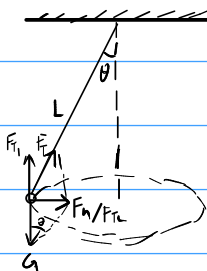


圆周，向心力常见模型

一、圆锥摆

① 等弧摆



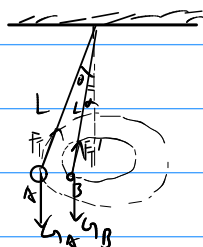
$$F_n = \vec{F}_T + G \quad \text{或} \quad F_n = F_{T2} \quad F_n = G \cdot \tan \theta = mg \cdot \tan \theta = m \omega^2 r$$

$$r = L \cdot \sin \theta$$

$$\omega = \sqrt{\frac{g \tan \theta}{r}} = \sqrt{\frac{g \tan \theta}{L \sin \theta}}$$

小球受2力作用 (F_T 与 G) 向心力是效果力, 不是性质力

向心力由拉力在水平方向上的分力提供或拉力与重力合力



$$m_A = m_B = m$$

$$r_A = L \cdot \sin \theta_A \quad r_B = L \cdot \sin \theta_B$$

$$F_{nA} = mg \tan \theta_A \quad F_{nB} = mg \tan \theta_B$$

$$g \tan \theta_A = \omega_A^2 r_A$$

$$g \tan \theta_B = \omega_B^2 r_B$$

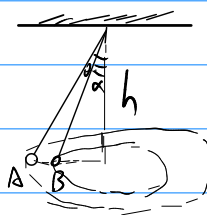
$$g \tan \theta_A = \frac{v_A^2}{r_A} \quad g \tan \theta_B = \frac{v_B^2}{r_B}$$

$$mg \tan \theta_A = m \left(\frac{v_A}{r_A} \right)^2 \cdot r_A = m \left(\frac{v_A}{L} \right)^2 L \sin \theta_A$$

$$mg \tan \theta_B = m \left(\frac{v_B}{L} \right)^2 L \sin \theta_B$$

T 不同, ω 不同, F_n 不同, v 不同

② 等高摆



$$m_A = m_B = m$$

$$r_A = h \tan \theta \quad r_B = h \tan \theta$$

$$F_n = m \frac{v^2}{r} = m \omega^2 r = m \left(\frac{v}{L} \right)^2 r$$

T 相同 F_n 不同 v 不同

$$\begin{cases} F_n = m \omega^2 r = mg \tan \theta \\ r = h \tan \theta \end{cases}$$

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

ω 不变