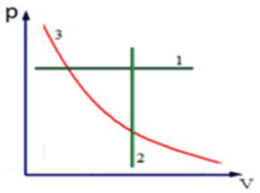
1. Procesul izobar, p; m = const, (fig.6.1/1)
2. Procesul izocor, V; m = const, (fig.6.1/2)
3. Procesul izoterm, T; m= const, (fig.6.1/3)



$$pV = \frac{m}{M}RT = \nu RT, \quad R = 8{,}31\frac{J}{mol\cdot K} \quad pV = NkT \quad P = nkT \quad k = 1.38\cdot 10^{-23}\frac{J}{K}$$

$$P = \frac{1}{3}nm_0\overline{v}_{patr}^2 \quad \langle\varepsilon_0\rangle = \frac{E}{N} = \frac{1}{2}m_0\overline{v}_{patr}^2 = \frac{3}{2}kT, \quad \langle\varepsilon\rangle = \frac{i}{2}kT \quad \overline{v}_{patr} = \sqrt{\frac{3RT}{M_0}} \quad p = p_0\cdot e^{-\frac{Mgh}{RT}}$$

(formula barometrică)

$$\frac{dN(v)}{N} = f(v)dv \quad v_{pb} = \sqrt{\frac{2RT}{M}} = \sqrt{\frac{2}{3}}\,\overline{v}_{patr.} \quad \langle v\rangle = \sqrt{\frac{8\,kT}{\pi m_0}} \quad v_T = \sqrt{\frac{3\,kT}{m_0}} = \sqrt{\frac{3RT}{M}} \quad n = n_0\cdot e^{-\frac{Mgh}{RT}}$$

(altimetru)

$$U = \frac{i}{2}\frac{m}{M}RT \quad Q = \Delta U + L \quad \delta L = p\,dV \quad p = \frac{F}{S} \quad L_{12} = \int_{V_1}^{V_2} p\,dV \quad C = \frac{\delta Q}{dT}$$

Procesul izocor

$$\delta Q = dU + \delta L$$
$$\delta L = PdV = 0.$$
$$\delta Q = dU,$$
$$C_V = \frac{dU}{dT} = \frac{i}{2}R$$

Procesul izobar

$$\delta Q = dU + PdV$$
$$\frac{PdV}{dT} = R$$

Procesul izoterm

$$\delta Q = \delta L$$

Procesul adiabatic

$$\delta L = -dU$$
$$PV^{\gamma} = const.$$

$$Q_1 - Q_2' = L \quad \eta = \frac{Q_1 - Q_2}{Q_1} = 1 - \frac{Q_2}{Q_1}$$

$$F = k\frac{q_1q_2}{r^2}$$
$$E = \frac{\sigma}{2\varepsilon_0}$$
$$E = \frac{q}{2\pi\varepsilon_0 r^2}$$

Forța electrică

$$F_e = k\frac{q_1q_2}{r^2}$$

$q = 1{,}6\cdot 10^{-19}$ C
$r = 5{,}3\cdot 10^{-11}$ m
$k = 9\cdot 10^9$ N·m²/C²

$F_e = 8{,}2\cdot 10^{-8}$ N

Forța gravitațională

$$F_g = G\frac{m_1m_2}{r^2}$$

$m_e = 9{,}1\cdot 10^{-31}$ kg
$m_p = 1{,}7\cdot 10^{-27}$ kg
$r = 5{,}3\cdot 10^{-11}$ m
$G = 6{,}67\cdot 10^{-11}$ N·m²/kg²

$F_g = 3{,}67\cdot 10^{-47}$ N

$$C = \frac{q}{V} \quad C = \frac{\varepsilon\varepsilon_0 S}{d} \quad C = \frac{2\pi\varepsilon\varepsilon_0 l}{\ln(r_2/r_1)} \quad C = \frac{4\pi\varepsilon\varepsilon_0 r_1 r_2}{(r_2 - r_1)} \quad W = \frac{\varepsilon\varepsilon_0 V}{2}E^2 \quad w = \frac{\varepsilon\varepsilon_0 E^2}{2} \quad a = \sqrt{a_\tau^2 + a_n^2}$$

