$$
{}^{n}\mathbb{K}_{n}^{\cup} = \begin{cases} \triangleleft\!\Gamma \in {}^{n}\mathbb{K}_{n} \\ \overset{-1}{\triangleleft\!\Gamma} = \overset{*}{\triangleleft\!\Gamma} \end{cases} \ni e = 1
$$

$$
\begin{cases} \Gamma^{\overset{\cup\ni}{\triangledown}_{0}}\,\Gamma \\ {}^{n}\mathbb{K}_{n}^{\ni\oplus} \end{cases} = \frac{\lrcorner\!\Gamma \in \begin{cases} \Gamma^{\overset{\ni}{\triangledown}_{0}}\,\Gamma \\ {}^{n}\mathbb{K}_{n}^{\ni} \end{cases}}{\begin{bmatrix} 1 & \lrcorner\!\Gamma \end{bmatrix} \begin{array}{c|c} 1 & 0 \\ \hline 0 & -1 \end{array} \begin{bmatrix} 1 \\ \overset{*}{\lrcorner\!\Gamma} \end{bmatrix} = 1 - \lrcorner\!\Gamma\,\overset{*}{\lrcorner\!\Gamma} = 0} \ni e = 1
$$

$$
{}^{n}\mathbb{K}_{n}^{\uplus\cup} = {}^{n}\mathbb{K}_{n}^{\uplus} \cap {}^{n}\mathbb{K}_{n}^{\cup}
$$