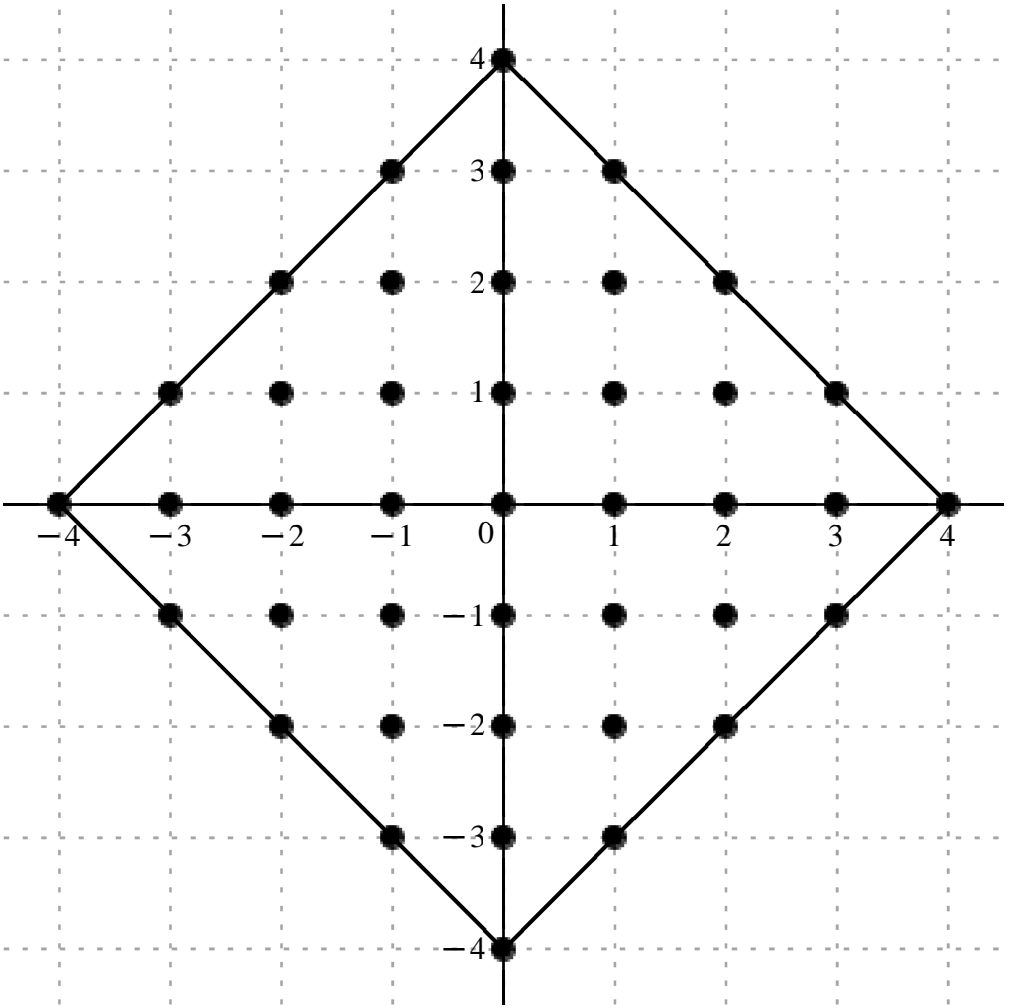
Error order:., 24, Error:.,  $2.5023627816901957188 \times 10^{-120}$ , New Error:.,  $2.5023627816901957188 \times 10^{-144}$

Error order:., 24, Error:.,  $2.5023627816901957188 \times 10^{-144}$ , New Error:.,  $2.5023627816901957188 \times 10^{-168}$

Error order:., 24, Error:.,  $2.5023627816901957188 \times 10^{-168}$ , New Error:.,  $2.5023627816901957188 \times 10^{-192}$

$$x_o + h . , \left[ \begin{array}{cccccccc} & & & & 4 \text{ I} & & & \\ & & & & -1 + 3 \text{ I} & 3 \text{ I} & 1 + 3 \text{ I} & \\ & & & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ -3 + \text{I} & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} & 3 + \text{I} & \\ -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\ -3 - \text{I} & -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} & 3 - \text{I} & \\ -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} & & & \\ & & & & -1 - 3 \text{ I} & -3 \text{ I} & 1 - 3 \text{ I} & \\ & & & & & & & -4 \text{ I} \end{array} \right]$$

$$c = , \frac{317519433}{1022125000} \qquad \qquad \qquad \frac{116400981312}{7515625} \qquad \qquad \qquad \frac{1027318230477}{8125} \qquad \qquad \qquad \frac{240232469754816}{138125} \qquad \qquad \qquad 0 \qquad \qquad \qquad \frac{240232469754816}{138125} \qquad \qquad \qquad \frac{1027318230477}{8125} \qquad \qquad \qquad \frac{116400981312}{7515625} \qquad \qquad \qquad -\frac{317519433}{1022125000} \\ -\frac{876326984379}{511062500} - \frac{190304210943 \text{ I}}{127765625} \qquad \frac{87352119683136}{25553125} - \frac{976542572130048 \text{ I}}{25553125} \qquad -\frac{23129639741439}{32500} - \frac{23129639741439 \text{ I}}{32500} \qquad \frac{240232469754816 \text{ I}}{138125} \qquad \frac{23129639741439}{32500} - \frac{23129639741439 \text{ I}}{32500} \qquad -\frac{87352119683136}{25553125} - \frac{976542572130048 \text{ I}}{25553125} \qquad \frac{876326984379}{511062500} - \frac{190304210943 \text{ I}}{127765625} \qquad \frac{317519433}{1022125000} \\ -\frac{876326984379}{511062500} + \frac{190304210943 \text{ I}}{127765625} \qquad \frac{87352119683136}{25553125} + \frac{976542572130048 \text{ I}}{25553125} \qquad -\frac{23129639741439}{32500} + \frac{23129639741439 \text{ I}}{32500} \qquad -\frac{240232469754816 \text{ I}}{138125} \qquad \frac{23129639741439}{32500} + \frac{23129639741439 \text{ I}}{32500} \qquad -\frac{87352119683136}{25553125} + \frac{976542572130048 \text{ I}}{25553125} \qquad \frac{876326984379}{511062500} + \frac{190304210943 \text{ I}}{127765625} \qquad -\frac{317519433}{1022125000} \\ -\frac{249394484493}{5525000} + \frac{249394484493 \text{ I}}{5525000} \qquad -\frac{976542572130048}{25553125} - \frac{87352119683136 \text{ I}}{25553125} \qquad \frac{1027318230477 \text{ I}}{8125} \qquad \frac{976542572130048}{25553125} - \frac{87352119683136 \text{ I}}{25553125} \qquad \frac{249394484493}{5525000} + \frac{249394484493 \text{ I}}{5525000} \qquad \frac{876326984379}{511062500} + \frac{190304210943 \text{ I}}{127765625} \qquad -\frac{317519433}{1022125000} \\ -\frac{190304210943}{127765625} + \frac{876326984379 \text{ I}}{511062500} \qquad \frac{116400981312 \text{ I}}{7515625} \qquad \frac{190304210943}{127765625} + \frac{876326984379 \text{ I}}{511062500} \qquad -\frac{317519433 \text{ I}}{1022125000}$$



$$\frac{d^{17}}{dx_{ol}^{17}} u(x_{ol}) = \frac{1}{1022125000 \Delta \mathfrak{x}_{ol}^{17}} \Big( 6237 \left( 50909 \, \mathbf{I} u_{ol+41} - (244097112 + 281009134 \, \mathbf{I}) \, u_{ol-1+31} - 2538164736 \, \mathbf{I} u_{ol+31} + (244097112 - 281009134 \, \mathbf{I}) \, u_{ol+1+31} - (7397463465 + 7397463465 \, \mathbf{I}) \, u_{ol-2+21} + ( -6262899292160 + 560218821120 \, \mathbf{I}) \, u_{ol-1+21} - 20720960941800 \, \mathbf{I} u_{ol+21} + (6262899292160 + 560218821120 \, \mathbf{I}) \, u_{ol+1+21} \right.$$
  
$$+ (7397463465 - 7397463465 \, \mathbf{I}) \, u_{ol+2+21} - (281009134 + 244097112 \, \mathbf{I}) \, u_{ol-3+1} + (560218821120 - 6262899292160 \, \mathbf{I}) \, u_{ol-2+1} - (116630939533150 + 116630939533150 \, \mathbf{I}) \, u_{ol-1+1} + 285028102643200 \, \mathbf{I} u_{ol+1} + (116630939533150 - 116630939533150 \, \mathbf{I}) \, u_{ol+1+1} - (560218821120 + 6262899292160 \, \mathbf{I}) \, u_{ol+2+1} + (281009134$$
  
$$- 244097112 \, \mathbf{I}) \, u_{ol+3+1} + 50909 \, u_{ol-4} - 2538164736 \, u_{ol-3} - 20720960941800 \, u_{ol-2} + 285028102643200 \, u_{ol-1} - 285028102643200 \, u_{ol+1} + 20720960941800 \, u_{ol+2} + 2538164736 \, u_{ol+3} - 50909 \, u_{ol+4} + ( -281009134 + 244097112 \, \mathbf{I}) \, u_{ol-3-1} + (560218821120 + 6262899292160 \, \mathbf{I}) \, u_{ol-2-1} + ( -116630939533150$$
  
$$+ 116630939533150 \, \mathbf{I}) \, u_{ol-1-1} - 285028102643200 \, \mathbf{I} u_{ol-1} + (116630939533150 + 116630939533150 \, \mathbf{I}) \, u_{ol+1-1} + ( -560218821120 + 6262899292160 \, \mathbf{I}) \, u_{ol+2-1} + (281009134 + 244097112 \, \mathbf{I}) \, u_{ol+3-1} + ( -7397463465 + 7397463465 \, \mathbf{I}) \, u_{ol-2-21} - (6262899292160 + 560218821120 \, \mathbf{I}) \, u_{ol-1-21} + 20720960941800 \, \mathbf{I} u_{ol-21}$$
  
$$\left. + (6262899292160 - 560218821120 \, \mathbf{I}) \, u_{ol+1-21} + (7397463465 + 7397463465 \, \mathbf{I}) \, u_{ol+2-21} + ( -244097112 + 281009134 \, \mathbf{I}) \, u_{ol-1-31} + 2538164736 \, \mathbf{I} u_{ol-31} + (244097112 + 281009134 \, \mathbf{I}) \, u_{ol+1-31} - 50909 \, \mathbf{I} u_{ol-41} \right), \quad O( \Delta \mathfrak{x}_{ol}^{24} )$$

Not square - Triangle: Interval, 9

Not square - Triangle: Interval, 10

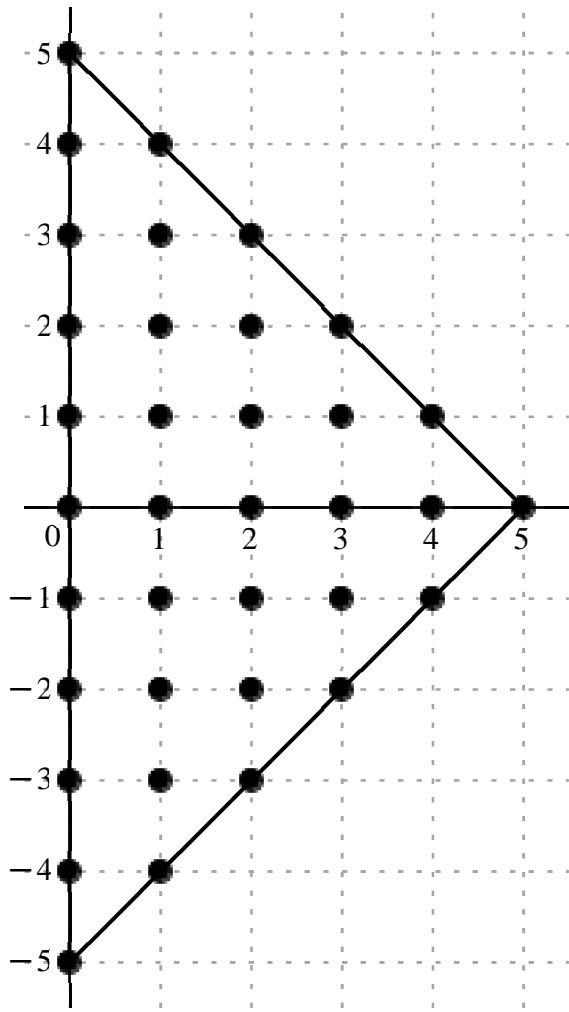
Formula:, 759, Var:, 1

Variavel :, x<sub>ol</sub> , Derivada de Ordem :, 1

Error order:, 35, Error:, 8.0320783771516181659 × 10<sup>−95</sup>, New Error:, 7.9153671861474760642 × 10<sup>−130</sup>  
Error order:, 35, Error:, 7.9153671861474760642 × 10<sup>−130</sup>, New Error:, 7.9037856506966751590 × 10<sup>−165</sup>  
Error order:, 35, Error:, 7.9037856506966751590 × 10<sup>−165</sup>, New Error:, 7.9026283885577176882 × 10<sup>−200</sup>  
Error order:, 35, Error:, 7.9026283885577176882 × 10<sup>−200</sup>, New Error:, 7.9025126712534685736 × 10<sup>−235</sup>  
Error order:, 35, Error:, 7.9025126712534685736 × 10<sup>−235</sup>, New Error:, 7.9025010996121357155 × 10<sup>−270</sup>

$$x_o \neq h. . \left[ \begin{array}{cccccc} 5 \, \mathbf{I} & & & & & \\ 4 \, \mathbf{I} & 1 + 4 \, \mathbf{I} & & & & \\ 3 \, \mathbf{I} & 1 + 3 \, \mathbf{I} & 2 + 3 \, \mathbf{I} & & & \\ 2 \, \mathbf{I} & 1 + 2 \, \mathbf{I} & 2 + 2 \, \mathbf{I} & 3 + 2 \, \mathbf{I} & & \\ \mathbf{I} & 1 + \mathbf{I} & 2 + \mathbf{I} & 3 + \mathbf{I} & 4 + \mathbf{I} & \\ 0 & 1 & 2 & 3 & 4 & 5 \\ -\mathbf{I} & 1 - \mathbf{I} & 2 - \mathbf{I} & 3 - \mathbf{I} & 4 - \mathbf{I} & \\ -2 \, \mathbf{I} & 1 - 2 \, \mathbf{I} & 2 - 2 \, \mathbf{I} & 3 - 2 \, \mathbf{I} & & \\ -3 \, \mathbf{I} & 1 - 3 \, \mathbf{I} & 2 - 3 \, \mathbf{I} & & & \\ -4 \, \mathbf{I} & 1 - 4 \, \mathbf{I} & & & & \\ -5 \, \mathbf{I} & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccc} \frac{229}{3055366641600} + \frac{71 \, \mathbf{I}}{286440622650} & & & & & & & \\ \frac{2057}{11751410160} + \frac{11237 \, \mathbf{I}}{35254230480} & \frac{1171}{837626720} - \frac{1437 \, \mathbf{I}}{837626720} & & & & & & \\ \frac{107}{901320} - \frac{673 \, \mathbf{I}}{7210560} & - \frac{4216}{2441075} + \frac{7208 \, \mathbf{I}}{2441075} & \frac{10901}{11828752} - \frac{2617 \, \mathbf{I}}{11828752} & & & & & \\ - \frac{34}{2331} + \frac{374 \, \mathbf{I}}{67599} & - \frac{1173}{1850} - \frac{1139 \, \mathbf{I}}{1850} & \frac{793305}{1478594} - \frac{485775 \, \mathbf{I}}{1478594} & - \frac{17}{3393} + \frac{119 \, \mathbf{I}}{13572} & & & & \\ \frac{85}{288} - \frac{85 \, \mathbf{I}}{288} & \frac{440}{37} - \frac{1160 \, \mathbf{I}}{37} & - \frac{9027}{2320} - \frac{86139 \, \mathbf{I}}{2320} & - \frac{1904}{6525} - \frac{7072 \, \mathbf{I}}{6525} & \frac{499}{2899520} - \frac{4447 \, \mathbf{I}}{2899520} & & & \\ - \frac{94687}{13260} & \frac{1105}{8} & - \frac{4420}{29} & \frac{17}{3} & - \frac{17}{1640} & \frac{1}{475600} & & \\ \frac{85}{288} + \frac{85 \, \mathbf{I}}{288} & \frac{440}{37} + \frac{1160 \, \mathbf{I}}{37} & - \frac{9027}{2320} + \frac{86139 \, \mathbf{I}}{2320} & - \frac{1904}{6525} + \frac{7072 \, \mathbf{I}}{6525} & \frac{499}{2899520} + \frac{4447 \, \mathbf{I}}{2899520} & & & \\ - \frac{34}{2331} - \frac{374 \, \mathbf{I}}{67599} & - \frac{1173}{1850} + \frac{1139 \, \mathbf{I}}{1850} & \frac{793305}{1478594} + \frac{485775 \, \mathbf{I}}{1478594} & - \frac{17}{3393} - \frac{119 \, \mathbf{I}}{13572} & & & & \\ \frac{107}{901320} + \frac{673 \, \mathbf{I}}{7210560} & - \frac{4216}{2441075} - \frac{7208 \, \mathbf{I}}{2441075} & \frac{10901}{11828752} + \frac{2617 \, \mathbf{I}}{11828752} & & & & & \\ \frac{2057}{11751410160} - \frac{11237 \, \mathbf{I}}{35254230480} & \frac{1171}{837626720} + \frac{1437 \, \mathbf{I}}{837626720} & & & & & & \\ \frac{229}{3055366641600} - \frac{71 \, \mathbf{I}}{286440622650} & & & & & & & \end{array} \right]$$



$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{155823698721600 \Delta x_{ol}} \left( (11679 + 38624 I) u_{ol+51} + (27275820 + 49667540 I) u_{ol+41} + (217841130 - 267325110 I) u_{ol+1+41} + (18498575160 - 14543856405 I) u_{ol+31} + (-269124346368 + 460115817984 I) u_{ol+1+31} + (143602143300 - 34474526100 I) u_{ol+2+31} + (-2272846742400 + 862114281600 I) u_{ol+21} \right. \\
- (98800647892128 + 95936860996704 I) u_{ol+1+21} + (83603558052000 - 51194078460000 I) u_{ol+2+21} + (-780725870400 + 1366270273200 I) u_{ol+3+21} + (45989633303250 - 45989633303250 I) u_{ol+1} + (1853038579392000 - 4885283527488000 I) u_{ol+1+1} - (606301951879260 + 5785559303525820 I) u_{ol+2+1} \\
- (45469474692096 + 168886620284928 I) u_{ol+3+1} + (26816861295 - 238987138635 I) u_{ol+4+1} - 1112705773819920 u_{ol} + 21523148385921000 u_{ol+1} - 23749680977568000 u_{ol+2} + 883000959422400 u_{ol+3} - 1615245657480 u_{ol+4} + 327636036 u_{ol+5} + (45989633303250 + 45989633303250 I) u_{ol-1} + (1853038579392000 \\
+ 4885283527488000 I) u_{ol+1-1} + (-606301951879260 + 5785559303525820 I) u_{ol+2-1} + (-45469474692096 + 168886620284928 I) u_{ol+3-1} + (26816861295 + 238987138635 I) u_{ol+4-1} - (2272846742400 + 862114281600 I) u_{ol-21} + (-98800647892128 + 95936860996704 I) u_{ol+1-21} + (83603558052000 \\
+ 51194078460000 I) u_{ol+2-21} - (780725870400 + 1366270273200 I) u_{ol+3-21} + (18498575160 + 14543856405 I) u_{ol-31} - (269124346368 + 460115817984 I) u_{ol+1-31} + (143602143300 + 34474526100 I) u_{ol+2-31} + (27275820 - 49667540 I) u_{ol-41} + (217841130 + 267325110 I) u_{ol+1-41} + (11679 - 38624 I) u_{ol-51} \Big), \quad O(\Delta x_{ol}^{35})$$

Formula:, 760, Var:, 1

Variavel :, x<sub>ol</sub>, Derivada de Ordem :, 1

Error order:, 35, Error:, 7.7749210965671822402 × 10<sup>-95</sup>, New Error:, 7.8896524397126484938 × 10<sup>-130</sup>

Error order:, 35, Error:, 7.8896524397126484938 × 10<sup>-130</sup>, New Error:, 7.9012141770348063903 × 10<sup>-165</sup>

Error order:, 35, Error:, 7.9012141770348063903 × 10<sup>-165</sup>, New Error:, 7.9023712411925124252 × 10<sup>-200</sup>

Error order:, 35, Error:, 7.9023712411925124252 × 10<sup>-200</sup>, New Error:, 7.9024869565169490289 × 10<sup>-235</sup>

Error order:, 35, Error:, 7.9024869565169490289 × 10<sup>-235</sup>, New Error:, 7.9024985281384837620 × 10<sup>-270</sup>

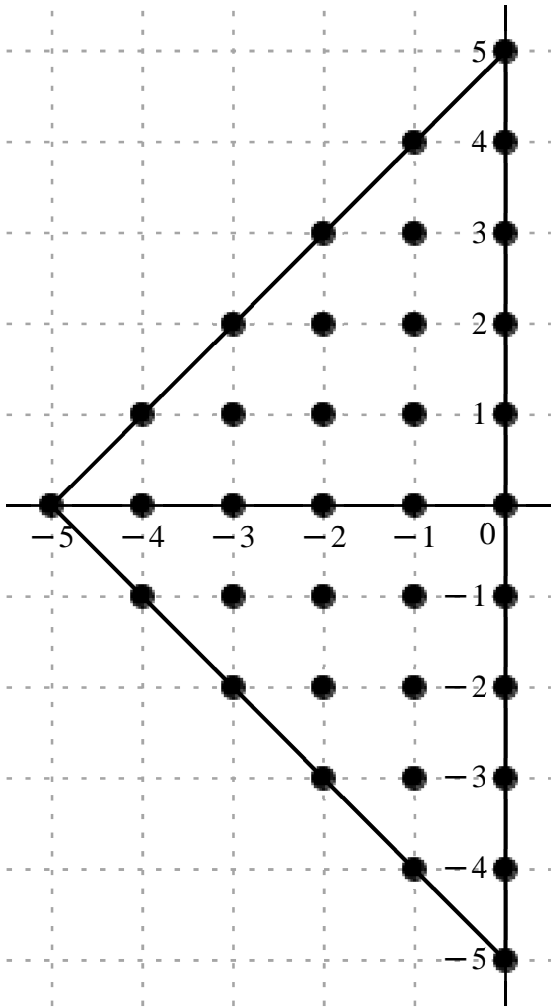


$$x_o \neq h.,$$

$$\begin{bmatrix} 5\text{ I} \\ -1+4\text{ I} & 4\text{ I} \\ -2+3\text{ I} & -1+3\text{ I} & 3\text{ I} \\ -3+2\text{ I} & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} \\ -4+\text{ I} & -3+\text{ I} & -2+\text{ I} & -1+\text{ I} & \text{ I} \\ -4 & -3 & -2 & -1 & 0 \\ -4-\text{ I} & -3-\text{ I} & -2-\text{ I} & -1-\text{ I} & -\text{ I} \\ -3-2\text{ I} & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} \\ -2-3\text{ I} & -1-3\text{ I} & -3\text{ I} \\ -1-4\text{ I} & -4\text{ I} \\ -5\text{ I} \end{bmatrix}$$

$$c =,$$

$$\begin{bmatrix} -\frac{1}{475600} & -\frac{499}{2899520} - \frac{4447\text{ I}}{2899520} & \frac{17}{3393} + \frac{119\text{ I}}{13572} & -\frac{10901}{11828752} - \frac{2617\text{ I}}{11828752} & -\frac{1171}{837626720} - \frac{1437\text{ I}}{837626720} & -\frac{229}{3055366641600} + \frac{71\text{ I}}{286440622650} \\ -\frac{499}{2899520} + \frac{4447\text{ I}}{2899520} & \frac{17}{1640} & -\frac{17}{3} & \frac{4420}{29} & -\frac{1105}{8} & \frac{94687}{13260} \\ \frac{1904}{6525} + \frac{7072\text{ I}}{6525} & \frac{1904}{6525} - \frac{7072\text{ I}}{6525} & \frac{9027}{2320} - \frac{86139\text{ I}}{2320} & \frac{9027}{2320} + \frac{86139\text{ I}}{2320} & -\frac{440}{37} + \frac{1160\text{ I}}{37} & -\frac{85}{288} + \frac{85\text{ I}}{288} \\ -\frac{793305}{1478594} + \frac{485775\text{ I}}{1478594} & \frac{793305}{1478594} - \frac{485775\text{ I}}{1478594} & \frac{1173}{1850} + \frac{1139\text{ I}}{1850} & \frac{1173}{1850} - \frac{1139\text{ I}}{1850} & \frac{34}{2331} - \frac{374\text{ I}}{67599} & \frac{34}{2331} + \frac{374\text{ I}}{67599} \\ -\frac{10901}{11828752} + \frac{2617\text{ I}}{11828752} & \frac{10901}{11828752} - \frac{2617\text{ I}}{11828752} & \frac{4216}{2441075} - \frac{7208\text{ I}}{2441075} & \frac{4216}{2441075} + \frac{7208\text{ I}}{2441075} & -\frac{107}{901320} + \frac{673\text{ I}}{7210560} & -\frac{107}{901320} - \frac{673\text{ I}}{7210560} \\ -\frac{1171}{837626720} + \frac{1437\text{ I}}{837626720} & \frac{1171}{837626720} - \frac{1437\text{ I}}{837626720} & \frac{2057}{11751410160} - \frac{11237\text{ I}}{35254230480} & \frac{2057}{11751410160} + \frac{11237\text{ I}}{35254230480} & -\frac{229}{3055366641600} - \frac{71\text{ I}}{286440622650} & \frac{229}{3055366641600} + \frac{71\text{ I}}{286440622650} \end{bmatrix}$$



$$\frac{\mathrm{d}}{\mathrm{d}x_{ol}}\,u(x_{ol})=\frac{1}{155823698721600\,\Delta x_{ol}}\Big( (-11679+38624\,\mathrm{I})\,u_{ol+5\mathrm{I}}-(217841130+267325110\,\mathrm{I})\,u_{ol-1+4\mathrm{I}}+( -27275820+49667540\,\mathrm{I})\,u_{ol+4\mathrm{I}}-(143602143300+34474526100\,\mathrm{I})\,u_{ol-2+3\mathrm{I}}+(269124346368+460115817984\,\mathrm{I})\,u_{ol-1+3\mathrm{I}}-(18498575160+14543856405\,\mathrm{I})\,u_{ol+3\mathrm{I}}+(780725870400+1366270273200\,\mathrm{I})\,u_{ol-3+2\mathrm{I}}\\
-(83603558052000+51194078460000\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(98800647892128-95936860996704\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+(2272846742400+862114281600\,\mathrm{I})\,u_{ol+2\mathrm{I}}-(26816861295+238987138635\,\mathrm{I})\,u_{ol-4+1\mathrm{I}}+(45469474692096-168886620284928\,\mathrm{I})\,u_{ol-3+1\mathrm{I}}+(606301951879260-5785559303525820\,\mathrm{I})\,u_{ol-2+1\mathrm{I}}-(1853038579392000\\
+4885283527488000\,\mathrm{I})\,u_{ol-1+1\mathrm{I}}-(45989633303250+45989633303250\,\mathrm{I})\,u_{ol+1\mathrm{I}}-327636036\,u_{ol-5\mathrm{I}}+1615245657480\,u_{ol-4\mathrm{I}}-883000959422400\,u_{ol-3\mathrm{I}}+23749680977568000\,u_{ol-2\mathrm{I}}-21523148385921000\,u_{ol-1\mathrm{I}}+1112705773819920\,u_{ol}+(-26816861295+238987138635\,\mathrm{I})\,u_{ol-4-1\mathrm{I}}+(45469474692096\\
+168886620284928\,\mathrm{I})\,u_{ol-3-1\mathrm{I}}+(606301951879260+5785559303525820\,\mathrm{I})\,u_{ol-2-1\mathrm{I}}+(-1853038579392000+4885283527488000\,\mathrm{I})\,u_{ol-1-1\mathrm{I}}+(-45989633303250+45989633303250\,\mathrm{I})\,u_{ol-1\mathrm{I}}+(780725870400-1366270273200\,\mathrm{I})\,u_{ol-3-2\mathrm{I}}+(-83603558052000+51194078460000\,\mathrm{I})\,u_{ol-2-2\mathrm{I}}+(98800647892128\\
+95936860996704\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}+(2272846742400-862114281600\,\mathrm{I})\,u_{ol-2\mathrm{I}}+(-143602143300+34474526100\,\mathrm{I})\,u_{ol-2-3\mathrm{I}}+(269124346368-460115817984\,\mathrm{I})\,u_{ol-1-3\mathrm{I}}+(-18498575160+14543856405\,\mathrm{I})\,u_{ol-3\mathrm{I}}+(-217841130+267325110\,\mathrm{I})\,u_{ol-1-4\mathrm{I}}-(27275820+49667540\,\mathrm{I})\,u_{ol-4\mathrm{I}}-(11679+38624\,\mathrm{I})\,u_{ol-5\mathrm{I}}\Big),\\
O(\,\,\Delta x_{ol}^{35}\,\,)$$

Formula: 761, Var.: 1

Variavel :  $x_{ol}$  , Derivada de Ordem : 1

Error order.: 35, Error.: 7.8747167701655901980 × 10<sup>−95</sup>, New Error.: 7.8998113969734141791 × 10<sup>−130</sup>  
Error order.: 35, Error.: 7.8998113969734141791 × 10<sup>−130</sup>, New Error.: 7.9022318719973874386 × 10<sup>−165</sup>  
Error order.: 35, Error.: 7.9022318719973874386 × 10<sup>−165</sup>, New Error.: 7.9024730286864730322 × 10<sup>−200</sup>  
Error order.: 35, Error.: 7.9024730286864730322 × 10<sup>−200</sup>, New Error.: 7.9024971354463274521 × 10<sup>−235</sup>  
Error order.: 35, Error.: 7.9024971354463274521 × 10<sup>−235</sup>, New Error.: 7.9024995460332214333 × 10<sup>−270</sup>

$$x_o\neq h.,\left[\begin{array}{cccccccccc} & & & & & 5\,\mathrm{I} & & & & \\ & & & & & -1+4\,\mathrm{I} & 4\,\mathrm{I} & 1+4\,\mathrm{I} & & \\ & & & & & -2+3\,\mathrm{I} & -1+3\,\mathrm{I} & 3\,\mathrm{I} & 1+3\,\mathrm{I} & 2+3\,\mathrm{I} \\ & & & & & -3+2\,\mathrm{I} & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & 3+2\,\mathrm{I} \\ & & & & & -4+\mathrm{I} & -3+\mathrm{I} & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & 3+\mathrm{I} & 4+\mathrm{I} \\ -5 & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 & 5 \end{array}\right]$$



$Variavel \, :, x_{oi} \, , \, Derivada \, de \, Ordem \, :, 1$

$Error \, order \, :, 35, \, Error \, :, 7.9282830823187865206 \times 10^{-95}, \, New \, Error \, :, 7.9051682326743704895 \times 10^{-130}$

$Error \, order \, :, 35, \, Error \, :, 7.9051682326743704895 \times 10^{-130}, \, New \, Error \, :, 7.9027675557719707119 \times 10^{-165}$

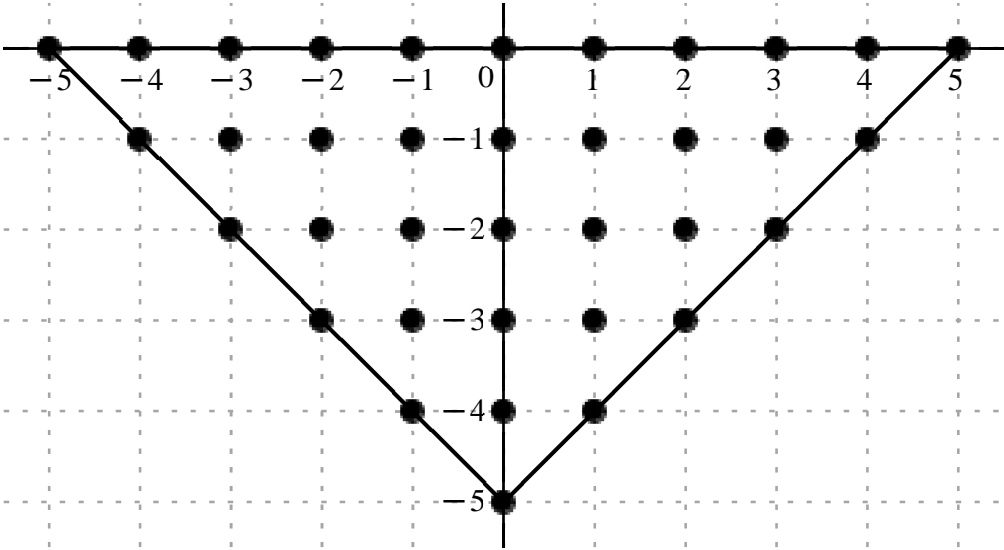
$Error \, order \, :, 35, \, Error \, :, 7.9027675557719707119 \times 10^{-165}, \, New \, Error \, :, 7.9025265970641358472 \times 10^{-200}$

$Error \, order \, :, 35, \, Error \, :, 7.9025265970641358472 \times 10^{-200}, \, New \, Error \, :, 7.9025024922840939381 \times 10^{-235}$

$Error \, order \, :, 35, \, Error \, :, 7.9025024922840939381 \times 10^{-235}, \, New \, Error \, :, 7.9025000817169980821 \times 10^{-270}$

$$x_o + h \cdot , \left[ \begin{array}{cccccccccccc} -5 & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 & 5 \\ -4 - I & -3 - I & -2 - I & -1 - I & -I & 1 - I & 2 - I & 3 - I & 4 - I & & \\ & -3 - 2 I & -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I & 3 - 2 I & & & \\ & & -2 - 3 I & -1 - 3 I & -3 I & 1 - 3 I & 2 - 3 I & & & & \\ & & & -1 - 4 I & -4 I & 1 - 4 I & & & & & \\ & & & & -5 I & & & & & & \end{array} \right]$$

$$c = , \left[ \begin{array}{cccccccccccccccccccc} \frac{71}{286440622650} + \frac{229 I}{3055366641600} & \frac{11237}{35254230480} + \frac{2057 I}{11751410160} & -\frac{673}{7210560} + \frac{107 I}{901320} & \frac{374}{67599} - \frac{34 I}{2331} & -\frac{85}{288} + \frac{85 I}{288} & -\frac{94687 I}{13260} & \frac{85}{288} + \frac{85 I}{288} & -\frac{374}{67599} - \frac{34 I}{2331} & \frac{673}{7210560} + \frac{107 I}{901320} & -\frac{11237}{35254230480} + \frac{2057 I}{11751410160} & -\frac{71}{286440622650} + \frac{229 I}{3055366641600} \\ -\frac{1437}{837626720} + \frac{1171 I}{837626720} & \frac{7208}{2441075} - \frac{4216 I}{2441075} & -\frac{1139}{1850} - \frac{1173 I}{1850} & -\frac{1160}{37} + \frac{440 I}{37} & \frac{1105 I}{8} & \frac{1160}{37} + \frac{440 I}{37} & \frac{1139}{1850} - \frac{1173 I}{1850} & -\frac{7208}{2441075} - \frac{4216 I}{2441075} & \frac{1437}{837626720} + \frac{1171 I}{837626720} \\ -\frac{2617}{11828752} + \frac{10901 I}{11828752} & -\frac{485775}{1478594} + \frac{793305 I}{1478594} & -\frac{86139}{2320} - \frac{9027 I}{2320} & -\frac{4420 I}{29} & \frac{86139}{2320} - \frac{9027 I}{2320} & \frac{485775}{1478594} + \frac{793305 I}{1478594} & \frac{2617}{11828752} + \frac{10901 I}{11828752} \\ \frac{119}{13572} - \frac{17 I}{3393} & -\frac{7072}{6525} - \frac{1904 I}{6525} & \frac{17 I}{3} & \frac{7072}{6525} - \frac{1904 I}{6525} & -\frac{119}{13572} - \frac{17 I}{3393} \\ -\frac{4447}{2899520} + \frac{499 I}{2899520} & -\frac{17 I}{1640} & \frac{4447}{2899520} + \frac{499 I}{2899520} \\ \frac{I}{475600} \end{array} \right]$$



$$\frac{d}{dx_{oi}} u(x_{oi}) = \frac{1}{155823698721600 \Delta x_{oi}} \left( (38624 + 11679 I) u_{oi-5} + (49667540 + 27275820 I) u_{oi-4} + (-14543856405 + 18498575160 I) u_{oi-3} + (862114281600 - 2272846742400 I) u_{oi-2} + (-45989633303250 + 45989633303250 I) u_{oi-1} - 1112705773819920 I u_{oi} + (45989633303250 + 45989633303250 I) u_{oi+1} - (862114281600 \right.$$

$$\begin{aligned}
&+2272846742400\,\mathrm{I}\,u_{o\,l\,+\,2}+(14543856405+18498575160\,\mathrm{I}\,u_{o\,l\,+\,3}+(\,-49667540+27275820\,\mathrm{I}\,u_{o\,l\,+\,4}+(\,-38624+11679\,\mathrm{I}\,u_{o\,l\,+\,5}+(\,-267325110+217841130\,\mathrm{I}\,u_{o\,l\,-\,4-\,1}+(460115817984-269124346368\,\mathrm{I}\,u_{o\,l\,-\,3-\,1}-(95936860996704+98800647892128\,\mathrm{I}\,u_{o\,l\,-\,2-\,1}+(\,-4885283527488000+1853038579392000\,\mathrm{I}\,u_{o\,l\,-\,1-\,1}\\
&+21523148385921000\,\mathrm{I}\,u_{o\,l\,-\,1}+(4885283527488000+1853038579392000\,\mathrm{I}\,u_{o\,l\,+\,1-\,1}+(95936860996704-98800647892128\,\mathrm{I}\,u_{o\,l\,+\,2-\,1}-(460115817984+269124346368\,\mathrm{I}\,u_{o\,l\,+\,3-\,1}+(267325110+217841130\,\mathrm{I}\,u_{o\,l\,+\,4-\,1}+(\,-34474526100+143602143300\,\mathrm{I}\,u_{o\,l\,-\,3-\,21}+(\,-51194078460000+83603558052000\,\mathrm{I}\,u_{o\,l\,-\,2-\,21}\\
&-(5785559303525820+606301951879260\,\mathrm{I}\,u_{o\,l\,-\,1-\,21}-23749680977568000\,\mathrm{I}\,u_{o\,l\,-\,21}+(5785559303525820-606301951879260\,\mathrm{I}\,u_{o\,l\,+\,1-\,21}+(51194078460000+83603558052000\,\mathrm{I}\,u_{o\,l\,+\,2-\,21}+(34474526100+143602143300\,\mathrm{I}\,u_{o\,l\,+\,3-\,21}+(1366270273200-780725870400\,\mathrm{I}\,u_{o\,l\,-\,2-\,31}-(168886620284928\\
&+45469474692096\,\mathrm{I}\,u_{o\,l\,-\,1-\,31}+883000959422400\,\mathrm{I}\,u_{o\,l\,-\,31}+(168886620284928-45469474692096\,\mathrm{I}\,u_{o\,l\,+\,1-\,31}-(1366270273200+780725870400\,\mathrm{I}\,u_{o\,l\,+\,2-\,31}+(\,-238987138635+26816861295\,\mathrm{I}\,u_{o\,l\,-\,1-\,41}-1615245657480\,\mathrm{I}\,u_{o\,l\,-\,41}+(238987138635+26816861295\,\mathrm{I}\,u_{o\,l\,+\,1-\,41}+327636036\,\mathrm{I}\,u_{o\,l\,-\,51}),\,O(\,\,\Delta x_{o\,l}^{\,\,35}\,\,)
\end{aligned}$$

Formula:., 763, Var:., 1

Variavel :., x<sub>o<sub>l</sub></sub>., Derivada de Ordem :., 1

Error order:., 28, Error:., 1.0852034524054918155 × 10<sup>−77</sup>, New Error:., 1.0852034524052380998 × 10<sup>−105</sup>

Error order:., 28, Error:., 1.0852034524052380998 × 10<sup>−105</sup>, New Error:., 1.0852034524052380744 × 10<sup>−133</sup>

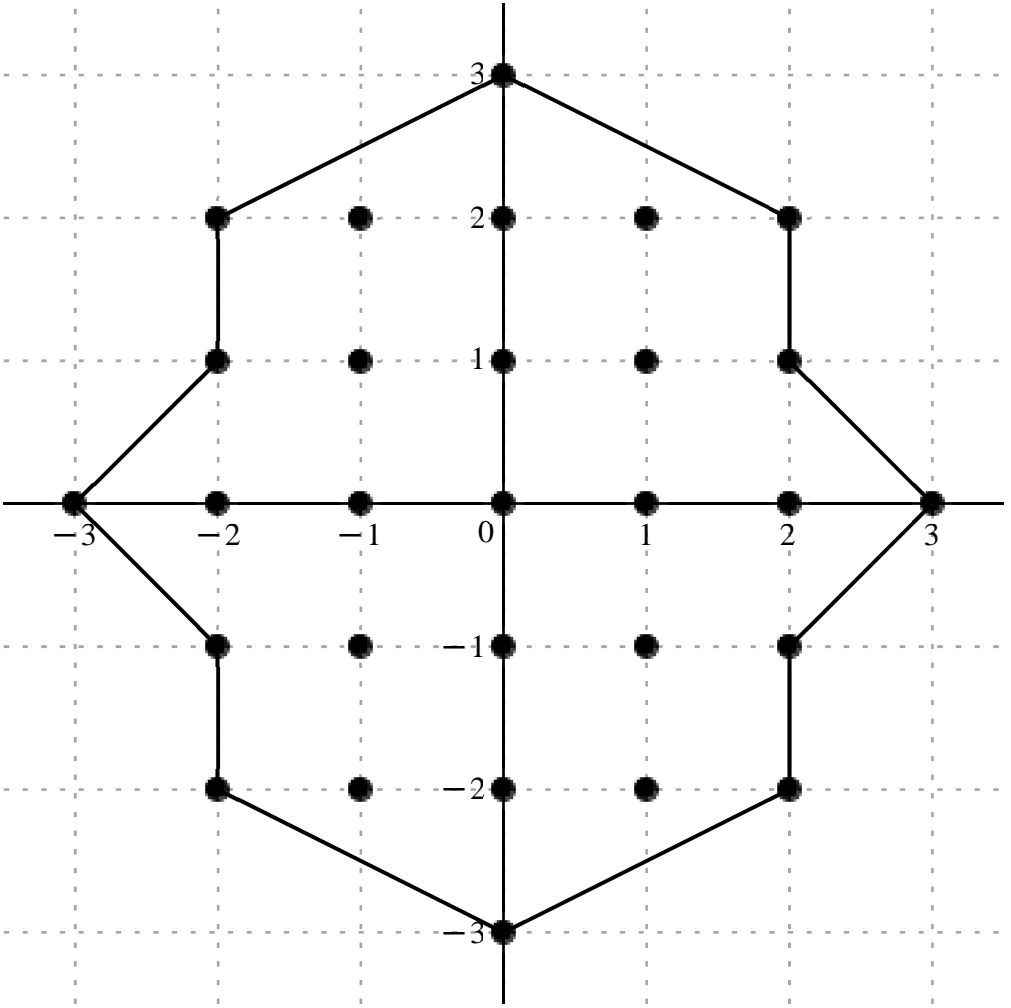
Error order:., 28, Error:., 1.0852034524052380744 × 10<sup>−133</sup>, New Error:., 1.0852034524052380744 × 10<sup>−161</sup>