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

$$\vec{v}_m = \frac{\Delta\vec{S}}{\Delta t} \quad \vec{v} = \lim\frac{\Delta\vec{r}}{\Delta t} = \frac{d\vec{r}}{dt} \quad \vec{a} = \frac{d\vec{v}}{dt} = \frac{d^2\vec{r}}{dt^2} \quad a_\tau = \frac{dv}{dt} \quad a_n = \frac{v^2}{R} \quad \vec{S} = \vec{v}_0t + \frac{\vec{a}t^2}{2} \quad \vec{S} = \frac{\vec{v}^2 - \vec{v}_0^2}{2\vec{a}}$$

$$I = \frac{dq}{dt} \quad I = \frac{q}{t} \quad j = \frac{dI}{dS_\perp} \quad \mathcal{E}_{12} = \frac{L_{12}}{q} \quad U = \frac{L_{12}}{q} = (\varphi_1 - \varphi_2) + \mathcal{E}_{12} \quad \oint_{(S)} \vec{j}d\vec{S} = \sum_{k=1}^{n} I_k = 0 \quad \sum_{k=1}^{n} E_k = \sum_{k=1}^{n} I_kR_k$$

Porțiune omogenă de circuit

$$I = \frac{1}{R}U \quad R = \rho\frac{l}{S} \quad \sigma = \frac{1}{\rho} \quad \vec{j} = \frac{1}{\rho}\vec{E} = \sigma\vec{E}$$

Porțiune neomogenă de circuit

$$I = \frac{\varphi_1 - \varphi_2 + \mathcal{E}_{12}}{R + r} \quad \vec{j} = \sigma\left(\vec{E} + \vec{E}_{ex}\right)$$

Circuit electric închis

$$I = \frac{\mathcal{E}}{R + r} \quad Q = L = IUt = I^2Rt \quad q = \rho j^2 \quad q = \sigma E^2 \quad P = \frac{Q}{t} = I^2R$$

Conexiunea în paralel a rezistențelor

$$U_1 = U_2 = U_3 = \ldots = U_m = const. \qquad I = \sum_{k=1}^{m} I_k \qquad \frac{1}{R} = \sum_{k=1}^{m}\frac{1}{R_k}$$

Conexiunea în serie a rezistențelor

$$I_1 = I_2 = I_3 = \ldots = I_n = const. \qquad U = \sum_{k=1}^{n} U_k \qquad R = \sum_{k=1}^{n} R_k$$

$$\vec{F}dt = d\left(m\vec{\upsilon}\right), \quad \vec{F} = m\frac{d\vec{\upsilon}}{dt} = m\vec{a} \qquad m_1\vec{\upsilon}_1 + m_2\vec{\upsilon}_2 + \ldots + m_n\vec{\upsilon}_n = const, \qquad m\frac{d\vec{\upsilon}_C}{dt} = \vec{F}^{ext} \qquad \vec{F}_{el} = -k\vec{x}$$

$$F = K\frac{m_1 m_2}{r^2}, \quad K = 6{,}6745(8)\cdot 10^{-11}\frac{m^3}{kg\cdot s^2} \qquad F_n = \frac{m\upsilon^2}{R} \qquad F_{fr.al} = \mu N \qquad \vec{F}_{rez} = -\alpha\vec{\upsilon} \qquad \vec{F}_{rez} = -\beta\upsilon^2\frac{\vec{\upsilon}}{\upsilon} = -\beta\upsilon\vec{\upsilon}$$

$$L = \int_{\vec{r}_1}^{\vec{r}_2}\vec{F}\cdot d\vec{r}, \quad L = \frac{Kx^2}{2}, \qquad E_c = \frac{m\upsilon^2}{2} \qquad E_p = mgh \qquad L_{fr} = \Delta E \qquad L_{fr} = E_{c_2} + E_{p_2} - \left(E_{c_1} + E_{p_1}\right) \qquad E = E_c + E_p = const \qquad L_{fr} = E_{c_2} - E_{c_1} = \frac{m\upsilon_2^2}{2} - \frac{m\upsilon_1^2}{2}$$

