FÍSICA

MRU

$$X_f = X_0 + V \cdot (t - t_0)$$

$$V = \frac{X_f - X_0}{t_f - t_0}$$

MRUV

$$X_f = X_0 + V_0 (t_f - t_0) + \frac{1}{2} a (t_f - t_0)^2$$

$$V_f = V_0 - a \cdot t$$

$$a = \frac{V_0 - V_f}{t}$$

TIRO VERTICAL Y CAIDA LIBRE

$$y = y_0 + V_0 \cdot t - \frac{1}{2} g \cdot t^2$$

$$V_f = V_0 - g \cdot t$$

$$y_{max} = \frac{V_f^2 - V_0^2}{2 \cdot g} + h$$

MCU

$$\theta = \theta_0 + w \cdot t \qquad s = \varphi \cdot R$$

$$T = \frac{2\pi}{w} \qquad F = \frac{1}{T}$$

$$V = w \cdot R$$

$$a_n = \frac{V^2}{R} = w^2 \cdot R \qquad a_t = \alpha \cdot R.$$

MCUA

$$\theta = \theta_0 + w_0 \cdot t + \frac{1}{2} \alpha t^2$$

$$w = w_0 + \alpha t$$

$$w^2 = w_0^2 + 2 \alpha \theta$$

$$\gamma = \frac{w_f - w_0}{t}$$

ROZAMIENTO

$$Fre \leq \mu e \cdot N$$

$$Fre_{max} = \mu e \cdot N$$

$$Frd \leq \mu d \cdot N$$

$$Frd_{max} = \mu a \cdot N$$

ROZAMIENTO VISCOSO

$$\vec{Frv} = -k \vec{V}$$

$$k = 6\pi R \eta \qquad [k] = \frac{N \cdot s}{M}$$

$$F - k \cdot V = (F - k \cdot v_0) \, e^{-\frac{k}{M} (t - t_0)}$$

$$V = \frac{F}{k} \left[1 = e^{-\frac{k}{M} \cdot t} \right]$$

$$V = \frac{F}{k}$$

FUERZA GRAVITATORIA

$$Fg = \frac{G \, M_1 \cdot m_2}{r^2}$$

$$G = 6{,}673 \times 10^{-11} \frac{N \, m^2}{kg^2}$$

FUERZA ELASTICA

$$\vec{Fe} = -k \cdot \vec{\Delta x}$$

$$\Delta x = x - x_0.$$

MAS.

$$X = A \cdot \text{sen} (wt + \varphi)$$

$$V = \Delta w \cdot \cos (wt + \varphi)$$

$$a = -A w^2 \cdot \text{sen} (wt + \varphi) = -w^2 \cdot x$$

$$\frac{k}{m} = w^2$$

$$w = 2\pi f = \frac{2\pi}{T}$$

$$T = 2\pi \sqrt{l/g}$$

MCA

$$s = L \cdot \theta$$

$$a = \frac{V^2}{L}$$

$$\frac{d^2\theta}{dt^2} + \frac{g}{L} \cdot \text{sen}\, \theta = 0 \quad (\text{para } \theta \text{ pequeño})$$

$\theta(t) = \theta_0 \cdot \cos(\omega t + \varphi)$

$\omega = \sqrt{g/L} = \frac{2\pi}{T}$

$T = 2\pi \cdot \sqrt{L/g}$ (para pequeñas amplitudes)

TRABAJO Y ENERGÍA.

$W = F \cdot d$

$W = F \cdot d \cdot \cos\theta$ $\quad [W] = J = N \cdot M$

$W_{21} = \int_{r1}^{r2} \vec{F} \cdot d\vec{r}$ → usar esta.

$dW = F \cdot d\vec{r}$ (diferencial de trabajo)

$\text{Pot. media} = \frac{W_{21}}{\Delta t_{21}}$ $\quad [P] = \frac{J}{S} = \text{WATT}$

$\text{Pot. Inst} = \vec{F} \cdot V_{inst.}$ $\quad HP = 743\,W$

$1\,kwhora = 1000W \cdot 3600seg = 3600000\,J$

$E_c = \frac{1}{2} m \cdot v^2$ $\quad [E_c] = J$

$W = \Delta E_c$

$E_m = E_c + E_P$ $\quad (W_{FNC} = \Delta E_M)$

$E_P = m \cdot g \cdot H$ $\quad (W_{FC} = \Delta E_P)$

$E_{p\,elastica} = \frac{1}{2} \cdot k \cdot x^2$

$E_{c\,elast.} = \frac{1}{2} m \cdot w^2 [A^2 - x^2]$

$W_{Fg} = 6 \cdot m_1 \cdot m_2 \cdot \left(\frac{1}{r_2} - \frac{1}{r_1}\right)$

$W_{Fg} = -mgh$ (superficie terrestre)

FORMULAS FISICA PARTE 1.

HOJA N°

FECHA

CINEMATICA.

