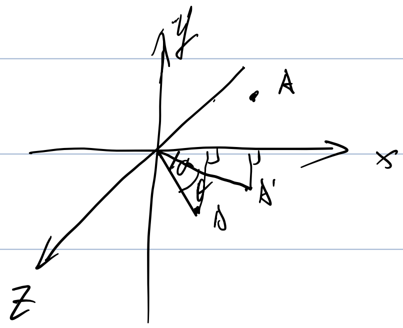

$A(x, y, z) \Rightarrow A'(x', y', z')$

绕Z轴:

$$\begin{cases} x' = r\cdot\cos(\alpha-\theta) \\ y' = r\cdot\sin(\alpha-\theta) \\ z' = z \end{cases}$$

$$\Rightarrow \begin{cases} x' = r\cdot(\cos\alpha\cos\theta + \sin\alpha\sin\theta) \\ y' = r\cdot(\sin\alpha\cos\theta - \sin\theta\cos\alpha) \\ z' = z \end{cases}$$

$$\Rightarrow \begin{cases} x' = \cos\theta\cdot x + \sin\theta\cdot y \\ y' = -\sin\theta\cdot x + \cos\theta\cdot y \\ z' = z \end{cases}$$

$$\Rightarrow \begin{pmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} \cos\theta x + \sin\theta y \\ \cos\theta y - \sin\theta x \\ z \end{pmatrix}$$

绕Y轴:

$$\begin{cases} x' = r\cdot\cos(\alpha-\theta) \\ y' = y \\ z' = r\cdot\sin(\alpha-\theta) \end{cases}$$

$$\Rightarrow \begin{cases} x' = r(\cos\theta\cos\alpha + \sin\alpha\sin\theta) \\ y' = y \\ z' = r(\sin\alpha\cos\theta - \sin\theta\cos\alpha) \end{cases}$$

$$\Rightarrow \begin{cases} x' = \cos\theta \cdot x + z \cdot \sin\theta \\ y' = y \\ z' = z\cos\theta - x\sin\theta \end{cases}$$

$$\Rightarrow \begin{pmatrix} \cos\theta, & 0, & \sin\theta \\ 0 & , 1 & , 0 \\ -\sin\theta & , 0 & , \cos\theta \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix}$$