

$${}^m\mathbb{K}_{m+n}^{\cup} = \frac{\mathbb{K} \in {}^m\mathbb{K}_{m+n}}{\mathbb{K}^* = I_m} = \left\{ \mathbb{K}_m \xrightarrow[\text{mono-metric}]{\mathbb{K}} \mathbb{K}_{m+n} \right\} \text{cpt}$$

$${}^m\mathbb{K}_{m+n}^{\cup} \leftarrow {}^m\mathbb{K}_m^{\cup} \times {}^m\mathbb{K}_{m+n}^{\cup}$$

$$\mathbb{K} \leftarrow \mathbb{K}^*$$

$$(\mathbb{K} \mathbb{K}^*) (\mathbb{K}^* \mathbb{K}) = \mathbb{K} (\mathbb{K} \mathbb{K}^*) \mathbb{K}^* = \mathbb{K} I_m \mathbb{K}^* = \mathbb{K} \mathbb{K}^* = I_m$$