Équations à connaître

$$\Delta x = x - x_0$$

$$\bar{v} = \frac{\Delta x}{\Delta t} = \frac{x - x_0}{t - t_0}$$

$$\bar{a} = \frac{\Delta \mathrm{v}}{\Delta t} = \frac{v - v_0}{t - t_0}$$

$$v = v_0 + at$$

$$x = x_0 + v_0 t + \tfrac{1}{2} a t^2$$

$$a = g \sin\theta$$

$$A_x = x_2 - x_1 = A \cos\theta_A$$

$$A_y = y_2 - y_1 = A \sin\theta_A$$

$$A = \sqrt{A_x^2 + A_y^2 + A_z^2}$$

$$\theta = \tan^{-1}\left(\frac{A_y}{A_x}\right)$$

$$T = \frac{2\pi r}{v}$$

$$f = \frac{1}{T}$$

$$\vec{F} = m\vec{g}$$

$$\sum \vec{F} = m\vec{a}$$

$$f_s \leq \mu_s N$$

$$f_c = \mu_c N$$

$$\vec{F}_{AB} = \vec{F}_{BA}$$

$$K = \tfrac{1}{2} m v^2$$

$$U_g = mgy$$

$$E = K + U$$

$$E = E_0 + W_{nc}$$

$$\vec{p} = m\vec{v}$$

$$\omega = 2\pi f$$

$$\omega = \omega_0 + \alpha t$$

$$\theta = \theta_0 + \omega_0 t + \tfrac{1}{2}\alpha t^2$$

$$\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$$

$$\sum \tau = I\alpha$$

$$L = I\omega$$

$$L = rmv$$

Équations fournies

$$x = x_0 + \frac{v_0 + v}{2} \cdot t$$

$$v^2 = v_0^2 + 2a(x - x_0)$$

$$a_r = \frac{v_t^2}{r}$$

$$F_g = \frac{G m_1 m_2}{r^2}$$

$$\vec{P}_{app} = -\sum \vec{F}_{contact}$$

$$v_{orb} = \sqrt{\frac{GM}{r}}$$

$$U_{él} = \tfrac{1}{2} k x^2$$

$$\vec{A} \bullet \vec{B} = AB \cos\theta_{AB} = A_x B_x + A_y B_y + A_z B_z$$

$$W = \vec{F} \bullet \Delta\vec{r}$$

$$\vec{F}_{él} = -kx\vec{\imath}$$

$$W_{él} = -\tfrac{1}{2} k (x^2 - x_0^2)$$

$$\sum W = \Delta K$$

$$\bar{P} = \frac{W}{\Delta t} = \frac{\Delta E}{\Delta t}$$

$$\bar{P} = \vec{F} \bullet \vec{v}$$

$$\vec{J} = \vec{F} \cdot \Delta t = \Delta\vec{p}$$

$$\vec{r}_{CM} = \frac{\sum m_i \vec{r}_i}{M}$$

$$v_2 - v_1 = -(u_2 - u_1)$$

$$\Delta s = \Delta\theta \cdot r$$

$$v_t = \omega r$$

$$a_t = \alpha r$$

$$a_r = \omega^2 r$$

$$\frac{\omega_A}{\omega_B} = \frac{r_B}{r_A}$$

$$I = \sum m_i r_i^2$$

$$I = I_{CM} + Md^2$$

$$K_{rot} = \tfrac{1}{2} I_O \omega^2$$

$$\tau = \pm rF \sin\theta_{rF}$$

Constantes fournies

$$g = 9{,}81\ \frac{\mathrm{m}}{\mathrm{s}^2}$$

$$G = 6{,}674 \times 10^{-11}\ \frac{\mathrm{N \cdot m^2}}{\mathrm{kg^2}}$$

Équations optionnelles ou non essentielles

$$v = \lim_{\Delta t \to 0} \frac{\Delta x}{\Delta t} = \frac{\mathrm{d}x}{\mathrm{d}t}$$

$$a = \lim_{\Delta t \to 0} \frac{\Delta v}{\Delta t} = \frac{\mathrm{d}v}{\mathrm{d}t} = \frac{\mathrm{d}}{\mathrm{d}t}\left(\frac{\mathrm{d}x}{\mathrm{d}t}\right) = \frac{d^2x}{dt^2}$$

$$\bar{v} = \frac{v_0 + v}{2}$$

$$x = x_0 + \bar{v} \cdot t$$

$$v_x = v \cos\theta$$

$$v_y = v \sin\theta$$

$$s = s_0 + v_{t0} t + \tfrac{1}{2} a_t t^2$$

$$v_t = v_{t0} + a_t t$$

$$n = \frac{\Delta s}{2\pi r}$$

$$F_r = \frac{m v_t^2}{r}$$

$$T_{orb} = \frac{2\pi r}{v_{orb}}$$

$$W = F \cdot \Delta r \cdot \cos\theta_{F\Delta r} = F_x \Delta x + F_y \Delta \mathrm{y} + F_z \Delta \mathrm{z}$$

$$W_{ext} = -W_{él}$$

$$\sum \vec{p}_i = \sum \vec{p}_f$$

$$m_1\vec{u}_1 + m_2\vec{u}_2 = m_1\vec{v}_1 + m_2\vec{v}_2$$

$$\tfrac{1}{2} m_1 u_1^2 + \tfrac{1}{2} m_2 u_2^2 = \tfrac{1}{2} m_1 v_1^2 + \tfrac{1}{2} m_2 v_2^2$$

$$\Delta\theta = \theta - \theta_0$$

$$\bar{\omega} = \frac{\Delta\theta}{\Delta t}$$

$$\bar{\alpha} = \frac{\Delta\omega}{\Delta t}$$