Error order:., 28, Error:., 1.0852034524052380744 × 10<sup>−161</sup>, New Error:., 1.0852034524052380744 × 10<sup>−189</sup>

Error order:., 28, Error:., 1.0852034524052380744 × 10<sup>−189</sup>, New Error:., 1.0852034524052380744 × 10<sup>−217</sup>

$$\begin{array}{c}
x_o\neq h\,.,\\
\left[ \begin{array}{cccccc}
& & & & & 3\,\mathrm{I}\\
& & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I}\\
& & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I}\\
-3 & -2 & -1 & 0 & 1 & 2 & 3\\
& -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I}\\
& -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I}\\
& & & & & & -3\,\mathrm{I}
\end{array} \right]
\end{array}$$

$$c=,\left[ \begin{array}{ccccccccc}
& & & & & & & & -\frac{\mathrm{I}}{2499510}\\
& & \frac{3}{2563600}+\frac{3\,\mathrm{I}}{2563600} & -\frac{6}{71825}-\frac{21\,\mathrm{I}}{143650} & \frac{27\,\mathrm{I}}{28730} & \frac{6}{71825}-\frac{21\,\mathrm{I}}{143650} & -\frac{3}{2563600}+\frac{3\,\mathrm{I}}{2563600} & & \\
& -\frac{21}{143650}-\frac{6\,\mathrm{I}}{71825} & -\frac{24}{1105}-\frac{24\,\mathrm{I}}{1105} & -\frac{27\,\mathrm{I}}{130} & \frac{24}{1105}-\frac{24\,\mathrm{I}}{1105} & \frac{21}{143650}-\frac{6\,\mathrm{I}}{71825} & & & \\
-\frac{1}{2499510} & \frac{27}{28730} & -\frac{27}{130} & 0 & \frac{27}{130} & -\frac{27}{28730} & & \frac{1}{2499510} & \\
& -\frac{21}{143650}+\frac{6\,\mathrm{I}}{71825} & -\frac{24}{1105}+\frac{24\,\mathrm{I}}{1105} & \frac{27\,\mathrm{I}}{130} & \frac{24}{1105}+\frac{24\,\mathrm{I}}{1105} & \frac{21}{143650}+\frac{6\,\mathrm{I}}{71825} & & & \\
& \frac{3}{2563600}-\frac{3\,\mathrm{I}}{2563600} & -\frac{6}{71825}+\frac{21\,\mathrm{I}}{143650} & -\frac{27\,\mathrm{I}}{28730} & \frac{6}{71825}+\frac{21\,\mathrm{I}}{143650} & -\frac{3}{2563600}-\frac{3\,\mathrm{I}}{2563600} & & & \\
& & & & & & & & \frac{\mathrm{I}}{2499510}
\end{array} \right]$$



$$\frac{d}{dx_{ol}} u(x_{ol}) = \frac{1}{99980400 \Delta x_{ol}} \left( -40 I u_{ol+3I} + (117 + 117 I) u_{ol-2+2I} - (8352 + 14616 I) u_{ol-1+2I} + 93960 I u_{ol+2I} + (8352 - 14616 I) u_{ol+1+2I} + (-117 + 117 I) u_{ol+2+2I} - (14616 + 8352 I) u_{ol-2+I} - (2171520 + 2171520 I) u_{ol-1+I} - 20765160 I u_{ol+I} + (2171520 - 2171520 I) u_{ol+1+I} + (14616 - 8352 I) u_{ol+2+I} - 40 u_{ol-3} \right. \\ \left. + 93960 u_{ol-2} - 20765160 u_{ol-1} + 20765160 u_{ol+1} - 93960 u_{ol+2} + 40 u_{ol+3} + (-14616 + 8352 I) u_{ol-2-I} + (-2171520 + 2171520 I) u_{ol-1-I} + 20765160 I u_{ol-I} + (2171520 + 2171520 I) u_{ol+1-I} + (14616 + 8352 I) u_{ol+2-I} + (117 - 117 I) u_{ol-2-2I} + (-8352 + 14616 I) u_{ol-1-2I} - 93960 I u_{ol-2I} + (8352 + 14616 I) u_{ol+1-2I} \right. \\ \left. - (117 + 117 I) u_{ol+2-2I} + 40 I u_{ol-3I} \right), \quad O(\Delta x_{ol}^{28})$$

Formula:, 764, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 2

Error order:, 28, Error:, 7.1986962016946067236 × 10<sup>-79</sup>, New Error:, 7.1986962016931217034 × 10<sup>-107</sup>

Error order:, 28, Error:, 7.1986962016931217034 × 10<sup>-107</sup>, New Error:, 7.1986962016931215549 × 10<sup>-135</sup>

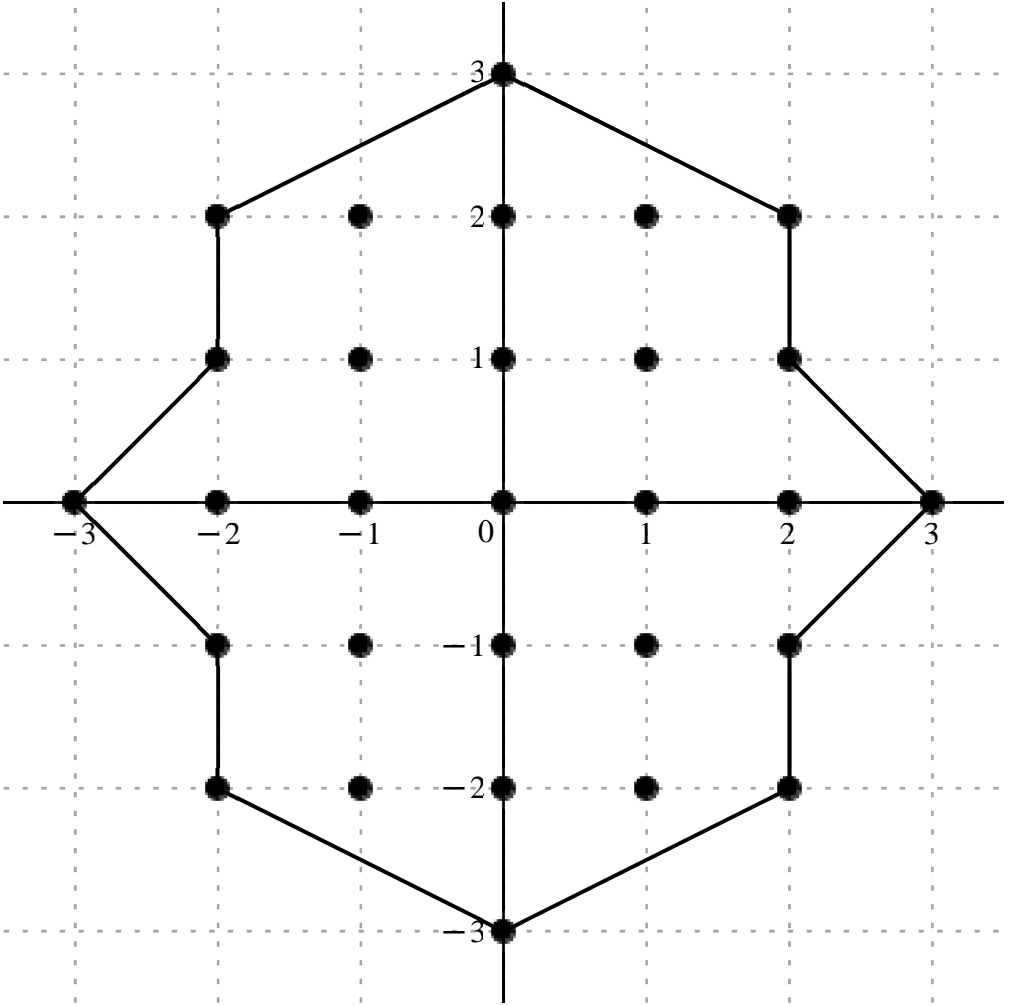
Error order:, 28, Error:, 7.1986962016931215549 × 10<sup>-135</sup>, New Error:, 7.1986962016931215549 × 10<sup>-163</sup>

Error order:, 28, Error:, 7.1986962016931215549 × 10<sup>-163</sup>, New Error:, 7.1986962016931215549 × 10<sup>-191</sup>

Error order:, 28, Error:, 7.1986962016931215549 × 10<sup>-191</sup>, New Error:, 7.1986962016931215549 × 10<sup>-219</sup>

$$x_o \neq h, \begin{bmatrix} & & & 3 I & & & \\ & -2 + 2 I & -1 + 2 I & 2 I & 1 + 2 I & 2 + 2 I & \\ & -2 + I & -1 + I & I & 1 + I & 2 + I & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - I & -1 - I & -I & 1 - I & 2 - I & \\ & -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I & \\ & & & -3 I & & & \end{bmatrix}$$

$$c =, \left[ \begin{array}{cccccc} & & & -\frac{1}{3749265} & & \\ & -\frac{3\text{ I}}{2563600} & -\frac{6}{71825} + \frac{9\text{ I}}{71825} & \frac{27}{28730} & -\frac{6}{71825} - \frac{9\text{ I}}{71825} & \frac{3\text{ I}}{2563600} \\ & \frac{6}{71825} + \frac{9\text{ I}}{71825} & \frac{48\text{ I}}{1105} & -\frac{27}{65} & -\frac{48\text{ I}}{1105} & \frac{6}{71825} - \frac{9\text{ I}}{71825} \\ \frac{1}{3749265} & -\frac{27}{28730} & \frac{27}{65} & 0 & \frac{27}{65} & -\frac{27}{28730} & \frac{1}{3749265} \\ & \frac{6}{71825} - \frac{9\text{ I}}{71825} & -\frac{48\text{ I}}{1105} & -\frac{27}{65} & \frac{48\text{ I}}{1105} & \frac{6}{71825} + \frac{9\text{ I}}{71825} \\ & \frac{3\text{ I}}{2563600} & -\frac{6}{71825} - \frac{9\text{ I}}{71825} & \frac{27}{28730} & -\frac{6}{71825} + \frac{9\text{ I}}{71825} & -\frac{3\text{ I}}{2563600} \\ & & & -\frac{1}{3749265} & & \end{array} \right]$$



$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} \; u(x_{ol}) = \frac{1}{299941200 \, \Delta x_{ol}^2} \Big( -80 \, u_{ol+3\text{I}} - 351 \, \text{I} \, u_{ol-2+2\text{I}} + (-25056 + 37584 \, \text{I}) \, u_{ol-1+2\text{I}} + 281880 \, u_{ol+2\text{I}} - (25056 + 37584 \, \text{I}) \, u_{ol+1+2\text{I}} + 351 \, \text{I} \, u_{ol+2+2\text{I}} + (25056 + 37584 \, \text{I}) \, u_{ol-2+\text{I}} + 13029120 \, \text{I} \, u_{ol-1+\text{I}} - 124590960 \, u_{ol+\text{I}} - 13029120 \, \text{I} \, u_{ol+1+\text{I}} + (25056 - 37584 \, \text{I}) \, u_{ol+2+\text{I}} + 80 \, u_{ol-3} - 281880 \, u_{ol-2} + 124590960 \, u_{ol-1} \\ + 124590960 \, u_{ol+1} - 281880 \, u_{ol+2} + 80 \, u_{ol+3} + (25056 - 37584 \, \text{I}) \, u_{ol-2-1} - 13029120 \, \text{I} \, u_{ol-1-1} - 124590960 \, u_{ol-1} + 13029120 \, \text{I} \, u_{ol+1-1} + (25056 + 37584 \, \text{I}) \, u_{ol+2-1} + 351 \, \text{I} \, u_{ol-2-2\text{I}} - (25056 + 37584 \, \text{I}) \, u_{ol-1-2\text{I}} + 281880 \, u_{ol-2\text{I}} + (-25056 + 37584 \, \text{I}) \, u_{ol+1-2\text{I}} - 351 \, \text{I} \, u_{ol+2-2\text{I}} - 80 \, u_{ol-3\text{I}} \Big), \; O( \, \Delta x_{ol}^{28} \, )$$

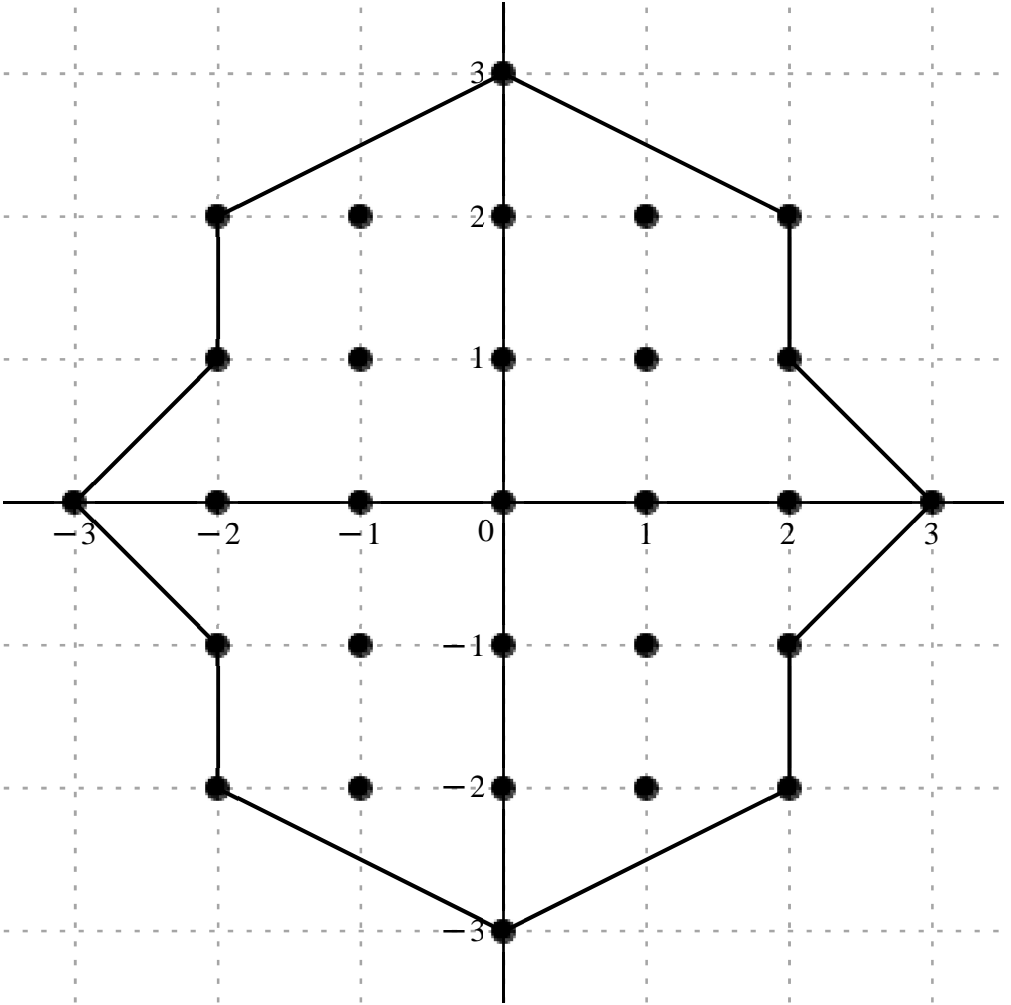
Formula.: 765, Var.: 1

Variavel .: x<sub>ol</sub>, Derivada de Ordem .: 3

Error order.: 28, Error.: 6.9318210897394674916 × 10<sup>−80</sup>, New Error.: 6.9318210897382009499 × 10<sup>−108</sup>

*Error order:*, 28, *Error:*,  $6.9318210897382009499 \times 10^{-108}$ , *New Error:*,  $6.9318210897382008232 \times 10^{-136}$   
*Error order:*, 28, *Error:*,  $6.9318210897382008232 \times 10^{-136}$ , *New Error:*,  $6.9318210897382008232 \times 10^{-164}$   
*Error order:*, 28, *Error:*,  $6.9318210897382008232 \times 10^{-164}$ , *New Error:*,  $6.9318210897382008232 \times 10^{-192}$   
*Error order:*, 28, *Error:*,  $6.9318210897382008232 \times 10^{-192}$ , *New Error:*,  $6.9318210897382008232 \times 10^{-220}$

$$\begin{aligned}
 &x_o \neq h., \left[ \begin{array}{cccccc} & & & 3 \text{ I} & & \\ & -2+2 \text{ I} & -1+2 \text{ I} & 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} \\ & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} \\ & -2-2 \text{ I} & -1-2 \text{ I} & -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} \\ & & & -3 \text{ I} & & \end{array} \right] \\
 &c =, \left[ \begin{array}{ccccccccc} & & & & & & & & \\ & & & & \frac{\text{I}}{3749265} & & & & \\ & -\frac{9}{10254400} + \frac{9 \text{ I}}{10254400} & \frac{72}{359125} + \frac{9 \text{ I}}{359125} & -\frac{81 \text{ I}}{57460} & -\frac{72}{359125} + \frac{9 \text{ I}}{359125} & \frac{9}{10254400} + \frac{9 \text{ I}}{10254400} & & & \\ & -\frac{9}{359125} - \frac{72 \text{ I}}{359125} & \frac{72}{1105} - \frac{72 \text{ I}}{1105} & \frac{81 \text{ I}}{65} & -\frac{72}{1105} - \frac{72 \text{ I}}{1105} & \frac{9}{359125} - \frac{72 \text{ I}}{359125} & & & \\ -\frac{1}{3749265} & \frac{81}{57460} & -\frac{81}{65} & 0 & \frac{81}{65} & -\frac{81}{57460} & \frac{1}{3749265} & & \\ & -\frac{9}{359125} + \frac{72 \text{ I}}{359125} & \frac{72}{1105} + \frac{72 \text{ I}}{1105} & -\frac{81 \text{ I}}{65} & -\frac{72}{1105} + \frac{72 \text{ I}}{1105} & \frac{9}{359125} + \frac{72 \text{ I}}{359125} & & & \\ & -\frac{9}{10254400} - \frac{9 \text{ I}}{10254400} & \frac{72}{359125} - \frac{9 \text{ I}}{359125} & \frac{81 \text{ I}}{57460} & -\frac{72}{359125} - \frac{9 \text{ I}}{359125} & \frac{9}{10254400} - \frac{9 \text{ I}}{10254400} & & & \\ & & & -\frac{\text{I}}{3749265} & & & & & \end{array} \right]
 \end{aligned}$$





$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{5998824000 \, \Delta x_{ol}^3} \Big( 1600 \, \mathrm{I} u_{ol+3\mathrm{I}} + (-5265 + 5265 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (1202688 + 150336 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 8456400 \, \mathrm{I} u_{ol+2\mathrm{I}} + (-1202688 + 150336 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (5265 + 5265 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} - (150336 + 1202688 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} + (390873600 - 390873600 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} + 7475457600 \, \mathrm{I} u_{ol+\mathrm{I}} - (390873600 + 390873600 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} + (150336 - 1202688 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} - 1600 \, u_{ol-3} + 8456400 \, u_{ol-2} - 7475457600 \, u_{ol-1} + 7475457600 \, u_{ol+1} - 8456400 \, u_{ol+2} + 1600 \, u_{ol+3} + (-150336 + 1202688 \, \mathrm{I}) \, u_{ol-2-\mathrm{I}} + (390873600 + 390873600 \, \mathrm{I}) \, u_{ol-1-\mathrm{I}} - 7475457600 \, \mathrm{I} u_{ol-\mathrm{I}} + (-390873600 + 390873600 \, \mathrm{I}) \, u_{ol+1-\mathrm{I}} + (150336 + 1202688 \, \mathrm{I}) \, u_{ol+2-\mathrm{I}} - (5265 + 5265 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (1202688 - 150336 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + 8456400 \, \mathrm{I} u_{ol-2\mathrm{I}} - (1202688 + 150336 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (5265 - 5265 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} - 1600 \, \mathrm{I} u_{ol-3\mathrm{I}} \Big), \, O(\, \Delta x_{ol}^{28} \, )$$

Formula.: 766, Var.: 1

Variavel .: x\_{ol}, Derivada de Ordem .: 4

Error order.: 28, Error.: 8.6216680220638392422 × 10−81, New Error.: 8.6216680220624389749 × 10−109

Error order.: 28, Error.: 8.6216680220624389749 × 10−109, New Error.: 8.6216680220624388349 × 10−137

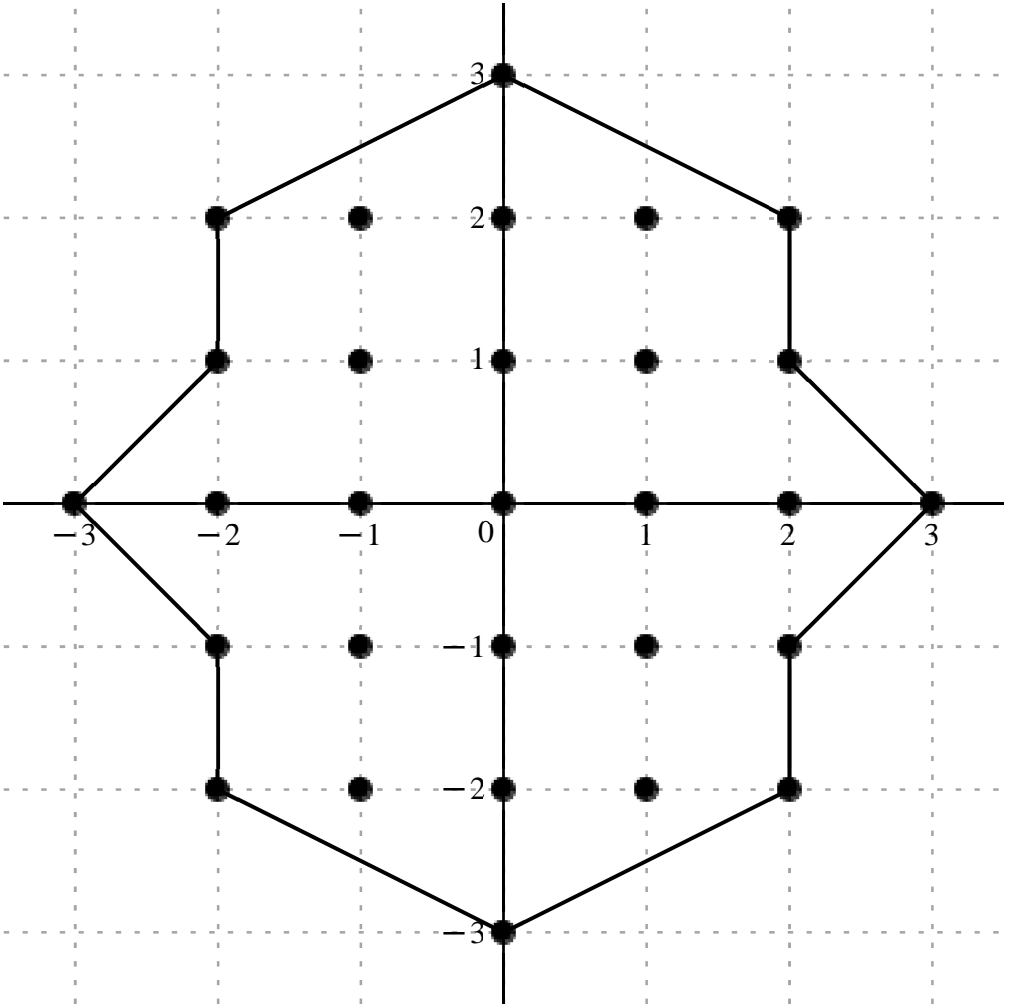
Error order.: 28, Error.: 8.6216680220624388349 × 10−137, New Error.: 8.6216680220624388349 × 10−165

Error order.: 28, Error.: 8.6216680220624388349 × 10−165, New Error.: 8.6216680220624388349 × 10−193

Error order.: 28, Error.: 8.6216680220624388349 × 10−193, New Error.: 8.6216680220624388349 × 10−221

$$x_o \neq h. , \left[ \begin{array}{ccccccc} & & & & 3 \, \mathrm{I} & & \\ & & & & -2+2 \, \mathrm{I} & -1+2 \, \mathrm{I} & 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} & \\ & & & & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & \\ -3 & & -2 & -1 & 0 & 1 & 2 & 3 & & \\ & & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & & & \\ & & -2-2 \, \mathrm{I} & -1-2 \, \mathrm{I} & -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} & & & \\ & & & & & & & -3 \, \mathrm{I} & & \end{array} \right]$$

$$c = , \left[ \begin{array}{ccccccc} & & & & \frac{4}{11247795} & & \\ & & & & \frac{9}{5127200} & -\frac{216}{1795625} - \frac{36 \, \mathrm{I}}{105625} & -\frac{81}{28730} & -\frac{216}{1795625} + \frac{36 \, \mathrm{I}}{105625} & \frac{9}{5127200} & \\ & & -\frac{216}{1795625} + \frac{36 \, \mathrm{I}}{105625} & -\frac{288}{1105} & \frac{324}{65} & -\frac{288}{1105} & -\frac{216}{1795625} - \frac{36 \, \mathrm{I}}{105625} & & & \\ & \frac{4}{11247795} & -\frac{81}{28730} & \frac{324}{65} & -\frac{2549299}{135000} & \frac{324}{65} & -\frac{81}{28730} & \frac{4}{11247795} & & \\ & & -\frac{216}{1795625} - \frac{36 \, \mathrm{I}}{105625} & -\frac{288}{1105} & \frac{324}{65} & -\frac{288}{1105} & -\frac{216}{1795625} + \frac{36 \, \mathrm{I}}{105625} & & & \\ & & \frac{9}{5127200} & -\frac{216}{1795625} + \frac{36 \, \mathrm{I}}{105625} & -\frac{81}{28730} & -\frac{216}{1795625} - \frac{36 \, \mathrm{I}}{105625} & \frac{9}{5127200} & & & \\ & & & & \frac{4}{11247795} & & & & & \end{array} \right]$$



$$\frac{\mathrm{d}^4}{\mathrm{d}x_{ol}^4} \, u(x_{ol}) = \frac{1}{44991180000 \, \Delta x_{ol}^4} \, (16000 \, u_{ol+3\mathrm{I}} + 78975 \, u_{ol-2+2\mathrm{I}} - (5412096 + 15334272 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 126846000 \, u_{ol+2\mathrm{I}} + (-5412096 + 15334272 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + 78975 \, u_{ol+2+2\mathrm{I}} + (-5412096 + 15334272 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} - 11726208000 \, u_{ol-1+\mathrm{I}} + 224263728000 \, u_{ol+\mathrm{I}} - 11726208000 \, u_{ol+1+\mathrm{I}} - (5412096 + 15334272 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} + 16000 \, u_{ol-3} - 126846000 \, u_{ol-2} + 224263728000 \, u_{ol-1} - 849599779132 \, u_{ol} + 224263728000 \, u_{ol+1} - 126846000 \, u_{ol+2} + 16000 \, u_{ol+3} - (5412096 + 15334272 \, \mathrm{I}) \, u_{ol-2-\mathrm{I}} - 11726208000 \, u_{ol-1-\mathrm{I}} + 224263728000 \, u_{ol-\mathrm{I}} - 11726208000 \, u_{ol+1-\mathrm{I}} + (-5412096 + 15334272 \, \mathrm{I}) \, u_{ol+2-\mathrm{I}} + 78975 \, u_{ol-2-2\mathrm{I}} + (-5412096 + 15334272 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} - 126846000 \, u_{ol-2\mathrm{I}} - (5412096 + 15334272 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + 78975 \, u_{ol+2-2\mathrm{I}} + 16000 \, u_{ol-3\mathrm{I}}), \, O(\, \Delta x_{ol}^{28} \, )$$

Formula:, 767, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

Error order:, 24, Error:,  $6.9983786677539646329 \times 10^{-68}$ , New Error:,  $6.9983786677524584118 \times 10^{-92}$

Error order:, 24, Error:,  $6.9983786677524584118 \times 10^{-92}$ , New Error:,  $6.9983786677524582612 \times 10^{-116}$

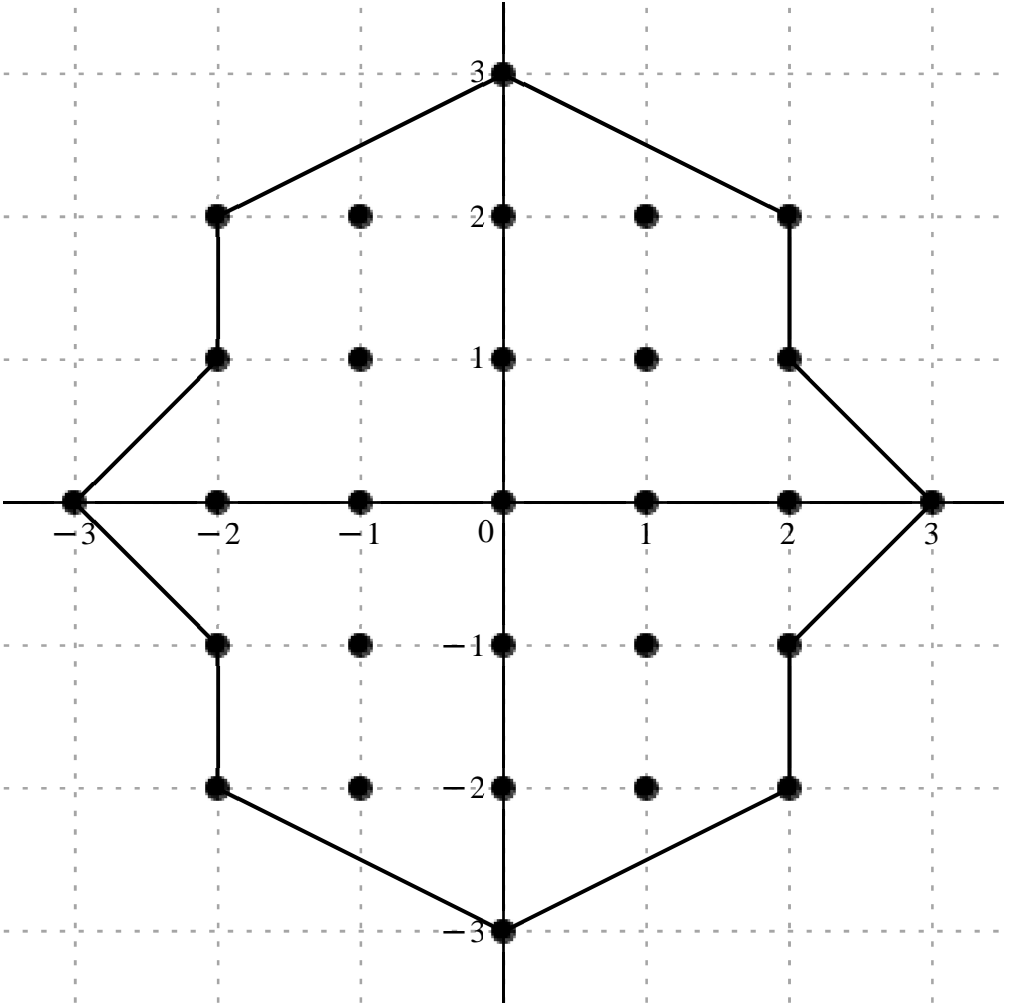
Error order:, 24, Error:,  $6.9983786677524582612 \times 10^{-116}$ , New Error:,  $6.9983786677524582612 \times 10^{-140}$

Error order:, 24, Error:,  $6.9983786677524582612 \times 10^{-140}$ , New Error:,  $6.9983786677524582612 \times 10^{-164}$

Error order:, 24, Error:,  $6.9983786677524582612 \times 10^{-164}$ , New Error:,  $6.9983786677524582612 \times 10^{-188}$

$$x_o \neq h., \left[ \begin{array}{cccccc} & & & 3 \, \mathrm{I} & & \\ & -2+2 \, \mathrm{I} & -1+2 \, \mathrm{I} & 2 \, \mathrm{I} & 1+2 \, \mathrm{I} & 2+2 \, \mathrm{I} \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ & -2-2 \, \mathrm{I} & -1-2 \, \mathrm{I} & -2 \, \mathrm{I} & 1-2 \, \mathrm{I} & 2-2 \, \mathrm{I} \\ & & & -3 \, \mathrm{I} & & \end{array} \right]$$

$$c = , \quad \frac{2383}{64090000} \quad \begin{array}{ccccccc} & & & \frac{2383 \text{ I}}{64090000} & & & \\ & -\frac{649981}{5768100000} - \frac{649981 \text{ I}}{5768100000} & \frac{14011}{1912500} + \frac{1430521 \text{ I}}{99450000} & -\frac{10619 \text{ I}}{130000} & -\frac{14011}{1912500} + \frac{1430521 \text{ I}}{99450000} & \frac{649981}{5768100000} - \frac{649981 \text{ I}}{5768100000} & \\ & \frac{1430521}{99450000} + \frac{14011 \text{ I}}{1912500} & \frac{3359299}{1243125} + \frac{3359299 \text{ I}}{1243125} & -\frac{690701 \text{ I}}{130000} & -\frac{3359299}{1243125} + \frac{3359299 \text{ I}}{1243125} & -\frac{1430521}{99450000} + \frac{14011 \text{ I}}{1912500} & \\ & -\frac{10619}{130000} & -\frac{690701}{130000} & 0 & \frac{690701}{130000} & \frac{10619}{130000} & -\frac{2383}{64090000} \\ & \frac{1430521}{99450000} - \frac{14011 \text{ I}}{1912500} & \frac{3359299}{1243125} - \frac{3359299 \text{ I}}{1243125} & \frac{690701 \text{ I}}{130000} & -\frac{3359299}{1243125} - \frac{3359299 \text{ I}}{1243125} & -\frac{1430521}{99450000} - \frac{14011 \text{ I}}{1912500} & \\ & -\frac{649981}{5768100000} + \frac{649981 \text{ I}}{5768100000} & \frac{14011}{1912500} - \frac{1430521 \text{ I}}{99450000} & \frac{10619 \text{ I}}{130000} & -\frac{14011}{1912500} - \frac{1430521 \text{ I}}{99450000} & \frac{649981}{5768100000} + \frac{649981 \text{ I}}{5768100000} & \\ & & & -\frac{2383 \text{ I}}{64090000} & & & \end{array}$$



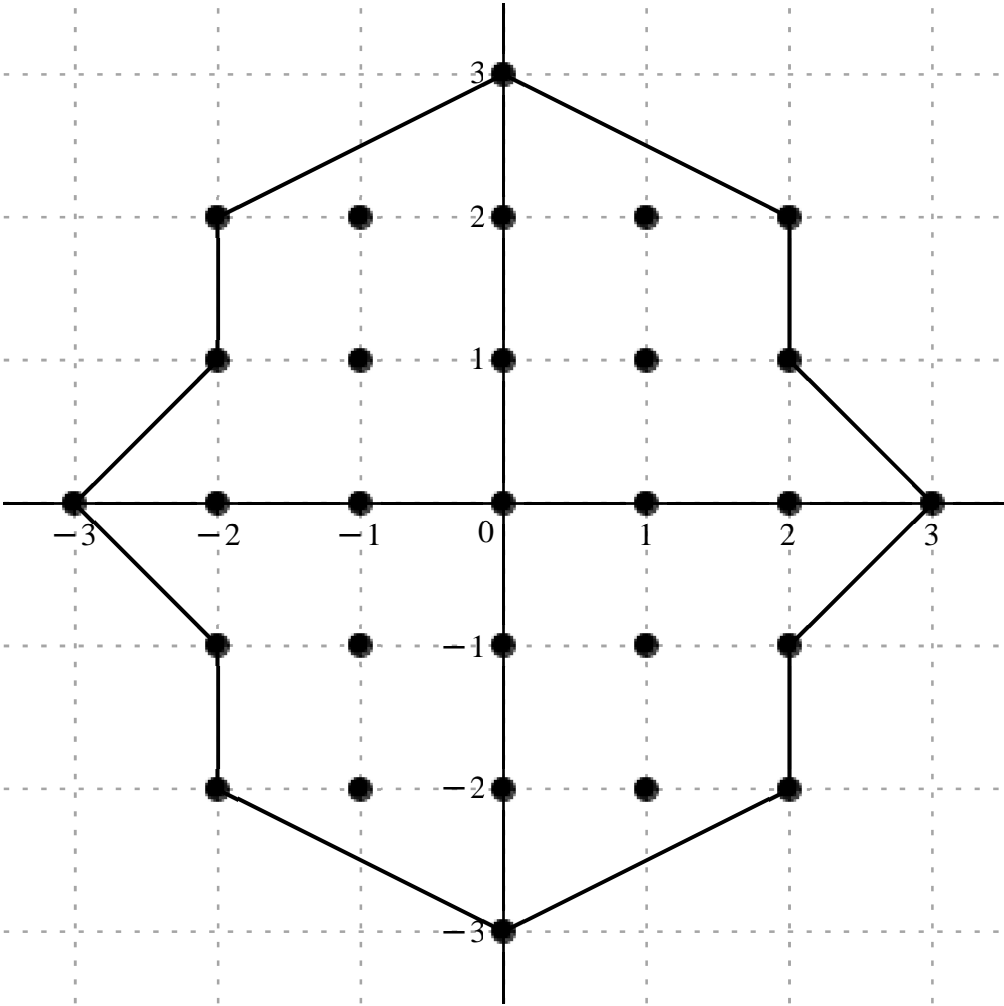
$$\frac{\mathrm{d}^5}{\mathrm{d}x_{ol}^5} \, u(x_{ol}) = \frac{1}{5768100000 \, \Delta x_{ol}^5} \big( 214470 \, \mathrm{I} \, u_{ol+3\mathrm{I}} - (649981 + 649981 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (42257176 + 82970218 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 471165030 \, \mathrm{I} \, u_{ol+2\mathrm{I}} + (-42257176 + 82970218 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (649981 - 649981 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} + (82970218 + 42257176 \, \mathrm{I}) \, u_{ol-2+\mathrm{I}} + (15587147360 + 15587147360 \, \mathrm{I}) \, u_{ol-1+\mathrm{I}} - 30646403370 \, \mathrm{I} \, u_{ol+\mathrm{I}} + (-15587147360$$

$$+ 15587147360 \, \mathrm{I}) \, u_{ol+1+\mathrm{I}} + (-82970218 + 42257176 \, \mathrm{I}) \, u_{ol+2+\mathrm{I}} + 214470 \, u_{ol-3} - 471165030 \, u_{ol-2} - 30646403370 \, u_{ol-1} + 30646403370 \, u_{ol+1} + 471165030 \, u_{ol+2} - 214470 \, u_{ol+3} + (82970218 - 42257176 \, \mathrm{I}) \, u_{ol-2-\mathrm{I}} + (15587147360 - 15587147360 \, \mathrm{I}) \, u_{ol-1-\mathrm{I}} + 30646403370 \, \mathrm{I} \, u_{ol-\mathrm{I}} - (15587147360 + 15587147360 \, \mathrm{I}) \, u_{ol+1-\mathrm{I}}$$

$$- (82970218 + 42257176 \, \mathrm{I}) \, u_{ol+2-\mathrm{I}} + (-649981 + 649981 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (42257176 - 82970218 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + 471165030 \, \mathrm{I} \, u_{ol-2\mathrm{I}} - (42257176 + 82970218 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (649981 + 649981 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} - 214470 \, \mathrm{I} \, u_{ol-3\mathrm{I}} \big) \cdot \mathcal{O}(\, \Delta x_{ol}^{24} \, )$$

*Error order:*, 24, *Error:*,  $1.3927121726873208782 \times 10^{-68}$ , *New Error:*,  $1.3927121726870563968 \times 10^{-92}$   
*Error order:*, 24, *Error:*,  $1.3927121726870563968 \times 10^{-92}$ , *New Error:*,  $1.3927121726870563704 \times 10^{-116}$   
*Error order:*, 24, *Error:*,  $1.3927121726870563704 \times 10^{-116}$ , *New Error:*,  $1.3927121726870563704 \times 10^{-140}$   
*Error order:*, 24, *Error:*,  $1.3927121726870563704 \times 10^{-140}$ , *New Error:*,  $1.3927121726870563704 \times 10^{-164}$   
*Error order:*, 24, *Error:*,  $1.3927121726870563704 \times 10^{-164}$ , *New Error:*,  $1.3927121726870563704 \times 10^{-188}$

$$\begin{aligned}
 & x_o + h \cdot \begin{bmatrix} & & & & 3 \text{ I} \\ & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} \\ & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \\ & & & & & -3 \text{ I} \end{bmatrix} \\
 & c = , \begin{bmatrix} & & & & & & \frac{2383}{32045000} \\ & & & & & & \\ & \frac{649981 \text{ I}}{1922700000} & \frac{213247}{8287500} - \frac{192511 \text{ I}}{5525000} & -\frac{31857}{130000} & \frac{213247}{8287500} + \frac{192511 \text{ I}}{5525000} & -\frac{649981 \text{ I}}{1922700000} & \\ & -\frac{213247}{8287500} - \frac{192511 \text{ I}}{5525000} & -\frac{6718598 \text{ I}}{414375} & -\frac{2072103}{65000} & \frac{6718598 \text{ I}}{414375} & -\frac{213247}{8287500} + \frac{192511 \text{ I}}{5525000} & \\ & -\frac{2383}{32045000} & \frac{31857}{130000} & 0 & \frac{2072103}{65000} & \frac{31857}{130000} & -\frac{2383}{32045000} \\ & -\frac{213247}{8287500} + \frac{192511 \text{ I}}{5525000} & \frac{6718598 \text{ I}}{414375} & -\frac{2072103}{65000} & -\frac{6718598 \text{ I}}{414375} & -\frac{213247}{8287500} - \frac{192511 \text{ I}}{5525000} & \\ & -\frac{649981 \text{ I}}{1922700000} & \frac{213247}{8287500} + \frac{192511 \text{ I}}{5525000} & -\frac{31857}{130000} & \frac{213247}{8287500} - \frac{192511 \text{ I}}{5525000} & \frac{649981 \text{ I}}{1922700000} & \\ & & & \frac{2383}{32045000} & & & \end{bmatrix}
 \end{aligned}$$



$$\left| \frac{d^6}{dx_{ol}^6} u(x_{ol}) = \frac{1}{1922700000 \Delta x_{ol}^6} \left( 142980 u_{ol+31} + 649981 I u_{ol-2+21} + (49473304 - 66993828 I) u_{ol-1+21} - 471165030 u_{ol+21} + (49473304 + 66993828 I) u_{ol+1+21} - 649981 I u_{ol+2+21} - (49473304 + 66993828 I) u_{ol-2+1} - 31174294720 I u_{ol-1+1} - 61292806740 u_{ol+1} + 31174294720 I u_{ol+1+1} + (-49473304 + 66993828 I) u_{ol+2+1} \right. \right. \\ \left. - 142980 u_{ol-3} + 471165030 u_{ol-2} + 61292806740 u_{ol-1} + 61292806740 u_{ol+1} + 471165030 u_{ol+2} - 142980 u_{ol+3} + (-49473304 + 66993828 I) u_{ol-2-1} + 31174294720 I u_{ol-1-1} - 61292806740 u_{ol-1} - 31174294720 I u_{ol+1-1} - (49473304 + 66993828 I) u_{ol+2-1} - 649981 I u_{ol-2-21} + (49473304 + 66993828 I) u_{ol-1-21} \right. \\ \left. - 471165030 u_{ol-21} + (49473304 - 66993828 I) u_{ol+1-21} + 649981 I u_{ol+2-21} + 142980 u_{ol-31} \right) \cdot O(\Delta x_{ol}^{24}) \quad \left. \right|$$

