

$$\rho_a = \begin{pmatrix} \epsilon & \theta \\ \theta & \theta \end{pmatrix}; \quad \rho_X = \begin{pmatrix} \theta & 1 \\ \theta & \theta \end{pmatrix}; \quad \text{exp} = \text{MatrixExp};$$

$$\text{Simplify} \left[\text{exp}[\alpha_i \rho_a] \cdot \text{exp}[\xi_i \rho_X] \cdot \text{exp}[\alpha_j \rho_a] \cdot \text{exp}[\xi_j \rho_X] == \right. \\ \left. \text{exp}[(\alpha_i + \alpha_j) \rho_a] \cdot \text{exp}[(e^{-\epsilon \alpha_j} \xi_i + \xi_j) \rho_X] \right]$$