Cinemática Traslacional

$v_f = v_i + at$

$d = \bar{v}t$

$\bar{v} = \dfrac{v_i + v_f}{2}$

$d = v_i t + \dfrac{1}{2}at^2$

$d = \dfrac{{v_f}^2 - {v_i}^2}{2a}$

$\bar{v} = \dfrac{d}{t}$

$\vec{v} = \dfrac{d\vec{s}}{dt}$

$\vec{a} = \dfrac{d\vec{v}}{dt}$

Cinemática Proyecciones

$A_y = \pm A \sin\theta_R$

$A_x = \pm A \cos\theta_R$

$|A| = \sqrt{(A_x)^2 + (A_y)^2}$

$\theta_R = \tan^{-1}(A_y/A_x)$

Cinemática Rotacional

$s = \theta R$

$v = \omega R$

$a = \propto R$

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

$\bar{\omega} = \dfrac{\theta}{t}$

$\omega_f = \omega_i + \alpha t$

$\bar{\omega} = \dfrac{\omega_i + \omega_f}{2}$

$\theta = \omega_i t + \dfrac{1}{2}\alpha t^2$

$\theta = \dfrac{{\omega_f}^2 - {\omega_i}^2}{2\alpha}$

Dinámica Traslacional

$\sum \vec{F} = m\vec{a}$ $\quad F = -kx$

$F_f = \mu N \quad F = -kx \quad Wt = mg$

$a_c = 4\pi^2 f^2 R \quad a_c = \omega^2 R$

$F_c = ma_c = \dfrac{mv^2}{R} = mr\omega^2 \quad a_c = \dfrac{v^2}{R}$

$F_c = \dfrac{4\pi^2 mR}{T^2} \quad F_c = 4\pi^2 mRf^2$

$\sum \vec{F} = \dfrac{\Delta\vec{p}}{\Delta t} \Rightarrow \dfrac{d\vec{p}}{dt} \quad \sum \vec{F} = 0$

$F = -mg\sin(\theta)$

Dinámica Espacial

$F_g = \dfrac{Gm_1m_2}{r^2}$

$v_e = \sqrt{\dfrac{2Gm_p}{R_p + h}}$

$g_p = \dfrac{Gm_p}{(R_p + h)^2}$

$T^2 = \dfrac{Gm_T}{(R_T + h)^2}$

$P_g = -\dfrac{Gm_1m_2}{r}$

$e = \sqrt{1 - \left(\dfrac{b}{a}\right)^2}$

$r_{max} = \dfrac{b^2}{(a-d)}$

$r_{min} = \dfrac{b^2}{(a+d)}$

$T^2 = \left(\dfrac{4\pi^2}{Gm}\right)r^3$

Dinámica Rotacional

$\tau = \pm FL = \pm rF\sin\theta_{r\perp F} \quad \overrightarrow{F_A} = -\overrightarrow{F_R}$

$\sum \vec{\tau} = \dfrac{\Delta\vec{L}}{\Delta t} \Rightarrow \dfrac{d\vec{L}}{dt} \quad \overrightarrow{\tau_A} = -\overrightarrow{\tau_R}$

$\sum \tau = I\alpha \quad \sum \vec{\tau} = I\vec{a} \quad \sum \vec{\tau} = 0$

Momento de Inercial

$I_{aro} = mR^2 \quad I_{particula} = mR^2$

$I_{disco} = \dfrac{1}{2}mR^2 \quad I_{esfera} = \dfrac{2}{5}mR^2$

$I = \sum_{i=1}^{n} m_i {r_i}^2 \Rightarrow \int r^2\,dm$

Trabajo y Energía

$EP = mgh \quad \Delta M = 0$

$EK = \dfrac{1}{2}mv^2 \quad EM = EP + EK$

$W = Fs\cos\theta_{F\perp s} \quad W_{nc} = \Delta M$

$W_{neto} = \Delta K \quad W = \int \vec{F}\cdot d\vec{s} \Rightarrow \vec{F}\cdot\vec{s}$

$P = \dfrac{W}{t} = Fv \quad P_e = \dfrac{1}{2}kx^2$

$W = \tau\theta \quad P = \tau\omega \quad EP = mgL(1 - \cos\theta)$

$\sum W_F = \Delta K_t \quad \sum W_\tau = \sum \tau\theta = \Delta K_r$

$Eff = \dfrac{W_o}{W_i} \times 100\% = \dfrac{P_o}{P_i} \times 100\% = \dfrac{VMA}{VMI} \times 100\%$

Impulso y Momentum

$\vec{p} = m\vec{v} \quad \Delta\vec{p} = m\Delta\vec{v} \quad \Delta\vec{p} = 0$

$\vec{J} = \vec{\tau}t \quad \vec{L} = \vec{I}\omega = \vec{r}\times\vec{p}$

$\vec{I} = \vec{F}t \quad \sum \vec{I} = \Delta\vec{p}$

$\sum \vec{J} = \overrightarrow{\Delta L} \quad \Delta\vec{L} = 0$

$K_r = \dfrac{1}{2}I\omega^2 \quad \vec{J} = \vec{r}\times\vec{F} \Rightarrow Fr$

$\vec{v}_{1A} - \overrightarrow{v_{2A}} = \vec{v}_{2D} - \vec{v}_{1D}$

$m_1\overrightarrow{v_1} + m_2\overrightarrow{v_2} = (m_1 + m_2)\vec{v}$

$m_1\vec{v}_{1A} + m_2\overrightarrow{v_{2A}} = m_1\vec{v}_{1D} + m_2\vec{v}_{2D}$