Formula:, 769, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 7

*Error order*., 24, *Error*.,  $3.1291879983344678353 \times 10^{-69}$ , *New Error*.,  $3.1291879983339415043 \times 10^{-93}$

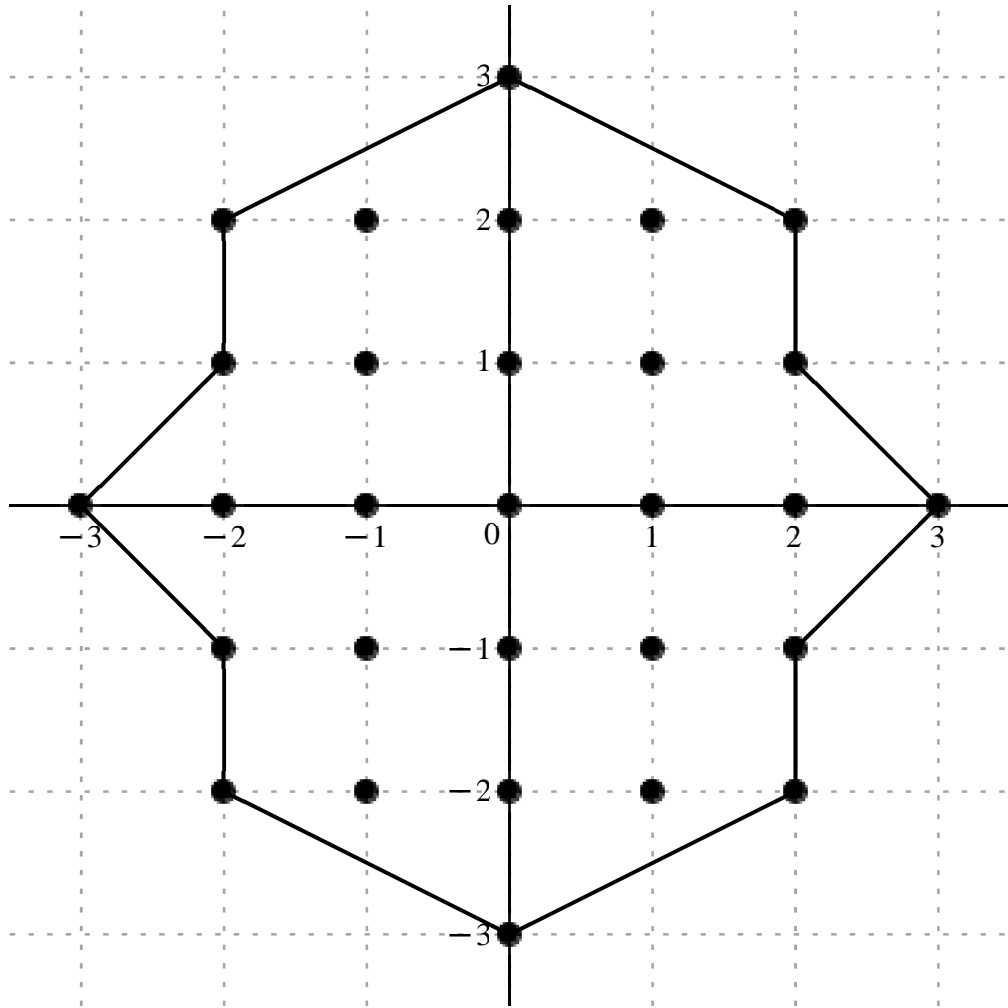
*Error order:*, 24, *Error:*,  $3.1291879983339415043 \times 10^{-93}$ , *New Error:*,  $3.1291879983339414517 \times 10^{-117}$

*Error order:*, 24, *Error:*,  $3.1291879983339414517 \times 10^{-117}$ , *New Error:*,  $3.1291879983339414517 \times 10^{-141}$

*Error order:*, 24, *Error:*,  $3.1291879983339414517 \times 10^{-141}$ , *New Error:*,  $3.1291879983339414517 \times 10^{-165}$

*Error order*., 24, *Error*.,  $3.1291879983339414517 \times 10^{-165}$ , *New Error*.,  $3.1291879983339414517 \times 10^{-189}$

$$c = \left[ \begin{array}{cccccccc} \frac{16681}{96135000} & -\frac{222999}{260000} & -\frac{14504721}{65000} & 0 & \frac{14504721}{65000} & \frac{222999}{260000} & -\frac{16681}{96135000} \\ \frac{4549867}{7690800000} - \frac{4549867 \text{ I}}{7690800000} & \frac{385637}{16575000} + \frac{276773 \text{ I}}{2071875} & -\frac{23515093}{414375} + \frac{23515093 \text{ I}}{414375} & \frac{14504721 \text{ I}}{65000} & \frac{23515093}{414375} + \frac{23515093 \text{ I}}{414375} & -\frac{385637}{16575000} + \frac{276773 \text{ I}}{2071875} & \\ \frac{385637}{16575000} - \frac{276773 \text{ I}}{2071875} & -\frac{23515093}{414375} - \frac{23515093 \text{ I}}{414375} & -\frac{14504721 \text{ I}}{65000} & \frac{23515093}{414375} - \frac{23515093 \text{ I}}{414375} & -\frac{385637}{16575000} - \frac{276773 \text{ I}}{2071875} & \frac{4549867}{7690800000} + \frac{4549867 \text{ I}}{7690800000} & \\ \frac{4549867}{7690800000} + \frac{4549867 \text{ I}}{7690800000} & -\frac{276773}{2071875} + \frac{385637 \text{ I}}{16575000} & -\frac{222999 \text{ I}}{260000} & \frac{276773}{2071875} + \frac{385637 \text{ I}}{16575000} & -\frac{4549867}{7690800000} + \frac{4549867 \text{ I}}{7690800000} & \frac{16681}{96135000} & \end{array} \right]$$



$$\frac{\mathrm{d}^7}{\mathrm{d}x_{ol}^7} u(x_{ol}) = \frac{1}{7690800000 \Delta x_{ol}^7} \left( 7 \left( -190640 \operatorname{I} u_{ol+3\operatorname{I}} + (649981 - 649981 \operatorname{I}) u_{ol-2+2\operatorname{I}} - (146768768 + 25562224 \operatorname{I}) u_{ol-1+2\operatorname{I}} + 942330060 \operatorname{I} u_{ol+2\operatorname{I}} + (146768768 - 25562224 \operatorname{I}) u_{ol+1+2\operatorname{I}} - (649981 + 649981 \operatorname{I}) u_{ol+2+2\operatorname{I}} + (25562224 + 146768768 \operatorname{I}) u_{ol-2+1} + (-62348589440 + 62348589440 \operatorname{I}) u_{ol-1+1} + 245171226960 \operatorname{I} u_{ol+1} \right. \right. \\ \left. \left. + (62348589440 + 62348589440 \operatorname{I}) u_{ol+1+1} + (-25562224 + 146768768 \operatorname{I}) u_{ol+2+1} + 190640 u_{ol-3} - 942330060 u_{ol-2} - 245171226960 u_{ol-1} + 245171226960 u_{ol+1} + 942330060 u_{ol+2} - 190640 u_{ol+3} + (25562224 - 146768768 \operatorname{I}) u_{ol-2-1} - (62348589440 + 62348589440 \operatorname{I}) u_{ol-1-1} - 245171226960 \operatorname{I} u_{ol-1} + (62348589440 \right. \\ \left. - 62348589440 \operatorname{I}) u_{ol+1-1} - (25562224 + 146768768 \operatorname{I}) u_{ol+2-1} + (649981 + 649981 \operatorname{I}) u_{ol-2-2\operatorname{I}} + (-146768768 + 25562224 \operatorname{I}) u_{ol-1-2\operatorname{I}} - 942330060 \operatorname{I} u_{ol-2\operatorname{I}} + (146768768 + 25562224 \operatorname{I}) u_{ol+1-2\operatorname{I}} + (-649981 + 649981 \operatorname{I}) u_{ol+2-2\operatorname{I}} + 190640 \operatorname{I} u_{ol-3\operatorname{I}} \right) \right), \quad O(\Delta x_{ol}^{24})$$

Formula:, 770, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 8

Error order:, 24, Error:,  $7.7840497471005207667 \times 10^{-70}$ , New Error:,  $7.7840497470993569613 \times 10^{-94}$

Error order:, 24, Error:,  $7.7840497470993569613 \times 10^{-94}$ , New Error:,  $7.7840497470993568449 \times 10^{-118}$

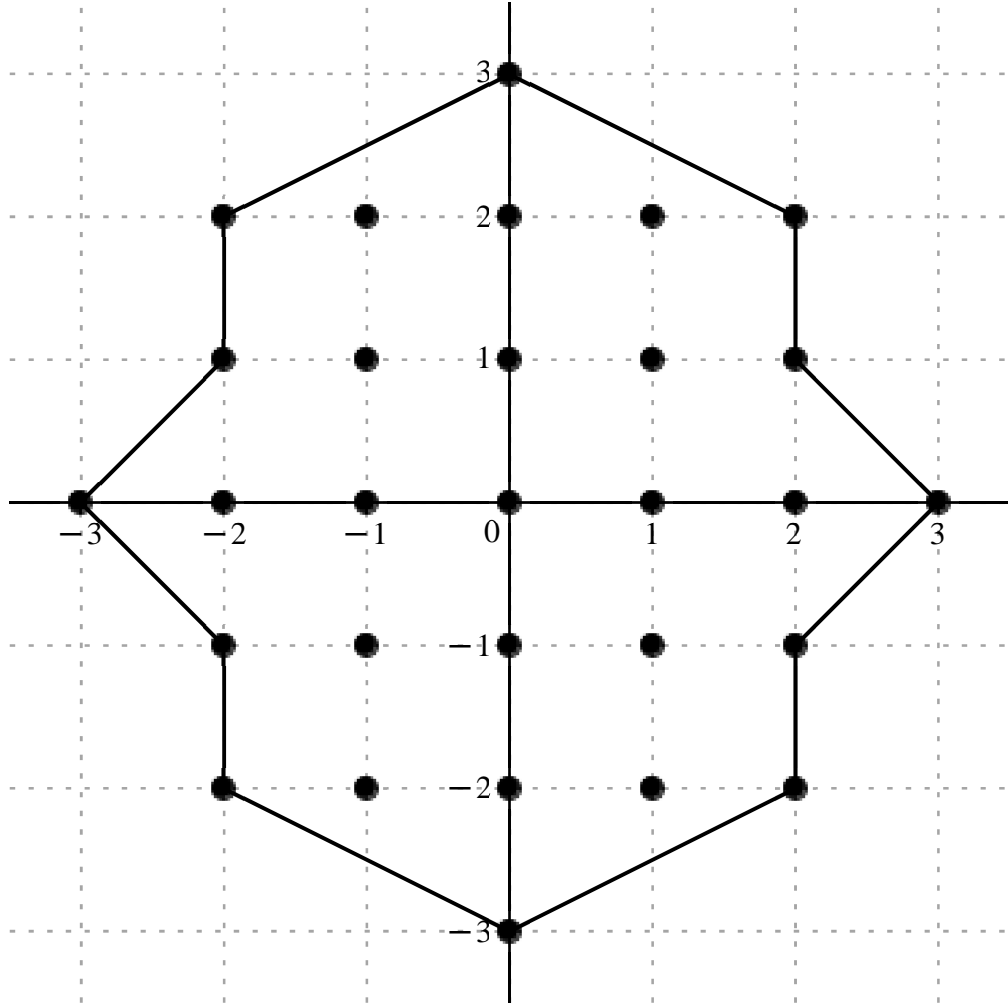
Error order:, 24, Error:,  $7.7840497470993568449 \times 10^{-118}$ , New Error:,  $7.7840497470993568449 \times 10^{-142}$

Error order:, 24, Error:,  $7.7840497470993568449 \times 10^{-142}$ , New Error:,  $7.7840497470993568449 \times 10^{-166}$

Error order:, 24, Error:,  $7.7840497470993568449 \times 10^{-166}$ , New Error:,  $7.7840497470993568449 \times 10^{-190}$

$$x_o + h \cdot, \begin{bmatrix} & & & 3 \operatorname{I} & & & \\ & -2+2 \operatorname{I} & -1+2 \operatorname{I} & 2 \operatorname{I} & 1+2 \operatorname{I} & 2+2 \operatorname{I} & \\ & -2+\operatorname{I} & -1+\operatorname{I} & \operatorname{I} & 1+\operatorname{I} & 2+\operatorname{I} & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\operatorname{I} & -1-\operatorname{I} & -\operatorname{I} & 1-\operatorname{I} & 2-\operatorname{I} & \\ & -2-2 \operatorname{I} & -1-2 \operatorname{I} & -2 \operatorname{I} & 1-2 \operatorname{I} & 2-2 \operatorname{I} & \\ & & & -3 \operatorname{I} & & & \end{bmatrix}$$

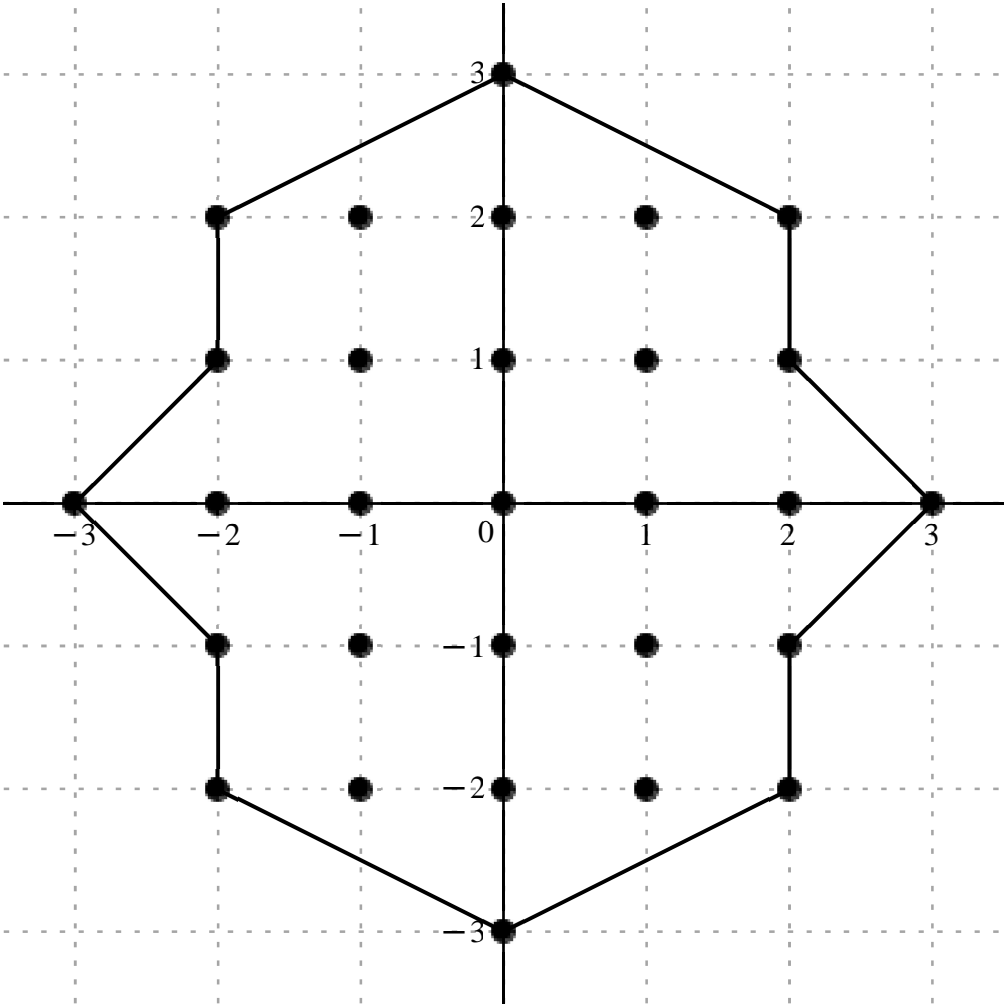
$$c = , \left[ \begin{array}{cccccc} & & & -\frac{16681}{36050625} & & \\ & -\frac{4549867}{1922700000} & \frac{96194}{690625} + \frac{962801 \text{ I}}{2071875} & \frac{222999}{65000} & \frac{96194}{690625} - \frac{962801 \text{ I}}{2071875} & -\frac{4549867}{1922700000} \\ \frac{96194}{690625} - \frac{962801 \text{ I}}{2071875} & & \frac{188120744}{414375} & \frac{14504721}{8125} & \frac{188120744}{414375} & \frac{96194}{690625} + \frac{962801 \text{ I}}{2071875} \\ -\frac{16681}{36050625} & \frac{222999}{65000} & \frac{14504721}{8125} & -\frac{80744027}{9000} & \frac{14504721}{8125} & \frac{222999}{65000} \\ \frac{96194}{690625} + \frac{962801 \text{ I}}{2071875} & & \frac{188120744}{414375} & \frac{14504721}{8125} & \frac{188120744}{414375} & \frac{96194}{690625} - \frac{962801 \text{ I}}{2071875} \\ & -\frac{4549867}{1922700000} & \frac{96194}{690625} - \frac{962801 \text{ I}}{2071875} & \frac{222999}{65000} & \frac{96194}{690625} + \frac{962801 \text{ I}}{2071875} & -\frac{4549867}{1922700000} \\ & & & -\frac{16681}{36050625} & & \end{array} \right]$$



$$\frac{\mathrm{d}^8}{\mathrm{d}x_{ol}^8} \, u(x_{ol}) = \frac{1}{5768100000 \, \Delta x_{ol}^8} \Big( 7 \, \big( -381280 \, u_{ol+3 \text{ I}} - 1949943 \, u_{ol-2+2 \text{ I}} + (114773184 + 382919712 \, \text{I}) \, u_{ol-1+2 \text{ I}} + 2826990180 \, u_{ol+2 \text{ I}} + (114773184 - 382919712 \, \text{I}) \, u_{ol+1+2 \text{ I}} - 1949943 \, u_{ol+2+2 \text{ I}} + (114773184 - 382919712 \, \text{I}) \, u_{ol-2+1 \text{ I}} + 374091536640 \, u_{ol-1+1 \text{ I}} + 1471027361760 \, u_{ol+1 \text{ I}} + 374091536640 \, u_{ol+1+1 \text{ I}} + (114773184 + 382919712 \, \text{I}) \, u_{ol+2+1 \text{ I}} - 381280 \, u_{ol-3} + 2826990180 \, u_{ol-2} + 1471027361760 \, u_{ol-1} - 7392692414900 \, u_{ol} + 1471027361760 \, u_{ol+1} + 2826990180 \, u_{ol+2} - 381280 \, u_{ol+3} + (114773184 + 382919712 \, \text{I}) \, u_{ol-2-1} + 374091536640 \, u_{ol-1-1} + 1471027361760 \, u_{ol-1} + 374091536640 \, u_{ol+1-1} + (114773184 - 382919712 \, \text{I}) \, u_{ol+2-1} - 1949943 \, u_{ol-2-2 \text{ I}} + (114773184 - 382919712 \, \text{I}) \, u_{ol-1-2 \text{ I}} + 2826990180 \, u_{ol-2 \text{ I}} + (114773184 + 382919712 \, \text{I}) \, u_{ol+1-2 \text{ I}} - 1949943 \, u_{ol+2-2 \text{ I}} - 381280 \, u_{ol-3 \text{ I}} \big) \Big), \, O( \, \Delta x_{ol}^{24} \, )$$

*Error order:*, 20, *Error:*,  $4.0877101267162695317 \times 10^{-57}$ , *New Error:*,  $4.0877101267151026284 \times 10^{-77}$   
*Error order:*, 20, *Error:*,  $4.0877101267151026284 \times 10^{-77}$ , *New Error:*,  $4.0877101267151025117 \times 10^{-97}$   
*Error order:*, 20, *Error:*,  $4.0877101267151025117 \times 10^{-97}$ , *New Error:*,  $4.0877101267151025117 \times 10^{-117}$   
*Error order:*, 20, *Error:*,  $4.0877101267151025117 \times 10^{-117}$ , *New Error:*,  $4.0877101267151025117 \times 10^{-137}$   
*Error order:*, 20, *Error:*,  $4.0877101267151025117 \times 10^{-137}$ , *New Error:*,  $4.0877101267151025117 \times 10^{-157}$

$$\begin{aligned}
 &x_o + h \cdot \begin{bmatrix} & & & & 3 \text{ I} \\ & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} \\ & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \\ & & & & & & -3 \text{ I} \end{bmatrix} \\
 &c = , \begin{bmatrix} & & & & \frac{86373 \text{ I}}{2563600} \\ & -\frac{2857281}{32045000} - \frac{2857281 \text{ I}}{32045000} & \frac{347109}{42500} + \frac{23129799 \text{ I}}{2210000} & -\frac{776223 \text{ I}}{8500} & -\frac{347109}{42500} + \frac{23129799 \text{ I}}{2210000} & \frac{2857281}{32045000} - \frac{2857281 \text{ I}}{32045000} \\ \frac{23129799}{2210000} + \frac{347109 \text{ I}}{42500} & -\frac{7989807}{27625} - \frac{7989807 \text{ I}}{27625} & \frac{18281781 \text{ I}}{26000} & \frac{7989807}{27625} - \frac{7989807 \text{ I}}{27625} & -\frac{23129799}{2210000} + \frac{347109 \text{ I}}{42500} \\ \frac{86373}{2563600} & -\frac{776223}{8500} & \frac{18281781}{26000} & 0 & -\frac{18281781}{26000} & \frac{776223}{8500} & -\frac{86373}{2563600} \\ \frac{23129799}{2210000} - \frac{347109 \text{ I}}{42500} & -\frac{7989807}{27625} + \frac{7989807 \text{ I}}{27625} & -\frac{18281781 \text{ I}}{26000} & \frac{7989807}{27625} + \frac{7989807 \text{ I}}{27625} & -\frac{23129799}{2210000} - \frac{347109 \text{ I}}{42500} \\ -\frac{2857281}{32045000} + \frac{2857281 \text{ I}}{32045000} & \frac{347109}{42500} - \frac{23129799 \text{ I}}{2210000} & \frac{776223 \text{ I}}{8500} & -\frac{347109}{42500} - \frac{23129799 \text{ I}}{2210000} & \frac{2857281}{32045000} + \frac{2857281 \text{ I}}{32045000} \\ & & -\frac{86373 \text{ I}}{2563600} & & & & \end{bmatrix}
 \end{aligned}$$





$$\frac{\mathrm{d}^9}{\mathrm{d}x_{ol}^9}u(x_{ol})=\frac{1}{64090000\mathbb{A}x_{ol}^9}\big(21\left(102825\,\mathrm{I}u_{ol+3\mathrm{I}}-(272122+272122\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(24925732+31941151\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}-278701020\,\mathrm{I}u_{ol+2\mathrm{I}}+(\,-24925732+31941151\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+(272122-272122\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}+(31941151+24925732\,\mathrm{I})\,u_{ol-2+\mathrm{I}}-(882683440+882683440\,\mathrm{I})\,u_{ol-1+\mathrm{I}}+2145932865\,\mathrm{I}u_{ol+\mathrm{I}}+(882683440\right.\\ \left.-882683440\,\mathrm{I})\,u_{ol+1+\mathrm{I}}+(\,-31941151+24925732\,\mathrm{I})\,u_{ol+2+\mathrm{I}}+102825\,u_{ol-3}-278701020\,u_{ol-2}+2145932865\,u_{ol-1}-2145932865\,u_{ol+1}+278701020\,u_{ol+2}-102825\,u_{ol+3}+(31941151-24925732\,\mathrm{I})\,u_{ol-2-\mathrm{I}}+(\,-882683440+882683440\,\mathrm{I})\,u_{ol-1-\mathrm{I}}-2145932865\,\mathrm{I}u_{ol-\mathrm{I}}+(882683440+882683440\,\mathrm{I})\,u_{ol+1-\mathrm{I}}-(31941151\right.\\ \left.+24925732\,\mathrm{I})\,u_{ol+2-\mathrm{I}}+(\,-272122+272122\,\mathrm{I})\,u_{ol-2-2\mathrm{I}}+(24925732-31941151\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}+278701020\,\mathrm{I}u_{ol-2\mathrm{I}}-(24925732+31941151\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}+(272122+272122\,\mathrm{I})\,u_{ol+2-2\mathrm{I}}-102825\,\mathrm{I}u_{ol-3\mathrm{I}}\bigg)\bigg),\,\,O(\,\,\mathbb{A}x_{ol}^{20}\,\,)$$

Formula.: 772, Var.: 1

Variavel .: x\_{ol}, Derivada de Ordem .: 10

Error order.: 20, Error.: 1.3557910868046873085 × 10<sup>−57</sup>, New Error.: 1.3557910868043458092 × 10<sup>−77</sup>

Error order.: 20, Error.: 1.3557910868043458092 × 10<sup>−77</sup>, New Error.: 1.3557910868043457750 × 10<sup>−97</sup>

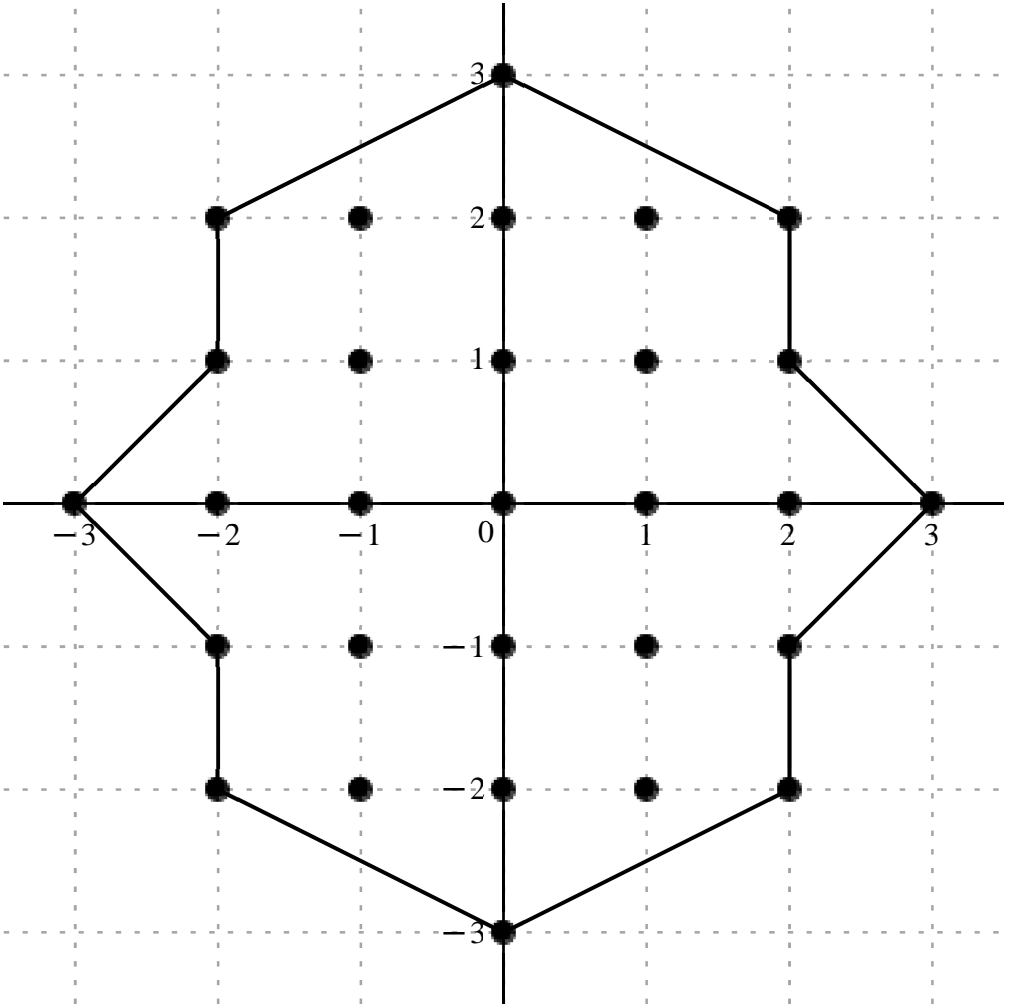
Error order.: 20, Error.: 1.3557910868043457750 × 10<sup>−97</sup>, New Error.: 1.3557910868043457750 × 10<sup>−117</sup>

Error order.: 20, Error.: 1.3557910868043457750 × 10<sup>−117</sup>, New Error.: 1.3557910868043457750 × 10<sup>−137</sup>

Error order.: 20, Error.: 1.3557910868043457750 × 10<sup>−137</sup>, New Error.: 1.3557910868043457750 × 10<sup>−157</sup>

$$x_o\neq h.\, , \left[ \begin{array}{ccccccc} & & & & 3\,\mathrm{I} & & \\ & & & & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & \\ & & & & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & \\ -3 & & -2 & -1 & 0 & 1 & 2 & 3 & & \\ & & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & & & \\ & & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & & & \\ & & & & & & -3\,\mathrm{I} & & & \end{array} \right]$$

$$c=,\left[ \begin{array}{cccccccccccc} & & & & & & & & \frac{28791}{256360} & & & \\ & & & & & & & & \frac{2857281\,\mathrm{I}}{6409000} & \frac{2820993}{110500}-\frac{11845827\,\mathrm{I}}{221000} & -\frac{776223}{1700} & \frac{2820993}{110500}+\frac{11845827\,\mathrm{I}}{221000} & & -\frac{2857281\,\mathrm{I}}{6409000} & \\ & & & & & & & & -\frac{2820993}{110500}-\frac{11845827\,\mathrm{I}}{221000} & \frac{15979614\,\mathrm{I}}{5525} & \frac{18281781}{2600} & -\frac{15979614\,\mathrm{I}}{5525} & & -\frac{2820993}{110500}+\frac{11845827\,\mathrm{I}}{221000} & \\ & & & & & & & & \frac{776223}{1700} & -\frac{18281781}{2600} & 0 & -\frac{18281781}{2600} & & \frac{776223}{1700} & -\frac{28791}{256360} \\ & & & & & & & & -\frac{2820993}{110500}+\frac{11845827\,\mathrm{I}}{221000} & -\frac{15979614\,\mathrm{I}}{5525} & \frac{18281781}{2600} & \frac{15979614\,\mathrm{I}}{5525} & & -\frac{2820993}{110500}-\frac{11845827\,\mathrm{I}}{221000} & \\ & & & & & & & & -\frac{2857281\,\mathrm{I}}{6409000} & \frac{2820993}{110500}+\frac{11845827\,\mathrm{I}}{221000} & -\frac{776223}{1700} & \frac{2820993}{110500}-\frac{11845827\,\mathrm{I}}{221000} & & \frac{2857281\,\mathrm{I}}{6409000} & \\ & & & & & & & & \frac{28791}{256360} & & & & & & \end{array} \right]$$



$$\frac{d^{10}}{dx_{ol}^{10}} u(x_{ol}) = \frac{1}{6409000 \Delta x_{ol}^{10}} \left( 21 \left( 34275 u_{ol+31} + 136061 I u_{ol-2+21} + (7791314 - 16358523 I) u_{ol-1+21} - 139350510 u_{ol+21} + (7791314 + 16358523 I) u_{ol+1+21} - 136061 I u_{ol+2+21} - (7791314 + 16358523 I) u_{ol-2+1} + 882683440 I u_{ol-1+1} + 2145932865 u_{ol+1} - 882683440 I u_{ol+1+1} + (-7791314 + 16358523 I) u_{ol+2+1} \right. \right. \\ \left. \left. - 34275 u_{ol-3} + 139350510 u_{ol-2} - 2145932865 u_{ol-1} - 2145932865 u_{ol+1} + 139350510 u_{ol+2} - 34275 u_{ol+3} + (-7791314 + 16358523 I) u_{ol-2-1} - 882683440 I u_{ol-1-1} + 2145932865 u_{ol-1} + 882683440 I u_{ol+1-1} - (7791314 + 16358523 I) u_{ol+2-1} - 136061 I u_{ol-2-21} + (7791314 + 16358523 I) u_{ol-1-21} - 139350510 u_{ol-21} \right. \right. \\ \left. \left. + (7791314 - 16358523 I) u_{ol+1-21} + 136061 I u_{ol+2-21} + 34275 u_{ol-31} \right) \right), O(\Delta x_{ol}^{20})$$

Formula:, 773, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 11

Error order:, 20, Error:,  $4.7869369137702234111 \times 10^{-58}$ , New Error:,  $4.7869369137691554672 \times 10^{-78}$

Error order:, 20, Error:,  $4.7869369137691554672 \times 10^{-78}$ , New Error:,  $4.7869369137691553604 \times 10^{-98}$

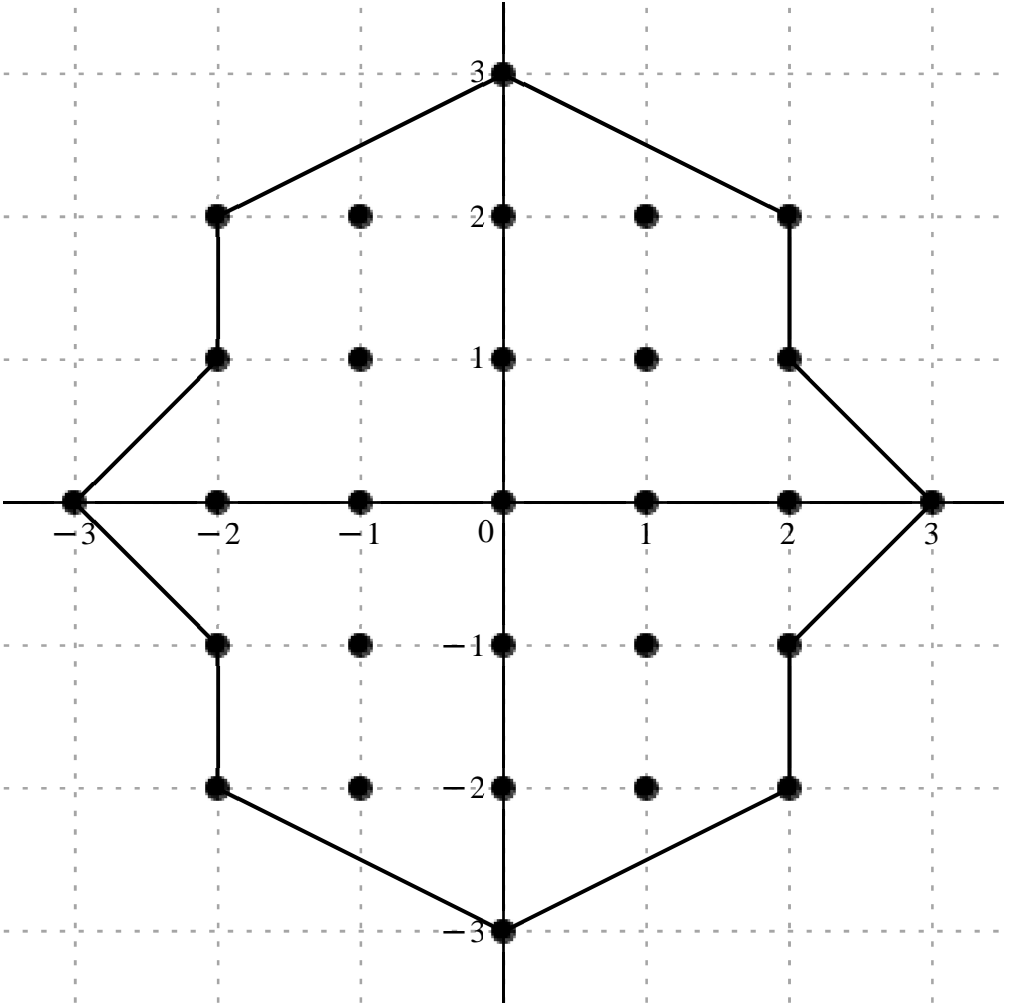
Error order:, 20, Error:,  $4.7869369137691553604 \times 10^{-98}$ , New Error:,  $4.7869369137691553604 \times 10^{-118}$

Error order:, 20, Error:,  $4.7869369137691553604 \times 10^{-118}$ , New Error:,  $4.7869369137691553604 \times 10^{-138}$

Error order:, 20, Error:,  $4.7869369137691553604 \times 10^{-138}$ , New Error:,  $4.7869369137691553604 \times 10^{-158}$

$$x_o \neq h., \begin{bmatrix} & & & 3 I & & & \\ & -2+2 I & -1+2 I & 2 I & 1+2 I & 2+2 I & \\ & -2+I & -1+I & I & 1+I & 2+I & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-I & -1-I & -I & 1-I & 2-I & \\ & -2-2 I & -1-2 I & -2 I & 1-2 I & 2-2 I & \\ & & & -3 I & & & \end{bmatrix}$$

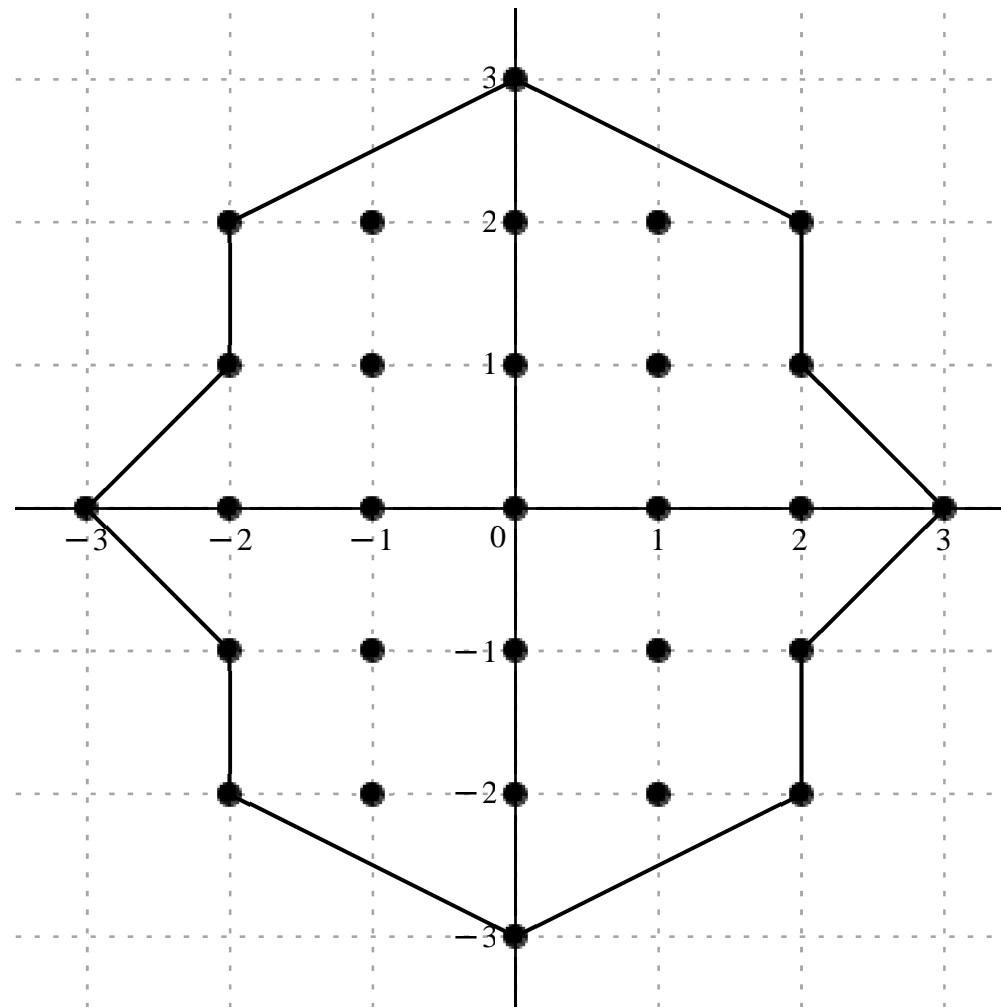
$$c = , \begin{pmatrix} \frac{105567}{256360} & -\frac{8538453}{3400} & \frac{201099591}{2600} & 0 & -\frac{201099591}{2600} & \frac{8538453}{3400} & -\frac{105567}{256360} \\ \frac{31430091}{25636000} - \frac{31430091 \text{ I}}{25636000} - \frac{8066751}{27625} + \frac{1236081 \text{ I}}{221000} & -\frac{8066751 \text{ I}}{27625} - \frac{1236081 \text{ I}}{221000} & \frac{87887877}{5525} - \frac{87887877 \text{ I}}{5525} & -\frac{201099591 \text{ I}}{2600} & -\frac{87887877}{5525} + \frac{87887877 \text{ I}}{5525} & \frac{1236081}{221000} + \frac{8066751 \text{ I}}{27625} & \\ -\frac{1236081}{221000} + \frac{8066751 \text{ I}}{27625} & \frac{87887877}{5525} - \frac{87887877 \text{ I}}{5525} & \frac{201099591 \text{ I}}{2600} & -\frac{87887877}{5525} + \frac{87887877 \text{ I}}{5525} & \frac{1236081}{221000} - \frac{8066751 \text{ I}}{27625} & \\ \frac{31430091}{25636000} + \frac{31430091 \text{ I}}{25636000} - \frac{8066751}{27625} - \frac{1236081 \text{ I}}{221000} & -\frac{8538453 \text{ I}}{3400} & \frac{8066751}{27625} - \frac{1236081 \text{ I}}{221000} & -\frac{31430091}{25636000} + \frac{31430091 \text{ I}}{25636000} & \\ \frac{105567 \text{ I}}{256360} & & & & & & \end{pmatrix}$$



$$\frac{d^{11}}{dx_{ol}^{11}} \; u(x_{ol}) = \frac{1}{25636000 \; \Delta x_{ol}^{11}} \; \Big( 231 \; \Big( -45700 \text{ I} u_{ol+31} + (136061 - 136061 \text{ I}) u_{ol-2+21} + (-32406688 + 620716 \text{ I}) u_{ol-1+21} + 278701020 \text{ I} u_{ol+21} + (32406688 + 620716 \text{ I}) u_{ol+1+21} - (136061 + 136061 \text{ I}) u_{ol+2+21} + (-620716 + 32406688 \text{ I}) u_{ol-2+1} + (1765366880 - 1765366880 \text{ I}) u_{ol-1+1} - 8583731460 \text{ I} u_{ol+1} - (1765366880 + 1765366880 \text{ I}) u_{ol+1+1} + (620716 + 32406688 \text{ I}) u_{ol+2+1} + 45700 u_{ol-3} - 278701020 u_{ol-2} + 8583731460 u_{ol-1} - 8583731460 u_{ol+1} + 278701020 u_{ol+2} - 45700 u_{ol+3} - (620716 + 32406688 \text{ I}) u_{ol-2-1} + (1765366880 + 1765366880 \text{ I}) u_{ol-1-1} + 8583731460 \text{ I} u_{ol-1} + (-1765366880 + 1765366880 \text{ I}) u_{ol+1-1} + (620716 - 32406688 \text{ I}) u_{ol+2-1} + (136061 + 136061 \text{ I}) u_{ol-2-21} - (32406688 + 620716 \text{ I}) u_{ol-1-21} - 278701020 \text{ I} u_{ol-21} + (32406688 - 620716 \text{ I}) u_{ol+1-21} + (-136061 + 136061 \text{ I}) u_{ol+2-21} + 45700 \text{ I} u_{ol-31} \Big) \Big) , \; O( \; \Delta x_{ol}^{20} \; )$$

