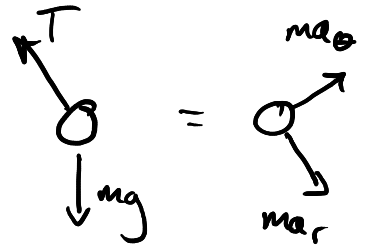


linear

$$\ddot{\theta} = -\frac{g}{L} \theta$$



$$\theta(t) = A \cos \omega t$$

$$\omega = \sqrt{\frac{g}{L}}$$

$$\dot{\theta}(t) = -\omega A \sin \omega t$$

$$\ddot{\theta}(t) = -\omega^2 \underbrace{A \cos \omega t}_{\theta(t)}$$

$$\ddot{\theta} = -\omega^2 \theta(t) = -\frac{g}{L} \theta(t)$$



$$T = \frac{2\pi}{\omega} = \frac{1}{f}$$

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

$$\overline{10T} =$$

	$T = 2\pi \sqrt{\frac{L}{g}}$	$\overline{10T} =$	error (s)
$L = 1 \text{ m}$	1.98 - 2.02 s	9.5, 9.68, 9.48, 11.15	0.07 s - 0.23 s
$L = 2 \text{ m}$	2.837 s	14.17, 14.15, 14, 13.66	0.13 s - 0.001 s

$$\frac{T_{2m}}{T_{1m}} = \frac{\cancel{2\pi}}{\cancel{2\pi}} \cdot \frac{\sqrt{\cancel{g}}}{\cancel{g}} \cdot \sqrt{\frac{2}{1}} = \sqrt{2}$$

errors from
equ \rightarrow

$$T = 2\pi \sqrt{\frac{L}{g}}$$

$$g = 9.81 \frac{m}{s^2} \pm 0.005 \frac{m}{s^2}$$

$$L = 1m \pm 0.02m$$