

FIZIKA I

1 UNI

Formule

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UREJANJE DOKUMENTA

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OPOMBE

Formule za predmet Fizika I

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0.1 Kinematika

$$v = \frac{dr}{dt} \quad a = \frac{dv}{dt}$$

$$\sum_i F_i = ma$$

0.2 Gravitacija

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

$$g_0 = \frac{GM}{r^2}$$

0.3 Kroženje

$$\mathbf{v} = \omega \times \mathbf{r}$$

$$\alpha = \frac{d\omega}{dt}$$

$$\mathbf{a}_t = \alpha \times \mathbf{r}$$

$$a_r = \omega^2 r = \frac{v^2}{r}$$

$$\omega = \frac{2\pi}{t_0} \quad \omega = \frac{d\phi}{dt}$$

0.4 Gibalna količina

$$F = \frac{dG}{dt}$$

$$G = mv$$

$$F\Delta t = \Delta G$$

$$F_c = \Phi_m v$$

0.5 Vrtalna količina

$$\mathbf{M} = \frac{d\mathbf{\Gamma}}{dt}$$

$$\mathbf{\Gamma} = \mathbf{J}\omega$$

$$\mathbf{M} = \mathbf{r} \times \mathbf{F} = \mathbf{J}\alpha$$

$$J = \int r^2 dm$$

$$J' = mr^2 + J_{tezisca}$$

$$\mathbf{M}\Delta t = \mathbf{r} \times \mathbf{F}\Delta t$$

0.6 Delo in energija

$$A = \int F dr$$

$$W_k = \frac{mv^2}{2} = \frac{J\omega^2}{2}$$

$$W_p = mgh$$

$$W_{pr} = \frac{kx^2}{2}$$

$$dW_p = G \frac{mM}{R^2} dR$$

$$P = \frac{dA}{dt}$$

0.7 Nihanje

$$\ddot{x} + \left(\frac{k}{m}\right)x = 0$$

$$\ddot{\varphi} + \left(\frac{D}{J}\right)\varphi = 0$$

$$\ddot{\varphi} + \left(\frac{g_0}{l}\right)\varphi = 0$$

$$\ddot{\varphi} + \left(\frac{mg_0 r_t}{J}\right)\varphi = 0$$

$$\omega = \sqrt{\frac{2\rho g S}{m}}$$

$$x(t) = x_0 \sin \omega t$$

$$v(t) = x_0 \omega \cos \omega t$$

$$a(t) = -x_0 \omega^2 \sin \omega t$$

$$W_k = \frac{m\omega_0^2 x_0^2}{2} \cos^2(\omega_0 t)$$

$$W_{pr} = \frac{kx_0^2}{2} \sin^2(\omega_0 t)$$

$$\Lambda = \beta t_0$$

$$x = Ae^{-\beta t} \sin(\sqrt{\omega_0^2 - \beta^2} t)$$

$$x_0 = \frac{F_0/m}{[(\omega_0^2 - \omega^2)^2 + 4\beta^2\omega^2]^{1/2}}$$

0.8 Deformacije teles

$$\frac{F}{S} = E \frac{\Delta l}{l}$$

$$\frac{F}{S} = G\vartheta$$

$$\frac{\Delta V}{V} = -\chi \Delta p$$

$$M = \int dM = \frac{\pi G R^4}{2l} \varphi$$

$$\mu = \frac{-\frac{\Delta r}{r}}{\frac{\Delta l}{l}}$$

$$G = \frac{E}{2(1+\mu)} \quad \chi = \frac{3(1-2\mu)}{E}$$

0.9 Mehanika tekočin

$$dp = -\rho g dz$$

$$dp = \rho \omega^2 r dr$$

$$\frac{F}{S} = \eta \frac{dv}{dz}$$

$$F_u = 6\pi\eta r v$$

$$F_u = c_u S \frac{\rho v^2}{2}$$

$$v_0 = \left(\frac{\Delta p}{4\eta l}\right) R^2$$

$$\Phi_v = \frac{\pi R^4}{8\eta l} \Delta p$$

$$\Phi_v = S \sqrt{2gh}$$

$$p + \frac{\rho v^2}{2} + \rho g z = konst.$$

$$Re = \frac{d\rho v}{\eta}$$

0.10 Valovanje

$$c = \sqrt{\frac{\kappa RT}{M}}$$

$$c = \sqrt{\frac{F}{\mu}}$$

$$c = \sqrt{\frac{1}{\chi\rho}}$$

$$c = \sqrt{\frac{E}{\rho}}$$

$$\nu_s = \nu_i \frac{1 \pm \frac{v_s}{c}}{1 \mp \frac{v_i}{c}}$$

$$j = cw = c \frac{\rho v^2}{2} = \frac{P}{4\pi r^2}$$

$$G = 10 \log_{10} \frac{j}{j^*}$$

$$d \sin \alpha_N = N \lambda$$

0.11 Termodinamika

$$\frac{pV}{T} = \frac{m}{M} R$$

$$p = nkT$$

$$W_k = \frac{3}{2} kT$$

$$W_n = mc_v t$$

$$A = -pdV$$

$$\eta = \frac{A}{Q_1}$$

$$\beta = \frac{\Delta V}{V \Delta T}$$

$$\alpha = \frac{\Delta l}{l \Delta T}$$

$$P = \lambda S \frac{\Delta T}{l}$$

$$TV^{\kappa-1} = konst.$$

$$\kappa = \frac{c_p}{c_v} \quad c_p - c_v = \frac{R}{M}$$

0.11.1 Dodatek

$$F_d = mg \sin(\alpha) \perp$$

$$F_s = mg \cos(\alpha) =$$

$$c = \lambda \nu$$

$$j^* = 10^{-12} W/m^2$$

Valj:

$$J = \frac{1}{2} mr^2 (\text{poln}) \quad J = mr^2 (\text{prazen})$$

Palica:

$$J = \frac{1}{12} mr^2 (v \text{ teziscu}) \quad J = \frac{1}{3} mr^2 (na koncu)$$

Krogla:

$$J = \frac{2}{5} mr^2$$

$$R = 8314 J/K$$

$$\beta = 3\alpha$$

$$k_b = 1,38 * 10^{-23} J/K$$

$$\kappa = \begin{cases} 5/3 & 1. \text{ at. plin} \\ 7/5 & 2. \text{ at. plin} \\ 4/3 & \text{vse ostalo} \end{cases}$$