*Error order:*, 20, *Error:*,  $1.7861704902127256488 \times 10^{-58}$ , *New Error:*,  $1.7861704902123714386 \times 10^{-78}$   
*Error order:*, 20, *Error:*,  $1.7861704902123714386 \times 10^{-78}$ , *New Error:*,  $1.7861704902123714031 \times 10^{-98}$   
*Error order:*, 20, *Error:*,  $1.7861704902123714031 \times 10^{-98}$ , *New Error:*,  $1.7861704902123714031 \times 10^{-118}$   
*Error order:*, 20, *Error:*,  $1.7861704902123714031 \times 10^{-118}$ , *New Error:*,  $1.7861704902123714031 \times 10^{-138}$   
*Error order:*, 20, *Error:*,  $1.7861704902123714031 \times 10^{-138}$ , *New Error:*,  $1.7861704902123714031 \times 10^{-158}$

$$c =, \left[ \begin{array}{cccccc} -\frac{105567}{64090} & \frac{25615359}{1700} & -\frac{603298773}{650} & \frac{88202037}{20} & -\frac{603298773}{650} & \frac{25615359}{1700} \\ \frac{20101851}{27625} + \frac{76699161 \text{ I}}{55250} & -\frac{1054654524}{5525} & -\frac{603298773}{650} & -\frac{603298773}{650} & -\frac{1054654524}{5525} & \frac{20101851}{27625} - \frac{76699161 \text{ I}}{55250} \\ -\frac{94290273}{12818000} & \frac{20101851}{27625} - \frac{76699161 \text{ I}}{55250} & \frac{25615359}{1700} & \frac{20101851}{27625} - \frac{76699161 \text{ I}}{55250} & -\frac{94290273}{12818000} & \frac{20101851}{27625} + \frac{76699161 \text{ I}}{55250} \end{array} \right]$$



$$\frac{d^{12}}{dx_{ol}^{12}} u(x_{ol}) = \frac{1}{12818000 \Delta x_{ol}^{12}} (231 (-91400 u_{ol+31} - 408183 u_{ol-2+21} + (40377744 + 77031192 I) u_{ol-1+21} + 836103060 u_{ol+21} + (40377744 - 77031192 I) u_{ol+1+21} - 408183 u_{ol+2+21} + (40377744 - 77031192 I) u_{ol-2+1} - 10592201280 u_{ol-1+1} - 51502388760 u_{ol+1} - 10592201280 u_{ol+1+1} + (40377744 + 77031192 I) u_{ol+2+1} + (40377744 - 77031192 I) u_{ol-3} + 836103060 u_{ol-2} - 51502388760 u_{ol-1} + 244712924300 u_{ol} - 51502388760 u_{ol+1} + 836103060 u_{ol+2} - 91400 u_{ol+3} + (40377744 + 77031192 I) u_{ol-2-1} - 10592201280 u_{ol-1-1} - 51502388760 u_{ol-1} - 10592201280 u_{ol+1-1} + (40377744 - 77031192 I) u_{ol+2-1} - 408183 u_{ol-2-21} + (40377744 - 77031192 I) u_{ol-1-21} + 836103060 u_{ol-21} + (40377744 + 77031192 I) u_{ol+1-21} - 408183 u_{ol+2-21} - 91400 u_{ol-31})), O(\Delta x_{ol}^{20})).$$

*Formula:*, 775, *Var:*, 1

*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 13

*Error order.*: 16, *Error.*:  $1.9823983001013669801 \times 10^{-46}$ , *New Error.*:  $1.9823983001016035765 \times 10^{-62}$

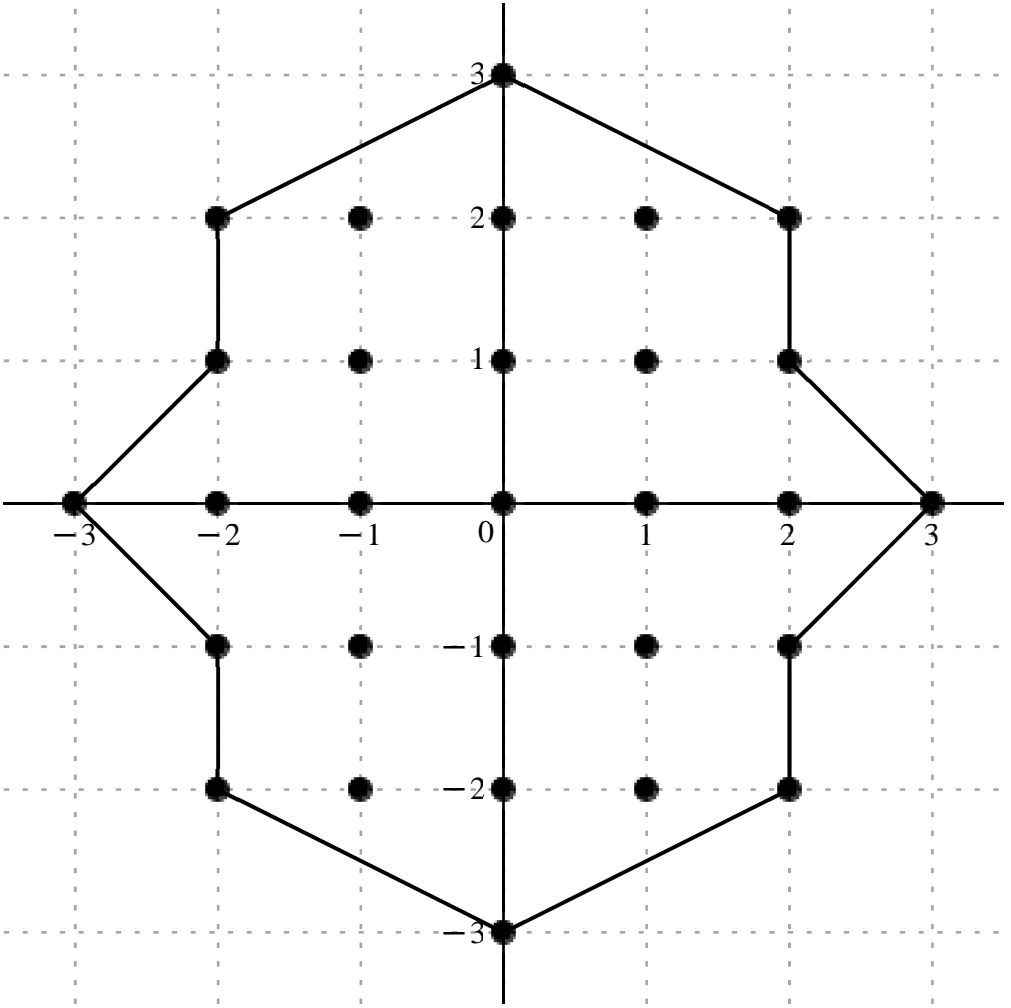
*Error order:*, 16, *Error:*,  $1.9823983001016035765 \times 10^{-62}$ , *New Error:*,  $1.9823983001016036001 \times 10^{-78}$

*Error order*., 16, *Error*.,  $1.9823983001016036001 \times 10^{-78}$ , *New Error*.,  $1.9823983001016036001 \times 10^{-94}$

*Error order:*, 16, *Error:*,  $1.9823983001016036001 \times 10^{-94}$ , *New Error:*,  $1.9823983001016036001 \times 10^{-110}$

*Error order*., 16, *Error*.,  $1.9823983001016036001 \times 10^{-110}$ , *New Error*.,  $1.9823983001016036001 \times 10^{-126}$

$$x_o + h., \quad \begin{bmatrix} & & & & 3 \text{ I} \\ & & & & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ & & & & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -3 & & & & -2 & -1 & 0 & 1 & 2 & 3 \\ & & & & -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} \\ & & & & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \\ & & & & & & & & -3 \text{ I} \end{bmatrix}$$



$$\frac{\mathrm{d}^{13}}{\mathrm{d}x_{ol}^{13}}\; u(x_{ol}) = \frac{1}{377000\; \mathcal{A}x_{ol}^{13}}\; \Big( 693\; \Big( -8595\; \mathrm{I}\, u_{ol+3\mathrm{I}} + (49504 + 49504\; \mathrm{I})\; u_{ol-2+2\mathrm{I}} + (292436 - 8581477\; \mathrm{I})\; u_{ol-1+2\mathrm{I}} - 23970240\; \mathrm{I}\, u_{ol+2\mathrm{I}} - (292436 + 8581477\; \mathrm{I})\; u_{ol+1+2\mathrm{I}} + (-49504 + 49504\; \mathrm{I})\; u_{ol+2+2\mathrm{I}} + (-8581477 + 292436\; \mathrm{I})\; u_{ol-2+\mathrm{I}} - (2412800 + 2412800\; \mathrm{I})\; u_{ol-1+\mathrm{I}} + 86334885\; \mathrm{I}\, u_{ol+\mathrm{I}} + (2412800 - 2412800\; \mathrm{I})\; u_{ol+1+\mathrm{I}} \\ + (8581477 + 292436\; \mathrm{I})\; u_{ol+2+\mathrm{I}} - 8595\; u_{ol-3} - 23970240\; u_{ol-2} + 86334885\; u_{ol-1} - 86334885\; u_{ol+1} + 23970240\; u_{ol+2} + 8595\; u_{ol+3} - (8581477 + 292436\; \mathrm{I})\; u_{ol-2-\mathrm{I}} + (-2412800 + 2412800\; \mathrm{I})\; u_{ol-1-\mathrm{I}} - 86334885\; \mathrm{I}\, u_{ol-\mathrm{I}} + (2412800 + 2412800\; \mathrm{I})\; u_{ol+1-\mathrm{I}} + (8581477 - 292436\; \mathrm{I})\; u_{ol+2-\mathrm{I}} + (49504 - 49504\; \mathrm{I})\; u_{ol-2-2\mathrm{I}} + (292436 \\ + 8581477\; \mathrm{I})\; u_{ol-1-2\mathrm{I}} + 23970240\; \mathrm{I}\, u_{ol-2\mathrm{I}} + (-292436 + 8581477\; \mathrm{I})\; u_{ol+1-2\mathrm{I}} - (49504 + 49504\; \mathrm{I})\; u_{ol+2-2\mathrm{I}} + 8595\; \mathrm{I}\, u_{ol-3\mathrm{I}} \Big) \Big) ,\; O(\; \mathcal{A}x_{ol}^{16}\; )$$

Formula:, 776, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 14

Error order:, 16, Error:,  $9.2051662359600422715 \times 10^{-47}$ , New Error:,  $9.2051662359610116449 \times 10^{-63}$

Error order:, 16, Error:,  $9.2051662359610116449 \times 10^{-63}$ , New Error:,  $9.2051662359610117419 \times 10^{-79}$

Error order:, 16, Error:,  $9.2051662359610117419 \times 10^{-79}$ , New Error:,  $9.2051662359610117419 \times 10^{-95}$

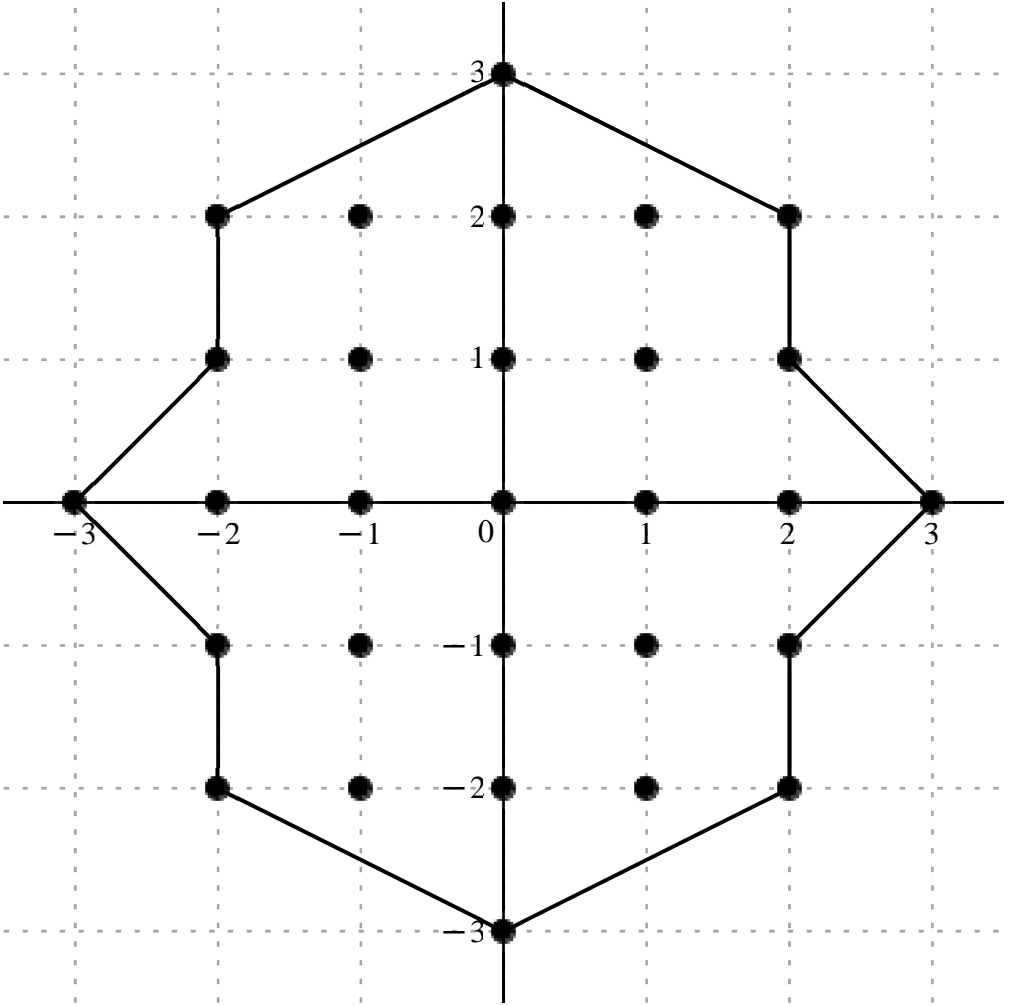
Error order:, 16, Error:,  $9.2051662359610117419 \times 10^{-95}$ , New Error:,  $9.2051662359610117419 \times 10^{-111}$

Error order:, 16, Error:,  $9.2051662359610117419 \times 10^{-111}$ , New Error:,  $9.2051662359610117419 \times 10^{-127}$

$$x_o \neq h. , \left[ \begin{array}{cccccc} & & & 3\; \mathrm{I} & & \\ & -2+2\; \mathrm{I} & -1+2\; \mathrm{I} & 2\; \mathrm{I} & 1+2\; \mathrm{I} & 2+2\; \mathrm{I} \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ & -2-2\; \mathrm{I} & -1-2\; \mathrm{I} & -2\; \mathrm{I} & 1-2\; \mathrm{I} & 2-2\; \mathrm{I} \\ & & & -3\; \mathrm{I} & & \end{array} \right]$$

$c = ,$ 

			$-\frac{2779623}{37700}$		
	$-\frac{2309076 I}{3625}$	$-\frac{291986541}{3250} + \frac{267527799 I}{6500}$	$-\frac{100241064}{325}$	$-\frac{291986541}{3250} - \frac{267527799 I}{6500}$	$\frac{2309076 I}{3625}$
	$\frac{291986541}{3250} + \frac{267527799 I}{6500}$	$\frac{310464 I}{5}$	$\frac{222180651}{100}$	$-\frac{310464 I}{5}$	$\frac{291986541}{3250} - \frac{267527799 I}{6500}$
$\frac{2779623}{37700}$	$\frac{100241064}{325}$	$-\frac{222180651}{100}$	0	$-\frac{222180651}{100}$	$\frac{100241064}{325}$
	$\frac{291986541}{3250} - \frac{267527799 I}{6500}$	$-\frac{310464 I}{5}$	$\frac{222180651}{100}$	$\frac{310464 I}{5}$	$\frac{291986541}{3250} + \frac{267527799 I}{6500}$
	$\frac{2309076 I}{3625}$	$-\frac{291986541}{3250} - \frac{267527799 I}{6500}$	$-\frac{100241064}{325}$	$-\frac{291986541}{3250} + \frac{267527799 I}{6500}$	$-\frac{2309076 I}{3625}$
			$-\frac{2779623}{37700}$		

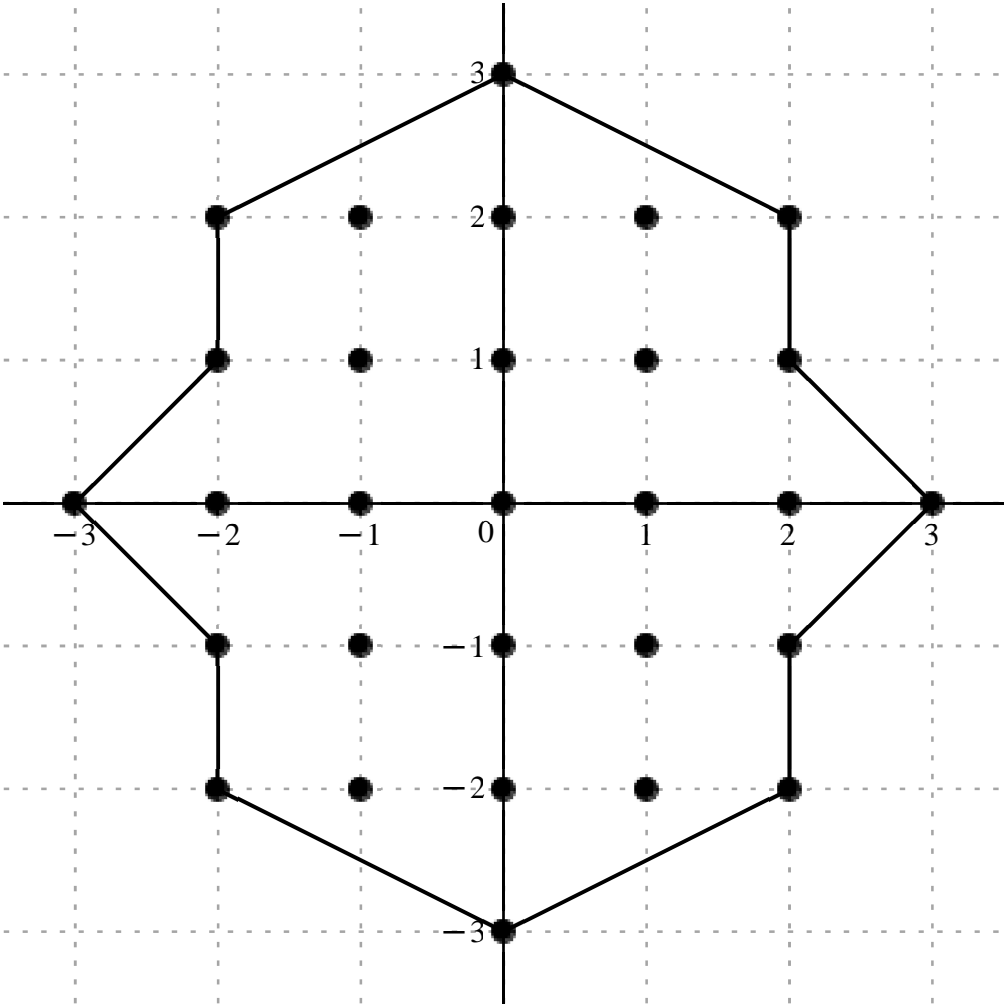


$$\frac{\mathrm{d}^{14}}{\mathrm{d} x_{o l}^{14}} \; u(x_{o l}) = \frac{1}{188500 \; \Delta x_{o l}^{14}} \Big( 4851 \; \Big( -2865 \; u_{o l+31} - 24752 \; I u_{o l-2+21} + \big( -3491078 + 1599321 \; I \big) \; u_{o l-1+21} - 11985120 \; u_{o l+21} - \big( 3491078 + 1599321 \; I \big) \; u_{o l+1+21} + 24752 \; I u_{o l+2+21} + \big( 3491078 + 1599321 \; I \big) \; u_{o l-2+1} + 2412800 \; I u_{o l-1+1} + 86334885 \; u_{o l+1} - 2412800 \; I u_{o l+1+1} + \big( 3491078 - 1599321 \; I \big) \; u_{o l+2+1} + 2865 \; u_{o l-3} \\ + 11985120 \; u_{o l-2} - 86334885 \; u_{o l-1} - 86334885 \; u_{o l+1} + 11985120 \; u_{o l+2} + 2865 \; u_{o l+3} + \big( 3491078 - 1599321 \; I \big) \; u_{o l-2-1} - 2412800 \; I u_{o l-1-1} + 86334885 \; u_{o l-1} + 2412800 \; I u_{o l+1-1} + \big( 3491078 + 1599321 \; I \big) \; u_{o l+2-1} + 24752 \; I u_{o l-2-21} - \big( 3491078 + 1599321 \; I \big) \; u_{o l-1-21} - 11985120 \; u_{o l-21} + \big( -3491078 + 1599321 \; I \big) \; u_{o l+1-21} \\ - 24752 \; I u_{o l+2-21} - 2865 \; u_{o l-31} \Big) \Big) , \; O( \; \Delta x_{o l}^{16} \; )$$

Error order:, 16, Error:, 4.4319529301685859740 × 10<sup>−47</sup>, New Error:, 4.4319529301689993529 × 10<sup>−63</sup>  
Error order:, 16, Error:, 4.4319529301689993529 × 10<sup>−63</sup>, New Error:, 4.4319529301689993943 × 10<sup>−79</sup>  
Error order:, 16, Error:, 4.4319529301689993943 × 10<sup>−79</sup>, New Error:, 4.4319529301689993943 × 10<sup>−95</sup>  
Error order:, 16, Error:, 4.4319529301689993943 × 10<sup>−95</sup>, New Error:, 4.4319529301689993943 × 10<sup>−111</sup>  
Error order:, 16, Error:, 4.4319529301689993943 × 10<sup>−111</sup>, New Error:, 4.4319529301689993943 × 10<sup>−127</sup>

$$x_o + h., \begin{bmatrix} & & & 3\text{ I} & & \\ & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} \\ & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \\ & & & -3\text{ I} & & \end{bmatrix}$$

$$c = , \begin{bmatrix} & & & \frac{2779623\text{ I}}{7540} & & \\ & -\frac{1731807}{725} + \frac{1731807\text{ I}}{725} & \frac{167854302}{325} + \frac{540251019\text{ I}}{1300} & \frac{150361596\text{ I}}{65} & -\frac{167854302}{325} + \frac{540251019\text{ I}}{1300} & \frac{1731807}{725} + \frac{1731807\text{ I}}{725} \\ & -\frac{540251019}{1300} - \frac{167854302\text{ I}}{325} & 465696 - 465696\text{ I} & -\frac{666541953\text{ I}}{20} & -465696 - 465696\text{ I} & \frac{540251019}{1300} - \frac{167854302\text{ I}}{325} \\ -\frac{2779623}{7540} & -\frac{150361596}{65} & \frac{666541953}{20} & 0 & -\frac{666541953}{20} & \frac{150361596}{65} & \frac{2779623}{7540} \\ & -\frac{540251019}{1300} + \frac{167854302\text{ I}}{325} & 465696 + 465696\text{ I} & \frac{666541953\text{ I}}{20} & -465696 + 465696\text{ I} & \frac{540251019}{1300} + \frac{167854302\text{ I}}{325} \\ & -\frac{1731807}{725} - \frac{1731807\text{ I}}{725} & \frac{167854302}{325} - \frac{540251019\text{ I}}{1300} & -\frac{150361596\text{ I}}{65} & \frac{167854302}{325} - \frac{540251019\text{ I}}{1300} & \frac{1731807}{725} - \frac{1731807\text{ I}}{725} \\ & & & -\frac{2779623\text{ I}}{7540} & & \end{bmatrix}$$





$$\frac{\mathrm{d}^{15}}{\mathrm{d}x_{ol}^{15}}\,u(x_{ol})=\frac{1}{37700\,\mathcal{A}_{ol}^{15}}\big(14553\,(955\,\mathrm{I}\,u_{ol+3\mathrm{I}}+(\,-6188+6188\,\mathrm{I})\,u_{ol-2+2\mathrm{I}}+(1337944+1076567\,\mathrm{I})\,u_{ol-1+2\mathrm{I}}+5992560\,\mathrm{I}\,u_{ol+2\mathrm{I}}+(\,-1337944+1076567\,\mathrm{I})\,u_{ol+1+2\mathrm{I}}+(6188+6188\,\mathrm{I})\,u_{ol+2+2\mathrm{I}}-(1076567+1337944\,\mathrm{I})\,u_{ol-2+\mathrm{I}}+(1206400-1206400\,\mathrm{I})\,u_{ol-1+\mathrm{I}}-86334885\,\mathrm{I}\,u_{ol+\mathrm{I}}-(1206400+1206400\,\mathrm{I})\,u_{ol+1+\mathrm{I}}+(1076567-1337944\,\mathrm{I})\,u_{ol+2+\mathrm{I}}-955\,u_{ol-3}-5992560\,u_{ol-2}+86334885\,u_{ol-1}-86334885\,u_{ol+1}+5992560\,u_{ol+2}+955\,u_{ol+3}+(\,-1076567+1337944\,\mathrm{I})\,u_{ol-2-\mathrm{I}}+(1206400+1206400\,\mathrm{I})\,u_{ol-1-\mathrm{I}}+86334885\,\mathrm{I}\,u_{ol-\mathrm{I}}+(\,-1206400+1206400\,\mathrm{I})\,u_{ol+1-\mathrm{I}}+(1076567+1337944\,\mathrm{I})\,u_{ol+2-\mathrm{I}}-(6188+6188\,\mathrm{I})\,u_{ol-2-2\mathrm{I}}+(1337944-1076567\,\mathrm{I})\,u_{ol-1-2\mathrm{I}}-5992560\,\mathrm{I}\,u_{ol-2\mathrm{I}}-(1337944+1076567\,\mathrm{I})\,u_{ol+1-2\mathrm{I}}+(6188-6188\,\mathrm{I})\,u_{ol+2-2\mathrm{I}}-955\,\mathrm{I}\,u_{ol-3\mathrm{I}})\big),\,\,O(\,\mathcal{A}_{ol}^{16}\,)$$

Formula.: 778, Var.: 1

Variavel .:  $x_{ol}$ , Derivada de Ordem .: 16

Error order.: 16, Error.:  $2.2049517065515581640\times 10^{-47}$ , New Error.:  $2.2049517065517409739\times 10^{-63}$

Error order.: 16, Error.:  $2.2049517065517409739\times 10^{-63}$ , New Error.:  $2.2049517065517409922\times 10^{-79}$

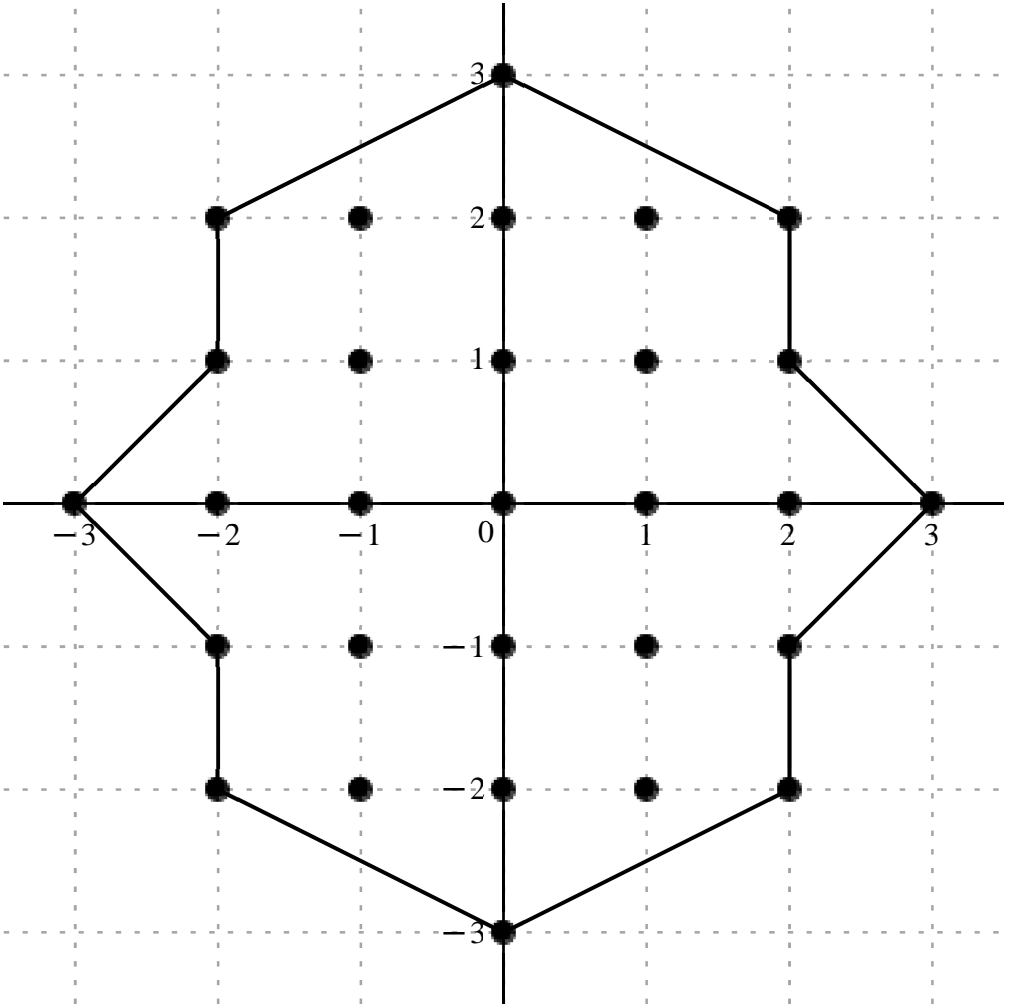
Error order.: 16, Error.:  $2.2049517065517409922\times 10^{-79}$ , New Error.:  $2.2049517065517409922\times 10^{-95}$

Error order.: 16, Error.:  $2.2049517065517409922\times 10^{-95}$ , New Error.:  $2.2049517065517409922\times 10^{-111}$

Error order.: 16, Error.:  $2.2049517065517409922\times 10^{-111}$ , New Error.:  $2.2049517065517409922\times 10^{-127}$

$$x_o+h.\,,\left[\begin{array}{ccccccccc} & & & & & & & & 3\,\mathrm{I} \\ & & & & & & & & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} \\ & & & & & & & & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -3 & & & & & & & & -2 & -1 & 0 & 1 & 2 & 3 \\ & & & & & & & & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ & & & & & & & & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} \\ & & & & & & & & & & & & & -3\,\mathrm{I} \end{array}\right]$$

$$c\,=,\left[\begin{array}{ccccccccccc} & & & & & & & & & & & & & \frac{3706164}{1885} \\ & & & & & & & & & & & & & \frac{13854456}{725} & \frac{327267864}{325}-\frac{1506468348\,\mathrm{I}}{325} & \frac{1202892768}{65} & \frac{327267864}{325}+\frac{1506468348\,\mathrm{I}}{325} & \frac{13854456}{725} \\ & & & & & & & & & & & & & \frac{327267864}{325}+\frac{1506468348\,\mathrm{I}}{325} & -7451136 & -\frac{2666167812}{5} & -7451136 & \frac{327267864}{325}-\frac{1506468348\,\mathrm{I}}{325} \\ \frac{3706164}{1885} & & & & & & & & & & & & & \frac{1202892768}{65} & -\frac{2666167812}{5} & 2080574496 & -\frac{2666167812}{5} & \frac{1202892768}{65} & \frac{3706164}{1885} \\ & & & & & & & & & & & & & \frac{327267864}{325}-\frac{1506468348\,\mathrm{I}}{325} & -7451136 & -\frac{2666167812}{5} & -7451136 & \frac{327267864}{325}+\frac{1506468348\,\mathrm{I}}{325} \\ & & & & & & & & & & & & & \frac{13854456}{725} & \frac{327267864}{325}+\frac{1506468348\,\mathrm{I}}{325} & \frac{1202892768}{65} & \frac{327267864}{325}-\frac{1506468348\,\mathrm{I}}{325} & \frac{13854456}{725} \\ & & & & & & & & & & & & & \frac{3706164}{1885} & & & & & \end{array}\right]$$



$$\frac{\mathrm{d}^{16}}{\mathrm{d}x_{ol}^{16}}\;u(x_{ol})=\frac{1}{9425\; \mathcal{A}x_{ol}^{16}}\left(19404\left(955\;u_{ol+3\mathrm{I}}+9282\;u_{ol-2+2\mathrm{I}}+(489114-2251473\;\mathrm{I})\;u_{ol-1+2\mathrm{I}}+8988840\;u_{ol+2\mathrm{I}}+(489114+2251473\;\mathrm{I})\;u_{ol+1+2\mathrm{I}}+9282\;u_{ol+2+2\mathrm{I}}+(489114+2251473\;\mathrm{I})\;u_{ol-2+1}-3619200\;u_{ol-1+1}-259004655\;u_{ol+1}-3619200\;u_{ol+1+1}+(489114-2251473\;\mathrm{I})\;u_{ol+2+1}+955\;u_{ol-3}+8988840\;u_{ol-2}\right.\right.\\ \left.\left.-259004655\;u_{ol-1}+1010586200\;u_{ol}-259004655\;u_{ol+1}+8988840\;u_{ol+2}+955\;u_{ol+3}+(489114-2251473\;\mathrm{I})\;u_{ol-2-1}-3619200\;u_{ol-1-1}-259004655\;u_{ol-1}-3619200\;u_{ol+1-1}+(489114+2251473\;\mathrm{I})\;u_{ol+2-1}+9282\;u_{ol-2-2\mathrm{I}}+(489114+2251473\;\mathrm{I})\;u_{ol-1-2\mathrm{I}}+8988840\;u_{ol-2\mathrm{I}}+(489114-2251473\;\mathrm{I})\;u_{ol+1-2\mathrm{I}}+9282\;u_{ol+2-2\mathrm{I}}+955\;u_{ol-3\mathrm{I}}\right)\right),\;O(\;\mathcal{A}x_{ol}^{16}\;)$$

Formula:, 779, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 17

Error order:, 12, Error:,  $8.3533445695539631627 \times 10^{-36}$ , New Error:,  $8.3533445695407089879 \times 10^{-48}$

Error order:, 12, Error:,  $8.3533445695407089879 \times 10^{-48}$ , New Error:,  $8.3533445695407076625 \times 10^{-60}$

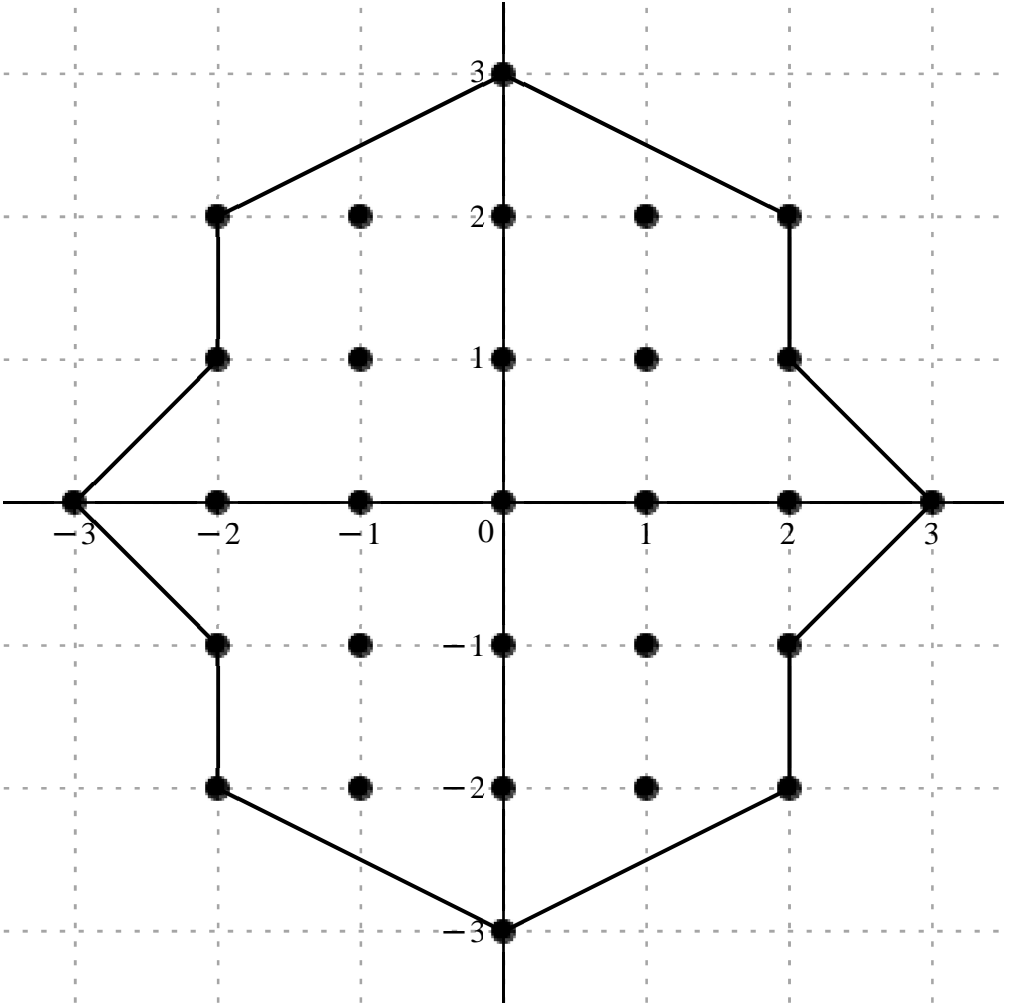
Error order:, 12, Error:,  $8.3533445695407076625 \times 10^{-60}$ , New Error:,  $8.3533445695407076624 \times 10^{-72}$

Error order:, 12, Error:,  $8.3533445695407076624 \times 10^{-72}$ , New Error:,  $8.3533445695407076624 \times 10^{-84}$

Error order:, 12, Error:,  $8.3533445695407076624 \times 10^{-84}$ , New Error:,  $8.3533445695407076624 \times 10^{-96}$

$$x_o \neq h., \left[ \begin{array}{cccccc} & & & 3\;\mathrm{I} & & \\ & -2+2\;\mathrm{I} & -1+2\;\mathrm{I} & 2\;\mathrm{I} & 1+2\;\mathrm{I} & 2+2\;\mathrm{I} \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} \\ & -2-2\;\mathrm{I} & -1-2\;\mathrm{I} & -2\;\mathrm{I} & 1-2\;\mathrm{I} & 2-2\;\mathrm{I} \\ & & & -3\;\mathrm{I} & & \end{array} \right]$$

$$c = , \begin{array}{ccccccc} & & & & -\frac{3667356 \text{ I}}{145} & & \\ & & & & & & \\ & -\frac{28873152}{725} & -\frac{28873152 \text{ I}}{725} & -\frac{947458512}{25} + \frac{93546684 \text{ I}}{25} & -\frac{620307072 \text{ I}}{5} & \frac{947458512}{25} + \frac{93546684 \text{ I}}{25} & \frac{28873152}{725} - \frac{28873152 \text{ I}}{725} \\ \frac{93546684}{25} & -\frac{947458512 \text{ I}}{25} & -\frac{3524387328}{5} - \frac{3524387328 \text{ I}}{5} & 1718942148 \text{ I} & \frac{3524387328}{5} - \frac{3524387328 \text{ I}}{5} & -\frac{93546684}{25} - \frac{947458512 \text{ I}}{25} & \\ -\frac{3667356}{145} & -\frac{620307072}{5} & 1718942148 & 0 & -1718942148 & \frac{620307072}{5} & \frac{3667356}{145} \\ \frac{93546684}{25} + \frac{947458512 \text{ I}}{25} & -\frac{3524387328}{5} + \frac{3524387328 \text{ I}}{5} & -1718942148 \text{ I} & \frac{3524387328}{5} + \frac{3524387328 \text{ I}}{5} & -\frac{93546684}{25} + \frac{947458512 \text{ I}}{25} & & \\ -\frac{28873152}{725} + \frac{28873152 \text{ I}}{725} & -\frac{947458512}{25} - \frac{93546684 \text{ I}}{25} & \frac{620307072 \text{ I}}{5} & \frac{947458512}{25} - \frac{93546684 \text{ I}}{25} & \frac{28873152}{725} + \frac{28873152 \text{ I}}{725} & & \\ & & \frac{3667356 \text{ I}}{145} & & & & \end{array}$$

