

$$\mathbb{h}_{\Delta_{\infty}} \mathbb{h}_{\Delta \mathbb{K}} \xleftarrow{\quad \mathcal{L} \quad} \underbrace{\mathbb{h}_{\Delta_{\infty} \mathbb{K}}}_{n}$$

$$\mathbb{h}_{\Delta_{\infty}} \mathbb{h}_{\Delta \mathbb{K}} \ni \mathcal{L}^j \text{ dual standard basis } \mathcal{L}^i \star \mathcal{L}^j = \overset{*}{\mathcal{L}}^i \circledcirc \mathcal{L}^j = {}_i \mathcal{L} \circledcirc \mathcal{L}^j = \eta^{ij}$$

$$\mathbf{A} = \mathcal{L} \underbrace{\mathcal{L} \mathbf{A}}_{\mu} : \quad {}_{\mu} \delta^{\nu} = {}_{\mu} \mathcal{L} \mathcal{L}^{\nu}$$

$$\mathbf{A} = \mathcal{L} \underbrace{\mathcal{L} \mathbf{A}}_{\nu} : \quad \overset{*}{\mathcal{L}}^i \mathcal{L}^j = {}_i \delta^j = {}_i \mathcal{L} \mathcal{L}^j$$

$$\overset{*}{\mathcal{L}}^i = {}_i \mathcal{L}$$

$$\begin{array}{ccc} \mathbb{h}_{\Delta_{\infty}} \mathbb{h}_{\Delta \mathbb{K}} & \xleftarrow{\quad \mathcal{L} \quad} & \mathbb{h}_{\Delta_{\infty} \mathbb{K}} \\ \uparrow & \searrow & \uparrow \\ \mathbf{A} & & \mathbf{A} \\ \downarrow & \swarrow & \downarrow \\ \mathbb{h}_{\Delta_{\infty}} \mathbb{h}_{\Delta \mathbb{K}} & \xleftarrow{\quad \mathcal{L} \quad} & \mathbb{h}_{\Delta_{\infty} \mathbb{K}} \end{array}$$

$$\mathcal{L}^i \star \mathcal{L}^j = \begin{cases} \overset{*}{\mathcal{L}}^i \mathbf{A} \mathcal{L}^j = \mathbf{A}^{ij} \\ \overset{*}{\mathcal{L}}^i \mathbf{A} \mathcal{L}^j = {}_i \mathcal{L} \mathcal{L}^j = \mathbf{A}^j \end{cases}$$

$$\mathbb{h}_{\Delta_{\infty}} \mathbb{h}_{\Delta \mathbb{K}} \ni \begin{cases} \mathbf{A}^j = \mathbf{A}^j \mathcal{L}^j \\ \mathbf{A}^j = \mathbf{A}^j \mathcal{L}^j \end{cases} \text{ dual ONBasis}$$

$$\begin{cases} \mathbf{A}^j = \mathbf{A}^j \mathcal{L}^j \\ \mathbf{A}^j = \mathbf{A}^j \mathcal{L}^j \end{cases}$$

$$\begin{cases} \mathbf{A}^j \\ \mathbf{A}^j \end{cases} = {}_i \delta^j$$

$$\begin{cases} \mathbf{A}^i \star \mathbf{A}^j = \overset{*}{\mathbf{A}}^i \mathbf{A} \mathbf{A}^j = \overset{*}{\mathbf{A}}^i \widehat{\mathbf{A} \circledcirc \mathbf{A}} \mathbf{A}^j = \widehat{\mathbf{A}^i \mathbf{A} \circledcirc \mathbf{A}^j} = \widehat{\mathbf{A}^i} \widehat{\mathbf{A} \circledcirc \mathbf{A}} \widehat{\mathbf{A}^j} = {}_i \mathcal{L} \widehat{\mathbf{A} \circledcirc \mathbf{A}} \mathcal{L}^j = {}_i \mathcal{L} \circledcirc \mathcal{L}^j = \eta^{ij} \\ \mathbf{A}^i \star \mathbf{A}^j = \overset{*}{\mathbf{A}}^i \mathbf{A} \mathbf{A}^j = \overset{*}{\mathbf{A}}^i \widehat{\mathbf{A} \circledcirc \mathbf{A}} \mathbf{A}^j = \widehat{\mathbf{A}^i \mathbf{A} \circledcirc \mathbf{A}^j} = \widehat{\mathbf{A}^i} \widehat{\mathbf{A} \circledcirc \mathbf{A}} \widehat{\mathbf{A}^j} = {}_i \mathcal{L} \widehat{\mathbf{A} \circledcirc \mathbf{A}} \mathcal{L}^j = {}_i \mathcal{L} \circledcirc \mathcal{L}^j = \eta^{ij} \end{cases}$$

