

ADVANCED DYNAMICS — PHY 4241/5227
SOLUTIONS – SET 10

(36) One finds

$$\begin{pmatrix} x'^1 \\ i x'^0 \end{pmatrix} = \begin{pmatrix} \cosh(\zeta) & i \sinh(\zeta) \\ -i \sinh(\zeta) & \cosh(\zeta) \end{pmatrix} \begin{pmatrix} x^1 \\ i x^0 \end{pmatrix}$$

and in components

$$\begin{aligned} x'^1 &= \cosh(\zeta) x^1 - \sinh(\zeta) x^0 \\ i x'^0 &= -i \sinh(\zeta) x^1 + i \cosh(\zeta) x^0 \end{aligned}$$

or, equivalently,

$$\begin{aligned} x'^0 &= +\cosh(\zeta) x^0 - \sinh(\zeta) x^1 \\ x'^1 &= -\sinh(\zeta) x^0 + \cosh(\zeta) x^1 \end{aligned}$$
$$\begin{pmatrix} x'^1 \\ x'^0 \end{pmatrix} = \begin{pmatrix} \cosh(\zeta) & -\sinh(\zeta) \\ -\sinh(\zeta) & \cosh(\zeta) \end{pmatrix} \begin{pmatrix} x^1 \\ x^0 \end{pmatrix}$$