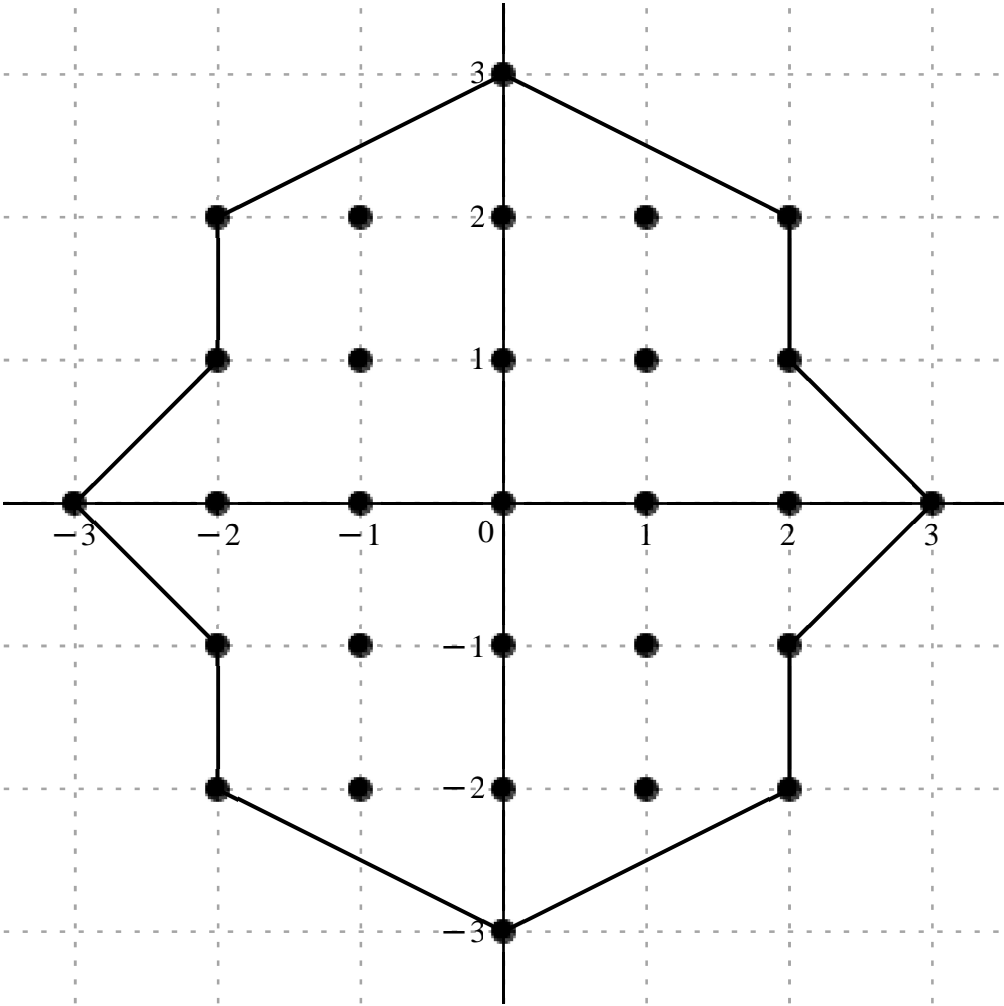


$$\frac{\mathrm{d}^{17}}{\mathrm{d}x_{ol}^{17}}\; u(x_{ol}) = \frac{1}{725 \, \Delta x_{ol}^{17}} \Big( 58212 \, \Big( -315 \, \text{I} u_{ol+3\text{I}} - (496 + 496 \, \text{I}) \, u_{ol-2+2\text{I}} + (-472004 + 46603 \, \text{I}) \, u_{ol-1+2\text{I}} - 1545120 \, \text{I} u_{ol+2\text{I}} + (472004 + 46603 \, \text{I}) \, u_{ol+1+2\text{I}} + (496 - 496 \, \text{I}) \, u_{ol+2+2\text{I}} + (46603 - 472004 \, \text{I}) \, u_{ol-2+1} - (8778880 + 8778880 \, \text{I}) \, u_{ol-1+1} + 21408525 \, \text{I} u_{ol+1} + (8778880 - 8778880 \, \text{I}) \, u_{ol+1+1} - (46603 + 472004 \, \text{I}) \, u_{ol+2+1} \\ - 315 \, u_{ol-3} - 1545120 \, u_{ol-2} + 21408525 \, u_{ol-1} - 21408525 \, u_{ol+1} + 1545120 \, u_{ol+2} + 315 \, u_{ol+3} + (46603 + 472004 \, \text{I}) \, u_{ol-2-1} + (-8778880 + 8778880 \, \text{I}) \, u_{ol-1-1} - 21408525 \, \text{I} u_{ol-1} + (8778880 + 8778880 \, \text{I}) \, u_{ol+1-1} + (-46603 + 472004 \, \text{I}) \, u_{ol+2-1} + (-496 + 496 \, \text{I}) \, u_{ol-2-2\text{I}} - (472004 + 46603 \, \text{I}) \, u_{ol-1-2\text{I}} + 1545120 \, \text{I} u_{ol-2\text{I}} \\ + (472004 - 46603 \, \text{I}) \, u_{ol+1-2\text{I}} + (496 + 496 \, \text{I}) \, u_{ol+2-2\text{I}} + 315 \, \text{I} u_{ol-3\text{I}} \Big) \Big) , \; O( \, \Delta x_{ol}^{12} \, )$$

Error order:, 12, Error:, 4.9870713848074051893 × 10<sup>−36</sup>, New Error:, 4.9870713848004231833 × 10<sup>−48</sup>  
Error order:, 12, Error:, 4.9870713848004231833 × 10<sup>−48</sup>, New Error:, 4.9870713848004224851 × 10<sup>−60</sup>  
Error order:, 12, Error:, 4.9870713848004224851 × 10<sup>−60</sup>, New Error:, 4.9870713848004224850 × 10<sup>−72</sup>  
Error order:, 12, Error:, 4.9870713848004224850 × 10<sup>−72</sup>, New Error:, 4.9870713848004224850 × 10<sup>−84</sup>  
Error order:, 12, Error:, 4.9870713848004224850 × 10<sup>−84</sup>, New Error:, 4.9870713848004224850 × 10<sup>−96</sup>

$$x_o + h \cdot \begin{bmatrix} & & & & 3 \text{ I} \\ & -2 + 2 \text{ I} & -1 + 2 \text{ I} & 2 \text{ I} & 1 + 2 \text{ I} & 2 + 2 \text{ I} \\ & -2 + \text{I} & -1 + \text{I} & \text{I} & 1 + \text{I} & 2 + \text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - \text{I} & -1 - \text{I} & -\text{I} & 1 - \text{I} & 2 - \text{I} \\ & -2 - 2 \text{ I} & -1 - 2 \text{ I} & -2 \text{ I} & 1 - 2 \text{ I} & 2 - 2 \text{ I} \\ & & & & & & -3 \text{ I} \end{bmatrix}$$

$$c = , \frac{22004136}{145} \begin{bmatrix} & & & & & & -\frac{22004136}{145} \\ & & & & & & \\ & \frac{259858368 \text{ I}}{725} & \frac{4084386768}{25} + \frac{6484933224 \text{ I}}{25} & -\frac{5582763648}{5} & \frac{4084386768}{25} - \frac{6484933224 \text{ I}}{25} & -\frac{259858368 \text{ I}}{725} & \\ -\frac{4084386768}{25} + \frac{6484933224 \text{ I}}{25} & \frac{63438971904 \text{ I}}{5} & 30940958664 & -\frac{63438971904 \text{ I}}{5} & -\frac{4084386768}{25} - \frac{6484933224 \text{ I}}{25} & \\ \frac{5582763648}{5} & -30940958664 & 0 & -30940958664 & \frac{5582763648}{5} & \frac{22004136}{145} \\ -\frac{4084386768}{25} - \frac{6484933224 \text{ I}}{25} & -\frac{63438971904 \text{ I}}{5} & 30940958664 & \frac{63438971904 \text{ I}}{5} & -\frac{4084386768}{25} + \frac{6484933224 \text{ I}}{25} & \\ -\frac{259858368 \text{ I}}{725} & \frac{4084386768}{25} - \frac{6484933224 \text{ I}}{25} & -\frac{5582763648}{5} & \frac{4084386768}{25} + \frac{6484933224 \text{ I}}{25} & \frac{259858368 \text{ I}}{725} & \\ & & & & & & -\frac{22004136}{145} \end{bmatrix}$$



$$\frac{\mathrm{d}^{18}}{\mathrm{d}x_{ol}^{18}}\,u(x_{ol})=\frac{1}{725\,\mathcal{A}x_{ol}^{18}}\Big(1047816\left(-105\,u_{ol+31}+248\,\mathrm{I}\,u_{ol-2+21}+(113042+179481\,\mathrm{I})\,u_{ol-1+21}-772560\,u_{ol+21}+(113042-179481\,\mathrm{I})\,u_{ol+1+21}-248\,\mathrm{I}\,u_{ol+2+21}+(\,-113042+179481\,\mathrm{I})\,u_{ol-2+1}+8778880\,\mathrm{I}\,u_{ol-1+1}+21408525\,u_{ol+1}-8778880\,\mathrm{I}\,u_{ol+1+1}-(113042+179481\,\mathrm{I})\,u_{ol+2+1}+105\,u_{ol-3}+772560\,u_{ol-2}\right.\\ \left.-21408525\,u_{ol-1}-21408525\,u_{ol+1}+772560\,u_{ol+2}+105\,u_{ol+3}-(113042+179481\,\mathrm{I})\,u_{ol-2-1}-8778880\,\mathrm{I}\,u_{ol-1-1}+21408525\,u_{ol-1}+8778880\,\mathrm{I}\,u_{ol+1-1}+(\,-113042+179481\,\mathrm{I})\,u_{ol+2-1}-248\,\mathrm{I}\,u_{ol-2-21}+(113042-179481\,\mathrm{I})\,u_{ol-1-21}-772560\,u_{ol-21}+(113042+179481\,\mathrm{I})\,u_{ol+1-21}+248\,\mathrm{I}\,u_{ol+2-21}-105\,u_{ol-31}\right)\Big),\\ O(\,\mathcal{A}x_{ol}^{12}\,)$$

Formula:, 781, Var:, 1

Variavel :, x\_{ol}, Derivada de Ordem :, 19

Error order:, 12, Error:, 3.0413852130099674580 × 10<sup>−36</sup>, New Error:, 3.0413852130061960830 × 10<sup>−48</sup>

Error order:, 12, Error:, 3.0413852130061960830 × 10<sup>−48</sup>, New Error:, 3.0413852130061957059 × 10<sup>−60</sup>

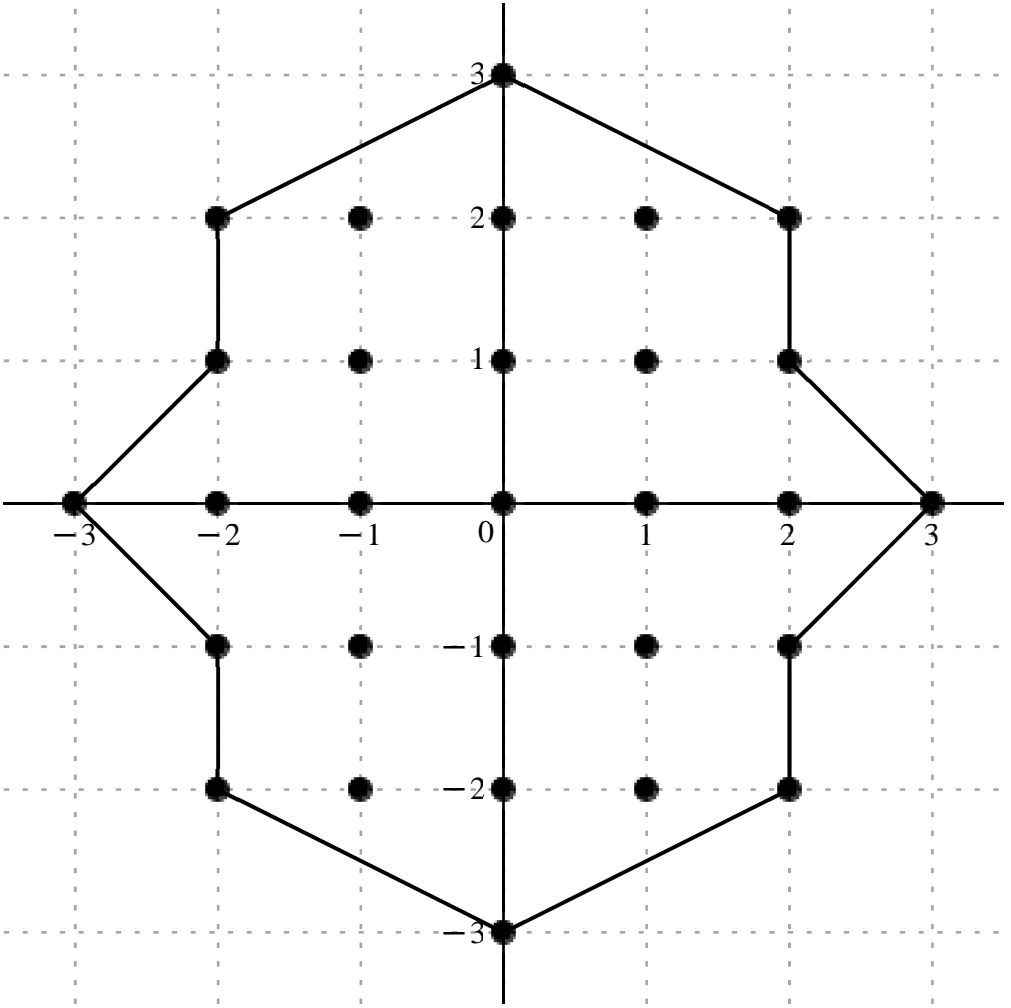
Error order:, 12, Error:, 3.0413852130061957059 × 10<sup>−60</sup>, New Error:, 3.0413852130061957058 × 10<sup>−72</sup>

Error order:, 12, Error:, 3.0413852130061957058 × 10<sup>−72</sup>, New Error:, 3.0413852130061957058 × 10<sup>−84</sup>

Error order:, 12, Error:, 3.0413852130061957058 × 10<sup>−84</sup>, New Error:, 3.0413852130061957058 × 10<sup>−96</sup>

$$x_o\neq h\,.\, ,\left[\begin{array}{ccccccc} & & & & 3\,\mathrm{I} & & \\ & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & \\ & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & \\ & & & & -3\,\mathrm{I} & & \end{array}\right]$$

$$c=,\left[\begin{array}{cccccccc} & & & & \frac{139359528\,\mathrm{I}}{145} & & & \\ & \frac{1234327248}{725}-\frac{1234327248\,\mathrm{I}}{725} & \frac{33764822784}{25}-\frac{55684085688\,\mathrm{I}}{25} & \frac{53036254656\,\mathrm{I}}{5} & -\frac{33764822784}{25}-\frac{55684085688\,\mathrm{I}}{25} & -\frac{1234327248}{725}-\frac{1234327248\,\mathrm{I}}{725} & & \\ \frac{55684085688}{25}-\frac{33764822784\,\mathrm{I}}{25} & \frac{602670233088}{5}-\frac{602670233088\,\mathrm{I}}{5} & -587878214616\,\mathrm{I} & -\frac{602670233088}{5}-\frac{602670233088\,\mathrm{I}}{5} & -\frac{55684085688}{25}-\frac{33764822784\,\mathrm{I}}{25} & & & \\ -\frac{139359528}{145} & -\frac{53036254656}{5} & 587878214616 & 0 & -587878214616 & \frac{53036254656}{5} & \frac{139359528}{145} & \\ \frac{55684085688}{25}+\frac{33764822784\,\mathrm{I}}{25} & \frac{602670233088}{5}+\frac{602670233088\,\mathrm{I}}{5} & 587878214616\,\mathrm{I} & -\frac{602670233088}{5}+\frac{602670233088\,\mathrm{I}}{5} & -\frac{55684085688}{25}+\frac{33764822784\,\mathrm{I}}{25} & & & \\ \frac{1234327248}{725}+\frac{1234327248\,\mathrm{I}}{725} & \frac{33764822784}{25}+\frac{55684085688\,\mathrm{I}}{25} & -\frac{53036254656\,\mathrm{I}}{5} & -\frac{33764822784}{25}+\frac{55684085688\,\mathrm{I}}{25} & -\frac{1234327248}{725}+\frac{1234327248\,\mathrm{I}}{725} & & & \\ & & & & & & & \\ & & & & -\frac{139359528\,\mathrm{I}}{145} & & & \end{array}\right]$$



$$\frac{d^{19}}{dx_{ol}^{19}} u(x_{ol}) = \frac{1}{725 \Delta x_{ol}^{19}} \left( 19908504 \left( 35 I u_{ol+3I} + (62 - 62 I) u_{ol-2+2I} + (49184 - 81113 I) u_{ol-1+2I} + 386280 I u_{ol+2I} - (49184 + 81113 I) u_{ol+1+2I} - (62 + 62 I) u_{ol+2+2I} + (81113 - 49184 I) u_{ol-2+I} + (4389440 - 4389440 I) u_{ol-1+I} - 21408525 I u_{ol+I} - (4389440 + 4389440 I) u_{ol+1+I} - (81113 + 49184 I) u_{ol+2+I} - 35 u_{ol-3} \right. \right. \\ \left. \left. - 386280 u_{ol-2} + 21408525 u_{ol-1} - 21408525 u_{ol+1} + 386280 u_{ol+2} + 35 u_{ol+3} + (81113 + 49184 I) u_{ol-2-I} + (4389440 + 4389440 I) u_{ol-1-I} + 21408525 I u_{ol-I} + (-4389440 + 4389440 I) u_{ol+1-I} + (-81113 + 49184 I) u_{ol+2-I} + (62 + 62 I) u_{ol-2-2I} + (49184 + 81113 I) u_{ol-1-2I} - 386280 I u_{ol-2I} + (-49184 \right. \right. \\ \left. \left. + 81113 I) u_{ol+1-2I} + (-62 + 62 I) u_{ol+2-2I} - 35 I u_{ol-3I} \right) \right), O(\Delta x_{ol}^{12})$$

Formula:, 782, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 20

Error order:, 12, Error:,  $1.8914087145581768497 \times 10^{-36}$ , New Error:,  $1.8914087145560920654 \times 10^{-48}$

Error order:, 12, Error:,  $1.8914087145560920654 \times 10^{-48}$ , New Error:,  $1.8914087145560918569 \times 10^{-60}$

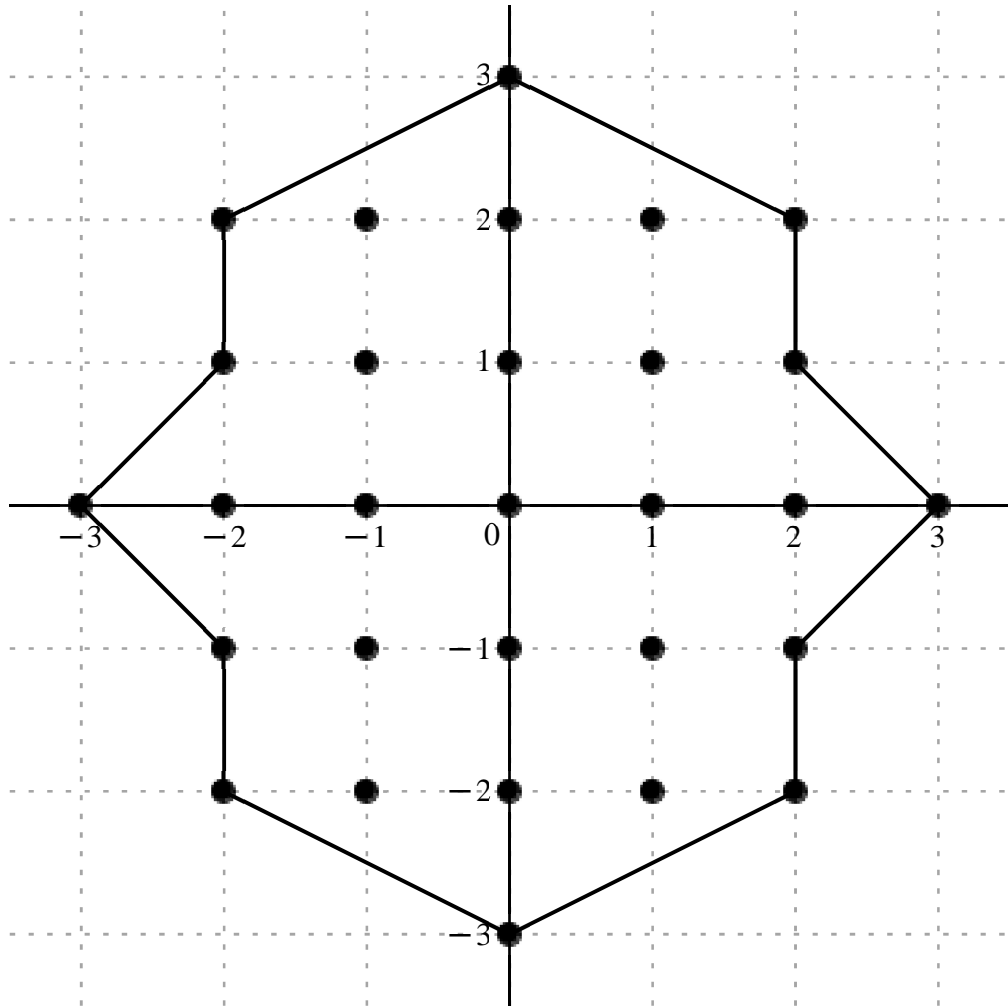
Error order:, 12, Error:,  $1.8914087145560918569 \times 10^{-60}$ , New Error:,  $1.8914087145560918569 \times 10^{-72}$

Error order:, 12, Error:,  $1.8914087145560918569 \times 10^{-72}$ , New Error:,  $1.8914087145560918569 \times 10^{-84}$

Error order:, 12, Error:,  $1.8914087145560918569 \times 10^{-84}$ , New Error:,  $1.8914087145560918569 \times 10^{-96}$

$$x_o \neq h., \begin{bmatrix} & & & 3 I \\ & -2 + 2 I & -1 + 2 I & 2 I & 1 + 2 I & 2 + 2 I \\ & -2 + I & -1 + I & I & 1 + I & 2 + I \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2 - I & -1 - I & -I & 1 - I & 2 - I \\ & -2 - 2 I & -1 - 2 I & -2 I & 1 - 2 I & 2 - 2 I \\ & & & -3 I & & \end{bmatrix}$$

$$c =, \begin{array}{cccccc} & & & \frac{185812704}{29} & & \\ & & -\frac{2468654496}{145} & -\frac{116106395328}{5} - \frac{9476447904 \text{ I}}{5} & 106072509312 & -\frac{116106395328}{5} + \frac{9476447904 \text{ I}}{5} & -\frac{2468654496}{145} \\ & -\frac{116106395328}{5} + \frac{9476447904 \text{ I}}{5} & & -2410680932352 & -11757564292320 & -2410680932352 & -\frac{116106395328}{5} - \frac{9476447904 \text{ I}}{5} \\ & 106072509312 & & -11757564292320 & 56434503565440 & -11757564292320 & 106072509312 & \frac{185812704}{29} \\ & -\frac{116106395328}{5} - \frac{9476447904 \text{ I}}{5} & & -2410680932352 & -11757564292320 & -2410680932352 & -\frac{116106395328}{5} + \frac{9476447904 \text{ I}}{5} \\ & -\frac{2468654496}{145} & & -\frac{116106395328}{5} + \frac{9476447904 \text{ I}}{5} & 106072509312 & -\frac{116106395328}{5} - \frac{9476447904 \text{ I}}{5} & -\frac{2468654496}{145} \\ & & & \frac{185812704}{29} & & \end{array}$$



$$\frac{\mathrm{d}^{20}}{\mathrm{d}x_{ol}^{20}}\;u(x_{ol})=\frac{1}{145\,\Delta x_{ol}^{20}}\big(26544672\,(35\,u_{ol+3\text{I}}-93\,u_{ol-2+2\text{I}}-(126846+10353\,\text{I})\,u_{ol-1+2\text{I}}+579420\,u_{ol+2\text{I}}+(-126846+10353\,\text{I})\,u_{ol+1+2\text{I}}-93\,u_{ol+2+2\text{I}}+(-126846+10353\,\text{I})\,u_{ol-2+1}-13168320\,u_{ol-1+1}-64225575\,u_{ol+1}-13168320\,u_{ol+1+1}-(126846+10353\,\text{I})\,u_{ol+2+1}+35\,u_{ol-3}+579420\,u_{ol-2}-64225575\,u_{ol-1}+308272900\,u_{ol}-64225575\,u_{ol+1}+579420\,u_{ol+2}+35\,u_{ol+3}-(126846+10353\,\text{I})\,u_{ol-2-1}-13168320\,u_{ol-1-1}-64225575\,u_{ol-1}-13168320\,u_{ol+1-1}+(-126846+10353\,\text{I})\,u_{ol+2-1}-93\,u_{ol-2-2\text{I}}+(-126846+10353\,\text{I})\,u_{ol-1-2\text{I}}+579420\,u_{ol-2\text{I}}-(126846+10353\,\text{I})\,u_{ol+1-2\text{I}}-93\,u_{ol+2-2\text{I}}+35\,u_{ol-3\text{I}})\big),\;O(\;\Delta x_{ol}^{12}\;)$$

Formula.: 783, Var.: 1

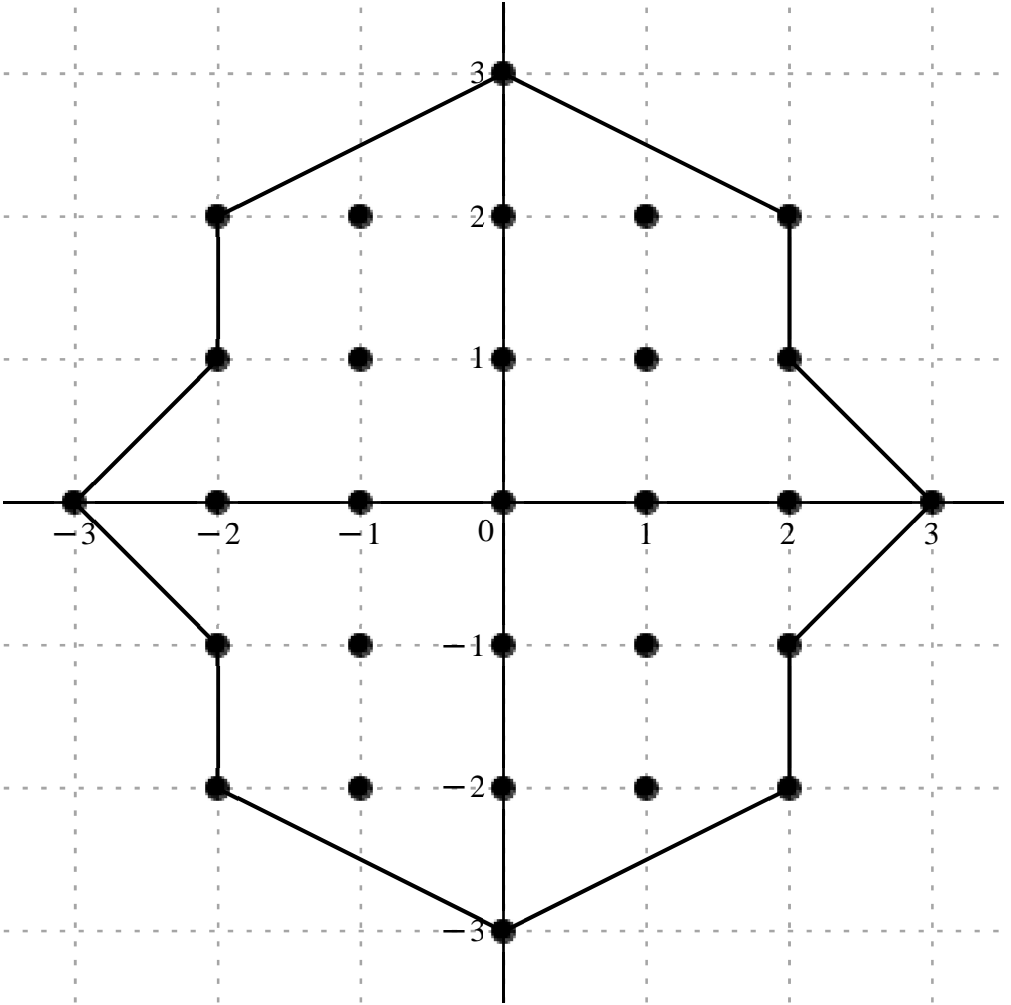
Variavel :,  $x_{ol}$ , Derivada de Ordem :, 21

Error order.: 8, Error.: 1.9117076029307471692 × 10<sup>-23</sup>, New Error.: 1.9117076029301804689 × 10<sup>-31</sup>

Error order:, 8, Error:, 1.9117076029301804689 × 10<sup>-31</sup>, New Error:, 1.9117076029301804122 × 10<sup>-39</sup>  
Error order:, 8, Error:, 1.9117076029301804122 × 10<sup>-39</sup>, New Error:, 1.9117076029301804122 × 10<sup>-47</sup>  
Error order:, 8, Error:, 1.9117076029301804122 × 10<sup>-47</sup>, New Error:, 1.9117076029301804122 × 10<sup>-55</sup>  
Error order:, 8, Error:, 1.9117076029301804122 × 10<sup>-55</sup>, New Error:, 1.9117076029301804122 × 10<sup>-63</sup>

$$x_o + h., \begin{bmatrix} & & & & 3\text{ I} \\ & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} \\ & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \\ & & & & & & -3\text{ I} \end{bmatrix}$$

$$c = , \begin{bmatrix} & & & & & & -\frac{15050829024\text{ I}}{29} \\ & & & & & & 0 & \frac{86960345472}{5} + \frac{148835975904\text{ I}}{5} & -\frac{214056235008}{145} + \frac{214056235008\text{ I}}{145} \\ & & & & & & \frac{148835975904}{5} - \frac{86960345472\text{ I}}{5} & -428112470016 - 428112470016\text{ I} & 767592280224\text{ I} & 428112470016 - 428112470016\text{ I} & -\frac{148835975904}{5} - \frac{86960345472\text{ I}}{5} \\ & & & & & & 0 & 767592280224 & 0 & -767592280224 & 0 & \frac{15050829024}{29} \\ & & & & & & \frac{148835975904}{5} + \frac{86960345472\text{ I}}{5} & -428112470016 + 428112470016\text{ I} & -767592280224\text{ I} & 428112470016 + 428112470016\text{ I} & -\frac{148835975904}{5} + \frac{86960345472\text{ I}}{5} \\ & & & & & & \frac{214056235008}{145} - \frac{214056235008\text{ I}}{145} & -\frac{86960345472}{5} - \frac{148835975904\text{ I}}{5} & 0 & \frac{86960345472}{5} - \frac{148835975904\text{ I}}{5} & -\frac{214056235008}{145} - \frac{214056235008\text{ I}}{145} \\ & & & & & & & & & & & \frac{15050829024\text{ I}}{29} \end{bmatrix}$$





$$\frac{d^{(21)}}{dx_{ol}^{21}} u(x_{ol}) = \frac{1}{145 \mathcal{A}_{ol}^{21}} \left( (1672314336 \left( -45 I u_{ol+31} + (128+128 I) u_{ol-2+21} + (-1508+2581 I) u_{ol-1+21} + (1508+2581 I) u_{ol+1+21} + (-128+128 I) u_{ol+2+21} + (2581-1508 I) u_{ol-2+1} - (37120+37120 I) u_{ol-1+1} + 66555 I u_{ol+1} + (37120-37120 I) u_{ol+1+1} - (2581+1508 I) u_{ol+2+1} - 45 u_{ol-3} + 66555 u_{ol-1} - 66555 u_{ol+1} \right. \right. \\ \left. \left. + 45 u_{ol+3} + (2581+1508 I) u_{ol-2-1} + (-37120+37120 I) u_{ol-1-1} - 66555 I u_{ol-1} + (37120+37120 I) u_{ol+1-1} + (-2581+1508 I) u_{ol+2-1} + (128-128 I) u_{ol-2-21} - (1508+2581 I) u_{ol-1-21} + (1508-2581 I) u_{ol+1-21} - (128+128 I) u_{ol+2-21} + 45 I u_{ol-31} \right) \right), O(\mathcal{A}_{ol}^8)$$

Formula:, 784, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 22

*Error order:*, 8, *Error:*,  $1.3949441878764501102 \times 10^{-23}$ , *New Error:*,  $1.3949441878760852461 \times 10^{-31}$

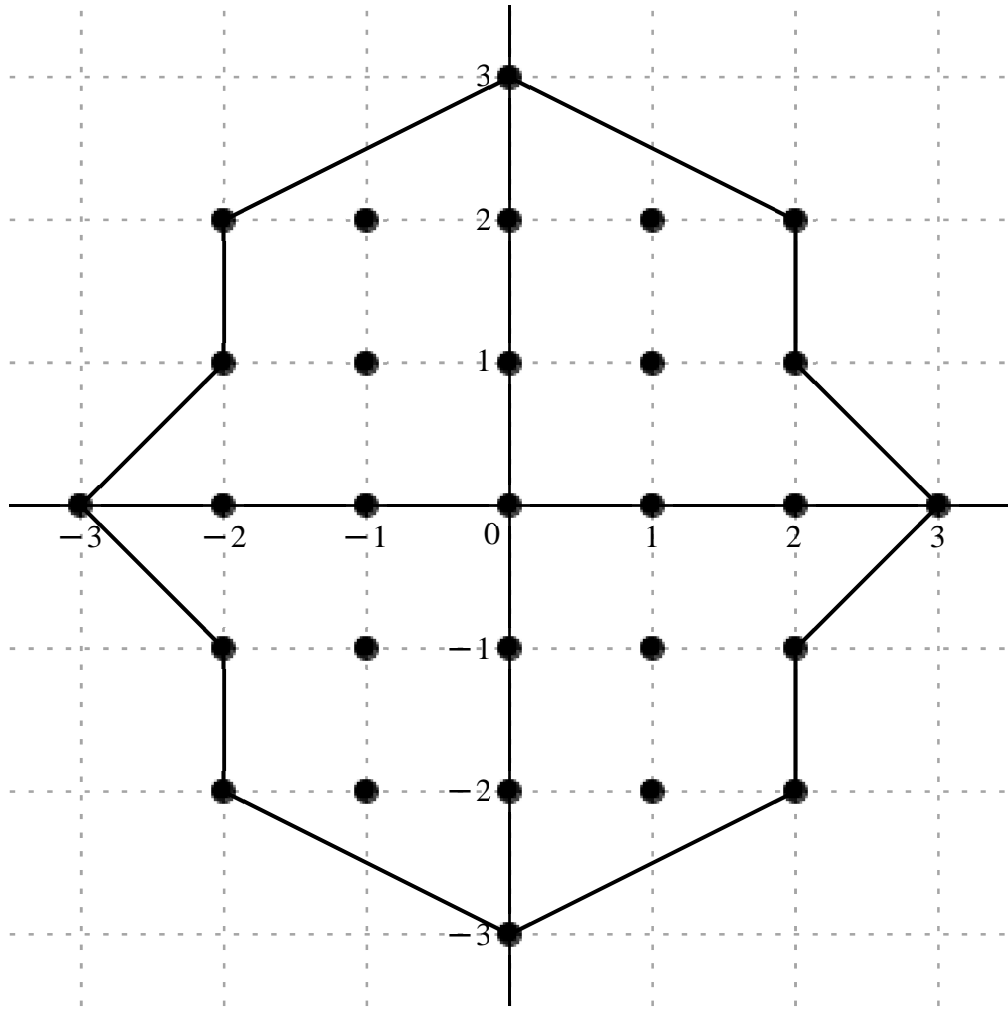
*Error order*., 8, *Error*.,  $1.3949441878760852461 \times 10^{-31}$ , *New Error*.,  $1.3949441878760852096 \times 10^{-39}$

*Error order*., 8, *Error*.,  $1.3949441878760852096 \times 10^{-39}$ , *New Error*.,  $1.3949441878760852096 \times 10^{-47}$

*Error order:*, 8, *Error:*,  $1.3949441878760852096 \times 10^{-47}$ , *New Error:*,  $1.3949441878760852096 \times 10^{-55}$

*Error order:*, 8, *Error:*,  $1.3949441878760852096 \times 10^{-55}$ , *New Error:*,  $1.3949441878760852096 \times 10^{-63}$

$$c =, \begin{bmatrix} \frac{110372746176}{29} & 0 & -\frac{1692382108032}{5} - \frac{110372746176 \text{ I}}{5} & \frac{2354618585088 \text{ I}}{145} & \frac{1692382108032}{5} - \frac{110372746176 \text{ I}}{5} & 0 & -\frac{110372746176}{29} \\ -\frac{1692382108032}{5} + \frac{110372746176 \text{ I}}{5} & 9418474340352 \text{ I} & 16887030164928 & -9418474340352 \text{ I} & -\frac{1692382108032}{5} - \frac{110372746176 \text{ I}}{5} & \frac{1692382108032}{5} + \frac{110372746176 \text{ I}}{5} & \frac{2354618585088 \text{ I}}{145} \\ 0 & -16887030164928 & 0 & -16887030164928 & 0 & -16887030164928 & \frac{110372746176}{29} \\ -\frac{1692382108032}{5} - \frac{110372746176 \text{ I}}{5} & -9418474340352 \text{ I} & 16887030164928 & 9418474340352 \text{ I} & -\frac{1692382108032}{5} + \frac{110372746176 \text{ I}}{5} & \frac{1692382108032}{5} - \frac{110372746176 \text{ I}}{5} & -\frac{110372746176}{29} \\ \frac{2354618585088 \text{ I}}{145} & \frac{1692382108032}{5} - \frac{110372746176 \text{ I}}{5} & 0 & \frac{1692382108032}{5} + \frac{110372746176 \text{ I}}{5} & -\frac{2354618585088 \text{ I}}{145} & \frac{1692382108032}{5} + \frac{110372746176 \text{ I}}{5} & -\frac{110372746176}{29} \end{bmatrix}$$



$$\frac{\mathrm{d}^{22}}{\mathrm{d}x_{ol}^{22}}\;u(x_{ol})=\frac{1}{145\,\Delta x_{ol}^{22}}\left(36790915392\left(-15\,u_{ol+31}-64\,\mathrm{I}u_{ol-2+21}+(1334+87\,\mathrm{I})\,u_{ol-1+21}+(1334-87\,\mathrm{I})\,u_{ol+1+21}+64\,\mathrm{I}u_{ol+2+21}+(-1334+87\,\mathrm{I})\,u_{ol-2+1}+37120\,\mathrm{I}u_{ol-1+1}+66555\,u_{ol+1}-37120\,\mathrm{I}u_{ol+1+1}-(1334+87\,\mathrm{I})\,u_{ol+2+1}+15\,u_{ol-3}-66555\,u_{ol-1}-66555\,u_{ol+1}+15\,u_{ol+3}-(1334+87\,\mathrm{I})\,u_{ol-2-1}-37120\,\mathrm{I}u_{ol-1-1}+66555\,u_{ol-1}+37120\,\mathrm{I}u_{ol+1-1}+(-1334+87\,\mathrm{I})\,u_{ol+2-1}+64\,\mathrm{I}u_{ol-2-21}+(1334-87\,\mathrm{I})\,u_{ol-1-21}+(1334+87\,\mathrm{I})\,u_{ol+1-21}-64\,\mathrm{I}u_{ol+2-21}-15\,u_{ol-31}\right)\right),\;O(\;\Delta x_{ol}^8\;)$$

Formula: 785, Var.: 1

Variavel :  $x_{ol}$ , Derivada de Ordem : 23

Error order.: 8, Error.: 1.0298095432886340352 × 10<sup>-23</sup>, New Error.: 1.0298095432883954602 × 10<sup>-31</sup>

Error order.: 8, Error.: 1.0298095432883954602 × 10<sup>-31</sup>, New Error.: 1.0298095432883954364 × 10<sup>-39</sup>

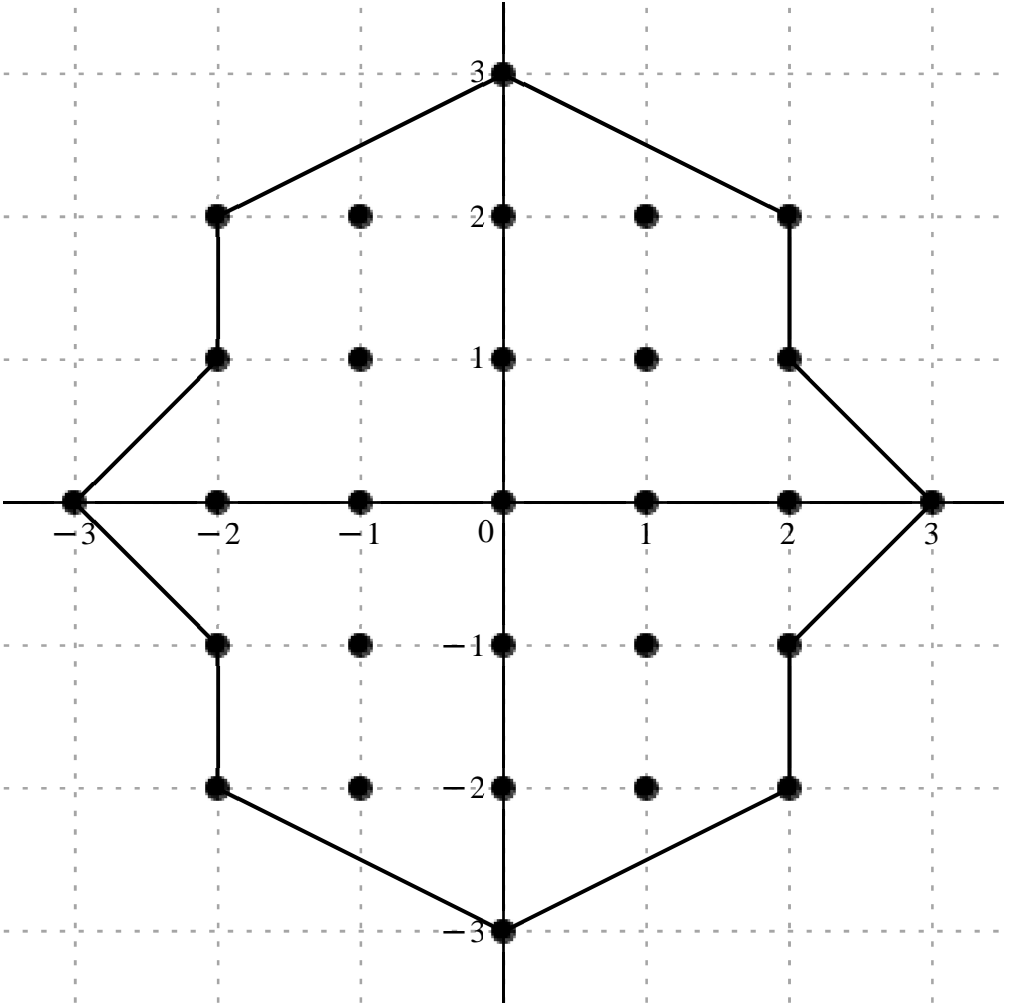
Error order.: 8, Error.: 1.0298095432883954364 × 10<sup>-39</sup>, New Error.: 1.0298095432883954364 × 10<sup>-47</sup>

