Limbertwig LateralAlgebra.app

Parker Emmerson

June 2023

1 Limbertwig Kernel

$\Lambda \to F\rangle \{\sigma, \oplus, \otimes, x, y, z \ldots \sim\} \langle\rightleftharpoons \Lambda \to \exists\, L \to F, value, value \ldots \langle \exists L \to \{\langle \sim\to \heartsuit \to \epsilon\rangle \langle\rightleftharpoons \heartsuit\rangle\rangle \to$
$\{(x \oplus y) \otimes z \Rightarrow \alpha_i\} \langle\rightleftharpoons \forall \alpha_i\rangle\bigcirc \ \to \ \{\} \langle\rightleftharpoons \uparrow \to \ \{\mathbf{x} \Rightarrow \oplus\} \langle\rightleftharpoons \ \mathbf{x} \ \to \ \{\mathbf{x} \Rightarrow \otimes\} \langle\rightleftharpoons$
$\mathbf{x} \to \{x \Rightarrow \mathrm{x}\} \langle\rightleftharpoons \mathbf{x} \to \{y \Rightarrow \mathrm{y}\} \langle\rightleftharpoons \mathbf{x} \to \{\mathbf{x} \Rightarrow \mathrm{z}\} \langle\rightleftharpoons \mathbf{x}- > \{\mathbf{x} \Rightarrow (x \oplus y) \otimes z\} \langle\rightleftharpoons$
$\mathbf{x} \to \{\sim\to \heartsuit \to \epsilon\rangle \langle\rightleftharpoons \sim\rangle \to$
$\exists n \in F \quad s.t \quad \mathcal{L}_f(x \ \oplus \ y \ \otimes \ z) \wedge \overline{\mu}_{\{\overline{g}(x\, y\, z\, \vdots\, \cdots\, \uplus \quad) \neq \ \Omega}$
$\Rightarrow \quad \mathcal{L}_f(x \ \oplus \ y \ \otimes \ z) \wedge \ \overline{\mu}_{\{\overline{g}(x\, y\, z\ \uplus \quad) \neq \ \Omega}$
$\Leftrightarrow \ \bigcirc^{\{\ \mu \ \in \ \infty \ \Rightarrow \ (\ \Omega \ \uplus \ ) \ < \ \frac{(x \oplus y) \otimes z}{\alpha_i \eta m} \ >}$
$\Rightarrow \ \heartsuit \ \Rightarrow \ \mathcal{L}_f(x \ \oplus \ y \ \otimes \ z) \wedge \ \overline{\mu}_{\{\overline{g}(x\, y\, z\ \uplus \quad) \neq \ \Omega}$
$\Rightarrow \ \ \uplus \overset{\approx}{\cdot} \heartsuit \ \Leftrightarrow \ \ \overset{\approx}{-} \ \ = \ \Lambda \ \Rightarrow \nwarrow \Rightarrow \ \overline{\mu}, \ \overline{g}(x\, y\, z \ \uplus \ \ )$
$\Leftarrow \ \Lambda \cdot \ \uplus \heartsuit$

2 Lateral Algebra

Let F be an abstract field whose elements will serve as symbols representing variables in a lateral algebra. The lateral algebra $\mathcal{L}$ is a parametric algebraic system which is characterized by operations $\oplus$ and $\otimes$.

The operations $\oplus$ and $\otimes$ combine two elements in the following way:

$$(x \oplus y) \otimes z = x \otimes z \ \oplus \ y \otimes z$$

where $x, y, z \in F$ and operators satisfy the following "list associativity" property:

$$(x \oplus y) \otimes (z \oplus w) = (x \otimes z) \ \oplus \ (y \otimes z) \ \oplus \ (x \otimes w) \ \oplus \ (y \otimes w).$$

