

$$\mathbb{1} \times \mathbb{K}^{\mathbb{H}} \xleftarrow{\pi} \mathbb{1}$$

$$\begin{array}{ccc} \mathbb{1} & & \\ \downarrow & & \\ \mathbb{1} \times \mathbb{C}^{\mathbb{H}} & \xrightarrow{\omega} & \end{array}$$

$$\begin{array}{ccc} \mathbb{1} \times \mathbb{K}^{\mathbb{H}} & \xleftarrow{\pi} & \mathbb{1} \\ \downarrow \pi \mathbf{x}_\ell & & \downarrow \pi \\ \mathbb{1} \times \mathbb{K}^{\mathbb{H}} \times \mathbb{K}^{\mathbb{H}} & \xleftarrow{\iota \mathbf{x} \Delta} & \mathbb{1} \times \mathbb{K}^{\mathbb{H}} \end{array}$$

$$\pi \mathbb{1} = \mathbb{1}_\alpha \mathbf{x} \gamma^\alpha \Leftrightarrow \mathbb{h}^\pi \mathbb{1} = \mathbb{1}_\nu^{\mathbb{h}} \gamma^\alpha$$

$$\pi \mathbb{1}_\alpha = {}^\beta \mathbb{1}_\alpha \mathbf{x} {}_\beta \gamma_\alpha \Leftrightarrow \mathbb{h}^\pi \mathbb{1}_\alpha = {}^\beta \mathbb{1}_\alpha {}_\beta^{\mathbb{h}} \gamma_\alpha$$

$$\underline{\pi \mathbf{x} \iota} \pi \mathbb{1} = \underline{\pi \mathbf{x} \iota} \mathbb{1}_\alpha \mathbf{x} \gamma^\alpha = \underline{\pi \mathbb{1}_\alpha} \mathbf{x} \gamma^\alpha = {}^\beta \mathbb{1}_\alpha \mathbf{x} {}_\beta \gamma_\alpha \mathbf{x} \gamma^\alpha$$

$$\underline{\iota \mathbf{x} \Delta} \pi \mathbb{1} = \mathbb{1}_\alpha \mathbf{x} \underline{\Delta \gamma^\alpha}$$

$$\underline{\pi \mathbf{x} \iota} \pi \mathbb{1} = \underline{\iota \mathbf{x} \Delta} \pi \Leftrightarrow \mathbb{h}^\pi \mathbb{h}'^\pi = \widehat{\mathbb{h} \mathbb{h}}$$

$${}^\beta \mathbb{1}_\alpha \mathbf{x} {}_\beta \gamma_\alpha \mathbf{x} \gamma^\alpha = \mathbb{1}_\alpha \mathbf{x} \underline{\Delta \gamma^\alpha} \Leftrightarrow$$

$$\mathbb{h}^\pi \underline{\mathbb{h}'^\pi \mathbb{1}} = \mathbb{h}^\pi \underline{\mathbb{1}_\nu^{\mathbb{h}} \gamma^\alpha} = \underline{\mathbb{h}^\pi \mathbb{1}_\alpha} {}^\mathbb{h} \gamma^\alpha = \underbrace{{}^\beta \mathbb{1}_{\alpha \beta} {}^\mathbb{h} \gamma^\alpha}_{{}^\beta \mathbb{1}_\alpha {}_\beta^{\mathbb{h}} \gamma^\alpha} = {}^\beta \mathbb{1}_\alpha \underbrace{{}^\mathbb{h} \gamma^\alpha}_{{}^\mathbb{h} \Delta \gamma^\alpha} = \mathbb{1}_\nu^{\mathbb{h} \mathbb{h}} \gamma^\alpha = \widehat{\mathbb{h} \mathbb{h}}^\pi \mathbb{1}$$

$$\underline{\mathbb{1} \times \mathbb{1}} \times \mathbb{K}^{\mathbb{H}} \xleftarrow{\pi} \underline{\mathbb{1} \times \mathbb{1}}$$

$$\pi \mathbb{1} = \mathbb{1}_\alpha \mathbf{x} \gamma^\alpha \varrho \mathbb{1} = \mathbb{1}_\beta \mathbf{x} \gamma^\beta \Rightarrow (\pi \mathbf{x} \varrho) \mathbb{1} \mathbf{x} \mathbb{1} = \mathbb{1}_\alpha \mathbf{x} \mathbb{1}_\beta \mathbf{x} \underline{\gamma^\alpha \gamma^\beta}$$

$$\begin{array}{ccc}
\underline{\mathbb{L} \times \mathbb{L} \times \frac{\mathbb{H}}{\Delta_\infty} \mathbb{K}} & \xleftarrow{\pi \mathbf{X} \varrho} & \mathbb{L} \times \mathbb{L} \\
\downarrow \iota \mathbf{X} \iota \mathbf{X} \mu & & \downarrow \pi \mathbf{X} \varrho \\
\underbrace{\mathbb{L} \times \mathbb{L} \times \frac{\mathbb{H}}{\Delta_\infty} \mathbb{K} \times \frac{\mathbb{H}}{\Delta_\infty} \mathbb{K}}_{\iota \mathbf{X} \Theta \mathbf{X} \iota} & \xleftarrow{\iota \mathbf{X} \Theta \mathbf{X} \iota} & \underbrace{\mathbb{L} \times \frac{\mathbb{H}}{\Delta_\infty} \mathbb{K} \times \mathbb{L} \times \frac{\mathbb{H}}{\Delta_\infty} \mathbb{K}}
\end{array}$$