Enakomerno pospešeno gibanje

$\vec{v}(t) = \vec{v}_0 + \vec{a}_0 t$

$v^2 = v_0^2 + 2as$

$s = \vec{v}_0 t + a_0 \frac{t^2}{2}$

Poševni met

$t = \sqrt{\frac{2h}{g}} \quad v_{0x} = v_o \cos(\alpha)$

$v_{0y} = v_0 \sin(\alpha)$

$s_x = v_0 \cos(\alpha) t$

$s_y = v_0 \sin(\alpha) t - g \frac{t^2}{2}$

$v_y = v_0 \sin(\alpha) - gt$

$v_x = konst.$

Navpični met

$v_z = v_0 - gt$

$z = v_0 t - g \frac{t^2}{2}$

Prosti pad

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

Kroženje

α -kotni pospešek

ω -kotna hitrost

v-hitrost

a-pospešek

a_t -tangentni pospešek

a_r -radialni pospešek

a_s -sistemski pospešek

φ -kot

$\omega = 2\Pi f$

$\omega = \omega_0 + \alpha t$

$\omega^2 = \omega_0^2 + 2\alpha\varphi$

$v = \omega r$

$a_r = \omega^2 r = \alpha^2 t^2 r$

$a_t = \alpha r$

$a_s = \sqrt{a_r^2 + a_t^2} \quad m_1 v_1' + m_2 v_2' = m_1 v_1 + m_2 v_2$

$\varphi = \omega_0 t + \frac{\alpha t^2}{2} = \int \omega dt$

Sile pri kroženju

$F_{ct} = m\omega^2 r_0$

$F_{cor} = 2m(\vec{\omega} \times \vec{v}_r)$

$F_{sist} = m\omega^2 r_0 - 2m(\vec{\omega} \times \vec{v}_r)$

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

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

$\nu = \frac{1}{t_0}$

$\omega = 2\Pi\nu$

Sile na klancu

F_d -dinamična

F_{st} -statična

$F_d = F_g \sin(\alpha)$

$F_{st} = F_g \cos(\alpha)$

Gravitacija

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

$G = 6.67 \times 10^{-11} \frac{Nm^2}{Kg^2}$

$g(h) = g_0 \frac{r^2}{(r+h)^2}$

Izrek o gibalni količini

$\Delta G = F \Delta t = G_2 - G_1 = m_2 v_2 + m_1 v_1$

Popolnoma neelastičen trk

$m_1 v_1 = (m_1 + m_2) v$

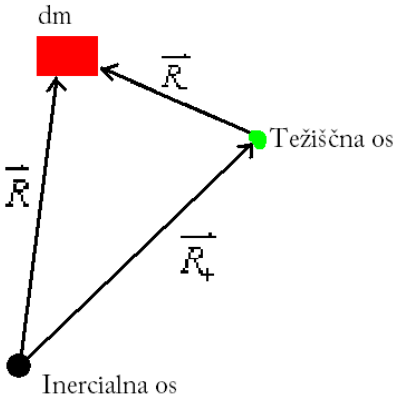
Popolnoma elastičen trk

$m_1 v_1' + m_2 v_2' = m_1 v_1 + m_2 v_2$

Vrtilna količina

$$M = \vec{r} \times \vec{F} = \frac{d\Gamma}{dt} = J\vec{\alpha} = \vec{\omega} \times \Gamma$$

$$\Gamma = \vec{r} \times \vec{v}m = \vec{r} \times \vec{G} = \int \vec{M} dt = J\vec{\omega}$$



$$\omega_0 = \sqrt{\frac{k}{m}}$$

$$\omega_0 = \sqrt{\frac{D}{J}}$$

$$J = mR_+^2 + J'$$

$$\omega_0 = \sqrt{\frac{g_0}{l}}$$

$$\omega_0 = \sqrt{\frac{mg_0 r_t}{J}}$$

*vztrajnostni moment(J')

