$$R = \cosh\left(\frac{\alpha}{2}\right) + \sinh\left(\frac{\alpha}{2}\right)\boldsymbol{\gamma_t} \wedge \boldsymbol{\gamma_x}$$

$$t\boldsymbol{\gamma_t} + x\boldsymbol{\gamma_x} = t'\boldsymbol{\gamma'_t} + x'\boldsymbol{\gamma'_x} = R\left(t'\boldsymbol{\gamma_t} + x'\boldsymbol{\gamma_x}\right)R^\dagger$$

$$t\boldsymbol{\gamma_t} + x\boldsymbol{\gamma_x} = \left(t'\cosh\left(\alpha\right) - x'\sinh\left(\alpha\right)\right)\boldsymbol{\gamma_t} + \left(-t'\sinh\left(\alpha\right) + x'\cosh\left(\alpha\right)\right)\boldsymbol{\gamma_x}$$

$$\sinh\left(\alpha\right) = \gamma\beta$$

$$\cosh\left(\alpha\right) = \gamma$$

$$t\boldsymbol{\gamma_t} + x\boldsymbol{\gamma_x} = \gamma\left(-\beta x' + t'\right)\boldsymbol{\gamma_t} + \gamma\left(-\beta t' + x'\right)\boldsymbol{\gamma_x}$$