

Angle Axis

1. to Rotation Matrix

$$\textcircled{1} \quad R = e^{\theta \hat{r}_x} = I + s\theta \hat{r}_x + (1-c\theta) \hat{r}_x^2 \\ = c\theta I + (1-c\theta) \hat{r}_x \hat{r}_x^T + s\theta \hat{r}_x$$

$$\textcircled{2}, \therefore R = A \begin{pmatrix} 1 & & \\ & 1 & \\ & & 1 \end{pmatrix}$$

$$+ (1-c\theta) \begin{pmatrix} r_1 \\ r_2 \\ r_3 \end{pmatrix} (r_1 \ r_2 \ r_3)$$

$$+ s\theta \cdot \begin{pmatrix} 0 & -r_3 & r_2 \\ r_3 & 0 & -r_1 \\ -r_2 & r_1 & 0 \end{pmatrix}$$