Masna točka

$$J = mr^2$$

Valj

$$J = \frac{1}{2}mr^2$$

Krogla

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

Palica

$$J = \frac{1}{3}ml^2$$

Delo, energija, moč

$$A = \int_a^b \vec{F} d\vec{r}$$

$$A = Fs$$

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

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

$$W_p = G\frac{mM}{r} = mgh$$

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

Nihanje

$$x(t) = x_0 \sin(\omega_0 t + \delta)$$

➔Vzmet

$$\omega_0 = \sqrt{\frac{k}{m}}$$

➔Vijačna vzmet

$$\omega_0 = \sqrt{\frac{D}{J}}$$

➔Utežno nihalo

$$\omega_0 = \sqrt{\frac{g_0}{l}}$$

➔Fizikalno nihalo

$$\omega_0 = \sqrt{\frac{mg_0 r_t}{J}}$$

r_t -razdalja od težišča

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

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

$$\omega_0 = \frac{2\Pi}{t}$$

Valovanje

$$c = \frac{\lambda}{t} = \lambda\nu$$

$$\nu = \frac{1}{t}$$

➔c valovanja strune

$$c = \sqrt{\frac{F}{\varphi S}} = \sqrt{\frac{Fd}{m}}$$

c-hitrost

F-sila s katero je vrv napeta

ρ -gostota vrvi

S-površina povprečnega preseka vrvi

d-dolžina vrvi

➔c valovanja kapljevine

plitva kapljevina(h< λ)

$$c=\sqrt{gh}$$

Globoka kapljevina(h> λ)

$$c=\sqrt{\frac{g\lambda}{2\Pi}}$$

c-hitrost
h-globina
g-težni pospešek
λ -valovna dolžina

Valovanje v plinih

$$c=\sqrt{\frac{KRT}{M}}$$

$$R=8314\frac{J}{K}$$

$$K=\frac{c_p}{c_v}$$

$$c_x=c_y\sqrt{\frac{M_y}{M_x}}$$

$$\frac{c_1}{c_2}=\sqrt{\frac{T_1}{T_2}}$$

c_1 -hitrost pri T_1

c_2 -hitrost pri T_2

Zvočni tlak

$$Ap=\rho cv$$

Glasnost

$$G=10\log(\frac{j}{j_0})$$

$$j_0=10^{-12}\frac{W}{m^2}$$

j_0 -meja slišnosti
j-gostota zvočnega toka
G-glasnost

Machov stožec

$$\sin(\alpha)=\frac{c}{v}=\frac{1}{M}$$

Interferenca

$$d=\sin(\alpha_n)=N\lambda$$

N=1,2,3…

α_n -kot med pravokotnico in n-to ojačitvijo
d-razdalja med dvema režama na uklonski mrežici

Lomni zakon

$$\frac{\sin(\alpha_1)}{\sin(\alpha_2)}=\frac{c_1}{c_2}$$

Dopplerjev pojav

➔Sprejemnik se giblje

$$v=v_0(1\pm\frac{v}{c})$$

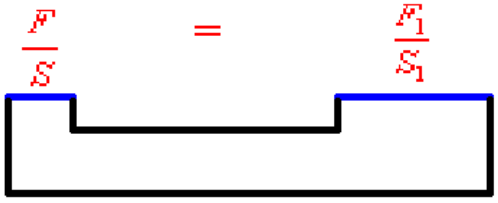
Ko se približuje (+),(-) ko se oddaljuje

➔Oddajnik se giblje

$$v=v_0\frac{1}{1\pm\frac{v}{c}}$$

Ko se približuje(-),(+) ko se oddaljuje

Mehanika tekočin



$$\rho=\varphi g_0 h$$

Upor v kapljevinah

$$R_e=\frac{d\varphi v}{\eta}$$

➔viskozni upor (R_e <1)

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

➔dinamični upor(R_e >1)

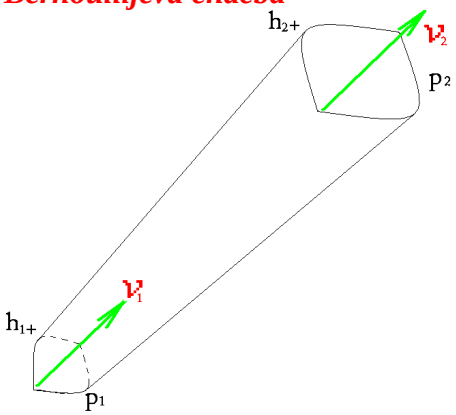
$$F_u=c_v S\frac{\rho v^2}{2}$$

Splošna plinska enačba

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

p-tlak
V-prostornina
T-temperatura
M-kilomolska masa
R-splošna plinska konstanta

Bernoullijeva enačba



$$p_1 + \frac{1}{2}\rho v_1^2 + \rho g h_1 = p_2 + \frac{1}{2}\rho v_2^2 + \rho g h_2$$

p-tlak
ρ -gostota
v-hitrost
g-težni pospešek
h-višina