$$(x \oplus y) \otimes (z \oplus w) = \left(\frac{r(\alpha - \Delta))}{z\Theta)} \oplus \frac{r(\alpha + \Delta))}{z\Theta)} \right) \otimes \left(\frac{1}{1 - \frac{v^2}{c^2}} \oplus z\Theta \right)$$

$$= \frac{1}{1 - \frac{v^2}{c^2}} \otimes \frac{r(\alpha - \Delta))}{z\Theta)} \oplus \frac{1}{1 - \frac{v^2}{c^2}} \otimes \frac{r(\alpha + \Delta))}{z\Theta)} \oplus z\Theta \otimes \frac{r(\alpha - \Delta))}{z\Theta)} \oplus z\Theta \otimes \frac{r(\alpha + \Delta))}{z\Theta)}$$

$$= \frac{r(\alpha-\Delta))}{z\Theta(1-\frac{v^2}{c^2})} \oplus \frac{r(\alpha+\Delta))}{z\Theta(1-\frac{v^2}{c^2})} \oplus \frac{z\Theta r(\alpha-\Delta))}{z\Theta} \oplus \frac{z\Theta r(\alpha+\Delta)}{z\Theta}$$

$$= \frac{r(\alpha-\Delta))}{z\Theta(1-\frac{v^2}{c^2})} \oplus \frac{r(\alpha+\Delta))}{z\Theta(1-\frac{v^2}{c^2})} \oplus r(\alpha-\Delta)) \oplus r(\alpha+\Delta))$$

$$= \frac{r^2(-\Delta^2+\alpha^2)}{z\Theta(1-\frac{v^2}{c^2})}$$

3 Package

$\Lambda \to N\rangle \{\sigma, \mathrm{g_a}, \mathrm{b}, \mathrm{c}, \mathrm{d}, \mathrm{e}, \ldots \sim\} \langle\rightleftharpoons \Lambda \to$
$\exists\ L \to N, value, value \ldots \langle \exists L \to \{\langle \sim\to \heartsuit \to \epsilon\rangle \langle\rightleftharpoons \heartsuit\rangle\rangle \to$
$\{\uparrow\Rightarrow \alpha_i\} \langle\rightleftharpoons \forall\alpha_i\rangle\bigcirc \to \{\} \langle\rightleftharpoons \uparrow \to \{\mathbf{x} \Rightarrow \mathrm{g_a}\} \langle\rightleftharpoons \mathbf{x} \to$
$\{\mathbf{x} \Rightarrow \mathrm{b}\} \langle\rightleftharpoons \mathbf{x} \to \{\mathbf{x} \Rightarrow \mathrm{c}\} \langle\rightleftharpoons \mathbf{x} \to \{\mathbf{x} \Rightarrow \mathrm{d}\} \langle\rightleftharpoons \mathbf{x}- >$
$\{\mathbf{x} \Rightarrow \mathrm{e}\} \langle\rightleftharpoons \mathbf{x} \to \{\sim\to \heartsuit \to \epsilon\rangle \langle\rightleftharpoons \sim\rangle \to$
$\exists\, n \in N\ s.t.\ \mathcal{L}_f(\Uparrow r\, \alpha\, s\, \Delta\, \eta) \wedge \overline{\mu}_{\{\overline{g}(a\,b\,c\,d\,e\ldots \vdots \cdots \uplus\ )\neq \Omega}$
$\Rightarrow\ \mathcal{L}_f(\Uparrow r\, \alpha\, s\, \Delta\, \eta) \wedge \overline{\mu}_{\{\overline{g}(a\,b\,c\,d\,e\ldots\ \uplus\ )\neq \Omega}$
$\Leftrightarrow\ \bigcirc^{\{\ \mu\ \in\ \infty\ \Rightarrow\ (\ \Omega\ \uplus\ )\ \otimes\ (\Delta\oplus H^{\circ}_{im})}$
$\Rightarrow\ \heartsuit\ \Rightarrow\ \mathcal{L}_f(\Uparrow r\, \alpha\, s\, \Delta\, \eta) \wedge\ \overline{\mu}_{\{\overline{g}(a\,b\,c\,d\,e\ldots\ \uplus\ )\neq \Omega}$
$\Rightarrow\ \uplus \overset{\approx}{\cdot} \heartsuit\ \Leftrightarrow\ \overset{\approx}{-}\ =\ \Lambda\ \Rightarrow \nwarrow\ \Rightarrow\ \overline{\mu},\ \overline{g}(a\,b\,c\,d\,e\ldots\ \uplus\ )$
$\Leftarrow\ \Lambda\cdot\ \uplus\ \otimes\ (\Delta\ \oplus\ H^{\circ}_{im})\ \Rightarrow\ \ \otimes \overset{\approx}{\oplus} \heartsuit\}$

