$$N_{\perp} = mg \cdot cos(\theta)$$
$$F_{||} = mg \cdot sin(\theta)$$
$$f_{s,max} < \mu_{min} N$$
$$|f_k| = |\mu N|$$
$$a_{||} = g[sin(\theta) - \mu \cdot cos(\theta)]$$
$$\Sigma m_0 = 0 \ , \ T = 2T \ , \ a_1 = \pm 2a_2$$

$$\vec{\tau} = FRsin(FR), FR_{efc}$$
$$x, v, a, m, F, P$$
$$\theta, \omega, \alpha, I, \tau, L$$

$$x_1 \mp \theta_1 r_1 = x_2$$
$$v_1 \mp \omega_1 r_1 = v_2$$
$$a_1 \mp \alpha_1 r_1 = a_2$$

$$\vec{\tau} = I\alpha$$

$$I_{new} = I_{c.m.} + ms^2$$
$$\frac{1}{2}, 1, \frac{2}{5}MR^2, \frac{1}{12}\frac{1}{3}Ml^2$$

$$E_f = E_i + W$$
$$W = \int F \cdot dx = -\mu_k \cdot N \cdot l$$
$$E \Rightarrow mg\Delta h + \frac{1}{2}k\Delta^2 + \frac{1}{2}mv^2$$

$$\omega^2 = \frac{k}{m}, \frac{g}{l}, m^* g\frac{C}{I}$$

$$\ddot{\vec{x}}_{(t)} = -(\omega^2)[\vec{x}_{(t)} - (x_{eq})]$$
$$x_{(t)} = A \cdot cos(\omega t + \phi) + x_{eq}$$
$$\overline{\underline{x_{t=0} = x_{eq} + D \ , \ \dot{x}_{t=0} = 0}} \Rightarrow A = D, \phi = 0$$
$$\overline{\underline{x_{t=0} = x_{eq} \ , \ \dot{x}_{t=0} = v_0}} \Rightarrow A = \frac{v_0}{\omega}, \phi = \frac{\pi}{2}$$
$$\vec{F}_{damped} = -b \cdot \vec{v} \Rightarrow \omega^2_{damped} = \omega^2_0 - (\frac{b}{2m})^2$$
$$x_{(t)damped} = A_{t=0} \cdot e^{-\frac{b}{2m}t} \cdot cos(\omega_{damped} \cdot t)$$
$$\vec{F}_{forced} = F_0 \cdot cos(w_{forced} \cdot t) \Rightarrow w_{forced} \approx \omega_0 \Rightarrow A \approx \infty$$

$$dm$$
$$\lambda \cdot dx, \sigma \cdot dxdy, \rho \cdot dxdydz$$
$$\lambda \cdot Rd\theta, \sigma \cdot rd\theta dr, \sigma \cdot rd\theta drdz$$
$$I = \Sigma mr^2 = \int r^2 \cdot dm$$

$$\Sigma \vec{F}_{ext} = M \cdot \frac{d\vec{v}}{dt} + \vec{U} \cdot |\dot{m}| \cdot (-1)_{out}$$
$$\vec{U} = \vec{v}_{small} - \vec{v}_{big}$$
$$\dot{m} = -\dot{M}$$

$$P \Rightarrow \Sigma m_i v_i = \Sigma m_i u_i$$

$$v_{\hat{\theta}} = \omega r$$
$$a_{\hat{r}} = \frac{v^2}{r} = \omega^2 r$$
$$\Delta h = R(1 - cos(\theta))$$

$$x_{c.m.} = \frac{\Sigma m_i x_i}{\Sigma m_i}$$

$$sin(0 \uparrow 1)$$
$$cos(1 \downarrow 0)$$
$$tan(0 \uparrow \infty)$$

$$x_{(t)} = x_0 + v_0 t + \frac{1}{2}at^2$$
$$v_{(t)} = v_0 + at \quad (\theta, \omega, \alpha)$$
$$y_{(x)} = x \cdot tan(\theta) - \frac{1}{2}g[\frac{x}{v_0 \cdot cos(\theta)}]^2$$
$$v^2_{(x)} = v^2_{(0)} + 2a\Delta x$$

$$E \Rightarrow \frac{1}{2}I\omega^2$$
$$\vec{L} \Rightarrow I\omega + mvR_{efc} = (\vec{R} \times \vec{P})$$

$$\left(\frac{r_1}{r_2}\right)^3 = \left(\frac{T_1}{T_2}\right)^2$$
$$F = G\frac{m_1 m_2}{r^2}$$
$$U_g = -G\frac{m_1 m_2}{r}$$
$$E_k = G\frac{mM}{2r} = -\frac{1}{2}U_g$$
$$E_{tot} = -G\frac{mM}{2r}$$

$$J = \Delta P = F \cdot t = \int F_{(t)} \cdot dt$$
$$v(t) = \int_0^t a_{(t)} \cdot dt = \frac{1}{m}\int_0^t F_{(t)} \cdot dt$$
$$\omega(t) = \int_0^t \alpha_{(t)} \cdot dt = \frac{1}{I}\int_0^t \tau_{(t)} \cdot dt = \frac{R_{efc}}{I}\int_0^t F(t) \cdot dt$$

חזרה לתרגילים