$$\mathbf{A} = \widehat{\mathbf{A}}^* \eta \circledcirc \widehat{\mathbf{A}} = \widehat{\mathbf{A}}^* \eta^{ij} \widehat{\mathbf{A}}_j$$

$$\mathbb{A} = \left\{ \begin{array}{c} \text{頂點} \\ \text{頂點} \\ \text{頂點} \end{array} \right\} \quad : \quad {}_i \delta^j = \left\{ \begin{array}{c} \text{頂點}^j \\ i \\ \text{頂點}^j \\ i \end{array} \right\}$$

$$A = \begin{cases} \begin{matrix} 1 & 0 \\ 0 & 1 \end{matrix} & : \quad \mu^\nu = \begin{cases} \begin{matrix} 1 & 0 \\ 0 & 1 \end{matrix} \\ \begin{matrix} 0 & 1 \\ 1 & 0 \end{matrix} \end{cases} \end{cases}$$

$$L_{\lambda}^j = \begin{cases} \overset{\circ}{\lambda} \underset{\lambda}{\cancel{\lambda}} \underset{\lambda}{\cancel{\lambda}} & = \overset{\circ}{\lambda} \underset{\lambda}{\cancel{\lambda}} \underset{\lambda}{\cancel{\lambda}} \\ \lambda \underset{\lambda}{\cancel{\lambda}} \underset{\lambda}{\cancel{\lambda}} & = \lambda \underset{\lambda}{\cancel{\lambda}} \underset{\lambda}{\cancel{\lambda}} \end{cases} L^j = \begin{cases} \overset{\circ}{\lambda} \underset{\lambda}{\cancel{\lambda}}^j & = \overset{\circ}{\lambda} \underset{\lambda}{\cancel{\lambda}}^j \\ \lambda \underset{\lambda}{\cancel{\lambda}}^j & = \lambda \underset{\mu}{\cancel{\lambda}}^j \end{cases}$$

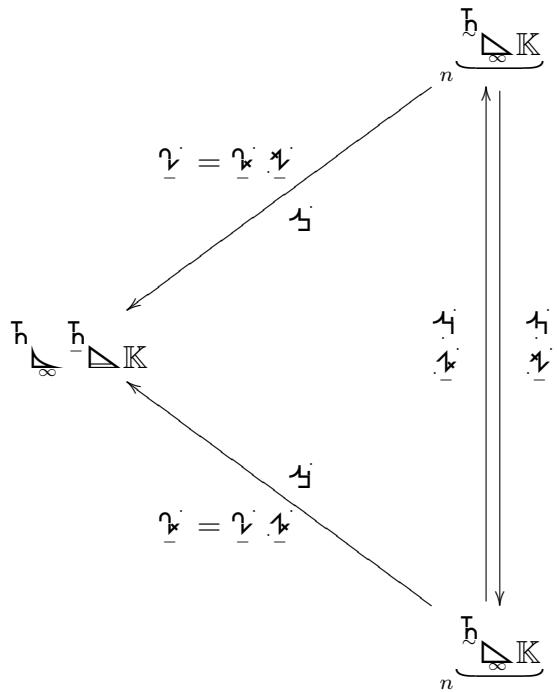
$$\mathcal{L}_{\cdot \cdot 1} = \begin{cases} \mathcal{L}_{\cdot \cdot 1} & = \mathcal{L}_{\cdot \cdot 1} \\ \mathcal{L}_{\cdot \cdot 1} & = \mathcal{L}_{\cdot \cdot 1} \end{cases} \quad \mathcal{L}_{\nu} = \begin{cases} \mathcal{L}_{\cdot \cdot \nu} & = \mathcal{L}_{\cdot \cdot \nu} \\ \mathcal{L}_{\cdot \cdot \nu} & = \mathcal{L}_{\cdot \cdot \nu} \end{cases}$$

