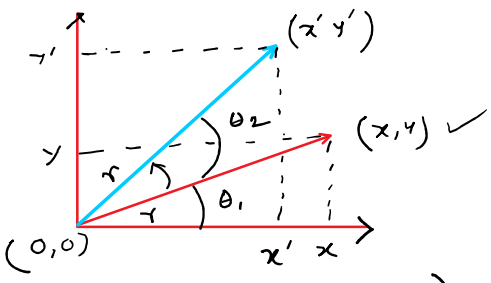
Rotation Matrices Part 2

Friday, May 26, 2023 6:00 PM



$$x' = r\cos(\theta_1 + \theta_2)$$

$$= r(\cos\theta_1 \cdot \cos\theta_2 - \sin\theta_1 \sin\theta_2)$$

$$= x\cos\theta_2 - y\sin\theta_2$$

$$\cos\theta_1 = \frac{x}{r} \quad r\cos\theta = \frac{b}{h} \quad \sin\theta = \frac{P}{h}$$

$$y' = r\sin(\theta_1 + \theta_2)$$

$$= r(\sin\theta_1 \cos\theta_2 + \cos\theta_1 \cdot \sin\theta_2)$$

$$y' = y\cos\theta_2 + x\sin\theta_2$$

$$\sin\theta_1 = \frac{y}{r}$$

$$y = r\sin\theta_1$$

$$R_\theta \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} x' \\ y' \end{pmatrix}$$

R_θ = Orthogonal

Orthogonal Matrix × Vector =

$R_\theta = ?$

$$\begin{pmatrix} \cos\theta_2 & -\sin\theta_2 \\ \sin\theta_2 & \cos\theta_2 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} x\cos\theta_2 - y\sin\theta_2 \\ x\sin\theta_2 + y\cos\theta_2 \end{pmatrix}$$

R_θ