4 Rewrite

$\Lambda \to N\rangle \{\sigma, \mathrm{g_a}, \mathrm{b}, \mathrm{c}, \mathrm{d}, \mathrm{e}, \ldots \sim\} \langle\rightleftharpoons \Lambda \to\ \exists\ L \to N, value, value \ldots \langle \exists L \to$
$\{\langle \sim\to \heartsuit \to \epsilon\rangle \langle\rightleftharpoons \heartsuit\rangle\rangle \to \{\uparrow\Rightarrow \alpha_i\} \langle\rightleftharpoons \forall\alpha_i\rangle\bigcirc \to \{\} \langle\rightleftharpoons \uparrow \to$
$\{\mathbf{x} \Rightarrow \mathrm{g_a}\} \langle\rightleftharpoons \mathbf{x} \to \{\mathbf{x} \Rightarrow \mathrm{b}\} \langle\rightleftharpoons \mathbf{x} \to \{\mathbf{x} \Rightarrow \mathrm{c}\} \langle\rightleftharpoons \mathbf{x} \to \{\mathbf{x} \Rightarrow \mathrm{d}\} \langle\rightleftharpoons \mathbf{x}- >$
$\{\mathbf{x} \Rightarrow \mathrm{e}\} \langle\rightleftharpoons \mathbf{x} \to \{\sim\to \heartsuit \to \epsilon\rangle \langle\rightleftharpoons \sim\rangle \to \exists\, n \in N\ s.t.\ \mathcal{L}_f(\Uparrow r\, \alpha\, s\, \Delta\, \eta) \wedge \overline{\mu}_{\{\overline{g}(a\,b\,c\,d\,e\ldots \vdots \cdots \uplus\ )\neq \Omega}$
$\Rightarrow\ \mathcal{L}_f(\Uparrow r\, \alpha\, s\, \Delta\, \eta) \wedge \overline{\mu}_{\{\overline{g}(a\,b\,c\,d\,e\ldots\ \uplus\ )\neq \Omega}$
$\Leftrightarrow\ \bigcirc^{\{\ \mu\ \in\ \infty\ \Rightarrow\ (\ \Omega\ \uplus\ )\ \otimes\ (x\oplus y\otimes z\ \oplus\ y\otimes z)}$
$\Rightarrow\ \heartsuit\ \Rightarrow\ \mathcal{L}_f(\Uparrow r\, \alpha\, s\, \Delta\, \eta) \wedge\ \overline{\mu}_{\{\overline{g}(a\,b\,c\,d\,e\ldots\ \uplus\ )\neq \Omega}$
$\Rightarrow\ \uplus \overset{\approx}{\cdot} \heartsuit\ \Leftrightarrow\ \overset{\approx}{-}\ =\ \Lambda\ \Rightarrow \nwarrow\ \Rightarrow\ \overline{\mu},\ \overline{g}(a\,b\,c\,d\,e\ldots\ \uplus\ )$
$\Leftarrow\ \Lambda\cdot\ \uplus\ \otimes\ (x \oplus y \otimes z\ \oplus\ y \otimes z)\ \Rightarrow\ \ \otimes \overset{\approx}{\oplus} \heartsuit\}$