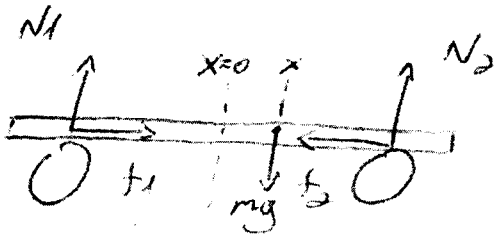


L.5901



$$\Sigma \vec{F} = f_1 - f_2 = \mu_1 N_1 - \mu_2 N_2 = \mu(N_1 - N_2)$$

$$mg\left(\frac{L}{2} - x\right) = N_2 L \quad \text{: EQUILIBRIUM OF THE RIGHT PART OF THE ROD}$$

$$mg\left(\frac{L}{2} - x\right) = N_1 L \quad \text{: EQUILIBRIUM OF THE LEFT PART OF THE ROD}$$

$$\Rightarrow N_1 = mg\left(\frac{L}{2} - \frac{x}{L}\right)$$

$$N_2 = mg\left(\frac{L}{2} - \frac{x}{L}\right)$$

$$\Rightarrow \Sigma \vec{F} = mg\mu\left(\frac{L}{2} - \frac{x}{L} - \frac{L}{2} - \frac{x}{L}\right) = -2\mu mg \frac{x}{L}$$

$$F = -kx$$

$$k = 2\mu mg/L$$

$$\omega = \sqrt{\frac{k}{m}} = \sqrt{\frac{2\mu g}{L}}$$

1_5201

$$m = 0.1 \text{ kg} \quad \theta = 10^\circ$$

$$L = \frac{1}{2} \text{ m}$$

(x) כפי שמוזכר בסעיף, המערכת היא מערכת מסוג פשוט תהיה

המערכת היא מסוג פשוט. $\theta \approx \frac{x}{L} \ll 1$ קירוב יהיה מקובל יותר.

$$ma = -mg \sin \theta \approx -mg \theta$$

$$a = \alpha L$$

$$\Rightarrow m \alpha = -m \frac{g}{L} \theta \Rightarrow \omega = \sqrt{\frac{g}{L}} =$$

$$T = 2\pi \cdot \sqrt{\frac{L}{g}} = 1.4 \text{ sec}$$

$$A = L \sin \theta$$

$$\theta_{\max} = \frac{A}{L} = 0.17 \text{ rad}$$

$$\Rightarrow \theta(t) = 0.17 \cos(4.47t)$$

$$t = \frac{T}{4} = 0.35 \text{ sec}$$

$$\dot{\theta}(t) = -0.17 \cdot 4.47 \sin(4.47t) =$$

$$= -0.76 \sin(4.47t)$$

$$t = \frac{T}{4} = \frac{2\pi}{4\omega} = \frac{\pi}{2\omega}$$

$$\Rightarrow \dot{\theta}(t = \frac{T}{4}) = -0.76 \cdot \sin(\omega \cdot \frac{\pi}{2\omega}) = -0.76 \sin \frac{\pi}{2} = -0.76 \frac{\text{rad}}{\text{sec}}$$