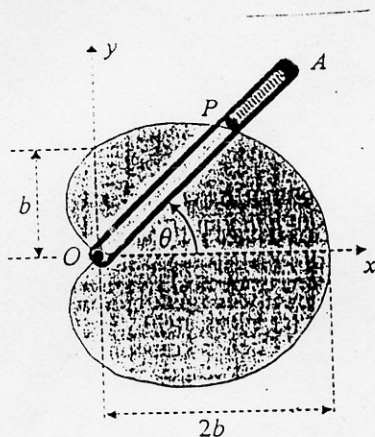


7.16)



$$\vec{V} = \dot{r} \vec{e}_r + r \dot{\theta} \vec{e}_\theta$$

$$\vec{a} = (\ddot{r} - r\dot{\theta}^2) \vec{e}_r + (2\dot{r}\dot{\theta} + r\ddot{\theta}) \vec{e}_\theta$$

$$r = b(1 + \cos \theta) \quad \dot{\theta} = \omega = \text{const} \Rightarrow \ddot{\theta} = 0$$

$$\dot{r} = -b\dot{\theta} \sin \theta = -b\omega \sin \theta \Rightarrow \ddot{r} = -b\ddot{\theta} \sin \theta - b\omega^2 \cos \theta$$

$$\theta = 0: \quad \vec{e}_r = \vec{e}_x \quad \vec{e}_\theta = \vec{e}_y$$

$$\vec{V} = 2b\omega \vec{e}_\theta = 2b\omega \vec{e}_y$$

$$\vec{a} = -3b\omega^2 \vec{e}_r = -3b\omega^2 \vec{e}_x$$

$$\theta = \frac{\pi}{2}: \quad \vec{e}_r = \vec{e}_y \quad \vec{e}_\theta = -\vec{e}_x$$

$$\vec{V} = -b\omega \vec{e}_r + b\omega \vec{e}_\theta =$$

$$= -b\omega \vec{e}_y - b\omega \vec{e}_x =$$

$$= -b\omega \vec{e}_x - b\omega \vec{e}_y$$

$$\vec{a} = -b\omega^2 \vec{e}_r - 2b\omega^2 \vec{e}_\theta =$$

$$= -b\omega^2 \vec{e}_y + 2b\omega^2 \vec{e}_x =$$

$$= 2b\omega^2 \vec{e}_x - b\omega^2 \vec{e}_y$$

$$\theta = \pi: \quad \vec{e}_r = -\vec{e}_x \quad \vec{e}_\theta = -\vec{e}_y$$

$$\vec{V} = \vec{0}$$

$$\vec{a} = b\omega^2 \vec{e}_r = -b\omega^2 \vec{e}_x$$

$$\theta = \frac{3\pi}{2}: \quad \vec{e}_r = -\vec{e}_y \quad \vec{e}_\theta = \vec{e}_x$$

$$\vec{V} = b\omega \vec{e}_r + b\omega \vec{e}_\theta =$$

$$= -b\omega \vec{e}_y + b\omega \vec{e}_x =$$

$$= b\omega \vec{e}_x - b\omega \vec{e}_y$$

$$\vec{a} = -b\omega^2 \vec{e}_r + 2b\omega^2 \vec{e}_\theta =$$

$$= b\omega^2 \vec{e}_y + 2b\omega^2 \vec{e}_x =$$

$$= 2b\omega^2 \vec{e}_x + b\omega^2 \vec{e}_y$$