

ASSUME $Q = S D S^{-1}$

$$e^{AQ} = \sum_{n=0}^{\infty} \frac{1}{n!} (AQ)^n = \sum_{n=0}^{\infty} \frac{1}{n!} A^n (S D S^{-1})^n$$

$$= \sum_{n=0}^{\infty} \frac{1}{n!} A^n S D^n S^{-1} = S \sum_{n=0}^{\infty} \frac{1}{n!} A^n D^n S^{-1} = S e^{AD} S^{-1}$$