

TLAK V TEKOČINI

$$p = \frac{F}{S} \left[\frac{N}{m^2} = Pa \right]$$

$$F = \int p \, dS$$

$$\Delta p = \rho g \Delta z$$

$$p = p_0 + \rho g z \quad \square \text{ nestisljiva tek.}$$

$$10^5 Pa = 1 \text{ bar}$$

$$\Delta p = \frac{\rho v^2}{2}$$

$$p = p_0 + \frac{1}{\kappa} \ln \frac{p}{p_0} \quad \square \text{ stisljiva tek.}$$

$$p = p_0 e^{-\frac{\rho_0 g z}{p_0}} \quad \square \text{ Barometerska enačba}$$

$$p = p_0 - \frac{1}{\kappa} \ln(1 - \kappa \rho_0 g z) \quad \square \text{ stisljiva}$$

$$\rho = \frac{\rho_0}{1 - \kappa g \rho_0 z} \quad \square \text{ stisljiva tek.}$$

VZGON

$$F_v = m_{izp} g = \rho_{izp} g$$

$$\Phi_m = \frac{dm}{dt} = \rho S v = \rho \Phi_v$$

$$\Phi_v = \frac{dV}{dt} = S v$$

MASNI PRETOK

PITOTOVA CEV

$$v = \sqrt{\frac{2 \rho_0 g h}{\rho}}$$

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

\square kvadratni zakon

C-koefficient upora C=0,3 kroglja

$$F_u = k \eta v$$

\square linearni zakon \square koef. viskoznosti k=6r -kroglja

$$F = \eta S \frac{v}{x} \quad \eta \left[\frac{Ns}{m^2} \right]$$

$$\frac{F_u^{kv}}{F_u^{lin}} = \frac{2r\rho v}{\eta} = Re$$

$$Re > 10^3 \Rightarrow F_u^{kv}$$

$$Re < 0.5 \Rightarrow F_u^{lin}$$

$$\frac{F}{S} = \eta \frac{dv}{dx} \Rightarrow \text{strižna napetost}$$

PRETAKANJE SKOZI CEV

$$v(r) = \frac{\Delta p}{4\eta l} (R^2 - r^2) \quad \Phi_v = \frac{4R^4 \Delta p}{8\eta l} \quad Rp = \frac{8\eta l}{\pi R^4} \quad \Phi_v = \frac{\Delta p}{Rp}$$

BERNOULI-jeva ENAČBA

$$\frac{v_1}{v_2} = \frac{S_2}{S_1}$$

$$p_1 + \frac{\rho v_1^2}{2} + \rho g z_1 = p_2 + \frac{\rho v_2^2}{2} + \rho g z_2 \Rightarrow \text{konst.}$$

iztekanje iz posode za pline

$$v = \sqrt{\frac{\Delta p}{\rho}} \quad \Delta p = p - p_0 \quad \frac{v_1}{v_2} = \sqrt{\frac{\rho_2}{\rho_1}}$$

iztekanje iz posode

$$v = \frac{\sqrt{2gh}}{\sqrt{\left(\frac{S}{S_1}\right)^2 - 1}}$$

če presek ni enak S \Rightarrow dS

$$v_1 = k \sqrt{2gh}$$

v=v upadanja gladine v1=v skozi luknjo

$$S_1 v dt = S dh$$

$$dt_1 = \frac{S}{S_1} \frac{dh}{k \sqrt{2gh}}$$

$$t = \frac{S}{kS_1} \sqrt{\frac{2h}{g}}$$

TOPLOTA

Toplotno raztezanje

$$dl = l\alpha dT \quad l = l_1(1 + \alpha\Delta T)$$

$$dV = V\beta dT \quad V = V_1(1 + \beta\Delta T)$$

$$\frac{dV}{V} = -\kappa dp \quad \kappa = 3\kappa$$

Temperaturno raztezanje plinov

Tlak pri segrevanju

$$dp = \left(\frac{\beta}{\kappa}\right) dT$$

$$dp = -\alpha E dT$$

$$dl = \frac{l dF}{ES}$$