$$\begin{cases} \mathfrak{A}^j = \mathbb{L} \underbrace{\mathfrak{A}}_{\lambda}^j = \mathfrak{A} \mathbb{L}^j \\ \mathfrak{A}^j = \mathbb{L}^j \underbrace{\mathfrak{A}}_{\lambda} = \mathfrak{A} \mathbb{L}^j \end{cases} \quad \begin{cases} \mathfrak{A}^j = \mathbb{L}^{\lambda} \underbrace{\mathfrak{A}}_{\lambda}^j = \mathfrak{A} \mathbb{L}^j \\ \mathfrak{A}^j = \mathbb{L}^j \underbrace{\mathfrak{A}}_{\lambda} = \mathfrak{A} \mathbb{L}^j \end{cases}$$

$$\left\{ \begin{array}{l} \overset{\circ}{\lambda} \cdot 4 = \lfloor \underbrace{\overset{\circ}{\lambda} \cdot 4}_{\cdot 4} \rfloor = \overset{\circ}{\lambda} \lfloor \cdot 4 \rfloor \\ \cdot 4 = \lfloor \cdot \underbrace{4}_{4} \rfloor = \lfloor \cdot 4 \rfloor \end{array} \right\} \left\{ \begin{array}{l} \overset{\circ}{\lambda} \nu = \lfloor^k \overset{\circ}{\lambda} \nu \rfloor_k = \overset{\circ}{\lambda} \lfloor^{\nu} \\ \nu = \lfloor^k \nu \rfloor_k = \lfloor^{\nu} \end{array} \right.$$

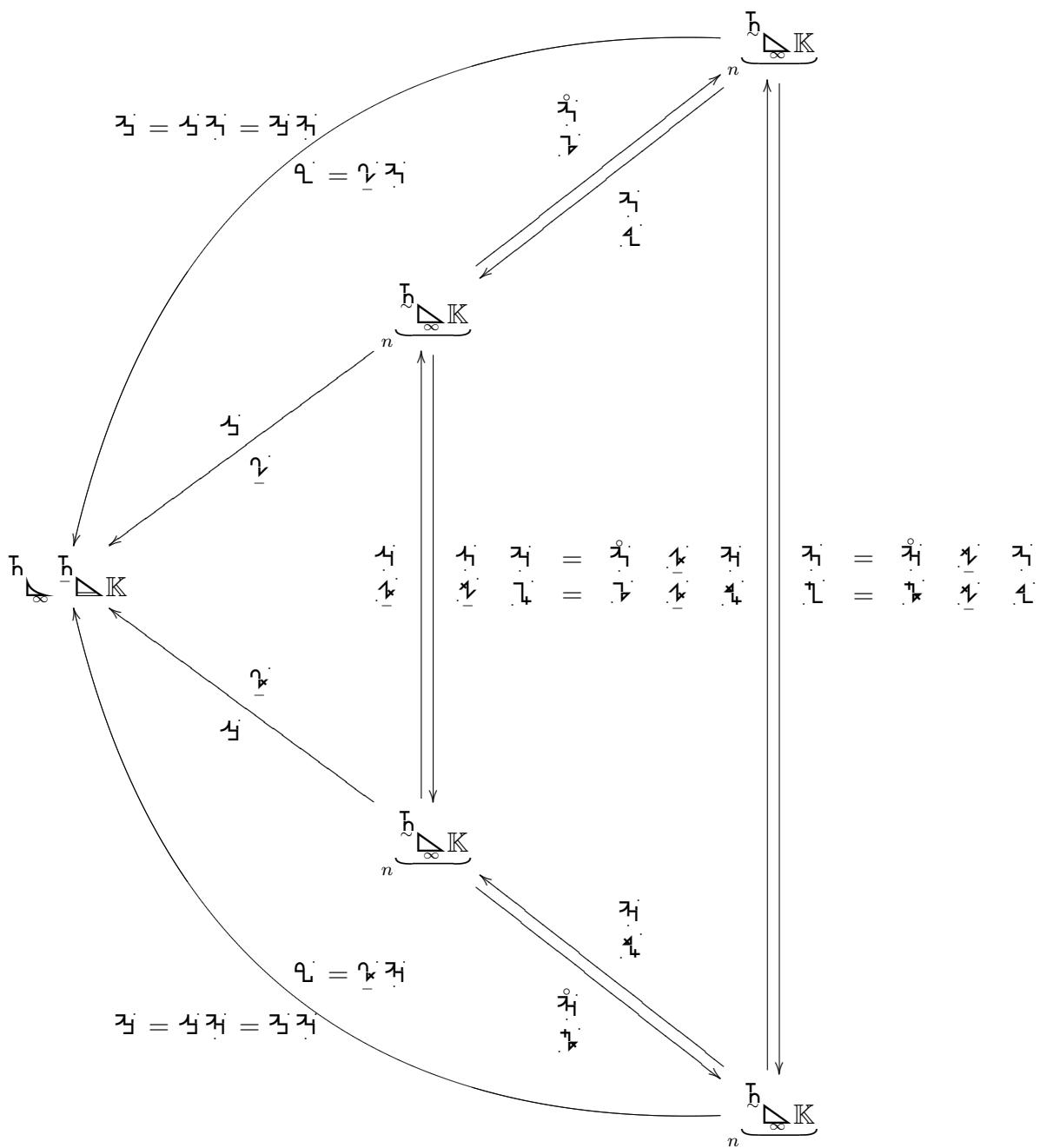
$$\begin{cases} \underline{\alpha}^j = \underline{\mu} \underline{\alpha}^j = \underline{\alpha} \underline{\mu}^j \\ \underline{\epsilon}^j = \underline{\mu} \underline{\epsilon}^j = \underline{\epsilon} \underline{\mu}^j \end{cases}$$

