

The adjoint

$$\begin{aligned}\text{Exp}(\varepsilon \tau) \mathcal{X} &= \mathcal{X} \text{Exp}(\mathcal{X} \tau) \\ \exp(\varepsilon \tau^\wedge) &= \mathcal{X} \exp(\mathcal{X} \tau^\wedge) \mathcal{X}^{-1} = \exp(\mathcal{X} \mathcal{X} \tau^\wedge \mathcal{X}^{-1}) \\ \varepsilon \tau^\wedge &= \mathcal{X} \mathcal{X} \tau^\wedge \mathcal{X}^{-1}\end{aligned}$$