- MRU: $d = v \cdot t$ → distancia; $t = \frac{d}{v}$ → tiempo; $x = x_0 + v \cdot t$; $v = \frac{d}{t}$ → velocidad; $v_m = \frac{x - x_0}{t - t_0}$

- MRUV: $x = v_0 \cdot t \pm \frac{1}{2} a \cdot t^2$; $v_f = v_0 \pm a \cdot t$; $v_f^2 = v_0^2 \pm 2a \cdot \Delta x$; $a = \frac{v_f - v_0}{t_f - t_0}$

a (+) acelerado
a (-) retardado

- CAIDA LIBRE: $y = y_0 + v_0 \cdot t + \frac{1}{2} a \cdot t^2$; $v = v_0 + a \cdot t$; $t = \frac{v_f - v_0}{g}$; $h_{max} = \frac{v_0^2}{2g}$; $v_f^2 = v_0^2 + 2gh$; $t_{encuentro} = \frac{h}{v_1 + v_2}$

- TIRO LIBRE: $v_f^2 = v_0^2 - 2gh$; $h = v_0 \cdot t - g \cdot t^2$; $v_f = v_0 \cdot t + g \cdot t$

- TIRO OBLICUO: $y = H + v_{oy} \cdot t - \frac{1}{2} g \cdot t^2 = H + v$; $v_y = v_{oy} - g \cdot t = v_0 \cdot \text{sen}(\alpha) - g \cdot t$; $x = v_x \cdot t = v_0 \cdot \cos(\alpha) \cdot t$; $v_x = v_{ox} = v_0 \cdot \cos(\alpha)$; $a_x = 0$; $a_y = -g$; $x_{max} = \frac{v_0^2 \cdot \text{sen}\, 2\alpha}{g}$

- MCU: $\omega = 2\pi f$; $v_t = \omega \cdot R$; $v_t = 2\pi R f$; $\varphi = \varphi_0 + \omega \cdot t$; $T = \frac{2\pi}{\omega}$; $f = \frac{\omega}{2\pi}$; $f = \frac{1}{T}$; $\omega = \frac{2\pi}{T}$; $v = \frac{2\pi}{T} \cdot R$

- MCUA: $\varphi = \varphi_0 + \omega \cdot t + \frac{1}{2} \alpha \cdot t^2$; $\omega = \omega_0 + \alpha \cdot t$; $\omega^2 = \omega_0^2 + 2\alpha \, \Delta\varphi$; $t = \frac{\omega - \omega_0}{\alpha}$; $a_t = \alpha \cdot R$; $a_n = \frac{v^2}{R} = \omega^2 \cdot R$; $a = \sqrt{a_t^2 + a_n^2}$; $\alpha = \frac{\omega_f - \omega_0}{t}$

$\alpha = \gamma$

- MOVIMIENTO RELATIVO:

DINAMICA.

$F_{re} = \mu_e \cdot N$; $F_{rd} = \mu_d \cdot N$; Rozamiento viscoso $\Rightarrow F_{rv} = -k \cdot v^N$; $ic = 6\pi \cdot R \cdot \eta$; $F_g = G \cdot \frac{m_1 \cdot m_2}{r^2}$; $G = 6{,}673 \times 10^{-11} \frac{N \cdot m^2}{kg^2}$; $F_e = -k \cdot \Delta x$; $x = \Delta \cdot \text{sen}(\omega t + \varphi)$; $\frac{k}{m} = \omega^2$; $v = \Delta\omega \cdot \cos(\omega t + \varphi)$; $a = -\Delta\omega^2 \cdot \text{sen}(\omega t + \varphi) = -\omega^2 \cdot x$; $\omega^2 = g/l$; $T = 2\pi \sqrt{l/g}$; $F^* = m \cdot a_{O'/O}$

pequeñas amplitudes

HP = 745 WATT

J/S = WATT

TRABAJO Y ENERGIA

$W = F \cdot d$

$W = F \cdot d \cdot \cos\theta$

$W_{21} = \int_{r1}^{r2} F \cdot dr$

$P_m = \frac{W_{21}}{\Delta t_{21}}$

$P_{inst} = F \cdot V_{inst}$

F_c = elastica y Peso

$E_c = \frac{1}{2} m \cdot v^2$

$E_c = W_T$

$E_m = E_c + E_p$

$E_p = m \cdot g \cdot h$

$E_{p\,elastica} = \frac{1}{2} k \cdot x^2$

$E_p = -W_{FC}$

$\Delta E_m = W_{FNC}$

$E_{c\ en\ un\ MAS} = \frac{1}{2} m \cdot A^2 \omega^2 \cdot \cos^2(\omega t + \varphi)$

$W_{Fg} = G \cdot m_1 \cdot m_2 \left(\frac{1}{r_2} - \frac{1}{r_1}\right)$

$W_{Fg} = m \cdot g \cdot h$