$$ {}^{z}\varphi_{\zeta} = \frac{\zeta - z}{1 - z\bar{\zeta}} $$

$$ b \in \underset{<}{\mathbb{C}} \Longrightarrow {}^{z}\gamma_{b} = 1 | z \frac{\begin{array}{c|c} 1 & b \\ \hline \overset{*}{b} & 1 \end{array}}{} = \frac{b + z}{1 + z\overset{*}{b}} \Longrightarrow {}^{0}\gamma_{-b} = 1 - \overline{b}^{2} $$

$$ \frac{\begin{array}{c|c} 1 & b \\ \hline \overset{*}{b} & 1 \end{array}}{}^{-1} = \frac{\begin{array}{c|c} 1 & -b \\ \hline \overset{*}{-b} & 1 \end{array}}{} \Longrightarrow \gamma_{b}^{-1} = \gamma_{-b} $$

$$ k^{-1} \gamma_{b} k = \gamma_{bk} $$

$$ {}^{z}\sigma_{b} = - {}^{z}\gamma_{-b} = - \gamma_{b}^{-1} $$

$$ {}^{0}\sigma_{b} = - {}^{0}\gamma_{-b} = - (-b) = b $$

$$ {}^{b}\sigma_{b} = - {}^{b}\gamma_{-b} = - {}^{b}\gamma_{b}^{-1} = -0 = 0 $$

$$ \sigma_{b} \sigma_{b} = \imath $$

$$ \sigma_{b} \sigma_{b} = \gamma_{-b} (-\imath) \gamma_{-b} (-\imath) = \gamma_{-b} \gamma_{b} = \imath $$