$$\llcorner\,\Lambda^{m}\mathbb{K} \xrightarrow{\;{}_I\llcorner\;} {}^{\begin{bmatrix} n+m+1 \\ m \end{bmatrix}}\mathbb{K} \qquad \llcorner\,\Lambda^{\mathbb{N}}\mathbb{K} \xrightarrow{\;{}_\bullet\llcorner\;} {}^{2^n}\mathbb{K}$$

$$^{\begin{bmatrix} n+m+1 \\ m \end{bmatrix}}\mathbb{K} \ni {}_I\llcorner\, \mathbb{1} \leftarrow\!\shortmid \mathbb{1} \in \llcorner\,\Lambda^{m}\mathbb{K}$$

$$\mathbb{1} = \sum_{|I| = m} \llcorner^{I} \, \underbrace{{}_I\llcorner\mathbb{1}}$$

$$^{2^n}\mathbb{K} \ni {}_\bullet\llcorner\, \mathbb{1} \; ↯ \; \mathbb{1} \in \llcorner\,\Lambda^{\mathbb{N}}\mathbb{K}$$

$$\mathbb{1} = \llcorner^{\bullet} \, \underbrace{{}_\bullet\llcorner\mathbb{1}}$$

$$\mathbb{K}^{n}\Lambda^{m}\mathbb{K} = \frac{.\llcorner^{M} \text{ free}}{M \subset n\colon \quad |M| = m}\mathbb{K} \ni .\mathbb{1} = \sum_{|M| = m} .\llcorner^{M} \; {}_M\mathbb{1}$$

$${}_M\mathbb{1} \in \mathbb{K} \text{ eind}$$

$$\underbrace{.\mathbb{1} \wedge .\mathbb{1}'} \wedge .\mathbb{1}'' = .\mathbb{1} \wedge \underbrace{.\mathbb{1}' \wedge .\mathbb{1}''}$$

$$\mathbb{1}' \wedge \underbrace{\ast\mathbb{1}} = \left(\mathbb{1} \wedge \mathbb{1}'\right) \llcorner^{N}$$

$$\mathbb{1} \wedge \mathbb{1}' = {}_N\llcorner \; \underbrace{\mathbb{1}' \wedge \overbrace{\ast\mathbb{1}}}$$

$$.\mathbb{1} \wedge .\mathbb{1}' = \overset{pq}{-1}\; .\mathbb{1}' \wedge .\mathbb{1}$$

$$\llcorner^{I} \wedge \underbrace{\ast\llcorner^{I}} = \llcorner^{I} \wedge \llcorner^{N \llcorner I} \; \overset{I}{\underset{N \llcorner I}{\vee}} \text{ per } {}_I\eta^{I} = {}_N\llcorner \; \underbrace{\overset{I}{\underset{N \llcorner I}{\vee}} \overset{I}{\underset{N \llcorner I}{\vee}}}_{=1} \; \llcorner^{I} \wedge \llcorner^{I}$$

$$\mathbb{K}^{n}\Lambda^{p+q}\mathbb{K} \xleftarrow[\text{bilin}]{\wedge} \mathbb{K}^{n}\Lambda^{p}\mathbb{K} \wedge \mathbb{K}^{n}\Lambda^{q}\mathbb{K}$$

$$.\llcorner^{P} \wedge .\llcorner^{Q} := \overset{P}{\underset{Q}{\vee}} \; .\llcorner^{P \cup Q}$$

$$\varepsilon = \overset{A}{\underset{B}{\vee}} \; \overset{A \cup B}{\underset{C}{\vee}} = \overset{A}{\underset{B}{\vee}} \overset{A}{\underset{C}{\vee}} \overset{B}{\underset{C}{\vee}} = \overset{A}{\underset{B \cup C}{\vee}} \overset{B}{\underset{C}{\vee}}$$

$$\Longrightarrow \underbrace{.\lrcorner^{A} \bowtie .\lrcorner^{B}} \bowtie .\lrcorner^{C} = \varepsilon \; .\lrcorner^{A \cup B \cup C} = .\lrcorner^{A} \; \bowtie \underbrace{.\lrcorner^{B} \bowtie .\lrcorner^{C}}$$

$$|P > Q||Q > P| = |P||Q| \Longrightarrow \underset{Q}{\overset{P}{\vee}} = \overset{pq}{-1} \underset{P}{\overset{Q}{\vee}} \Longrightarrow .\lrcorner^{P} \; \bowtie .\lrcorner^{Q} = \overset{pq}{-1} \; .\lrcorner^{Q} \; \bowtie .\lrcorner^{P}$$

$$.\lrcorner^{M} = \underset{j \in M}{\bowtie} .\lrcorner^{j} = .\lrcorner^{j_1} \; \bowtie \cdots \bowtie .\lrcorner^{j_m}$$

