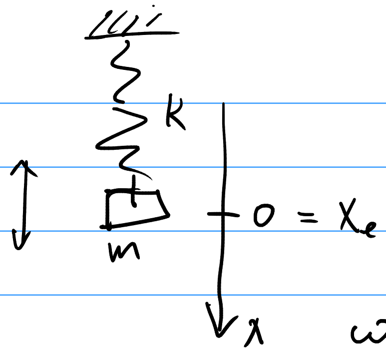


$$\omega = \sqrt{\frac{K}{m}}$$

$$\ddot{x} = -\omega^2 x$$

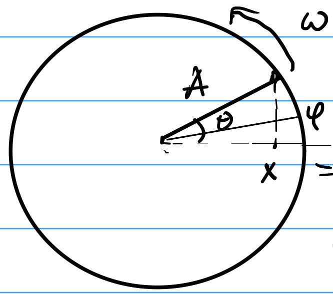
$$x(t) = A \cdot \cos(\omega t + \varphi)$$

$$v = \dot{x}(t) = -\omega A \sin(\omega t + \varphi)$$

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

$m \rightarrow T = 8s/10$

$\omega \Rightarrow \theta = \omega t + \varphi$



$\varphi = \theta(t=0)$

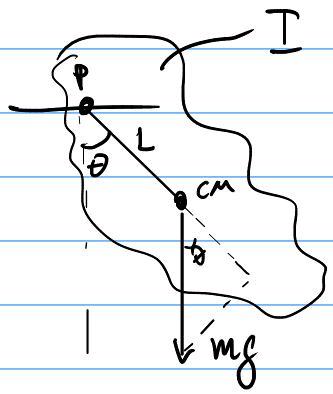
$x = A\cos\theta$

$x = A\cos(\omega t + \varphi)$

$v = -A\omega \sin(\theta)$

Physical Pendulum

$$\ddot{x} = -\omega^2 x$$



$$I\alpha = \tau = -mg\cdot L\cdot \sin\theta$$

$$I\cdot\ddot{\theta} = -mgL\sin\theta$$

$$\ddot{\theta} = -\frac{mgL}{I}\sin\theta = -\omega^2\sin\theta$$

$$\frac{mgL}{I} = \omega^2$$

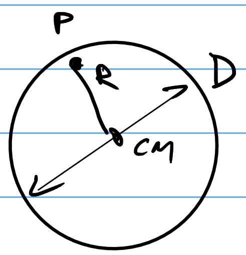
$$\omega = \sqrt{\frac{mgL}{I}}$$

$$I \sim c\cdot md^2$$

$\theta \ll 1\ \text{rad} \Rightarrow \sin\theta \approx \theta$

$$\ddot{\theta} = -\omega^2\theta$$

$$\theta(t) = \theta_A\cos(\omega t + \varphi)$$

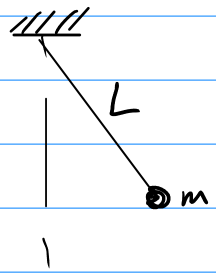


$T = 14.4\ s/10$

$$I_{cm} = mR^2$$

$$I_p = I_{CM} + mR^2 = 2mR^2$$

$$\omega = \sqrt{\frac{mgR}{2mR^2}} = \sqrt{\frac{g}{2R}} = \sqrt{\frac{g}{D}}$$



$$\omega = \sqrt{\frac{mgL}{I}} = \sqrt{\frac{mgL}{mL^2}} = \sqrt{\frac{g}{L}}$$

$$T = \frac{26s}{10}$$