Error order.: 8, Error.: 1.0298095432883954364 × 10<sup>-47</sup>, New Error.: 1.0298095432883954364 × 10<sup>-55</sup>

Error order.: 8, Error.: 1.0298095432883954364 × 10<sup>-55</sup>, New Error.: 1.0298095432883954364 × 10<sup>-63</sup>

$$x_o+h.,\left[ \begin{array}{ccccccc} & & & & 3\,\mathrm{I} & & \\ & -2+2\,\mathrm{I} & -1+2\,\mathrm{I} & 2\,\mathrm{I} & 1+2\,\mathrm{I} & 2+2\,\mathrm{I} & \\ & -2+\mathrm{I} & -1+\mathrm{I} & \mathrm{I} & 1+\mathrm{I} & 2+\mathrm{I} & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ & -2-\mathrm{I} & -1-\mathrm{I} & -\mathrm{I} & 1-\mathrm{I} & 2-\mathrm{I} & \\ & -2-2\,\mathrm{I} & -1-2\,\mathrm{I} & -2\,\mathrm{I} & 1-2\,\mathrm{I} & 2-2\,\mathrm{I} & \\ & & & & -3\,\mathrm{I} & & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccc} -\frac{13539056864256}{145} + \frac{13539056864256 \text{ I}}{145} & -\frac{6769528432128}{5} - \frac{16077630026304 \text{ I}}{5} & \frac{846191054016 \text{ I}}{29} & 0 & \frac{6769528432128}{5} - \frac{16077630026304 \text{ I}}{5} & \frac{13539056864256}{145} + \frac{13539056864256 \text{ I}}{145} & \\ \frac{16077630026304}{5} + \frac{6769528432128 \text{ I}}{5} & 108312454914048 - 108312454914048 \text{ I} & -388401693793344 \text{ I} & -108312454914048 - 108312454914048 \text{ I} & -\frac{16077630026304}{5} + \frac{6769528432128 \text{ I}}{5} & \\ -\frac{846191054016}{29} & 0 & 388401693793344 & 0 & -388401693793344 & 0 & \frac{846191054016}{29} \\ \frac{16077630026304}{5} - \frac{6769528432128 \text{ I}}{5} & 108312454914048 + 108312454914048 \text{ I} & 388401693793344 \text{ I} & -108312454914048 + 108312454914048 \text{ I} & -\frac{16077630026304}{5} - \frac{6769528432128 \text{ I}}{5} & \\ -\frac{13539056864256}{145} - \frac{13539056864256 \text{ I}}{145} & -\frac{6769528432128}{5} + \frac{16077630026304 \text{ I}}{5} & 0 & \frac{6769528432128}{5} + \frac{16077630026304 \text{ I}}{5} & \frac{13539056864256}{145} - \frac{13539056864256 \text{ I}}{145} & \end{array} \right]$$



$$\frac{\mathrm{d}^{23}}{\mathrm{d} x_{o l}^{23}} \ u(x_{o l}) = \frac{1}{145 \ \Delta x_{o l}^{23}} \big( 846191054016 \big( 5 \text{ I} u_{o l+3 \text{ I}} + (-16+16 \text{ I}) \ u_{o l-2+2 \text{ I}} - (232+551 \text{ I}) \ u_{o l-1+2 \text{ I}} + (232-551 \text{ I}) \ u_{o l+1+2 \text{ I}} + (16+16 \text{ I}) \ u_{o l+2+2 \text{ I}} + (551+232 \text{ I}) \ u_{o l-2+1} + (18560-18560 \text{ I}) \ u_{o l-1+1} - 66555 \text{ I} u_{o l+1} - (18560+18560 \text{ I}) \ u_{o l+1+1} + (-551+232 \text{ I}) \ u_{o l+2+1} - 5 \ u_{o l-3} + 66555 \ u_{o l-1} - 66555 \ u_{o l+1} + 5 \ u_{o l+3} + (551-232 \text{ I}) \ u_{o l-2-1} + (18560+18560 \text{ I}) \ u_{o l-1-1} + 66555 \text{ I} u_{o l-1} + (-18560+18560 \text{ I}) \ u_{o l+1-1} - (551+232 \text{ I}) \ u_{o l+2-1} - (16+16 \text{ I}) \ u_{o l-2-2 \text{ I}} + (-232+551 \text{ I}) \ u_{o l-1-2 \text{ I}} + (232+551 \text{ I}) \ u_{o l+1-2 \text{ I}} + (16-16 \text{ I}) \ u_{o l+2-2 \text{ I}} - 5 \text{ I} u_{o l-3 \text{ I}} \big) \big) , \ O(\ \Delta x_{o l}^{\ 8} \ )$$

Formula.: 786, Var.: 1

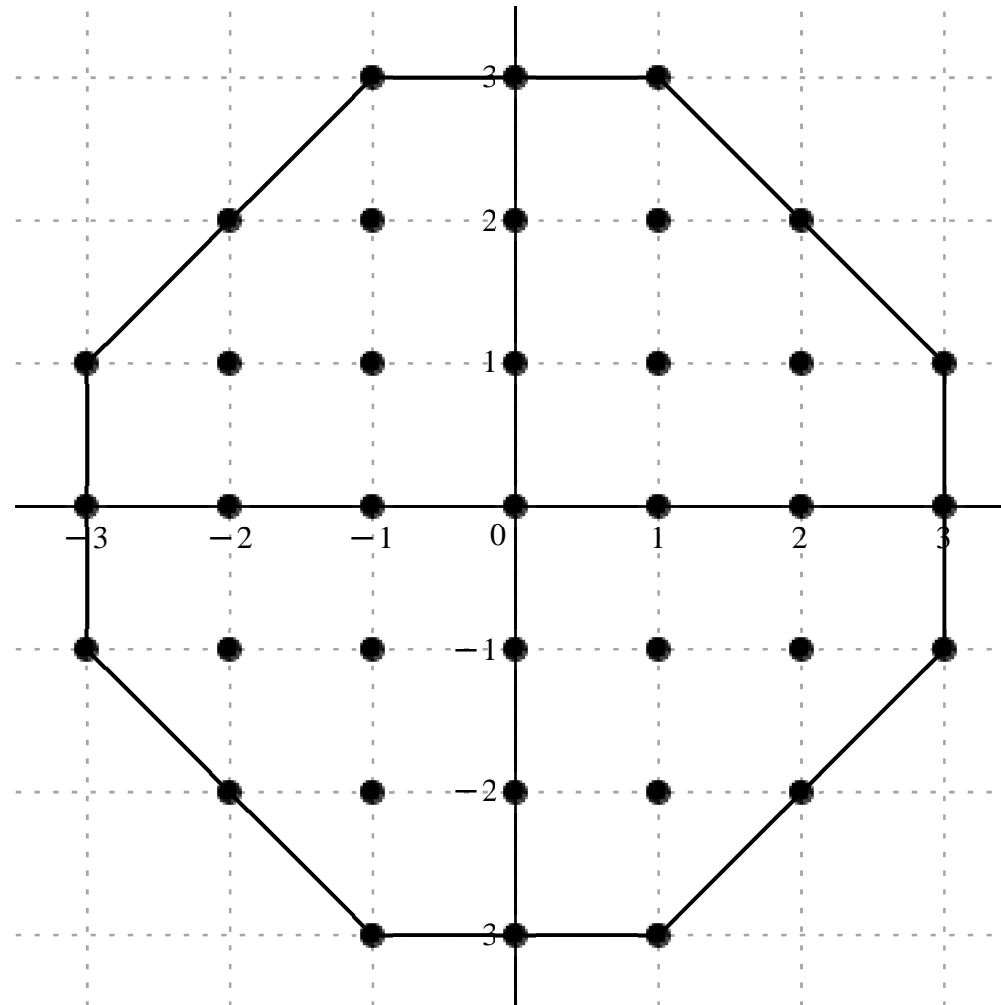
Variavel .: x<sub>o l</sub>, Derivada de Ordem .: 1

Error order.: 36, Error.: 1.4359063000094388797 × 10<sup>−101</sup>, New Error.: 1.4359063000088284585 × 10<sup>−137</sup>

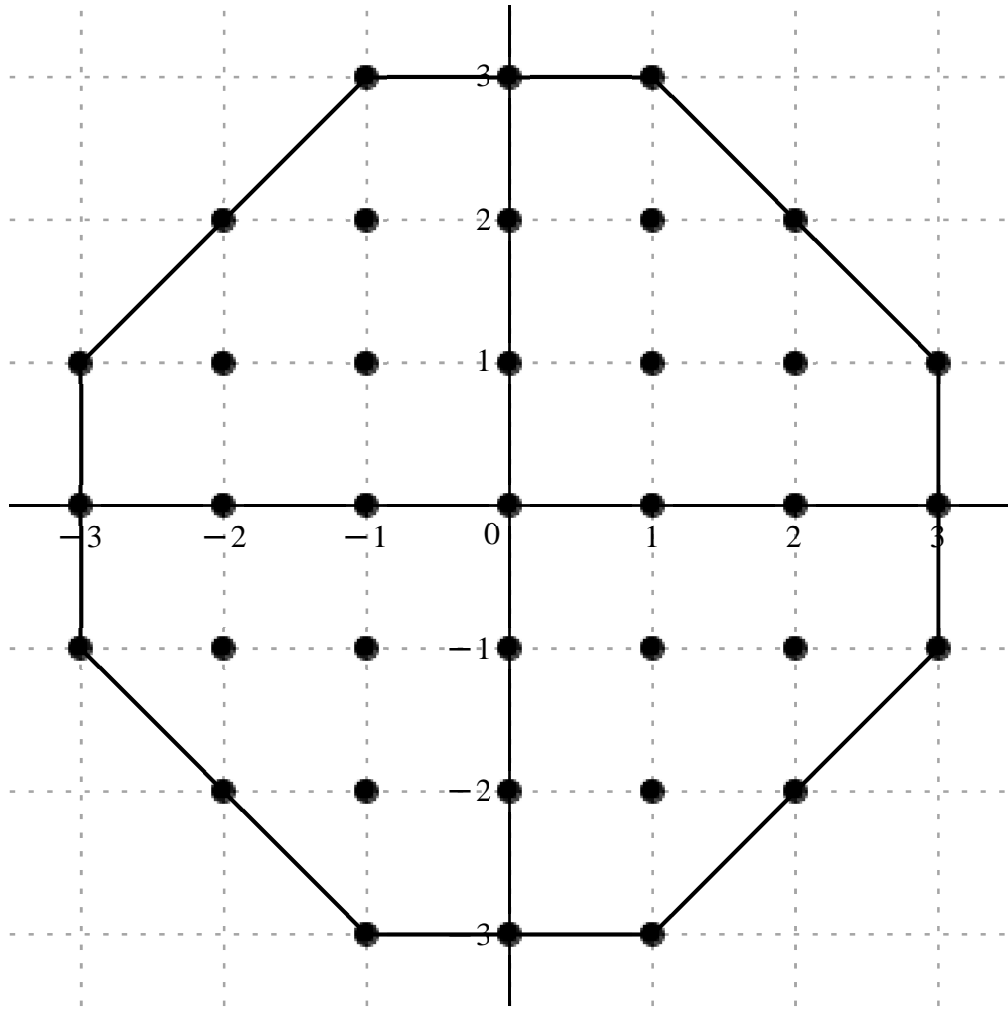
*Error order:*, 36, *Error:*,  $1.4359063000088284585 \times 10^{-137}$ , *New Error:*,  $1.4359063000088283975 \times 10^{-173}$   
*Error order:*, 36, *Error:*,  $1.4359063000088283975 \times 10^{-173}$ , *New Error:*,  $1.4359063000088283975 \times 10^{-209}$   
*Error order:*, 36, *Error:*,  $1.4359063000088283975 \times 10^{-209}$ , *New Error:*,  $1.4359063000088283975 \times 10^{-245}$   
*Error order:*, 36, *Error:*,  $1.4359063000088283975 \times 10^{-245}$ , *New Error:*,  $1.4359063000088283975 \times 10^{-281}$

$$c = , \quad x_o \neq h. , \quad \left[ \begin{array}{cccccc} -1+3 \text{ I} & 3 \text{ I} & 1+3 \text{ I} & & & \\ & -2+2 \text{ I} & -1+2 \text{ I} & 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} \\ -3+ \text{ I} & -2+ \text{ I} & -1+ \text{ I} & \text{ I} & 1+ \text{ I} & 2+ \text{ I} & 3+ \text{ I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3- \text{ I} & -2- \text{ I} & -1- \text{ I} & - \text{ I} & 1- \text{ I} & 2- \text{ I} & 3- \text{ I} \\ & -2-2 \text{ I} & -1-2 \text{ I} & -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & \\ & & -1-3 \text{ I} & -3 \text{ I} & 1-3 \text{ I} & & \end{array} \right]$$

$$\begin{array}{cccccccc} & & & \frac{219}{34064155450} - \frac{16239 \text{ I}}{272513243600} & - \frac{40 \text{ I}}{120226431} & - \frac{219}{34064155450} & - \frac{16239 \text{ I}}{272513243600} & \\ & & \frac{15}{22662224} + \frac{15 \text{ I}}{22662224} & - \frac{26592}{460326425} - \frac{72744 \text{ I}}{460326425} & \frac{75 \text{ I}}{74698} & \frac{26592}{460326425} - \frac{72744 \text{ I}}{460326425} & - \frac{15}{22662224} + \frac{15 \text{ I}}{22662224} & \\ - \frac{16239}{272513243600} + \frac{219 \text{ I}}{34064155450} & - \frac{72744}{460326425} - \frac{26592 \text{ I}}{460326425} & & - \frac{75}{3536} - \frac{75 \text{ I}}{3536} & - \frac{600 \text{ I}}{2873} & \frac{75}{3536} - \frac{75 \text{ I}}{3536} & \frac{72744}{460326425} - \frac{26592 \text{ I}}{460326425} & \frac{16239}{272513243600} + \frac{219 \text{ I}}{34064155450} \\ & - \frac{40}{120226431} & \frac{75}{74698} & - \frac{600}{2873} & 0 & \frac{600}{2873} & - \frac{75}{74698} & \frac{40}{120226431} \\ - \frac{16239}{272513243600} - \frac{219 \text{ I}}{34064155450} & - \frac{72744}{460326425} + \frac{26592 \text{ I}}{460326425} & & - \frac{75}{3536} + \frac{75 \text{ I}}{3536} & \frac{600 \text{ I}}{2873} & \frac{75}{3536} + \frac{75 \text{ I}}{3536} & \frac{72744}{460326425} + \frac{26592 \text{ I}}{460326425} & \frac{16239}{272513243600} - \frac{219 \text{ I}}{34064155450} \\ & \frac{15}{22662224} - \frac{15 \text{ I}}{22662224} & & - \frac{26592}{460326425} + \frac{72744 \text{ I}}{460326425} & - \frac{75 \text{ I}}{74698} & \frac{26592}{460326425} + \frac{72744 \text{ I}}{460326425} & - \frac{15}{22662224} - \frac{15 \text{ I}}{22662224} & \\ & & \frac{219}{34064155450} + \frac{16239 \text{ I}}{272513243600} & \frac{40 \text{ I}}{120226431} & - \frac{219}{34064155450} + \frac{16239 \text{ I}}{272513243600} & & & \end{array}$$







$$\frac{\mathrm{d}^2}{\mathrm{d}x_{ol}^2} u(x_{ol}) = \frac{1}{12263095962000 \Delta x_{ol}^2} \left( (-454221 + 98847 \operatorname{I}) u_{ol-1+3\operatorname{I}} - 2720000 u_{ol+3\operatorname{I}} - (454221 + 98847 \operatorname{I}) u_{ol+1+3\operatorname{I}} - 8116875 \operatorname{I} u_{ol-2+2\operatorname{I}} + (-1266955776 + 1341888768 \operatorname{I}) u_{ol-1+2\operatorname{I}} + 12312675000 u_{ol+2\operatorname{I}} - (1266955776 + 1341888768 \operatorname{I}) u_{ol+1+2\operatorname{I}} + 8116875 \operatorname{I} u_{ol+2+2\operatorname{I}} + (454221 + 98847 \operatorname{I}) u_{ol-3+1} + (1266955776 \right. \\ \left. + 1341888768 \operatorname{I}) u_{ol-2+1} + 520210518750 \operatorname{I} u_{ol-1+1} - 5122072800000 u_{ol+1} - 520210518750 \operatorname{I} u_{ol+1+1} + (1266955776 - 1341888768 \operatorname{I}) u_{ol+2+1} + (454221 - 98847 \operatorname{I}) u_{ol+3+1} + 2720000 u_{ol-3} - 12312675000 u_{ol-2} + 5122072800000 u_{ol-1} + 5122072800000 u_{ol+1} - 12312675000 u_{ol+2} + 2720000 u_{ol+3} + (454221 \right. \\ \left. - 98847 \operatorname{I}) u_{ol-3-1} + (1266955776 - 1341888768 \operatorname{I}) u_{ol-2-1} - 520210518750 \operatorname{I} u_{ol-1-1} - 5122072800000 u_{ol-1} + 520210518750 \operatorname{I} u_{ol+1-1} + (1266955776 + 1341888768 \operatorname{I}) u_{ol+2-1} + (454221 + 98847 \operatorname{I}) u_{ol+3-1} + 8116875 \operatorname{I} u_{ol-2-2\operatorname{I}} - (1266955776 + 1341888768 \operatorname{I}) u_{ol-1-2\operatorname{I}} + 12312675000 u_{ol-2\operatorname{I}} + (-1266955776 \right. \\ \left. + 1341888768 \operatorname{I}) u_{ol+1-2\operatorname{I}} - 8116875 \operatorname{I} u_{ol+2-2\operatorname{I}} - (454221 + 98847 \operatorname{I}) u_{ol-1-3\operatorname{I}} - 2720000 u_{ol-3\operatorname{I}} + (-454221 + 98847 \operatorname{I}) u_{ol+1-3\operatorname{I}} \right), \quad O(\Delta x_{ol}^{36})$$

Formula:, 788, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 3

Error order:, 36, Error:,  $5.7556850870001087599 \times 10^{-104}$ , New Error:,  $5.7556850869981009111 \times 10^{-140}$

Error order:, 36, Error:,  $5.7556850869981009111 \times 10^{-140}$ , New Error:,  $5.7556850869981007104 \times 10^{-176}$

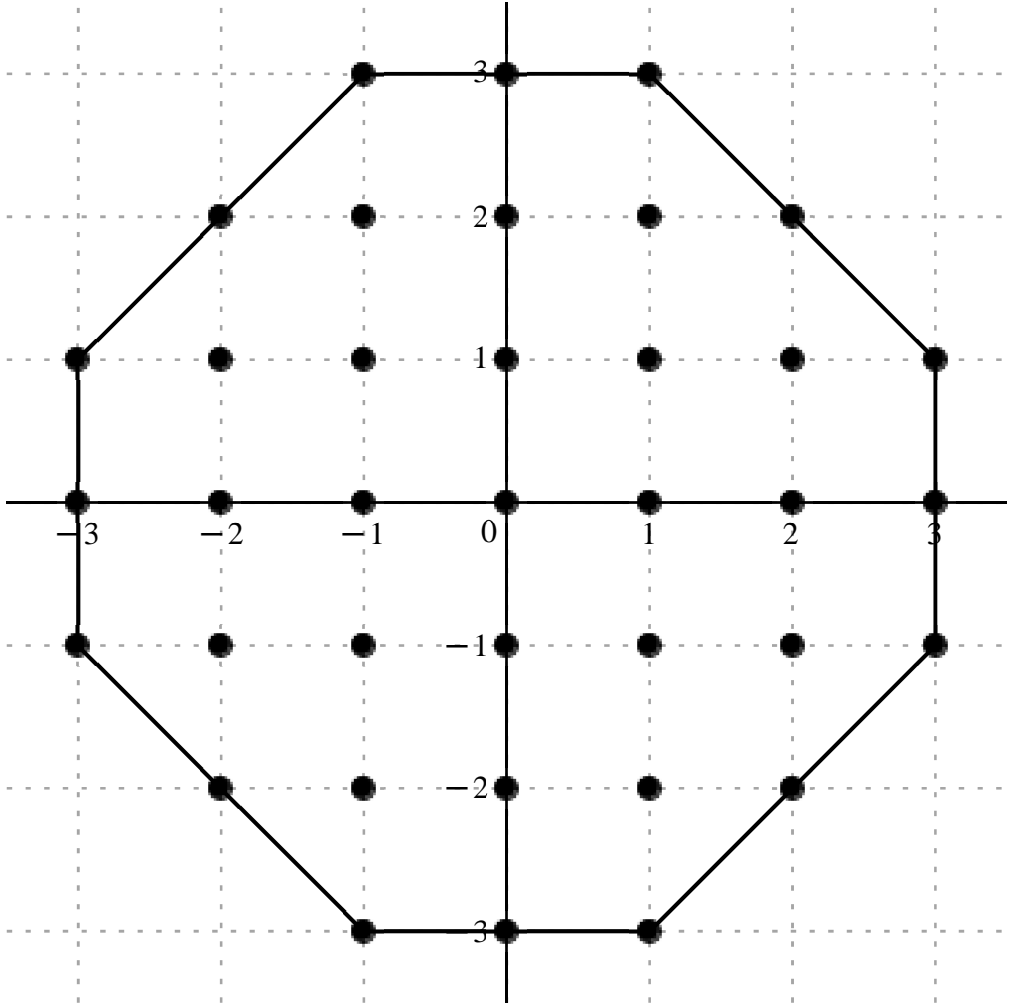
Error order:, 36, Error:,  $5.7556850869981007104 \times 10^{-176}$ , New Error:,  $5.7556850869981007103 \times 10^{-212}$

Error order:, 36, Error:,  $5.7556850869981007103 \times 10^{-212}$ , New Error:,  $5.7556850869981007103 \times 10^{-248}$

Error order:, 36, Error:,  $5.7556850869981007103 \times 10^{-248}$ , New Error:,  $5.7556850869981007103 \times 10^{-284}$

$$x_o + h \cdot, \left[ \begin{array}{ccccccccc} & & & & -1+3\operatorname{I} & 3\operatorname{I} & 1+3\operatorname{I} & & \\ & & & & -2+2\operatorname{I} & -1+2\operatorname{I} & 2\operatorname{I} & 1+2\operatorname{I} & 2+2\operatorname{I} \\ -3+\operatorname{I} & -2+\operatorname{I} & -1+\operatorname{I} & \operatorname{I} & 1+\operatorname{I} & 2+\operatorname{I} & 3+\operatorname{I} & & \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 & & \\ -3-\operatorname{I} & -2-\operatorname{I} & -1-\operatorname{I} & -\operatorname{I} & 1-\operatorname{I} & 2-\operatorname{I} & 3-\operatorname{I} & & \\ & & -2-2\operatorname{I} & -1-2\operatorname{I} & -2\operatorname{I} & 1-2\operatorname{I} & 2-2\operatorname{I} & & \\ & & & & -1-3\operatorname{I} & -3\operatorname{I} & 1-3\operatorname{I} & & \end{array} \right]$$

$$c = , \begin{array}{cccccccc} & & & & \frac{125127}{6812831090000} + \frac{52659 \text{ I}}{1703207772500} & \frac{80 \text{ I}}{360679293} & -\frac{125127}{6812831090000} + \frac{52659 \text{ I}}{1703207772500} & & \\ & & & & \frac{2224512}{11508160625} + \frac{671184 \text{ I}}{11508160625} & -\frac{225 \text{ I}}{149396} & -\frac{2224512}{11508160625} + \frac{671184 \text{ I}}{11508160625} & & \frac{45}{90648896} + \frac{45 \text{ I}}{90648896} \\ -\frac{52659}{1703207772500} - \frac{125127 \text{ I}}{6812831090000} & -\frac{45}{90648896} + \frac{45 \text{ I}}{90648896} & -\frac{671184}{11508160625} - \frac{2224512 \text{ I}}{11508160625} & \frac{225}{3536} - \frac{225 \text{ I}}{3536} & \frac{3600 \text{ I}}{2873} & -\frac{225}{3536} - \frac{225 \text{ I}}{3536} & \frac{671184}{11508160625} - \frac{2224512 \text{ I}}{11508160625} & \frac{52659}{1703207772500} - \frac{125127 \text{ I}}{6812831090000} \\ & -\frac{80}{360679293} & \frac{225}{149396} & -\frac{3600}{2873} & 0 & \frac{3600}{2873} & -\frac{225}{149396} & \frac{80}{360679293} \\ -\frac{52659}{1703207772500} + \frac{125127 \text{ I}}{6812831090000} & -\frac{671184}{11508160625} + \frac{2224512 \text{ I}}{11508160625} & \frac{225}{3536} + \frac{225 \text{ I}}{3536} & -\frac{3600 \text{ I}}{2873} & -\frac{225}{3536} + \frac{225 \text{ I}}{3536} & \frac{671184}{11508160625} + \frac{2224512 \text{ I}}{11508160625} & \frac{52659}{1703207772500} + \frac{125127 \text{ I}}{6812831090000} \\ & -\frac{45}{90648896} - \frac{45 \text{ I}}{90648896} & \frac{2224512}{11508160625} - \frac{671184 \text{ I}}{11508160625} & \frac{225 \text{ I}}{149396} & -\frac{2224512}{11508160625} - \frac{671184 \text{ I}}{11508160625} & \frac{45}{90648896} - \frac{45 \text{ I}}{90648896} & & \\ & & \frac{125127}{6812831090000} - \frac{52659 \text{ I}}{1703207772500} & -\frac{80 \text{ I}}{360679293} & -\frac{125127}{6812831090000} - \frac{52659 \text{ I}}{1703207772500} & & & \end{array}$$

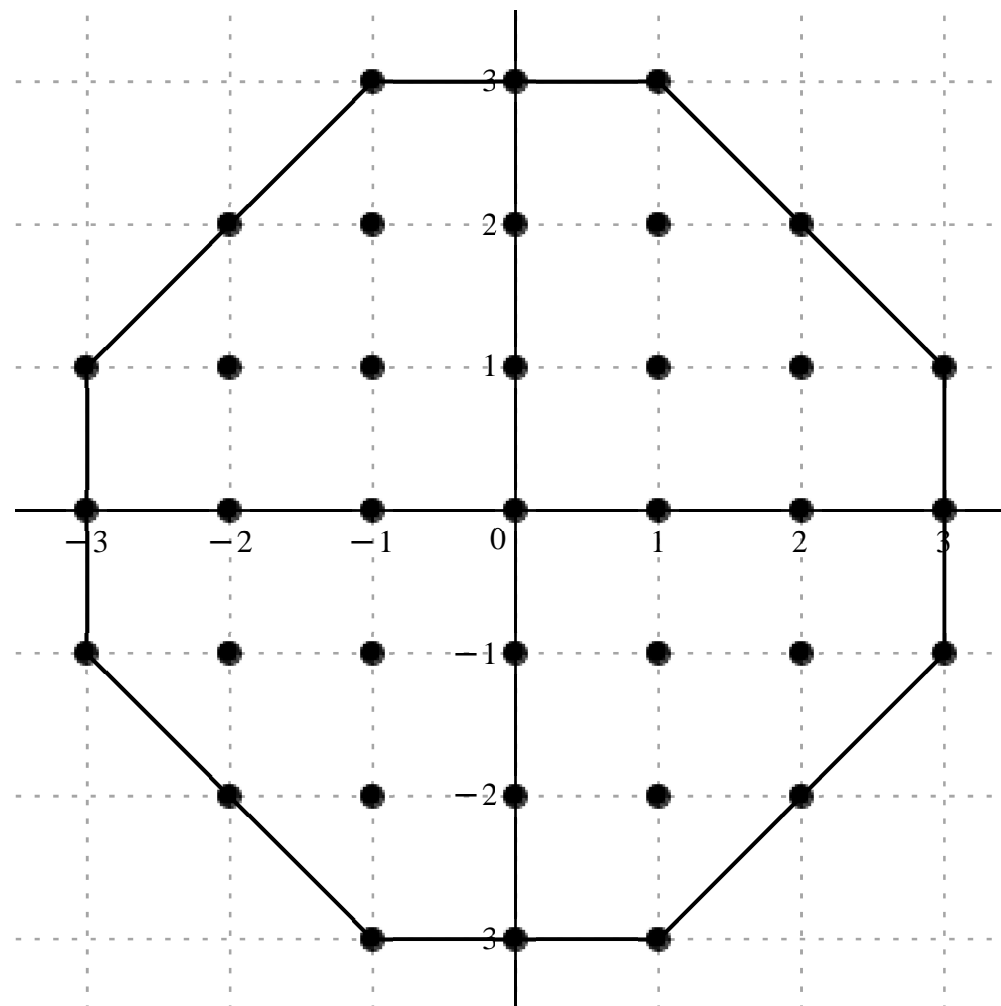


$$\frac{\mathrm{d}^3}{\mathrm{d}x_{ol}^3} \, u(x_{ol}) = \frac{1}{245261919240000 \, \Delta x_{ol}^3} \big( (4504572 + 7582896 \, \mathrm{I}) \, u_{ol-1+3\mathrm{I}} + 54400000 \, \mathrm{I} u_{ol+3\mathrm{I}} + (-4504572 + 7582896 \, \mathrm{I}) \, u_{ol+1+3\mathrm{I}} + (-121753125 + 121753125 \, \mathrm{I}) \, u_{ol-2+2\mathrm{I}} + (47408799744 + 14304273408 \, \mathrm{I}) \, u_{ol-1+2\mathrm{I}} - 369380250000 \, \mathrm{I} u_{ol+2\mathrm{I}} + (-47408799744 + 14304273408 \, \mathrm{I}) \, u_{ol+1+2\mathrm{I}} + (121753125 + 121753125 \, \mathrm{I}) \, u_{ol+2+2\mathrm{I}} \\ - (7582896 + 4504572 \, \mathrm{I}) \, u_{ol-3+1} - (14304273408 + 47408799744 \, \mathrm{I}) \, u_{ol-2+1} + (15606315562500 - 15606315562500 \, \mathrm{I}) \, u_{ol-1+1} + 307324368000000 \, \mathrm{I} u_{ol+1} - (15606315562500 + 15606315562500 \, \mathrm{I}) \, u_{ol+1+1} + (14304273408 - 47408799744 \, \mathrm{I}) \, u_{ol+2+1} + (7582896 - 4504572 \, \mathrm{I}) \, u_{ol+3+1} - 54400000 \, u_{ol-3} + 369380250000 \, u_{ol-2} \\ - 307324368000000 \, u_{ol-1} + 307324368000000 \, u_{ol+1} - 369380250000 \, u_{ol+2} + 54400000 \, u_{ol+3} + (-7582896 + 4504572 \, \mathrm{I}) \, u_{ol-3-1} + (-14304273408 + 47408799744 \, \mathrm{I}) \, u_{ol-2-1} + (15606315562500 + 15606315562500 \, \mathrm{I}) \, u_{ol-1-1} - 307324368000000 \, \mathrm{I} u_{ol-1} + (-15606315562500 + 15606315562500 \, \mathrm{I}) \, u_{ol+1-1} + (14304273408 \\ + 47408799744 \, \mathrm{I}) \, u_{ol+2-1} + (7582896 + 4504572 \, \mathrm{I}) \, u_{ol+3-1} - (121753125 + 121753125 \, \mathrm{I}) \, u_{ol-2-2\mathrm{I}} + (47408799744 - 14304273408 \, \mathrm{I}) \, u_{ol-1-2\mathrm{I}} + 369380250000 \, \mathrm{I} u_{ol-2\mathrm{I}} - (47408799744 + 14304273408 \, \mathrm{I}) \, u_{ol+1-2\mathrm{I}} + (121753125 - 121753125 \, \mathrm{I}) \, u_{ol+2-2\mathrm{I}} + (4504572 - 7582896 \, \mathrm{I}) \, u_{ol-1-3\mathrm{I}} - 54400000 \, \mathrm{I} u_{ol-3\mathrm{I}} - (4504572 \\ + 7582896 \, \mathrm{I}) \, u_{ol+1-3\mathrm{I}} \big), \, O(\, \Delta x_{ol}^{\,36} \,)$$

*Error order:*, 36, *Error:*,  $5.7270498378108718506 \times 10^{-105}$ , *New Error:*,  $5.7270498378090556148 \times 10^{-141}$   
*Error order:*, 36, *Error:*,  $5.7270498378090556148 \times 10^{-141}$ , *New Error:*,  $5.7270498378090554332 \times 10^{-177}$   
*Error order:*, 36, *Error:*,  $5.7270498378090554332 \times 10^{-177}$ , *New Error:*,  $5.7270498378090554332 \times 10^{-213}$   
*Error order:*, 36, *Error:*,  $5.7270498378090554332 \times 10^{-213}$ , *New Error:*,  $5.7270498378090554332 \times 10^{-249}$   
*Error order:*, 36, *Error:*,  $5.7270498378090554332 \times 10^{-249}$ , *New Error:*,  $5.7270498378090554332 \times 10^{-285}$

$$c = , \quad x_o + h. , \quad \left[ \begin{array}{cccccc} & & -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & \\ & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -3+ \text{ I} & -2+ \text{ I} & -1+ \text{ I} & \text{ I} & 1+ \text{ I} & 2+ \text{ I} & 3+ \text{ I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3- \text{ I} & -2- \text{ I} & -1- \text{ I} & -\text{ I} & 1- \text{ I} & 2- \text{ I} & 3- \text{ I} \\ & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & \\ & & -1-3\text{ I} & -3\text{ I} & 1-3\text{ I} & & \end{array} \right]$$

$$\begin{array}{cccccc} & & \frac{506781}{17032077725000} - \frac{586017\text{ I}}{17032077725000} & \frac{320}{1082037879} & \frac{506781}{17032077725000} + \frac{586017\text{ I}}{17032077725000} & \\ & & - \frac{3528576}{57540803125} - \frac{20480832\text{ I}}{57540803125} & - \frac{225}{74698} & - \frac{3528576}{57540803125} + \frac{20480832\text{ I}}{57540803125} & \\ & & & & & \frac{45}{45324448} \\ \frac{506781}{17032077725000} + \frac{586017\text{ I}}{17032077725000} & - \frac{3528576}{57540803125} + \frac{20480832\text{ I}}{57540803125} & - \frac{225}{884} & \frac{14400}{2873} & - \frac{225}{884} & - \frac{3528576}{57540803125} - \frac{20480832\text{ I}}{57540803125} \\ & & & & & \frac{506781}{17032077725000} - \frac{586017\text{ I}}{17032077725000} \\ & & & & & \frac{320}{1082037879} \\ \frac{506781}{17032077725000} - \frac{586017\text{ I}}{17032077725000} & - \frac{3528576}{57540803125} - \frac{20480832\text{ I}}{57540803125} & - \frac{225}{884} & \frac{14400}{2873} & - \frac{225}{884} & - \frac{3528576}{57540803125} + \frac{20480832\text{ I}}{57540803125} \\ & & & & & \frac{45}{45324448} \\ & & - \frac{3528576}{57540803125} + \frac{20480832\text{ I}}{57540803125} & - \frac{225}{74698} & - \frac{3528576}{57540803125} - \frac{20480832\text{ I}}{57540803125} & \\ & & \frac{506781}{17032077725000} + \frac{586017\text{ I}}{17032077725000} & \frac{320}{1082037879} & \frac{506781}{17032077725000} - \frac{586017\text{ I}}{17032077725000} & \end{array}$$





$$\frac{d^4}{dx_{ol}^4} u(x_{ol}) = \frac{1}{1839464394300000 \mathcal{A}_{ol}^4} \left( (54732348 - 63289836 \text{ I}) u_{ol-1+3\text{I}} + 544000000 u_{ol+3\text{I}} + (54732348 + 63289836 \text{ I}) u_{ol+1+3\text{I}} + 1826296875 u_{ol-2+2\text{I}} - (112801517568 + 654731237376 \text{ I}) u_{ol-1+2\text{I}} - 5540703750000 u_{ol+2\text{I}} + (-112801517568 + 654731237376 \text{ I}) u_{ol+1+2\text{I}} + 1826296875 u_{ol+2+2\text{I}} + (54732348 + 63289836 \text{ I}) u_{ol-3+\text{I}} + (-112801517568 + 654731237376 \text{ I}) u_{ol-2+\text{I}} - 468189466875000 u_{ol-1+\text{I}} + 9219731040000000 u_{ol+\text{I}} - 468189466875000 u_{ol+1+\text{I}} - (112801517568 + 654731237376 \text{ I}) u_{ol+2+\text{I}} + (54732348 - 63289836 \text{ I}) u_{ol+3+\text{I}} + 544000000 u_{ol-3} - 5540703750000 u_{ol-2} + 9219731040000000 u_{ol-1} - 34983110984405740 u_{ol} + 9219731040000000 u_{ol+1} - 5540703750000 u_{ol+2} + 544000000 u_{ol+3} + (54732348 - 63289836 \text{ I}) u_{ol-3-\text{I}} - (112801517568 + 654731237376 \text{ I}) u_{ol-2-\text{I}} - 468189466875000 u_{ol-1-\text{I}} + 9219731040000000 u_{ol-\text{I}} - 468189466875000 u_{ol+1-\text{I}} + (-112801517568 + 654731237376 \text{ I}) u_{ol+2-\text{I}} + (54732348 + 63289836 \text{ I}) u_{ol+3-\text{I}} + 1826296875 u_{ol-2+2\text{I}} + (-112801517568 + 654731237376 \text{ I}) u_{ol-1-2\text{I}} - 5540703750000 u_{ol-2\text{I}} - (112801517568 + 654731237376 \text{ I}) u_{ol+1-2\text{I}} + 1826296875 u_{ol+2-2\text{I}} + (54732348 + 63289836 \text{ I}) u_{ol-1-3\text{I}} + 544000000 u_{ol-3\text{I}} + (54732348 - 63289836 \text{ I}) u_{ol+1-3\text{I}} \right), \mathcal{O}(\mathcal{A}_{ol}^{-36})$$

*Formula:*, 790, *Var:*, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 5

*Error order:*, 32, *Error:*,  $9.3259354846109639191 \times 10^{-92}$ , *New Error:*,  $9.3259354846070688384 \times 10^{-124}$

*Error order:*, 32, *Error:*,  $9.3259354846070688384 \times 10^{-124}$ , *New Error:*,  $9.3259354846070684489 \times 10^{-156}$

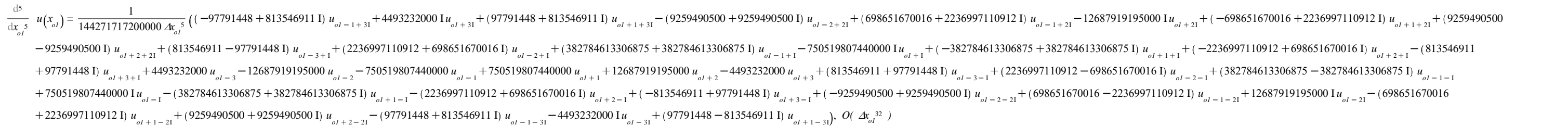
*Error order:*, 32, *Error:*,  $9.3259354846070684489 \times 10^{-156}$ , *New Error:*,  $9.3259354846070684488 \times 10^{-188}$

*Error order.*: 32, *Error.*:  $9.3259354846070684488 \times 10^{-188}$ , *New Error.*:  $9.3259354846070684488 \times 10^{-220}$

*Error order:*, 32, *Error:*,  $9.3259354846070684488 \times 10^{-220}$ , *New Error:*,  $9.3259354846070684488 \times 10^{-252}$

$$c = , \quad x_o \neq h. , \quad \left[ \begin{array}{cccccc} & & -1+3 \text{ I} & 3 \text{ I} & 1+3 \text{ I} & \\ & -2+2 \text{ I} & -1+2 \text{ I} & 2 \text{ I} & 1+2 \text{ I} & 2+2 \text{ I} \\ -3+ \text{ I} & -2+ \text{ I} & -1+ \text{ I} & 1 & 1+ \text{ I} & 2+ \text{ I} & 3+ \text{ I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3- \text{ I} & -2- \text{ I} & -1- \text{ I} & -1 & 1- \text{ I} & 2- \text{ I} & 3- \text{ I} \\ & -2-2 \text{ I} & -1-2 \text{ I} & -2 \text{ I} & 1-2 \text{ I} & 2-2 \text{ I} & \\ & & -1-3 \text{ I} & -3 \text{ I} & 1-3 \text{ I} & & \end{array} \right]$$

$$\begin{array}{cccccccccccc} -\frac{12223931}{18033964650000} + \frac{813546911 \text{ I}}{144271717200000} & \frac{31203 \text{ I}}{1001886925} & \frac{12223931}{18033964650000} + \frac{813546911 \text{ I}}{144271717200000} & & & & & & & & & \\ \frac{813546911}{144271717200000} - \frac{12223931 \text{ I}}{18033964650000} & -\frac{38501}{599882400} - \frac{38501 \text{ I}}{599882400} & \frac{147519356}{30462778125} + \frac{472338917 \text{ I}}{30462778125} & -\frac{2364943 \text{ I}}{26891280} & -\frac{147519356}{30462778125} + \frac{472338917 \text{ I}}{30462778125} & \frac{38501}{599882400} - \frac{38501 \text{ I}}{599882400} & & & & & & \\ \frac{472338917}{30462778125} + \frac{147519356 \text{ I}}{30462778125} & \frac{3377443}{1272960} + \frac{3377443 \text{ I}}{1272960} & -\frac{672557 \text{ I}}{129285} & -\frac{3377443}{1272960} + \frac{3377443 \text{ I}}{1272960} & -\frac{472338917}{30462778125} + \frac{147519356 \text{ I}}{30462778125} & -\frac{813546911}{144271717200000} - \frac{12223931 \text{ I}}{18033964650000} & & & & & & \\ \frac{31203}{1001886925} & -\frac{2364943}{26891280} & -\frac{672557}{129285} & 0 & \frac{672557}{129285} & \frac{2364943}{26891280} & -\frac{31203}{1001886925} & & & & & \\ \frac{813546911}{144271717200000} + \frac{12223931 \text{ I}}{18033964650000} & \frac{472338917}{30462778125} - \frac{147519356 \text{ I}}{30462778125} & \frac{3377443}{1272960} - \frac{3377443 \text{ I}}{1272960} & \frac{672557 \text{ I}}{129285} & -\frac{3377443}{1272960} - \frac{3377443 \text{ I}}{1272960} & -\frac{472338917}{30462778125} - \frac{147519356 \text{ I}}{30462778125} & -\frac{813546911}{144271717200000} + \frac{12223931 \text{ I}}{18033964650000} & & & & & \\ -\frac{38501}{599882400} + \frac{38501 \text{ I}}{599882400} & \frac{147519356}{30462778125} - \frac{472338917 \text{ I}}{30462778125} & \frac{2364943 \text{ I}}{26891280} & -\frac{147519356}{30462778125} - \frac{472338917 \text{ I}}{30462778125} & \frac{38501}{599882400} + \frac{38501 \text{ I}}{599882400} & & & & & & & \\ -\frac{12223931}{18033964650000} - \frac{813546911 \text{ I}}{144271717200000} & -\frac{31203 \text{ I}}{1001886925} & \frac{12223931}{18033964650000} - \frac{813546911 \text{ I}}{144271717200000} & & & & & & & & & \end{array}$$

