第七章 第 1 次作业

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7-10

随凸轮转动，顶杆 AB 的底面距离 O 点的数值距离 h 为

$$h = R + OC \times \sin\varphi = R + e\sin\omega t$$

则速度为

$$v = \frac{\mathrm{d}h}{\mathrm{d}t} = e\omega\cos\omega t$$

当 $\varphi = \omega t = 0$ 时，$v = e\omega$。

7-18

$$y = O_1 A \times \sin\omega t = 0.1\sin 2t$$
$$v = \frac{\mathrm{d}y}{\mathrm{d}t} = 0.2\cos 2t$$
$$a = \frac{\mathrm{d}v}{\mathrm{d}t} = -0.4\sin 2t$$

$\varphi = 60°$时，

$$v = 0.2\cos\frac{\pi}{3} = 0.1m/s$$
$$a = -0.4\sin\frac{\pi}{3} = -0.346m/s^2$$

7-27

$$x_1 = 40mm \qquad \alpha = 2\mathrm{rad}/s^2 \qquad \omega_1 = 2\mathrm{rad}/s$$
$$a_e = \frac{\mathrm{d}^2 x}{\mathrm{d}t^2} = 80mm/s^2$$
$$a_r^n = \omega_1^2 x_1 \sin 60° = 138.564mm/s^2$$
$$a_r^t = \alpha x_1 \sin 60° = 69.282mm/s^2$$
$$a_c = 2\omega_e \times v_r = 2\omega_1 v_r \sin 60° = 138.564mm/s^2$$
$$a_a = 355.5mm/s^2$$

7-31

$$\omega_{AB} = \frac{v}{r}\sin\theta\tan\theta$$
$$\alpha_{AB} = \frac{v^2}{r^2}\tan^3\theta(1+\cos^2\theta)$$

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