3 masse → 3 eq. del moto → 3 leggi orarie

1 coordinata → a

$$\begin{cases} \tau_2 - \tau_1 - F_a = m_1 a \\ \tau_1 - F_a = m_2 a \\ m_3 g - \tau_2 = m_3 a \end{cases} \qquad F_a = 0 \qquad \begin{cases} \tau_2 - \tau_1 = m_1 a \\ \tau_1 = m_2 a \\ m_3 g - \tau_2 = m_3 a \end{cases}$$

$$m_3 g = (m_1 + m_2 + m_3) a$$

$$a = \frac{m_3}{m_1 + m_2 + m_3} g = 1.6 \ \frac{m}{s^2}$$

$$\tau_1 = 3.2 \ N$$

$$\tau_2 = (m_1 + m_2) a = 8.17 N$$

$$m_3 g - 2F_a = 0$$

$$F_a = \frac{m_3 g}{2} \leq \mu_s N$$

$$\mu_s = \frac{F_a}{N} = \frac{m_3 g}{2 N}$$

$$N = m_1 g$$

$$m_3 \frac{g}{2} \leq \mu_s m_1 g$$

$$\mu_s \geq \frac{m_3}{2 m_1}$$

$$a = \frac{m_3 - 2\mu_d m_1}{m_1 + m_2 + m_3} g$$

$$\begin{cases} -Mg + \tau = 0 \\ -mg + \tau\cos\theta = 0 \\ \tau \cancel{\sin\theta} = m\omega^2 l \cancel{\sin\theta} \end{cases}$$

$$\begin{cases} \tau = Mg \\ \tau\cos\theta = mg = \frac{Mg}{2} \Rightarrow \cos\theta = \frac{1}{2} \Rightarrow \theta = \frac{\pi}{3} \\ \tau = m\omega^2 l = \frac{M\omega^2 l}{2} \Rightarrow \omega = \sqrt{\frac{2g}{l}} \Rightarrow T = 2\pi\sqrt{\frac{l}{2g}} = 1.1\ s \end{cases}$$

$$\vec{\tau}_1 \equiv (0 - \quad)$$

$$\vec{\tau}_2 \equiv (\sin\theta\, Mg, -\cos\theta\, Mg) = Mg\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$

$$\tau_a = \vec{\tau}_1 + \vec{\tau}_2 \equiv \left(\sin\theta\, Mg, -Mg(1+\cos\theta)\right)$$

$$Mg\left(\frac{\sqrt{3}}{2}, -\frac{3}{2}\right)$$

$$|\tau_a| = Mg\sqrt{\frac{3}{4}+\frac{9}{4}} = Mg\sqrt{3} = 1.7\ N$$