$$\left\{ \begin{array}{l} \text{---} \\ \text{---} \end{array} \right. \begin{array}{l} \text{---} \\ \text{---} \end{array} = \underbrace{\text{---}}_{\text{---}} \left\{ \begin{array}{l} \text{---} \\ \text{---} \end{array} \right. \begin{array}{l} \text{---} \\ \text{---} \end{array} = \underbrace{\text{---}}_{\text{---}}$$



$\mathbb{L}^\dagger \mathbb{K}^\dagger \subset \gamma^\nu$ dual holonomic basis

$$\gamma^\mu = \underbrace{\gamma_\mu \gamma^\nu}_{\gamma^\mu} \gamma_\nu: \quad \gamma_\mu \delta^\nu = \underbrace{\gamma_\mu \gamma^\nu}_{\delta^\nu}$$



$$\mathbb{K}_{\infty}^n \otimes \mathbb{K}_{\infty}^{n*} \ni \begin{cases} \alpha^j \\ \beta^j \end{cases} \quad \text{dual ONbasis } \alpha^i \otimes \alpha^j = \eta^{ij}$$

$$\alpha = \begin{cases} \alpha \alpha \alpha \\ \alpha \alpha \alpha \end{cases} \quad : \quad i \delta^j = \begin{cases} \alpha \alpha \alpha^j \\ i \alpha \alpha^j \end{cases}$$

$$\begin{cases} \underline{\gamma}^j \underline{\alpha} = \underline{\gamma}^j \underline{\alpha} \\ \underline{\alpha}^j = \underline{\gamma}^j \underline{\alpha} \end{cases} \quad \begin{cases} \underline{\gamma}^j = \underline{\gamma}^j \underline{\alpha} \\ \underline{\alpha}^j = \underline{\gamma}^j \underline{\alpha} \end{cases}$$

$$\underline{\gamma}^j \underline{\alpha} = \begin{cases} \underline{\gamma}^j \underline{\alpha} \\ \underline{\alpha}^j \underline{\alpha} \end{cases} \quad ; \quad \underline{\gamma}^j = \begin{cases} \underline{\gamma}^j \underline{\alpha} \\ \underline{\alpha}^j \underline{\alpha} \end{cases}$$

$$\begin{cases} \underline{\gamma}^j \underline{\alpha} = \underline{\gamma}^j \underline{\alpha} \\ \underline{\alpha}^j = \underline{\alpha}^j \underline{\alpha} \end{cases} \quad \begin{cases} \underline{\gamma}^j = \underline{\gamma}^j \underline{\alpha} \\ \underline{\alpha}^j = \underline{\alpha}^j \underline{\alpha} \end{cases}$$

$$\begin{cases} \underline{\gamma}^j \underline{\alpha} = \underline{\gamma}^j \underline{\alpha} \\ \underline{\alpha}^j = \underline{\gamma}^j \underline{\alpha} \end{cases} \quad \begin{cases} \underline{\gamma}^j = \underline{\gamma}^j \underline{\alpha} \\ \underline{\alpha}^j = \underline{\gamma}^j \underline{\alpha} \end{cases}$$

