

Cinematica e Moto

Moto rettilineo uniforme

$$v = \Delta s / \Delta t \quad | \quad s = s_0 + v \cdot t$$

Caduta libera

$$h = h_0 + v_0 \cdot t - \frac{1}{2} \cdot g \cdot t^2 \quad | \quad v = v_0 - g \cdot t$$

$$v^2 = v_0^2 - 2 \cdot g \cdot \Delta s$$

Moto parabolico

$$x = x_0 + v_x \cdot t \quad | \quad y = y_0 + v_{0y} \cdot t - \frac{1}{2} \cdot g \cdot t^2$$

Moto circolare uniforme

$$\omega = \Delta \theta / \Delta t \quad | \quad v_t = \omega \cdot R \quad | \quad a_c = v^2 / R$$

$$f = 1 / T \quad | \quad \omega = 2\pi / T$$

Moto armonico semplice

$$x(t) = A \cdot \sin(\omega t + \varphi)$$

$$v(t) = A \cdot \omega \cdot \cos(\omega t + \varphi)$$

$$a(t) = -A \cdot \omega^2 \cdot \sin(\omega t + \varphi)$$

Moto uniformemente accelerato

$$a = \Delta v / \Delta t \quad | \quad v = v_0 + a \cdot t$$

$$s = s_0 + v_0 \cdot t + \frac{1}{2} \cdot a \cdot t^2$$

$$v^2 = v_0^2 + 2 \cdot a \cdot \Delta s$$

Energia, Lavoro e Potenza

$$L = F \cdot s \cdot \cos\theta \quad | \quad L = \Delta K \quad | \quad E_i = E_f \quad | \quad P = L / t$$

$$K_i + U_i = K_f + U_f \quad | \quad U_{grav} = m \cdot g \cdot h$$

$$U_{el} = \frac{1}{2} \cdot k \cdot x^2 \quad | \quad K = \frac{1}{2} \cdot m \cdot v^2$$

Dinamiche e Forze

$$\Sigma F = 0 \text{ (equilibrio)}$$

$$\Sigma F = m \cdot a$$

Piano inclinato

$$P_x = m \cdot g \cdot \sin\theta \quad | \quad P_y = m \cdot g \cdot \cos\theta$$

$$N = P_y \quad | \quad F_a = \mu \cdot N$$

Forza elastica

$$F_e = k \cdot \Delta x$$

Pendolo semplice

$$F_x = -(m \cdot g / L) \cdot x \quad | \quad T = 2\pi \cdot \sqrt{L / g}$$

Quantità di moto / impulso

$$I = F \cdot \Delta t = \Delta p \quad | \quad p = m \cdot v \quad | \quad L = r \cdot p \cdot \sin\theta$$

$$M = F \cdot b \cdot \sin\theta$$

Gravitazione universale

$$F_G = G \cdot (m_1 \cdot m_2 / d^2)$$

Termologia e Termodinamica

$$\Delta l = \lambda \cdot l_0 \cdot \Delta T \quad | \quad Q = m \cdot c \cdot \Delta T = C \cdot \Delta T \quad | \quad Q = \lambda \cdot m$$

$$T_e = (m_1 c_1 T_1 + m_2 c_2 T_2) / (m_1 c_1 + m_2 c_2) \quad | \quad pV = nRT$$

$$T_k = T_c + 273.15$$

Trasformazioni

Isocora $L = 0 \rightarrow \Delta U = Q = c_v \cdot m \cdot \Delta T$

Isoterma $\Delta U = 0 \rightarrow Q = L = nRT \cdot \ln(V_f / V_i)$

Adiabatica $Q = 0 \rightarrow \Delta U = L = (P_f - P_i) / (\gamma - 1)$

Isobara $L = p \cdot \Delta V \rightarrow Q = c_p \cdot m \cdot \Delta T$

$$\Delta U = Q - L \quad | \quad \Delta S = dQ / T \quad | \quad \eta = 1 - T_F / T_C$$

Elettrostatica ed Elettrodinamica

$$i = \Delta Q / \Delta t \quad | \quad i = \Delta V / R \quad | \quad R = \rho \cdot l / A \quad | \quad P = \Delta V \cdot i = R \cdot i^2$$

Resistenze

Serie $R_{eq} = R_1 + R_2$

Parallelo $1/R_{eq} = 1/R_1 + 1/R_2$

Condensatori

Serie $1/C_{eq} = 1/C_1 + 1/C_2$

Parallelo $C_{eq} = C_1 + C_2$

$$Q = C \cdot \Delta V \quad | \quad C = \epsilon \cdot A / d$$

Forze e Campi

$$F_c = k \cdot (Q_1 \cdot Q_2 / d^2) \quad | \quad V = k \cdot Q / d \quad | \quad E = F_c / Q_0 = k \cdot Q / d^2$$

$$\Phi(E) = Q / \epsilon_0$$

ALTRE FORMULE UTILI

$$1^\circ = \pi / 180 \text{ rad} \quad | \quad 1 \text{ bar} = 10^5 \text{ Pa}$$

$$1 \text{ L} = 10^{-3} \text{ m}^3$$