

Program:

```
from printer import Format, xpdf
from ga import Ga
from mv import Com

Format()
g4d = Ga('a b c d')
(a,b,c,d) = g4d.mv()

print 'g_{ij} =', g4d.g
print '\\bm{a|(b*c)} =', a|(b*c)
print '\\bm{a|(b^c)} =', a|(b^c)
print '\\bm{a|(b^c^d)} =', a|(b^c^d)
print '\\bm{a|(b^c)+c|(a^b)+b|(c^a)} =', (a|(b^c))+(c|(a^b))+(b|(c^a))
print '\\bm{a*(b^c)-b*(a^c)+c*(a^b)} =', a*(b^c)-b*(a^c)+c*(a^b)
print '\\bm{a*(b^c^d)-b*(a^c^d)+c*(a^b^d)-d*(a^b^c)} =', \
      a*(b^c^d)-b*(a^c^d)+c*(a^b^d)-d*(a^b^c)
print '\\bm{(a^b)|(c^d)} =', (a^b)|(c^d)
print '\\bm{((a^b)|c)|d} =', ((a^b)|c)|d
print '\\bm{(a^b)\\times (c^d)} =', Com(a^b,c^d)
xpdf(paper='letter', prog=True)
```

Code Output:

$$g_{ij} = \begin{bmatrix} (a \cdot a) & (a \cdot b) & (a \cdot c) & (a \cdot d) \\ (a \cdot b) & (b \cdot b) & (b \cdot c) & (b \cdot d) \\ (a \cdot c) & (b \cdot c) & (c \cdot c) & (c \cdot d) \\ (a \cdot d) & (b \cdot d) & (c \cdot d) & (d \cdot d) \end{bmatrix}$$

$$\mathbf{a} \cdot (\mathbf{bc}) = - (a \cdot c) \mathbf{b} + (a \cdot b) \mathbf{c}$$

$$\mathbf{a} \cdot (\mathbf{b} \wedge \mathbf{c}) = - (a \cdot c) \mathbf{b} + (a \cdot b) \mathbf{c}$$

$$\mathbf{a} \cdot (\mathbf{b} \wedge \mathbf{c} \wedge \mathbf{d}) = (a \cdot d) \mathbf{b} \wedge \mathbf{c} - (a \cdot c) \mathbf{b} \wedge \mathbf{d} + (a \cdot b) \mathbf{c} \wedge \mathbf{d}$$

$$\mathbf{a} \cdot (\mathbf{b} \wedge \mathbf{c}) + \mathbf{c} \cdot (\mathbf{a} \wedge \mathbf{b}) + \mathbf{b} \cdot (\mathbf{c} \wedge \mathbf{a}) = 0$$

$$\mathbf{a}(\mathbf{b} \wedge \mathbf{c}) - \mathbf{b}(\mathbf{a} \wedge \mathbf{c}) + \mathbf{c}(\mathbf{a} \wedge \mathbf{b}) = 3\mathbf{a} \wedge \mathbf{b} \wedge \mathbf{c}$$

$$\mathbf{a}(\mathbf{b} \wedge \mathbf{c} \wedge \mathbf{d}) - \mathbf{b}(\mathbf{a} \wedge \mathbf{c} \wedge \mathbf{d}) + \mathbf{c}(\mathbf{a} \wedge \mathbf{b} \wedge \mathbf{d}) - \mathbf{d}(\mathbf{a} \wedge \mathbf{b} \wedge \mathbf{c}) = 4\mathbf{a} \wedge \mathbf{b} \wedge \mathbf{c} \wedge \mathbf{d}$$

$$(\mathbf{a} \wedge \mathbf{b}) \cdot (\mathbf{c} \wedge \mathbf{d}) = - (a \cdot c) (b \cdot d) + (a \cdot d) (b \cdot c)$$

$$((\mathbf{a} \wedge \mathbf{b}) \cdot \mathbf{c}) \cdot \mathbf{d} = - (a \cdot c) (b \cdot d) + (a \cdot d) (b \cdot c)$$

$$(\mathbf{a} \wedge \mathbf{b}) \times (\mathbf{c} \wedge \mathbf{d}) = - (b \cdot d) \mathbf{a} \wedge \mathbf{c} + (b \cdot c) \mathbf{a} \wedge \mathbf{d} + (a \cdot d) \mathbf{b} \wedge \mathbf{c} - (a \cdot c) \mathbf{b} \wedge \mathbf{d}$$