$$M = \left\{ j_1 \leqslant \cdots \leqslant j_m \right\}$$

$$\begin{array}{ccc} \lrcorner_{\unrhd} \overset{m}{\mathbb{K}} & & \lrcorner_{\unrhd} \overset{\mathbb{N}}{\mathbb{K}} \\ {}_{I}\lrcorner \Big\downarrow & & \bullet\lrcorner \Big\downarrow \\ {}_{\left[\begin{smallmatrix} n \\ m \end{smallmatrix}\right]}\mathbb{K} & & {}_{2^n}\mathbb{K} \end{array}$$

$$_{\left[\begin{smallmatrix} n \\ m \end{smallmatrix}\right]}\mathbb{K} \ni {}_{I}\lrcorner \; \Vdash \mapsfrom \mathbb{1} \in \lrcorner_{\unrhd} \overset{m}{\mathbb{K}}$$

$$\mathbb{1} = \sum_{|I| = m} \lrcorner^{I} \; \underbrace{{}_{I}\lrcorner \mathbb{1}}$$

$$_{2^n}\mathbb{K} \ni \bullet\lrcorner \; \Vdash \mapsfrom \mathbb{1} \in \lrcorner_{\unrhd} \overset{\mathbb{N}}{\mathbb{K}}$$

$$\mathbb{1} = \lrcorner^{\bullet} \; \underbrace{\bullet\lrcorner \mathbb{1}}$$

$$\mathbb{K}^{n}{}_{\unrhd} \overset{m}{\mathbb{K}} = \frac{.\lrcorner^{M} \text{ free}}{M \subset n: \quad |M| = m} \mathbb{K} \ni .\mathbb{1} = \sum_{|M| = m} .\lrcorner^{M} \; {}_{M}\mathbb{1}$$

$$_{M}\mathbb{1} \in \mathbb{K} \text{ eind}$$

$$\underbrace{.\mathbb{1} \bowtie .\mathbb{1}'} \bowtie .\mathbb{1}'' = .\mathbb{1} \bowtie \underbrace{.\mathbb{1}' \bowtie .\mathbb{1}''}$$

$$\mathbb{1}' \bowtie \underbrace{\ast \mathbb{1}} = \left(\mathbb{1} \blacktriangledown \mathbb{1}' \right) \lrcorner^{N}$$

$$\mathbb{1} \blacktriangledown \mathbb{1}' = {}_{N}\lrcorner \; \underbrace{\mathbb{1}' \bowtie \overbrace{\ast \mathbb{1}}}$$

$$.\mathbb{1} \bowtie .\mathbb{1}' = \overset{pq}{-1} \; .\mathbb{1}' \bowtie .\mathbb{1}$$

$$e^I \wedge \underbrace{\star e^I} = e^I \wedge e^{N \setminus I} \underset{N \setminus I}{\overset{I}{\vee}} \det {}_I\eta^I = {}_N e \overbrace{\underset{N \setminus I}{\overset{I}{\vee}} \underset{N \setminus I}{\overset{I}{\vee}}}^{=1} e^I \wedge e^I$$

$$\overset{\mathbb{K}^n}{\Lambda} \overset{p+q}{\mathbb{K}} \underset{\text{bilin}}{\overset{\wedge}{\longleftarrow}} \overset{\mathbb{K}^n}{\Lambda} \overset{p}{\mathbb{K}} \wedge \overset{\mathbb{K}^n}{\Lambda} \overset{q}{\mathbb{K}}$$

$$.e^P \wedge .e^Q := \underset{Q}{\overset{P}{\vee}} \; .e^{P \cup Q}$$

$$\varepsilon = \underset{B}{\overset{A}{\vee}} \; \underset{C}{\overset{A \cup B}{\vee}} = \underset{B}{\overset{A}{\vee}} \underset{C}{\overset{A}{\vee}} \underset{C}{\overset{B}{\vee}} = \underset{B \cup C}{\overset{A}{\vee}} \; \underset{C}{\overset{B}{\vee}}$$

$$\Longrightarrow \underbrace{.e^A \wedge .e^B} \wedge .e^C = \varepsilon \; .e^{A \cup B \cup C} = .e^A \wedge \underbrace{.e^B \wedge .e^C}$$

$$|P > Q||Q > P| = |P||Q| \Longrightarrow \underset{Q}{\overset{P}{\vee}} = \overset{pq}{-1} \underset{P}{\overset{Q}{\vee}} \Longrightarrow .e^P \wedge .e^Q = \overset{pq}{-1} \; .e^Q \wedge .e^P$$

$$.e^M = \bigwedge_{j \in M} .e^j = .e^{j_1} \wedge \cdots \wedge .e^{j_m}$$

$$M = \left\{ j_1 < \cdots < j_m \right\}$$