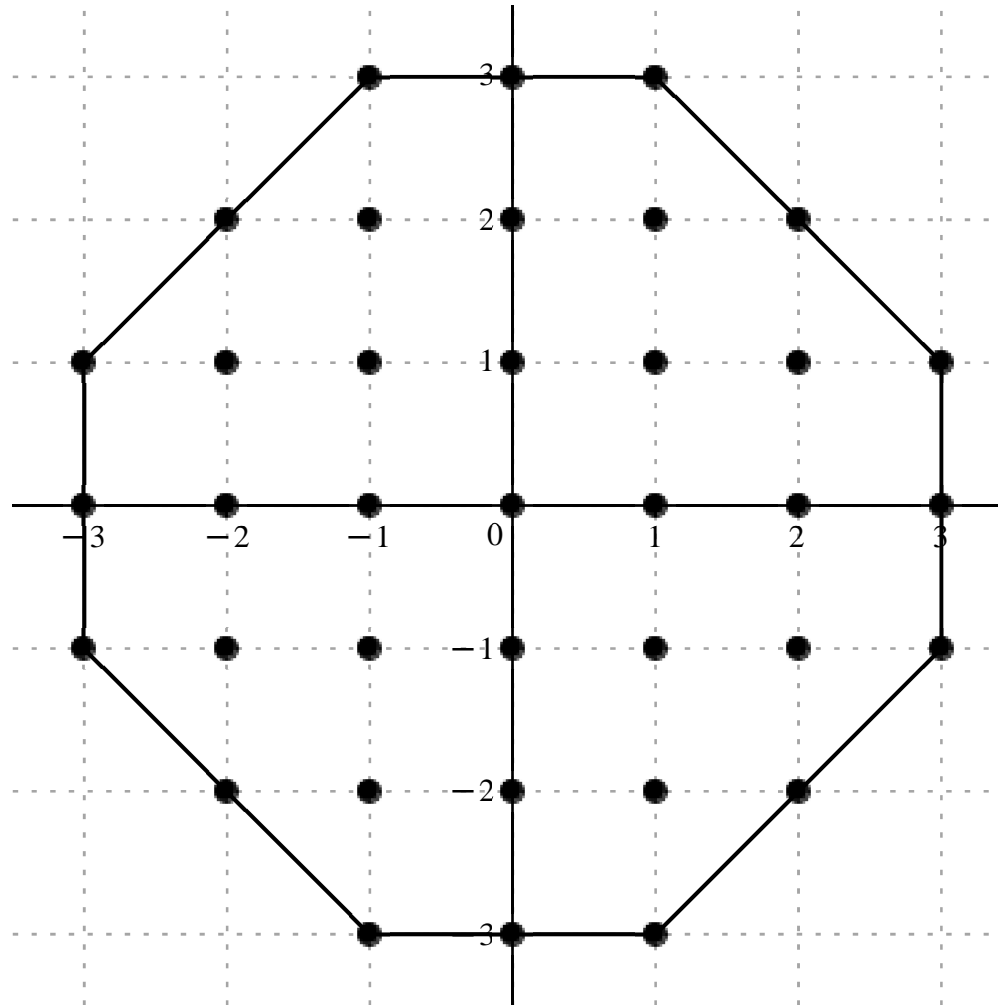


*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 6

*Error order:*, 32, *Error:*,  $1.4651901782577522265 \times 10^{-92}$ , *New Error:*,  $1.4651901782571985548 \times 10^{-124}$   
*Error order:*, 32, *Error:*,  $1.4651901782571985548 \times 10^{-124}$ , *New Error:*,  $1.4651901782571984994 \times 10^{-156}$   
*Error order:*, 32, *Error:*,  $1.4651901782571984994 \times 10^{-156}$ , *New Error:*,  $1.4651901782571984994 \times 10^{-188}$   
*Error order:*, 32, *Error:*,  $1.4651901782571984994 \times 10^{-188}$ , *New Error:*,  $1.4651901782571984994 \times 10^{-220}$   
*Error order:*, 32, *Error:*,  $1.4651901782571984994 \times 10^{-220}$ , *New Error:*,  $1.4651901782571984994 \times 10^{-252}$

$$x_o + h. , \left[ \begin{array}{ccccccc} & & & -1+3\text{I} & 3\text{I} & 1+3\text{I} & \\ & & & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} \\ -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-\text{I} & -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ & -2-2\text{I} & -1-2\text{I} & -2\text{I} & 1-2\text{I} & 2-2\text{I} & \\ & & -1-3\text{I} & -3\text{I} & 1-3\text{I} & & \end{array} \right]$$

	$\frac{2538432181}{240452862000000}$	$-\frac{520172567\text{ I}}{240452862000000}$	$\frac{62406}{1001886925}$	$\frac{2538432181}{240452862000000} + \frac{520172567\text{ I}}{240452862000000}$	
		$\frac{38501\text{ I}}{199960800}$	$\frac{1594316956}{50771296875} - \frac{511585086\text{ I}}{16923765625}$	$-\frac{2364943}{8963760} + \frac{1594316956}{50771296875} + \frac{511585086\text{ I}}{16923765625}$	$-\frac{38501\text{ I}}{199960800}$
$-\frac{2538432181}{240452862000000} - \frac{520172567\text{ I}}{240452862000000}$	$-\frac{1594316956}{50771296875} - \frac{511585086\text{ I}}{16923765625}$	$-\frac{3377443\text{ I}}{212160}$	$-\frac{1345114}{43095}$	$\frac{3377443\text{ I}}{212160}$	$-\frac{1594316956}{50771296875} + \frac{511585086\text{ I}}{16923765625}$
$-\frac{62406}{1001886925}$	$\frac{2364943}{8963760}$	$\frac{1345114}{43095}$	0	$\frac{1345114}{43095}$	$-\frac{62406}{1001886925}$
$-\frac{2538432181}{240452862000000} + \frac{520172567\text{ I}}{240452862000000}$	$-\frac{1594316956}{50771296875} + \frac{511585086\text{ I}}{16923765625}$	$\frac{3377443\text{ I}}{212160}$	$-\frac{1345114}{43095}$	$-\frac{3377443\text{ I}}{212160}$	$-\frac{1594316956}{50771296875} - \frac{511585086\text{ I}}{16923765625}$
	$-\frac{38501\text{ I}}{199960800}$	$\frac{1594316956}{50771296875} + \frac{511585086\text{ I}}{16923765625}$	$-\frac{2364943}{8963760}$	$\frac{1594316956}{50771296875} - \frac{511585086\text{ I}}{16923765625}$	$\frac{38501\text{ I}}{199960800}$
	$\frac{2538432181}{240452862000000} + \frac{520172567\text{ I}}{240452862000000}$	$\frac{62406}{1001886925}$	$\frac{2538432181}{240452862000000} - \frac{520172567\text{ I}}{240452862000000}$		

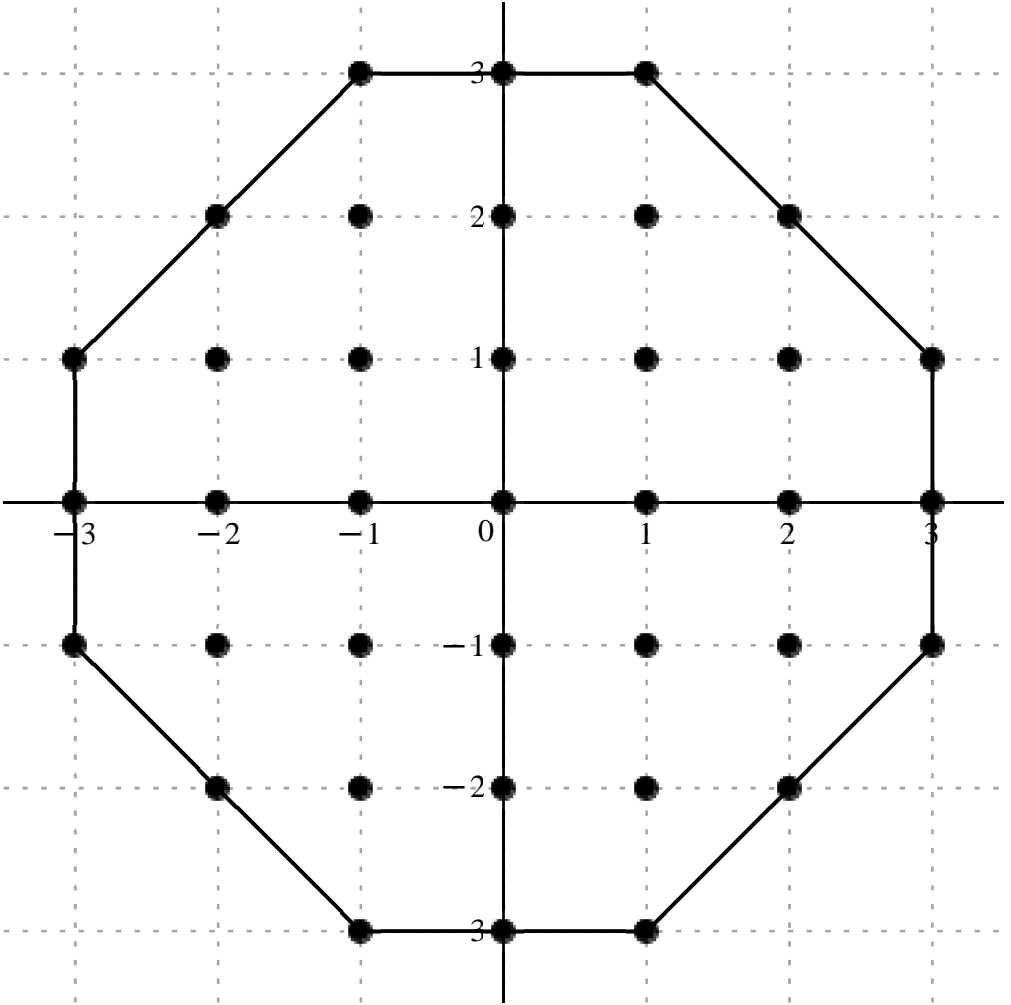


$$\frac{\mathrm{d}^6}{\mathrm{d}x_{ol}^6} u(x_{ol}) = \frac{1}{240452862000000 \Delta x_{ol}^6} \left( (2538432181 - 520172567 \mathbf{I}) u_{ol-1+31} + 14977440000 u_{ol+31} + (2538432181 + 520172567 \mathbf{I}) u_{ol+1+31} + 46297452500 \mathbf{I} u_{ol-2+21} + (7550685103616 - 7268600901888 \mathbf{I}) u_{ol-1+21} - 63439595975000 u_{ol+21} + (7550685103616 + 7268600901888 \mathbf{I}) u_{ol+1+21} - 46297452500 \mathbf{I} u_{ol+2+21} - (2538432181 + 520172567 \mathbf{I}) u_{ol-3+1} - (7550685103616 + 7268600901888 \mathbf{I}) u_{ol-2+1} - 3827846133068750 \mathbf{I} u_{ol-1+1} - 7505198074400000 u_{ol+1} + 3827846133068750 \mathbf{I} u_{ol+1+1} + (-7550685103616 + 7268600901888 \mathbf{I}) u_{ol+2+1} + (-2538432181 + 520172567 \mathbf{I}) u_{ol+3+1} - 14977440000 u_{ol-3} + 63439595975000 u_{ol-2} + 7505198074400000 u_{ol-1} + 7505198074400000 u_{ol+1} + 63439595975000 u_{ol+2} - 14977440000 u_{ol+3} + (-2538432181 + 520172567 \mathbf{I}) u_{ol-3-1} + (-7550685103616 + 7268600901888 \mathbf{I}) u_{ol-2-1} + 3827846133068750 \mathbf{I} u_{ol-1-1} - 7505198074400000 u_{ol-1} - 3827846133068750 \mathbf{I} u_{ol+1-1} - (7550685103616 + 7268600901888 \mathbf{I}) u_{ol+2-1} - (2538432181 + 520172567 \mathbf{I}) u_{ol+3-1} - 46297452500 \mathbf{I} u_{ol-2-21} + (7550685103616 + 7268600901888 \mathbf{I}) u_{ol-1-21} - 63439595975000 u_{ol-21} + (7550685103616 - 7268600901888 \mathbf{I}) u_{ol+1-21} + 46297452500 \mathbf{I} u_{ol+2-21} + (2538432181 + 520172567 \mathbf{I}) u_{ol-1-31} + 14977440000 u_{ol-31} + (2538432181 - 520172567 \mathbf{I}) u_{ol+1-31} \right), \mathcal{O}(\Delta x_{ol}^{32})$$

Error order.: 28, Error.:  $5.2991903382131958474 \times 10^{-81}$ , New Error.:  $5.2991903382108293674 \times 10^{-109}$   
Error order.: 28, Error.:  $5.2991903382108293674 \times 10^{-109}$ , New Error.:  $5.2991903382108291308 \times 10^{-137}$   
Error order.: 28, Error.:  $5.2991903382108291308 \times 10^{-137}$ , New Error.:  $5.2991903382108291308 \times 10^{-165}$   
Error order.: 28, Error.:  $5.2991903382108291308 \times 10^{-165}$ , New Error.:  $5.2991903382108291308 \times 10^{-193}$   
Error order.: 28, Error.:  $5.2991903382108291308 \times 10^{-193}$ , New Error.:  $5.2991903382108291308 \times 10^{-221}$

$$x_o + h., \left[ \begin{array}{cccccc} -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & & & \\ -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & \\ -3+\text{ I} & -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} & 3+\text{ I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-\text{ I} & -2-\text{ I} & -1-\text{ I} & -\text{ I} & 1-\text{ I} & 2-\text{ I} & 3-\text{ I} \\ -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & & \\ -1-3\text{ I} & -3\text{ I} & 1-3\text{ I} & & & & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccccc} \frac{13215233913}{2763826000000} - \frac{121135497\text{ I}}{345478250000} & -\frac{17715327}{359125000} - \frac{17715327\text{ I}}{359125000} & \frac{6660870951}{583578125} + \frac{3621941652\text{ I}}{583578125} & -\frac{121135497}{345478250000} + \frac{13215233913\text{ I}}{2763826000000} & \frac{593416341\text{ I}}{21592390625} & \frac{121135497}{345478250000} + \frac{13215233913\text{ I}}{2763826000000} & & \\ \frac{593416341}{21592390625} & -\frac{44842227969}{466862500} & \frac{7092065001}{8978125} & 0 & -\frac{7092065001}{8978125} & \frac{44842227969}{466862500} & -\frac{593416341}{21592390625} & \\ \frac{13215233913}{2763826000000} + \frac{121135497\text{ I}}{345478250000} & \frac{6660870951}{583578125} - \frac{3621941652\text{ I}}{583578125} & -\frac{28986722499}{88400000} + \frac{28986722499\text{ I}}{88400000} & -\frac{7092065001\text{ I}}{8978125} & \frac{28986722499}{88400000} + \frac{28986722499\text{ I}}{88400000} & -\frac{6660870951}{583578125} - \frac{3621941652\text{ I}}{583578125} & -\frac{13215233913}{2763826000000} + \frac{121135497\text{ I}}{345478250000} & \\ -\frac{17715327}{359125000} + \frac{17715327\text{ I}}{359125000} & \frac{3621941652}{583578125} - \frac{6660870951\text{ I}}{583578125} & \frac{44842227969\text{ I}}{466862500} & -\frac{3621941652}{583578125} - \frac{6660870951\text{ I}}{583578125} & \frac{17715327}{359125000} + \frac{17715327\text{ I}}{359125000} & & & \\ -\frac{121135497}{345478250000} - \frac{13215233913\text{ I}}{2763826000000} & -\frac{593416341\text{ I}}{21592390625} & \frac{121135497}{345478250000} - \frac{13215233913\text{ I}}{2763826000000} & & & & & \end{array} \right]$$



$$\frac{d^9}{dx_{ol}^9} u(x_{ol}) = \frac{1}{2763826000000 \mathcal{A}_{ol}^9} (21 ((-46146856 + 629296853 \mathbb{I}) u_{ol-1+31} + 3617013888 \mathbb{I} u_{ol+31} + (46146856 + 629296853 \mathbb{I}) u_{ol+1+31} - (6492245552 + 6492245552 \mathbb{I}) u_{ol-2+21} + (816834079232 + 1502184991616 \mathbb{I}) u_{ol-1+21} - 12641237598880 \mathbb{I} u_{ol+21} + (-816834079232 + 1502184991616 \mathbb{I}) u_{ol+1+21} + (6492245552 - 6492245552 \mathbb{I}) u_{ol+2+21} + (629296853 - 46146856 \mathbb{I}) u_{ol-3+1} + (1502184991616 + 816834079232 \mathbb{I}) u_{ol-2+1} - (43155708520535 + 43155708520535 \mathbb{I}) u_{ol-1+1} + 103962918567040 \mathbb{I} u_{ol+1} + (43155708520535 - 43155708520535 \mathbb{I}) u_{ol+1+1} + (-1502184991616 + 816834079232 \mathbb{I}) u_{ol+2+1} - (629296853 + 46146856 \mathbb{I}) u_{ol+3+1} + 3617013888 u_{ol-3} - 12641237598880 u_{ol-2} + 103962918567040 u_{ol-1} - 103962918567040 u_{ol+1} + 12641237598880 u_{ol+2} - 3617013888 u_{ol+3} + (629296853 + 46146856 \mathbb{I}) u_{ol-3-1} + (1502184991616 - 816834079232 \mathbb{I}) u_{ol-2-1} + (-43155708520535 + 43155708520535 \mathbb{I}) u_{ol-1-1} - 103962918567040 \mathbb{I} u_{ol-1} + (43155708520535 + 43155708520535 \mathbb{I}) u_{ol+1-1} - (1502184991616 + 816834079232 \mathbb{I}) u_{ol+2-1} + (-629296853 + 46146856 \mathbb{I}) u_{ol+3-1} + (-6492245552 + 6492245552 \mathbb{I}) u_{ol-2-21} + (816834079232 - 1502184991616 \mathbb{I}) u_{ol-1-21} + 12641237598880 \mathbb{I} u_{ol-21} - (816834079232 + 1502184991616 \mathbb{I}) u_{ol+1-21} + (6492245552 + 6492245552 \mathbb{I}) u_{ol+2-21} - (46146856 + 629296853 \mathbb{I}) u_{ol-1-31} - 3617013888 \mathbb{I} u_{ol-31} + (46146856 - 629296853 \mathbb{I}) u_{ol+1-31})). \quad O(\mathcal{A}_{ol}^{28})$$

Formula:, 793, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 10

*Error order:*, 28, *Error:*,  $1.3875858439939697423 \times 10^{-81}$ , *New Error:*,  $1.3875858439934090979 \times 10^{-109}$

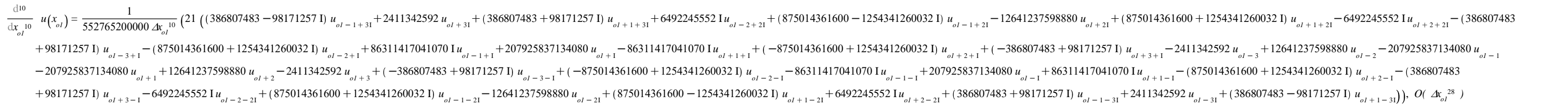
*Error order:*, 28, *Error:*,  $1.3875858439934090979 \times 10^{-109}$ , *New Error:*,  $1.3875858439934090418 \times 10^{-137}$

*Error order:*, 28, *Error:*,  $1.3875858439934090418 \times 10^{-137}$ , *New Error:*,  $1.3875858439934090418 \times 10^{-165}$

*Error order:*, 28, *Error:*,  $1.3875858439934090418 \times 10^{-165}$ , *New Error:*,  $1.3875858439934090418 \times 10^{-193}$

*Error order*., 28, *Error*.,  $1.3875858439934090418 \times 10^{-193}$ , *New Error*.,  $1.3875858439934090418 \times 10^{-221}$

[illegible]



Variavel :,  $x_{ol}$ , Derivada de Ordem :, 11

*Error order.*: 28, *Error.*:  $3.8942325000452863936 \times 10^{-110}$ , *New Error.*:  $3.8942325000452862509 \times 10^{-138}$

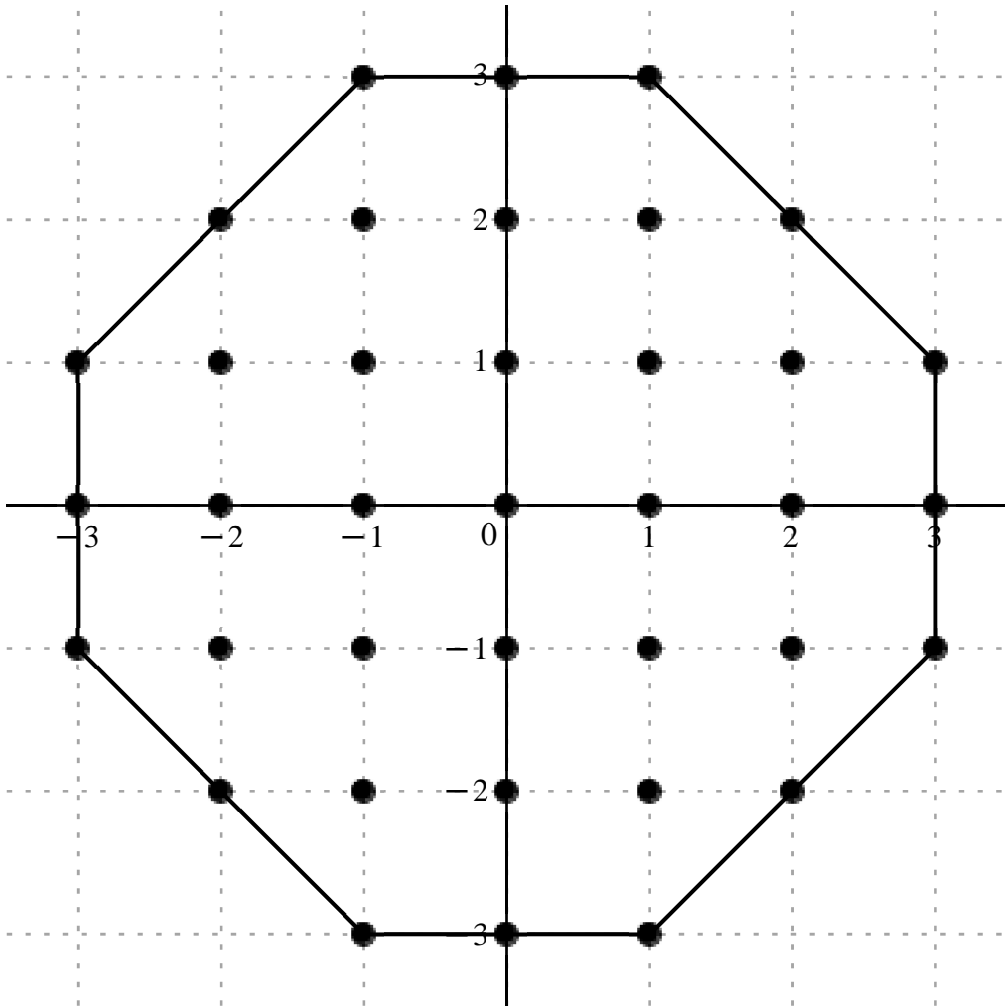
*Error order:*, 28, *Error:*,  $3.8942325000452862508 \times 10^{-166}$ , *New Error:*,  $3.8942325000452862508 \times 10^{-194}$

*Error order:*, 28, *Error:*,  $3.8942325000452862508 \times 10^{-194}$ , *New Error:*,  $3.8942325000452862508 \times 10^{-222}$

$$x_o + h., \left[ \begin{array}{ccccccc} & & & -1+3\text{I} & 3\text{I} & 1+3\text{I} & \\ & & & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} \\ -3+1 & -2+1 & -1+1 & 1 & 1+1 & 2+1 & 3+1 \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-1 & -2-1 & -1-1 & -1 & 1-1 & 2-1 & 3-1 \\ & -2-2\text{I} & -1-2\text{I} & -2\text{I} & 1-2\text{I} & 2-2\text{I} & \\ & & -1-3\text{I} & -3\text{I} & 1-3\text{I} & & \end{array} \right]$$

$c =$ ,

			$-\frac{78692604837}{2763826000000}-\frac{30672503169\text{ I}}{690956500000}$	$-\frac{1450573278\text{ I}}{4318478125}$	$\frac{78692604837}{2763826000000}-\frac{30672503169\text{ I}}{690956500000}$			
	$\frac{194868597}{287300000}-\frac{194868597\text{ I}}{287300000}$		$-\frac{165040958544}{583578125}-\frac{24177323478\text{ I}}{583578125}$	$\frac{493264507659}{186745000}$	$-\frac{165040958544}{583578125}-\frac{24177323478\text{ I}}{583578125}$	$-\frac{194868597}{287300000}-\frac{194868597\text{ I}}{287300000}$		
$\frac{30672503169}{690956500000}+\frac{78692604837\text{ I}}{2763826000000}$	$\frac{24177323478}{583578125}+\frac{165040958544\text{ I}}{583578125}$		$\frac{318853947489}{17680000}-\frac{318853947489\text{ I}}{17680000}$	$-\frac{156025430022\text{ I}}{1795625}$	$-\frac{318853947489}{17680000}-\frac{318853947489\text{ I}}{17680000}$	$-\frac{24177323478}{583578125}+\frac{165040958544\text{ I}}{583578125}$	$-\frac{30672503169}{690956500000}+\frac{78692604837\text{ I}}{2763826000000}$	
$\frac{1450573278}{4318478125}$	$-\frac{493264507659}{186745000}$		$\frac{156025430022}{1795625}$	0	$-\frac{156025430022}{1795625}$	$\frac{493264507659}{186745000}$	$-\frac{1450573278}{4318478125}$	
$\frac{30672503169}{690956500000}-\frac{78692604837\text{ I}}{2763826000000}$	$\frac{24177323478}{583578125}-\frac{165040958544\text{ I}}{583578125}$		$\frac{318853947489}{17680000}+\frac{318853947489\text{ I}}{17680000}$	$\frac{156025430022\text{ I}}{1795625}$	$-\frac{318853947489}{17680000}+\frac{318853947489\text{ I}}{17680000}$	$-\frac{24177323478}{583578125}-\frac{165040958544\text{ I}}{583578125}$	$-\frac{30672503169}{690956500000}-\frac{78692604837\text{ I}}{2763826000000}$	
	$\frac{194868597}{287300000}+\frac{194868597\text{ I}}{287300000}$		$-\frac{165040958544}{583578125}+\frac{24177323478\text{ I}}{583578125}$	$-\frac{493264507659\text{ I}}{186745000}$	$\frac{165040958544}{583578125}+\frac{24177323478\text{ I}}{583578125}$	$-\frac{194868597}{287300000}+\frac{194868597\text{ I}}{287300000}$		
			$-\frac{78692604837}{2763826000000}+\frac{30672503169\text{ I}}{690956500000}$	$\frac{1450573278\text{ I}}{4318478125}$	$\frac{78692604837}{2763826000000}+\frac{30672503169\text{ I}}{690956500000}$			



$$\frac{\mathrm{d}^{11}}{\mathrm{d}x_{ol}^{11}}\;u(x_{ol})=\frac{1}{2763826000000\;\Delta x_{ol}^{11}}\big(231\;\big(- (340660627+531125596\;\mathrm{I})\;u_{ol-1+3\mathrm{I}}-4018904320\;\mathrm{I}\;u_{ol+3\mathrm{I}}+(340660627-531125596\;\mathrm{I})\;u_{ol+1+3\mathrm{I}}+(8115306940-8115306940\;\mathrm{I})\;u_{ol-2+2\mathrm{I}}-(3383696881664+495687463168\;\mathrm{I})\;u_{ol-1+2\mathrm{I}}+31603093997200\;\mathrm{I}\;u_{ol+2\mathrm{I}}+(3383696881664-495687463168\;\mathrm{I})\;u_{ol+1+2\mathrm{I}}-(8115306940+8115306940\;\mathrm{I})\;u_{ol+2+2\mathrm{I}}+(531125596+340660627\;\mathrm{I})\;u_{ol-3+1\mathrm{I}}+(495687463168+3383696881664\;\mathrm{I})\;u_{ol-2+1\mathrm{I}}+(215778542602675-215778542602675\;\mathrm{I})\;u_{ol-1+1\mathrm{I}}-1039629185670400\;\mathrm{I}\;u_{ol+1\mathrm{I}}-(215778542602675+215778542602675\;\mathrm{I})\;u_{ol+1+1\mathrm{I}}+(-495687463168+3383696881664\;\mathrm{I})\;u_{ol+2+1\mathrm{I}}+(-531125596+340660627\;\mathrm{I})\;u_{ol+3+1\mathrm{I}}+4018904320\;u_{ol-3}-31603093997200\;u_{ol-2}+1039629185670400\;u_{ol-1}-1039629185670400\;u_{ol+1}+31603093997200\;u_{ol+2}-4018904320\;u_{ol+3}+(531125596-340660627\;\mathrm{I})\;u_{ol-3-1\mathrm{I}}+(495687463168-3383696881664\;\mathrm{I})\;u_{ol-2-1\mathrm{I}}+(215778542602675+215778542602675\;\mathrm{I})\;u_{ol-1-1\mathrm{I}}+1039629185670400\;\mathrm{I}\;u_{ol-1\mathrm{I}}+(-215778542602675+215778542602675\;\mathrm{I})\;u_{ol+1-1\mathrm{I}}-(495687463168+3383696881664\;\mathrm{I})\;u_{ol+2-1\mathrm{I}}-(531125596+340660627\;\mathrm{I})\;u_{ol+3-1\mathrm{I}}+(8115306940+8115306940\;\mathrm{I})\;u_{ol-2-2\mathrm{I}}+(-3383696881664+495687463168\;\mathrm{I})\;u_{ol-1-2\mathrm{I}}-31603093997200\;\mathrm{I}\;u_{ol-2\mathrm{I}}+(3383696881664+495687463168\;\mathrm{I})\;u_{ol+1-2\mathrm{I}}+(-8115306940+8115306940\;\mathrm{I})\;u_{ol+2-2\mathrm{I}}+(-340660627+531125596\;\mathrm{I})\;u_{ol-1-3\mathrm{I}}+4018904320\;\mathrm{I}\;u_{ol-3\mathrm{I}}+(340660627+531125596\;\mathrm{I})\;u_{ol+1-3\mathrm{I}}\big)\big)\big),\;O(\;\Delta x_{ol}^{28}\;)\big)$$

Formula:, 795, Var.:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 12

*Error order:*, 28, *Error:*,  $1.1624574627004727517 \times 10^{-82}$ , *New Error:*,  $1.1624574627000854867 \times 10^{-110}$

*Error order:*, 28, *Error:*,  $1.1624574627000854867 \times 10^{-110}$ , *New Error:*,  $1.1624574627000854480 \times 10^{-138}$

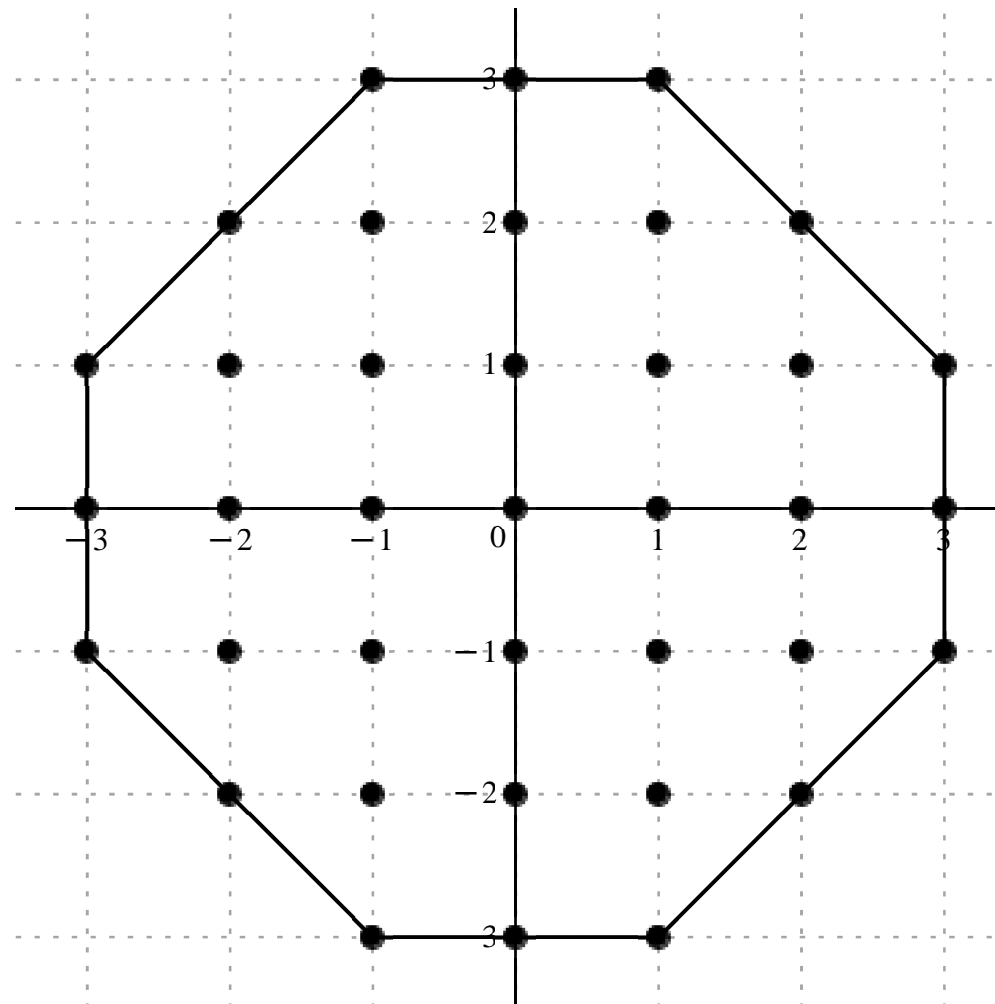
*Error order*., 28, *Error*.,  $1.1624574627000854480 \times 10^{-138}$ , *New Error*.,  $1.1624574627000854480 \times 10^{-166}$

*Error order*., 28, *Error*.,  $1.1624574627000854480 \times 10^{-166}$ , *New Error*.,  $1.1624574627000854480 \times 10^{-194}$

*Error order.*: 28, *Error.*:  $1.1624574627000854480 \times 10^{-194}$ , *New Error.*:  $1.1624574627000854480 \times 10^{-222}$

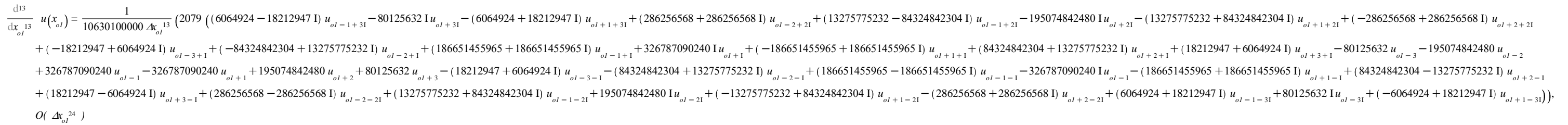
$$x_o + h., \left[ \begin{array}{ccccccc} & & & -1+3I & 3I & 1+3I & \\ & & & -2+2I & -1+2I & 2I & 1+2I & 2+2I \\ -3+I & -2+I & -1+I & I & 1+I & 2+I & 3+I \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-I & -2-I & -1-I & -I & 1-I & 2-I & 3-I \\ & -2-2I & -1-2I & -2I & 1-2I & 2-2I & \\ & & -1-3I & -3I & 1-3I & & \end{array} \right]$$

[illegible]







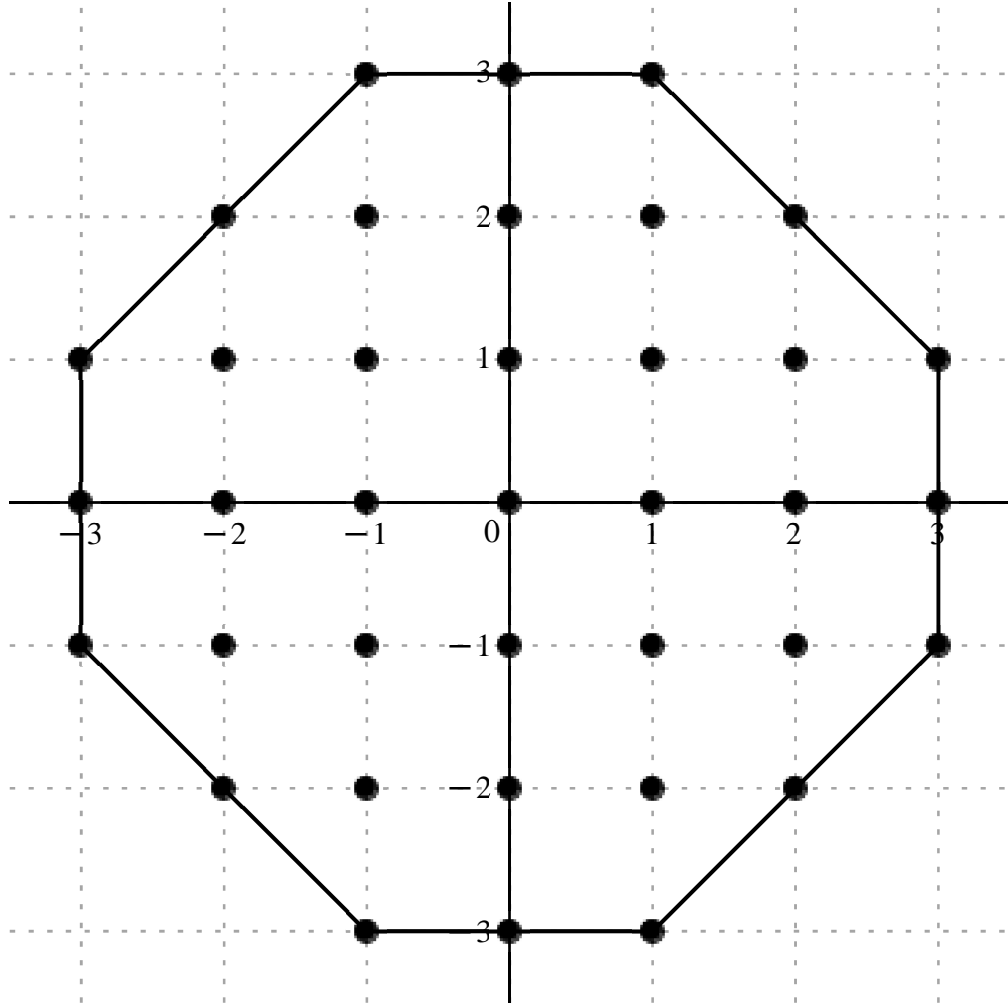


Variavel :,  $x_{oI}$ , Derivada de Ordem :, 14

*Error order:*, 24, *Error:*,  $1.0834988458684782355 \times 10^{-70}$ , *New Error:*,  $1.0834988458681831242 \times 10^{-94}$   
*Error order:*, 24, *Error:*,  $1.0834988458681831242 \times 10^{-94}$ , *New Error:*,  $1.0834988458681830947 \times 10^{-118}$   
*Error order:*, 24, *Error:*,  $1.0834988458681830947 \times 10^{-118}$ , *New Error:*,  $1.0834988458681830947 \times 10^{-142}$   
*Error order:*, 24, *Error:*,  $1.0834988458681830947 \times 10^{-142}$ , *New Error:*,  $1.0834988458681830947 \times 10^{-166}$   
*Error order:*, 24, *Error:*,  $1.0834988458681830947 \times 10^{-166}$ , *New Error:*,  $1.0834988458681830947 \times 10^{-190}$

$$x_o + h., \left[ \begin{array}{ccccccc} & & & -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & \\ & & & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -3+1 & -2+1 & -1+1 & 1 & 1+1 & 2+1 & 3+1 \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-1 & -2-1 & -1-1 & -1 & 1-1 & 2-1 & 3-1 \\ & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & \\ & & -1-3\text{ I} & -3\text{ I} & 1-3\text{ I} & & \end{array} \right]$$

$$c = \frac{1}{10630100000} \left( \begin{array}{cccccc} \frac{176684378409}{10630100000} + \frac{10580031 \text{ I}}{2126020000} & \frac{894446357112}{8978125} + \frac{284045512212 \text{ I}}{8978125} & -\frac{1082612223 \text{ I}}{2762500} & -\frac{176684378409}{10630100000} + \frac{10580031 \text{ I}}{2126020000} & -\frac{24293090052}{332190625} & -\frac{176684378409}{10630100000} - \frac{10580031 \text{ I}}{2126020000} \\ \frac{24293090052}{332190625} & \frac{959096007639}{3591250} & -\frac{123589722564}{138125} & -\frac{894446357112}{8978125} + \frac{284045512212 \text{ I}}{8978125} & -\frac{959096007639}{3591250} & -\frac{894446357112}{8978125} - \frac{284045512212 \text{ I}}{8978125} \\ \frac{176684378409}{10630100000} - \frac{10580031 \text{ I}}{2126020000} & \frac{894446357112}{8978125} - \frac{284045512212 \text{ I}}{8978125} & \frac{1082612223 \text{ I}}{2762500} & -\frac{894446357112}{8978125} - \frac{284045512212 \text{ I}}{8978125} & -\frac{176684378409}{10630100000} - \frac{10580031 \text{ I}}{2126020000} & -\frac{24293090052}{332190625} \\ \frac{24293090052}{332190625} & \frac{959096007639}{3591250} & -\frac{123589722564}{138125} & 0 & -\frac{123589722564}{138125} & -\frac{176684378409}{10630100000} + \frac{10580031 \text{ I}}{2126020000} \\ \frac{176684378409}{10630100000} - \frac{10580031 \text{ I}}{2126020000} & \frac{894446357112}{8978125} - \frac{284045512212 \text{ I}}{8978125} & \frac{1082612223 \text{ I}}{2762500} & -\frac{894446357112}{8978125} - \frac{284045512212 \text{ I}}{8978125} & -\frac{176684378409}{10630100000} - \frac{10580031 \text{ I}}{2126020000} & -\frac{24293090052}{332190625} \end{array} \right)$$



$$\frac{d^{14}}{dx_{ol}^{14}} u(x_{ol}) = \frac{1}{10630100000 \Delta x_{ol}^{14}} \left( 14553 \left( (-12140753 + 3635 \text{ I}) u_{ol-1+3\text{I}} - 53417088 u_{ol+3\text{I}} - (12140753 + 3635 \text{ I}) u_{ol+1+3\text{I}} - 286256568 \text{ I} u_{ol-2+2\text{I}} + (-72770183936 + 23109316736 \text{ I}) u_{ol-1+2\text{I}} - 195074842480 u_{ol+2\text{I}} - (72770183936 + 23109316736 \text{ I}) u_{ol+1+2\text{I}} + 286256568 \text{ I} u_{ol+2+2\text{I}} + (12140753 + 3635 \text{ I}) u_{ol-3+1} \right. \right. \\ \left. + (72770183936 + 23109316736 \text{ I}) u_{ol-2+1} - 373302911930 \text{ I} u_{ol-1+1} + 653574180480 u_{ol+1} + 373302911930 \text{ I} u_{ol+1+1} + (72770183936 - 23109316736 \text{ I}) u_{ol+2+1} + (12140753 - 3635 \text{ I}) u_{ol+3+1} + 53417088 u_{ol-3} + 195074842480 u_{ol-2} - 653574180480 u_{ol-1} - 653574180480 u_{ol+1} + 195074842480 u_{ol+2} + 53417088 u_{ol+3} \right. \\ \left. + (12140753 - 3635 \text{ I}) u_{ol-3-1} + (72770183936 - 23109316736 \text{ I}) u_{ol-2-1} + 373302911930 \text{ I} u_{ol-1-1} + 653574180480 u_{ol-1} - 373302911930 \text{ I} u_{ol+1-1} + (72770183936 + 23109316736 \text{ I}) u_{ol+2-1} + (12140753 + 3635 \text{ I}) u_{ol+3-1} + 286256568 \text{ I} u_{ol-2-2\text{I}} - (72770183936 + 23109316736 \text{ I}) u_{ol-1-2\text{I}} - 195074842480 u_{ol-2\text{I}} \right. \\ \left. + (-72770183936 + 23109316736 \text{ I}) u_{ol+1-2\text{I}} - 286256568 \text{ I} u_{ol+2-2\text{I}} - (12140753 + 3635 \text{ I}) u_{ol-1-3\text{I}} - 53417088 u_{ol-3\text{I}} + (-12140753 + 3635 \text{ I}) u_{ol+1-3\text{I}} \right), O(\Delta x_{ol}^{24})$$

