

Kinematika

$$\vec{v} = \frac{d\vec{s}}{dt}, \quad \vec{a} = \frac{d\vec{v}}{dt}, \quad \vec{\omega} = \frac{d\vec{\varphi}}{dt}, \quad \vec{\varepsilon} = \frac{d\vec{\omega}}{dt}, \quad s = \varphi r, \quad v = \omega r, \quad a_t = \varepsilon r, \quad a_n = \frac{v^2}{r}, \quad \omega = 2\pi f, \quad f = \frac{1}{T},$$

$$s = s_0 + v_0 t + \frac{1}{2} a t^2, \quad \varphi = \varphi_0 + \omega_0 t + \frac{1}{2} \varepsilon t^2.$$

Dynamika

$$\sum \vec{F} = m \vec{a}, \quad \sum \vec{M} = J \vec{\varepsilon}, \quad \vec{M} = \vec{r} \times \vec{F}, \quad \vec{G} = \kappa \frac{m_1 m_2}{r^2} \vec{r}_0, \quad G = mg, \quad T = N f, \quad J = \int_m r^2 dm, \quad \vec{p} = m \vec{v},$$

$$\vec{I} = \vec{F} \Delta t, \quad W = \vec{F} \cdot \vec{s}, \quad E_k = \frac{1}{2} m v^2, \quad E_p = mgh, \quad P = \frac{dW}{dt} = \vec{F} \cdot \vec{v}, \quad \eta = \frac{P}{P_0}, \quad P = \vec{M} \cdot \vec{\omega}, \quad \vec{r}_T = \frac{1}{m} \sum \vec{r}_i m_i.$$

Pružnost a pevnost

$$F = kx, \quad E_p = \frac{1}{2} k x^2, \quad \sigma = \frac{F}{S}, \quad \tau = \frac{F}{S}, \quad \varepsilon = \frac{\Delta l}{l}, \quad \sigma = E \varepsilon, \quad \tau = G \gamma.$$

Mechanika tekutin

$$p = \frac{F}{S}, \quad p = \rho gh, \quad F_v = \rho V g, \quad \frac{F_1}{S_1} = \frac{F_2}{S_2}, \quad S_1 v_1 = S_2 v_2, \quad \frac{1}{2} \rho v_1^2 + \rho gh_1 + p_1 = \frac{1}{2} \rho v_2^2 + \rho gh_2 + p_2$$
$$V = S v t$$

Termika

$$Q = mc \Delta t, \quad Q = ml, \quad l_t = l_0 (1 + \alpha \Delta t), \quad V_t = V_0 (1 + \beta \Delta t), \quad pV = nRT, \quad \frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}.$$

$$(m_1 c_1 + C) (t - t_1) = (m_2 c_2) (t_2 - t)$$

Vlastnosti materiálů

$$\rho = \frac{m}{V}$$

Elektřina a magnetismus

$$\vec{F} = \frac{1}{4\pi\varepsilon} \frac{Q_1 Q_2}{r^2} \vec{r}_0, \quad \vec{E} = \frac{\vec{F}}{Q}, \quad \vec{E} = -\nabla \varphi, \quad E = \frac{\varphi_1 - \varphi_0}{d}, \quad U_{AB} = \varphi_A - \varphi_B, \quad C = \frac{Q}{U}, \quad C = \varepsilon \frac{S}{d}, \quad I = \frac{dQ}{dt},$$

$$R = \frac{1}{G}, \quad R = \rho \frac{l}{S}, \quad \rho = \frac{1}{\gamma}, \quad U = RI, \quad R = \sum R_i, \quad \frac{1}{R} = \sum \frac{1}{R_i}, \quad R = R_0 (1 + \alpha \Delta t), \quad W = UI t, \quad P = UI,$$

$$\vec{B} = \mu \vec{H}, \quad \mu = \mu_0 \mu_r, \quad \Phi = \int_S \vec{B} \cdot d\vec{S}, \quad u(t) = -\frac{d\Phi}{dt}, \quad U_0 = U + R_l I \quad F_m = Q(\vec{v} \times \vec{B})$$

$$u(t) = U_0 \sin(\omega t + \varphi_0), \quad U_{ef}^2 = \frac{1}{T} \int_0^T u^2 dt, \quad U_{ef} = \frac{\sqrt{2}}{2} U_0, \quad \varepsilon = \varepsilon_r \varepsilon_0.$$

Kmity, vlnění, světlo

$$x = A \sin(\omega t + \varphi_0), \quad \omega = \sqrt{\frac{k}{m}}, \quad \omega = \sqrt{\frac{g}{l}}, \quad \lambda = \frac{c}{f}, \quad L = 10 \log \frac{I}{I_0}, \quad f_d = f_z \frac{c - v_d}{c - v_z},$$

$$n = \frac{c}{c_i}, \quad \frac{\sin \alpha}{\sin \beta} = \frac{c_1}{c_2} = \frac{n_{A2}}{n_{A1}}, \quad \frac{1}{x} + \frac{1}{x'} = \frac{1}{f}, \quad Z = \frac{y'}{y} = -\frac{x'}{x} \quad E_f = hf = h \frac{c}{\lambda}$$