*Variavel* :,  $x_{ol}$ , *Derivada de Ordem* :, 15

*Error order*:, 24, *Error*:,  $4.1465704013335276713 \times 10^{-71}$ , *New Error*:,  $4.1465704013325033350 \times 10^{-95}$

*Error order:*, 24, *Error:*,  $4.1465704013325033350 \times 10^{-95}$ , *New Error:*,  $4.1465704013325032325 \times 10^{-11}$

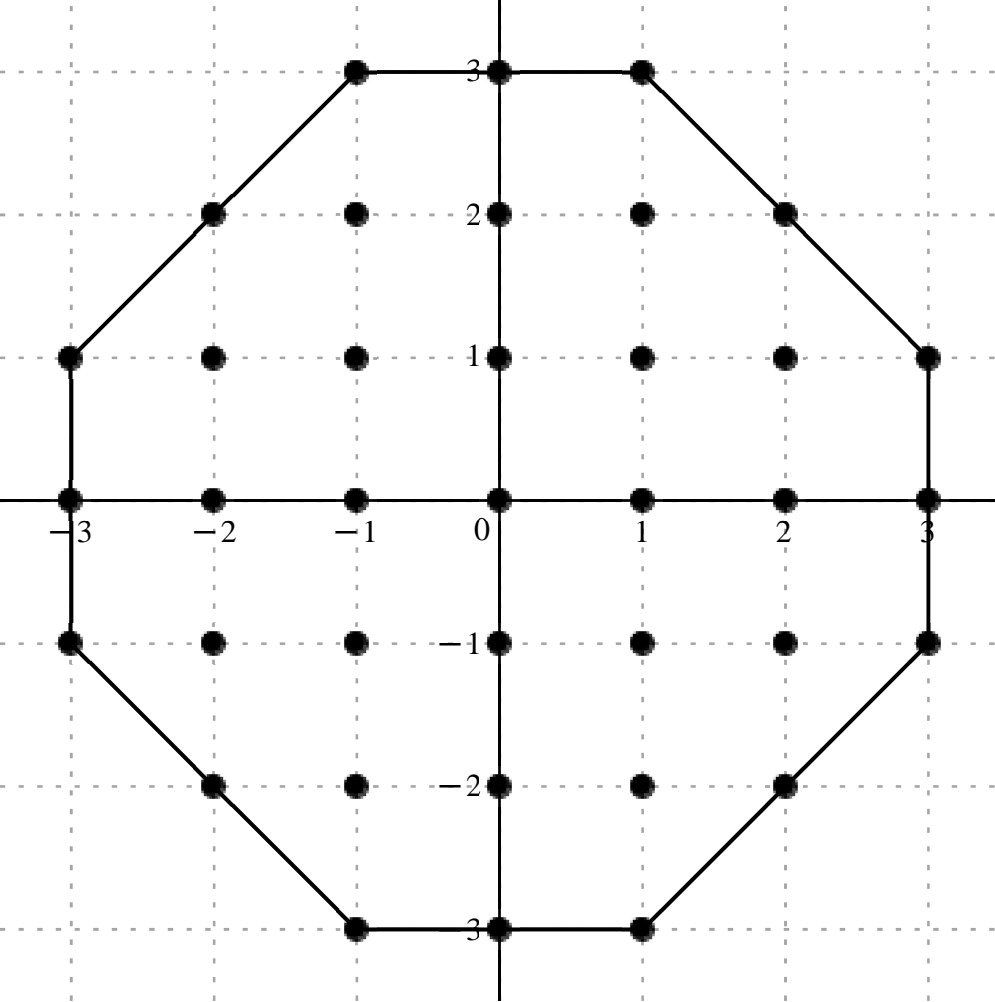
*Error order*., 24, *Error*.,  $4.1465704013325032325 \times 10^{-119}$ , *New Error*.,  $4.1465704013325032325 \times 10^{-14}$

*Error order:*, 24, *Error:*,  $4.1465704013325032325 \times 10^{-143}$ , *New Error:*,  $4.1465704013325032325 \times 10^{-16}$

*Error order*., 24, *Error*.,  $4.1465704013325032325 \times 10^{-167}$ , *New Error*.,  $4.1465704013325032325 \times 10^{-19}$

$$x_o \neq h., \quad \begin{array}{ccccccc} & & -1+3\text{I} & 3\text{I} & 1+3\text{I} & & \\ & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} & \\ -3+\text{I} & -2+\text{I} & -1+\text{I} & \text{I} & 1+\text{I} & 2+\text{I} & 3+\text{I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-\text{I} & -2-\text{I} & -1-\text{I} & -\text{I} & 1-\text{I} & 2-\text{I} & 3-\text{I} \\ & -2-2\text{I} & -1-2\text{I} & -2\text{I} & 1-2\text{I} & 2-2\text{I} & \\ & & -1-3\text{I} & -3\text{I} & 1-3\text{I} & & \end{array}$$

[illegible]



$$\frac{d^{15}}{dx_{ol}^{15}} u(x_{ol}) = \frac{1}{10630100000 \Delta x_{ol}^{15}} \left( 43659 \left( (6075829 + 18209312 I) u_{ol-1+31} + 89028480 I u_{ol+31} + (-6075829 + 18209312 I) u_{ol+1+31} + (-357820710 + 357820710 I) u_{ol-2+21} + (118988817408 + 122431051136 I) u_{ol-1+21} + 487687106200 I u_{ol+21} + (-118988817408 + 122431051136 I) u_{ol+1+21} + (357820710 + 357820710 I) u_{ol+2+21} - (18209312 + 6075829 I) u_{ol-3+1} - (122431051136 + 118988817408 I) u_{ol-2+1} + (-933257279825 + 933257279825 I) u_{ol-1+1} - 3267870902400 I u_{ol+1} + (933257279825 + 933257279825 I) u_{ol+1+1} + (122431051136 - 118988817408 I) u_{ol+2+1} + (18209312 - 6075829 I) u_{ol+3+1} - 89028480 u_{ol-3} - 487687106200 u_{ol-2} + 3267870902400 u_{ol-1} - 3267870902400 u_{ol+1} + 487687106200 u_{ol+2} + 89028480 u_{ol+3} + (-18209312 + 6075829 I) u_{ol-3-1} + (-122431051136 + 118988817408 I) u_{ol-2-1} - (933257279825 + 933257279825 I) u_{ol-1-1} + 3267870902400 I u_{ol-1} + (933257279825 - 933257279825 I) u_{ol+1-1} + (122431051136 + 118988817408 I) u_{ol+2-1} + (18209312 + 6075829 I) u_{ol+3-1} - (357820710 + 357820710 I) u_{ol-2-21} + (118988817408 - 122431051136 I) u_{ol-1-21} - 487687106200 I u_{ol-21} - (118988817408 + 122431051136 I) u_{ol+1-21} + (357820710 - 357820710 I) u_{ol+2-21} + (6075829 - 18209312 I) u_{ol-1-31} - 89028480 I u_{ol-31} - (6075829 + 18209312 I) u_{ol+1-31} \right) \cdot O(\Delta x_{ol}^{24})$$

Formula:, 799, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 16

*Error order:*, 24, *Error:*,  $1.6503762791376853893 \times 10^{-71}$ , *New Error:*,  $1.6503762791373147565 \times 10^{-95}$

*Error order:*, 24, *Error:*,  $1.6503762791373147565 \times 10^{-95}$ , *New Error:*,  $1.6503762791373147194 \times 10^{-119}$

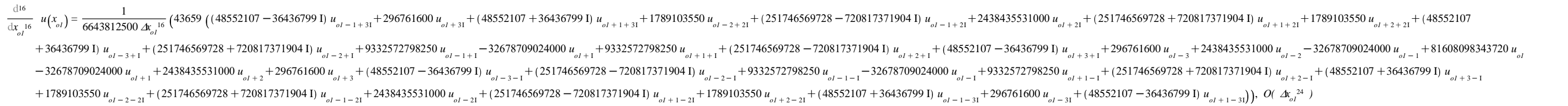
*Error order*., 24, *Error*.,  $1.6503762791373147194 \times 10^{-119}$ , *New Error*.,  $1.6503762791373147194 \times 10^{-143}$

*Error order.*: 24, *Error.*:  $1.6503762791373147194 \times 10^{-143}$ , *New Error.*:  $1.6503762791373147194 \times 10^{-167}$

*Error order.*: 24, *Error.*:  $1.6503762791373147194 \times 10^{-167}$ , *New Error.*:  $1.6503762791373147194 \times 10^{-191}$

$$x_o \neq h., \left[ \begin{array}{cccccc} -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & & & \\ & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -3+1 & -2+1 & -1+1 & 1 & 1+1 & 2+1 & 3+1 \\ & -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-1 & -2-1 & -1-1 & -1 & 1-1 & 2-1 & 3-1 \\ & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & \\ & & -1-3\text{ I} & -3\text{ I} & 1-3\text{ I} & & \end{array} \right]$$

$$c =, \left[ \begin{array}{cccccc} \frac{2119736439513}{6643812500} + \frac{1590794207541\text{ I}}{6643812500} & \frac{74263537079424}{44890625} + \frac{212636254324032\text{ I}}{44890625} & \frac{260643400479}{4250} & \frac{5932306683072}{27625} & \frac{260643400479}{4250} & \frac{74263537079424}{44890625} - \frac{212636254324032\text{ I}}{44890625} & \frac{2119736439513}{6643812500} - \frac{1590794207541\text{ I}}{6643812500} \\ \frac{129563146944}{66438125} & \frac{5754576045834}{359125} & \frac{5932306683072}{27625} & \frac{1675867567374}{3125} & \frac{5932306683072}{27625} & \frac{5754576045834}{359125} & \frac{129563146944}{66438125} \\ \frac{2119736439513}{6643812500} - \frac{1590794207541\text{ I}}{6643812500} & \frac{74263537079424}{44890625} - \frac{212636254324032\text{ I}}{44890625} & \frac{260643400479}{4250} & \frac{5932306683072}{27625} & \frac{260643400479}{4250} & \frac{74263537079424}{44890625} + \frac{212636254324032\text{ I}}{44890625} & \frac{2119736439513}{6643812500} + \frac{1590794207541\text{ I}}{6643812500} \\ \frac{3247836669}{276250} & \frac{74263537079424}{44890625} + \frac{212636254324032\text{ I}}{44890625} & \frac{5754576045834}{359125} & \frac{74263537079424}{44890625} - \frac{212636254324032\text{ I}}{44890625} & \frac{3247836669}{276250} & & \\ \frac{2119736439513}{6643812500} + \frac{1590794207541\text{ I}}{6643812500} & \frac{74263537079424}{44890625} - \frac{212636254324032\text{ I}}{44890625} & \frac{260643400479}{4250} & \frac{5932306683072}{27625} & \frac{260643400479}{4250} & \frac{74263537079424}{44890625} + \frac{212636254324032\text{ I}}{44890625} & \frac{2119736439513}{6643812500} - \frac{1590794207541\text{ I}}{6643812500} \end{array} \right]$$

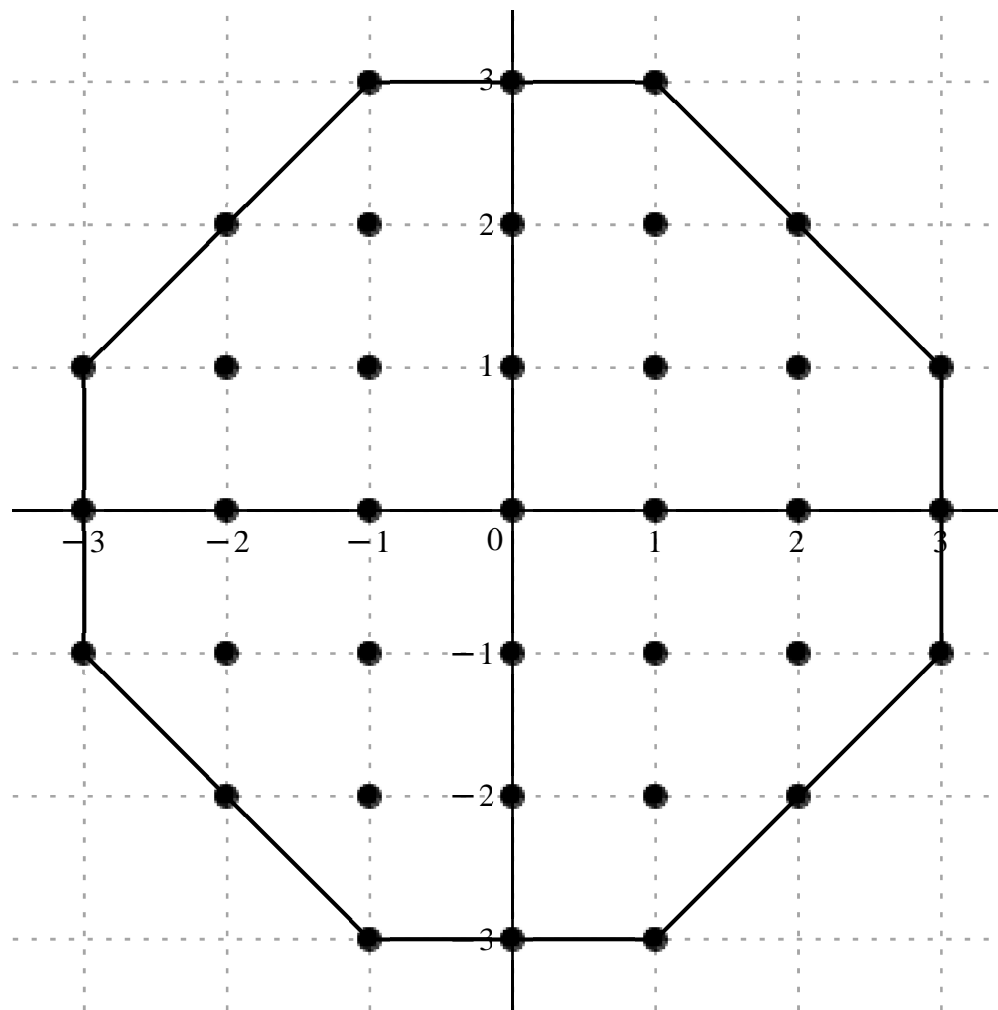


Variavel :,  $x_{ol}$ , Derivada de Ordem :, 17

*Error order:*, 20, *Error:*,  $2.8489297107598552070 \times 10^{-140}$ , *New Error:*,  $2.8489297107598552070 \times 10^{-160}$

$$x_o + h., \left[ \begin{array}{ccccccc} & & & -1+3\text{I} & 3\text{I} & 1+3\text{I} & \\ & & & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} \\ -3+1 & -2+1 & -1+1 & 1 & 1+1 & 2+1 & 3+1 \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-1 & -2-1 & -1-1 & -1 & 1-1 & 2-1 & 3-1 \\ & -2-2\text{I} & -1-2\text{I} & -2\text{I} & 1-2\text{I} & 2-2\text{I} & \\ & & -1-3\text{I} & -3\text{I} & 1-3\text{I} & & \end{array} \right]$$

[illegible]

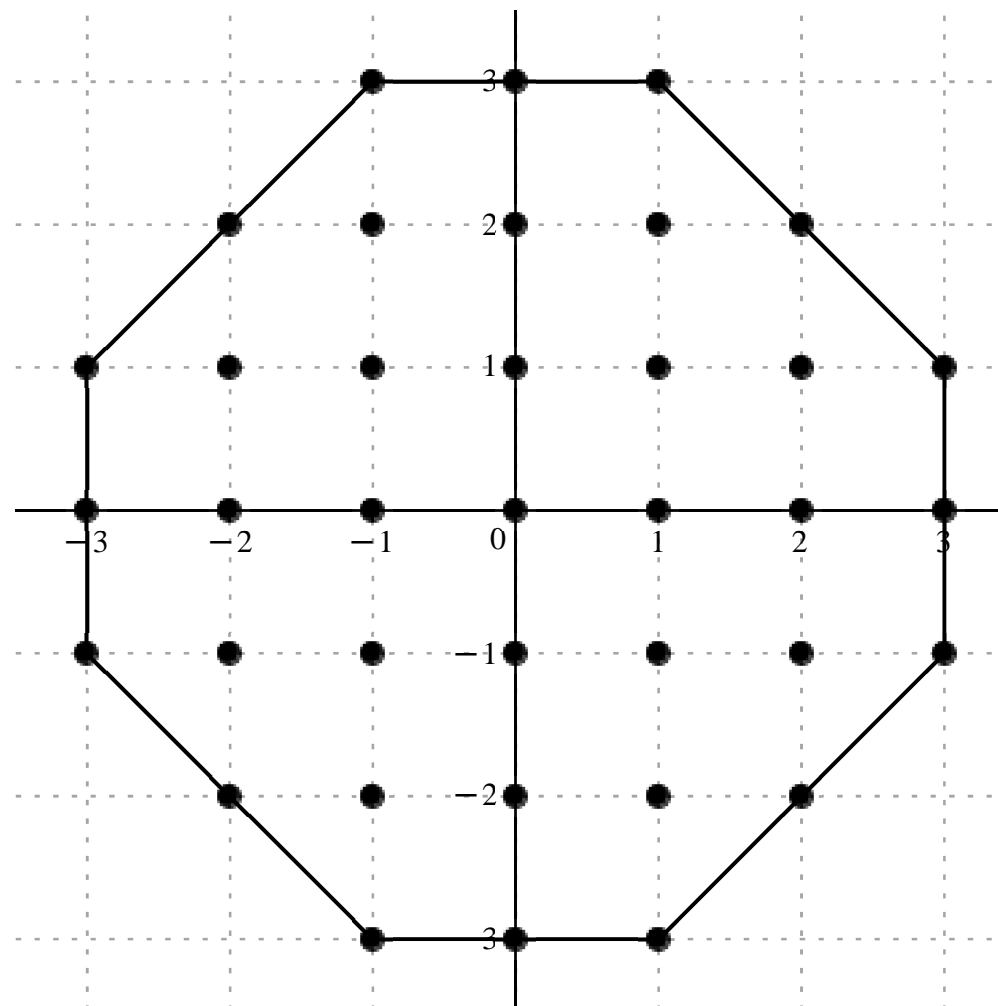


$$\frac{(\mathbb{d}17)}{\mathbb{d}\mathbf{x}_{ol}^{17}} u(\mathbf{x}_{ol}) = \frac{1}{106301000 \mathcal{A}_{ol}^{17}} \left( 43659 \left( -(4151152 + 4293509 \text{ I}) u_{ol-1+31} - 34291584 \text{ I} u_{ol+31} + (4151152 - 4293509 \text{ I}) u_{ol+1+31} - (106966704 + 106966704 \text{ I}) u_{ol-2+21} + (-93402236416 + 8314649472 \text{ I}) u_{ol-1+21} - 309340086560 \text{ I} u_{ol+21} + (93402236416 + 8314649472 \text{ I}) u_{ol+1+21} + (106966704 - 106966704 \text{ I}) u_{ol+2+21} \right. \right. \\ \left. - (4293509 + 4151152 \text{ I}) u_{ol-3+1} + (8314649472 - 93402236416 \text{ I}) u_{ol-2+1} - (1740045852545 + 1740045852545 \text{ I}) u_{ol-1+1} + 4252882558080 \text{ I} u_{ol+1} + (1740045852545 - 1740045852545 \text{ I}) u_{ol+1+1} - (8314649472 + 93402236416 \text{ I}) u_{ol+2+1} + (4293509 - 4151152 \text{ I}) u_{ol+3+1} - 34291584 u_{ol-3} - 309340086560 u_{ol-2} \right. \\ \left. + 4252882558080 u_{ol-1} - 4252882558080 u_{ol+1} + 309340086560 u_{ol+2} + 34291584 u_{ol+3} + (-4293509 + 4151152 \text{ I}) u_{ol-3-1} + (8314649472 + 93402236416 \text{ I}) u_{ol-2-1} + (-1740045852545 + 1740045852545 \text{ I}) u_{ol-1-1} - 4252882558080 \text{ I} u_{ol-1} + (1740045852545 + 1740045852545 \text{ I}) u_{ol+1-1} + (-8314649472 \right. \\ \left. + 93402236416 \text{ I}) u_{ol+2-1} + (4293509 + 4151152 \text{ I}) u_{ol+3-1} + (-106966704 + 106966704 \text{ I}) u_{ol-2-21} - (93402236416 + 8314649472 \text{ I}) u_{ol-1-21} + 309340086560 \text{ I} u_{ol-21} + (93402236416 - 8314649472 \text{ I}) u_{ol+1-21} + (106966704 + 106966704 \text{ I}) u_{ol+2-21} + (-4151152 + 4293509 \text{ I}) u_{ol-1-31} + 34291584 \text{ I} u_{ol-31} + (4151152 \right. \\ \left. + 4293509 \text{ I}) u_{ol+1-31} \right), O(\mathcal{A}_{ol}^{20})$$

*Error order:*, 20, *Error:*,  $1.3427791252633676001 \times 10^{-60}$ , *New Error:*,  $1.3427791252599478080 \times 10^{-80}$   
*Error order:*, 20, *Error:*,  $1.3427791252599478080 \times 10^{-80}$ , *New Error:*,  $1.3427791252599474660 \times 10^{-100}$   
*Error order:*, 20, *Error:*,  $1.3427791252599474660 \times 10^{-100}$ , *New Error:*,  $1.3427791252599474660 \times 10^{-120}$   
*Error order:*, 20, *Error:*,  $1.3427791252599474660 \times 10^{-120}$ , *New Error:*,  $1.3427791252599474660 \times 10^{-140}$   
*Error order:*, 20, *Error:*,  $1.3427791252599474660 \times 10^{-140}$ , *New Error:*,  $1.3427791252599474660 \times 10^{-160}$

$$c = , \quad x_o + h . , \quad \begin{bmatrix} -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} \\ -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} \\ -3+\text{ I} & -2+\text{ I} & -1+\text{ I} & \text{ I} & 1+\text{ I} & 2+\text{ I} & 3+\text{ I} \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-\text{ I} & -2-\text{ I} & -1-\text{ I} & -\text{ I} & 1-\text{ I} & 2-\text{ I} & 3-\text{ I} \\ -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} \\ -1-3\text{ I} & -3\text{ I} & 1-3\text{ I} \end{bmatrix}$$

$$\begin{array}{cccccccc} -\frac{5488067277}{850408} + \frac{1316080340883\text{ I}}{106301000} & -\frac{66050129376}{781625} & -\frac{5488067277}{850408} & -\frac{1316080340883\text{ I}}{106301000} & & & & \\ \frac{10922695938\text{ I}}{27625} & \frac{58425407054784}{359125} + \frac{94775925381984\text{ I}}{359125} & -\frac{4831053638796}{4225} & \frac{58425407054784}{359125} & -\frac{94775925381984\text{ I}}{359125} & -\frac{10922695938\text{ I}}{27625} & & \\ \frac{5488067277}{850408} + \frac{1316080340883\text{ I}}{106301000} & -\frac{58425407054784}{359125} + \frac{94775925381984\text{ I}}{359125} & \frac{1286381044179\text{ I}}{100} & \frac{10218230380512}{325} & -\frac{1286381044179\text{ I}}{100} & -\frac{58425407054784}{359125} - \frac{94775925381984\text{ I}}{359125} & \frac{5488067277}{850408} - \frac{1316080340883\text{ I}}{106301000} & \\ \frac{66050129376}{781625} & \frac{4831053638796}{4225} & -\frac{10218230380512}{325} & 0 & -\frac{10218230380512}{325} & \frac{4831053638796}{4225} & \frac{66050129376}{781625} & \\ \frac{5488067277}{850408} - \frac{1316080340883\text{ I}}{106301000} & -\frac{58425407054784}{359125} - \frac{94775925381984\text{ I}}{359125} & -\frac{1286381044179\text{ I}}{100} & \frac{10218230380512}{325} & \frac{1286381044179\text{ I}}{100} & -\frac{58425407054784}{359125} + \frac{94775925381984\text{ I}}{359125} & \frac{5488067277}{850408} + \frac{1316080340883\text{ I}}{106301000} & \\ & -\frac{10922695938\text{ I}}{27625} & \frac{58425407054784}{359125} - \frac{94775925381984\text{ I}}{359125} & -\frac{4831053638796}{4225} & \frac{58425407054784}{359125} + \frac{94775925381984\text{ I}}{359125} & \frac{10922695938\text{ I}}{27625} & & \\ & & -\frac{5488067277}{850408} - \frac{1316080340883\text{ I}}{106301000} & -\frac{66050129376}{781625} & -\frac{5488067277}{850408} + \frac{1316080340883\text{ I}}{106301000} & & & \end{array}$$





$$\frac{d_{18}}{dx_{ol}^{18}} u(x_{ol}) = \frac{1}{106301000 \Delta x_{ol}^{18}} \left( (392931 \left( (-1745875 + 3349393 \text{ I}) u_{ol-1+31} - 22861056 u_{ol+31} - (1745875 + 3349393 \text{ I}) u_{ol+1+31} + 106966704 \text{ I} u_{ol-2+21} + (44012614144 + 71395929344 \text{ I}) u_{ol-1+21} - 309340086560 u_{ol+21} + (44012614144 - 71395929344 \text{ I}) u_{ol+1+21} - 106966704 \text{ I} u_{ol+2+21} + (1745875 + 3349393 \text{ I}) u_{ol-3+1} \right. \right. \\ \left. \left. + (-44012614144 + 71395929344 \text{ I}) u_{ol-2+1} + 3480091705090 \text{ I} u_{ol-1+1} + 8505765116160 u_{ol+1} - 3480091705090 \text{ I} u_{ol+1+1} - (44012614144 + 71395929344 \text{ I}) u_{ol+2+1} + (1745875 - 3349393 \text{ I}) u_{ol+3+1} + 22861056 u_{ol-3} + 309340086560 u_{ol-2} - 8505765116160 u_{ol-1} - 8505765116160 u_{ol+1} + 309340086560 u_{ol+2} \right. \right. \\ \left. \left. + 22861056 u_{ol+3} + (1745875 - 3349393 \text{ I}) u_{ol-3-1} - (44012614144 + 71395929344 \text{ I}) u_{ol-2-1} - 3480091705090 \text{ I} u_{ol-1-1} + 8505765116160 u_{ol-1} + 3480091705090 \text{ I} u_{ol+1-1} + (-44012614144 + 71395929344 \text{ I}) u_{ol+2-1} + (1745875 + 3349393 \text{ I}) u_{ol+3-1} - 106966704 \text{ I} u_{ol-2-21} + (44012614144 - 71395929344 \text{ I}) u_{ol-1-21} \right. \right. \\ \left. \left. - 309340086560 u_{ol-21} + (44012614144 + 71395929344 \text{ I}) u_{ol+1-21} + 106966704 \text{ I} u_{ol+2-21} - (1745875 + 3349393 \text{ I}) u_{ol-1-31} - 22861056 u_{ol-31} + (-1745875 + 3349393 \text{ I}) u_{ol+1-31} \right) \right), O(\Delta x_{ol}^{20})$$

Formula:, 802, Var:, 1

Variavel :,  $x_{ol}$ , Derivada de Ordem :, 21

*Error order*:, 16, *Error*:,  $2.5691836081830182608 \times 10^{-47}$ , *New Error*:,  $2.5691836081819095668 \times 10^{-63}$

*Error order*:, 16, *Error*:,  $2.5691836081819095668 \times 10^{-63}$ , *New Error*:,  $2.5691836081819094560 \times 10^{-79}$

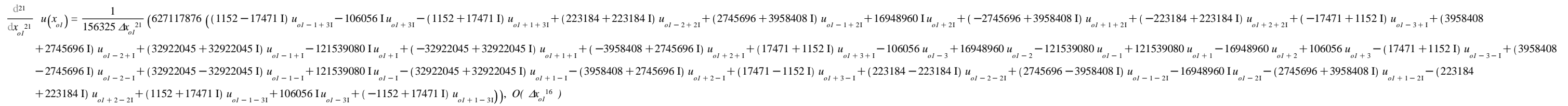
*Error order:*, 16, *Error:*,  $2.5691836081819094560 \times 10^{-79}$ , *New Error:*,  $2.5691836081819094559 \times 10^{-95}$

*Error order:*, 16, *Error:*,  $2.5691836081819094559 \times 10^{-95}$ , *New Error:*,  $2.5691836081819094559 \times 10^{-11}$

*Error order*:, 16, *Error*:,  $2.5691836081819094559 \times 10^{-111}$ , *New Error*:,  $2.5691836081819094559 \times 10^{-127}$

$$x_o + h., \left[ \begin{array}{ccccccc} & & -1+3\text{ I} & 3\text{ I} & 1+3\text{ I} & & \\ & -2+2\text{ I} & -1+2\text{ I} & 2\text{ I} & 1+2\text{ I} & 2+2\text{ I} & \\ -3+1 & -2+1 & -1+1 & 1 & 1+1 & 2+1 & 3+1 \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-1 & -2-1 & -1-1 & -1 & 1-1 & 2-1 & 3-1 \\ & -2-2\text{ I} & -1-2\text{ I} & -2\text{ I} & 1-2\text{ I} & 2-2\text{ I} & \\ & & -1-3\text{ I} & -3\text{ I} & 1-3\text{ I} & & \end{array} \right]$$

[illegible]



Variavel :,  $x_{ol}$ , Derivada de Ordem :, 22

*Error order*., 16, *Error*.,  $1.4800219790521605195 \times 10^{-63}$ , *New Error*.,  $1.4800219790521604617 \times 10^{-79}$

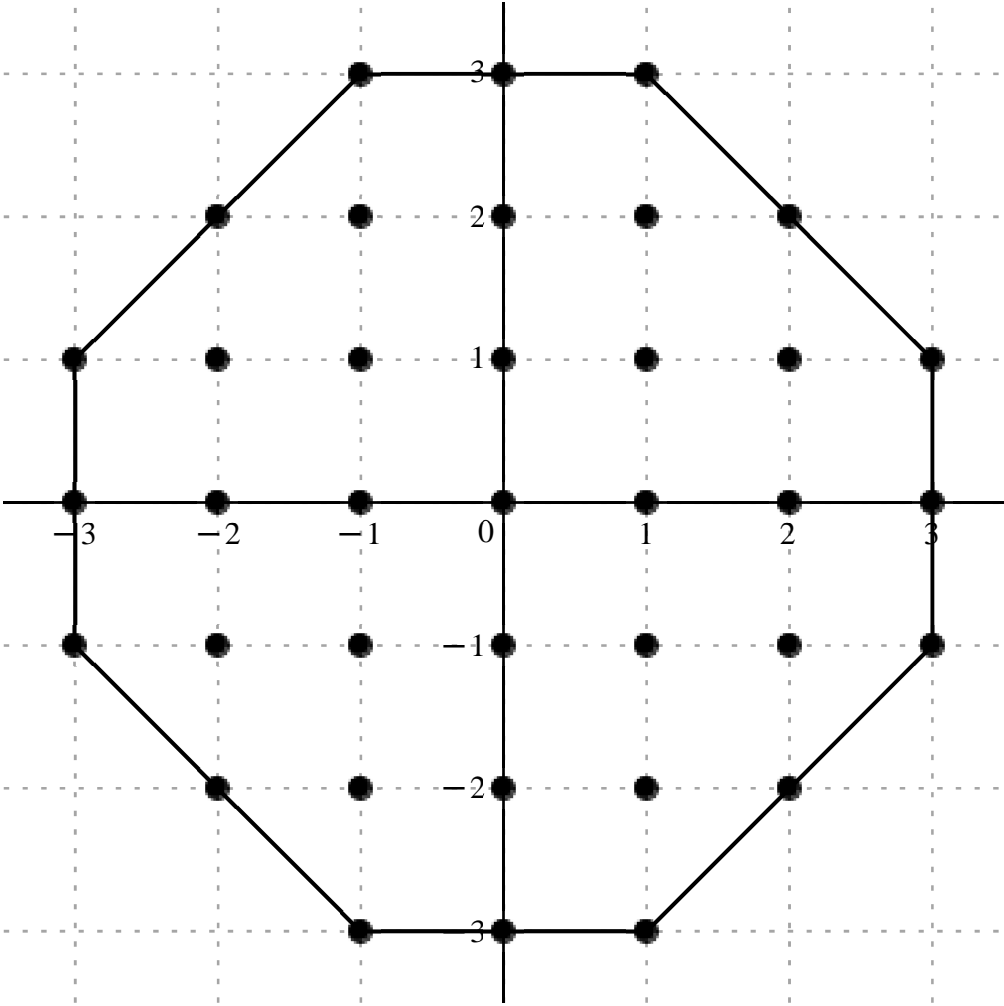
*Error order:*, 16, *Error:*,  $1.4800219790521604617 \times 10^{-95}$ , *New Error:*,  $1.4800219790521604617 \times 10^{-111}$

*Error order:*, 16, *Error:*,  $1.4800219790521604617 \times 10^{-111}$ , *New Error:*,  $1.4800219790521604617 \times 10^{-127}$

$$x_o + h., \left[ \begin{array}{ccccccc} & & & -1+3\text{I} & 3\text{I} & 1+3\text{I} & \\ & & & -2+2\text{I} & -1+2\text{I} & 2\text{I} & 1+2\text{I} & 2+2\text{I} \\ -3+1 & -2+1 & -1+1 & 1 & 1+1 & 2+1 & 3+1 \\ -3 & -2 & -1 & 0 & 1 & 2 & 3 \\ -3-1 & -2-1 & -1-1 & -1 & 1-1 & 2-1 & 3-1 \\ & -2-2\text{I} & -1-2\text{I} & -2\text{I} & 1-2\text{I} & 2-2\text{I} & \\ & & -1-3\text{I} & -3\text{I} & 1-3\text{I} & & \end{array} \right]$$

$c = ,$

		$-\frac{73901451861468}{156325} + \frac{19335925470708 \text{ I}}{156325}$	$-\frac{487737165351744}{156325}$	$-\frac{73901451861468}{156325} - \frac{19335925470708 \text{ I}}{156325}$	
	$-\frac{3200809639104 \text{ I}}{325}$	$\frac{385642375138944}{4225} - \frac{140945996866752 \text{ I}}{845}$	$\frac{631994344603776}{845}$	$\frac{385642375138944}{4225} + \frac{140945996866752 \text{ I}}{845}$	$\frac{3200809639104 \text{ I}}{325}$
$\frac{73901451861468}{156325} + \frac{19335925470708 \text{ I}}{156325}$	$-\frac{385642375138944}{4225} - \frac{140945996866752 \text{ I}}{845}$	$-\frac{14527812715416 \text{ I}}{5}$	$-\frac{697224637593792}{65}$	$\frac{14527812715416 \text{ I}}{5}$	$-\frac{385642375138944}{4225} + \frac{140945996866752 \text{ I}}{845}$
$\frac{487737165351744}{156325}$	$-\frac{631994344603776}{845}$	$\frac{697224637593792}{65}$	$0$	$\frac{697224637593792}{65}$	$-\frac{631994344603776}{845}$
$\frac{73901451861468}{156325} - \frac{19335925470708 \text{ I}}{156325}$	$-\frac{385642375138944}{4225} + \frac{140945996866752 \text{ I}}{845}$	$\frac{14527812715416 \text{ I}}{5}$	$-\frac{697224637593792}{65}$	$-\frac{14527812715416 \text{ I}}{5}$	$-\frac{385642375138944}{4225} - \frac{140945996866752 \text{ I}}{845}$
	$\frac{3200809639104 \text{ I}}{325}$	$\frac{385642375138944}{4225} + \frac{140945996866752 \text{ I}}{845}$	$\frac{631994344603776}{845}$	$\frac{385642375138944}{4225} - \frac{140945996866752 \text{ I}}{845}$	$-\frac{3200809639104 \text{ I}}{325}$
		$-\frac{73901451861468}{156325} - \frac{19335925470708 \text{ I}}{156325}$	$-\frac{487737165351744}{156325}$	$-\frac{73901451861468}{156325} + \frac{19335925470708 \text{ I}}{156325}$	



$$\frac{\mathrm{d}^{22}}{\mathrm{d}x_{ol}^{22}}\; u(x_{ol}) = \frac{1}{156325\; \Delta x_{ol}^{22}}\; \big( ( -10713 + 2803 \text{ I} )\; u_{ol-1+3\text{I}} - 70704\; u_{ol+3\text{I}} - ( 10713 + 2803 \text{ I} )\; u_{ol+1+3\text{I}} - 223184 \text{ I}\; u_{ol-2+2\text{I}} + ( 2068448 - 3779920 \text{ I} )\; u_{ol-1+2\text{I}} + 16948960\; u_{ol+2\text{I}} + ( 2068448 + 3779920 \text{ I} )\; u_{ol+1+2\text{I}} + 223184 \text{ I}\; u_{ol+2+2\text{I}} + ( 10713 + 2803 \text{ I} )\; u_{ol-3+\text{I}} - ( 2068448 + 3779920 \text{ I} )\; u_{ol-2+\text{I}} - 65844090 \text{ I}\; u_{ol-1+\text{I}} \\ - 243078160\; u_{ol+\text{I}} + 65844090 \text{ I}\; u_{ol+1+\text{I}} + ( -2068448 + 3779920 \text{ I} )\; u_{ol+2+\text{I}} + ( 10713 - 2803 \text{ I} )\; u_{ol+3+\text{I}} + 70704\; u_{ol-3} - 16948960\; u_{ol-2} + 243078160\; u_{ol-1} + 243078160\; u_{ol+1} - 16948960\; u_{ol+2} + 70704\; u_{ol+3} + ( 10713 - 2803 \text{ I} )\; u_{ol-3-\text{I}} + ( -2068448 + 3779920 \text{ I} )\; u_{ol-2-\text{I}} + 65844090 \text{ I}\; u_{ol-1-\text{I}} - 243078160\; u_{ol-\text{I}} \\ - 65844090 \text{ I}\; u_{ol+1-\text{I}} - ( 2068448 + 3779920 \text{ I} )\; u_{ol+2-\text{I}} + ( 10713 + 2803 \text{ I} )\; u_{ol+3-\text{I}} + 223184 \text{ I}\; u_{ol-2-2\text{I}} + ( 2068448 + 3779920 \text{ I} )\; u_{ol-1-2\text{I}} + 16948960\; u_{ol-2\text{I}} + ( 2068448 - 3779920 \text{ I} )\; u_{ol+1-2\text{I}} - 223184 \text{ I}\; u_{ol+2-2\text{I}} - ( 10713 + 2803 \text{ I} )\; u_{ol-1-3\text{I}} - 70704\; u_{ol-3\text{I}} + ( -10713 + 2803 \text{ I} )\; u_{ol+1-3\text{I}} \big) \cdot \; O( \; \Delta x_{ol}^{16} \; )$$