Ciocnirea centrală a corpurilor:

a) plastică: viteză comună a corpurilor de după ciocnire $\vec{u} = \frac{m_1\vec{\upsilon}_1 + m_2\vec{\upsilon}_2}{m_1 + m_2}$

b) elastică: corpurile se vor mișca cu vitezele:

- viteza primului corp după ciocnire $\vec{u}_1 = \frac{(m_1 - m_2)\vec{\upsilon}_1 + 2m_2\vec{\upsilon}_2}{m_1 + m_2}$
- viteza corpului al doilea după ciocnire $\vec{u}_2 = \frac{(m_2 - m_1)\vec{\upsilon}_2 + 2m_1\vec{\upsilon}_1}{m_1 + m_2}$

$$\omega = \frac{d\varphi}{dt} = \dot{\varphi} \qquad \varepsilon = \frac{d^2\varphi}{dt^2} = \ddot{\varphi} \qquad \omega = \frac{\varphi}{t} = \frac{2\pi}{T} = 2\pi\nu, \qquad \upsilon = \omega R$$

$$a_\tau = \varepsilon R, \qquad a_n = \omega^2 R.$$

$$I = \frac{1}{2}mR^2 \qquad I = \int r^2 dm \qquad M = Fl, \quad I = mr^2 \qquad I = \frac{m\left(R_1^2 + R_2^2\right)}{2}$$

$$P = M\frac{d\varphi}{dt} = M\omega, \qquad I = \frac{1}{12}ml^2 \qquad I = \frac{2}{5}mR^2, \qquad L = M\varphi$$

$$E_c = \frac{I\omega^2}{2} \qquad E_c = \frac{m\upsilon^2}{2} + \frac{I\omega^2}{2}$$

Mișcarea de translație	Mișcarea de rotație
uniformă	
$s = \upsilon\cdot t$	$\varphi = \omega\cdot t$
$\upsilon = const$	$\omega = const$
$a = 0$	$\varepsilon = 0$
variată	
$s = \upsilon_0\cdot t + \frac{at^2}{2}$	$\varphi = \omega_o t + \frac{\varepsilon t^2}{2}$
$\upsilon = \upsilon_o + at$	$\omega = \omega_o + \varepsilon t$
$a = const$	$\varepsilon = const$
neuniformă	
$s = f(t)$	$\varphi = f(t)$
$\upsilon = \frac{ds}{dt}$	$\omega = \frac{d\varphi}{dt}$
$a = \frac{d\upsilon}{dt} = \frac{d^2s}{dt^2}$	$\varepsilon = \frac{d\omega}{dt} = \frac{d^2\varphi}{dt^2}$

$$F_{max} = BIl \qquad F = BIl\sin\alpha \qquad F = |q|\upsilon B\sin\theta$$

$$B = \frac{F_{max}}{Il} \qquad d\vec{B} = \frac{\mu_0\cdot I}{4\pi}\frac{d\vec{l}\times\vec{r}}{r^3} \qquad B = \frac{\mu_0 I}{4\pi r_0}\left(\cos\varphi_1 - \cos\varphi_2\right)$$

$$\vec{p}_m = I\vec{S} \qquad B = \frac{\mu_0 I}{2\pi r_0} \qquad B = \frac{\mu_0 I}{4\pi r_0} \qquad B = \frac{\mu_0 I}{2R} \qquad \oint_S\left(\vec{B}\cdot d\vec{S}\right) = 0$$

$$p_m = IS \qquad \Phi_m = BS\cos\alpha \qquad \operatorname{div}\vec{B} = 0$$

$$\oint_L\left(\vec{B}d\vec{l}\right) = \oint_L\left(\sum_{i=1}^{n}\vec{B}_i d\vec{l}\right) = \sum_{i=1}^{n}\oint_L\vec{B}_i d\vec{l} = \mu_0\sum_{i=1}^{n}I_i$$

Mișcarea de translație	Mișcarea de rotație
Legea a II – a Newton	
$F\,\Delta t = m\upsilon_2 - m\upsilon_1$	$M\Delta t = I\omega_2 - I\omega_1$
sau $F = ma$	sau $M = I\,\varepsilon$
Legea conservării impulsului	Legea conservării momentului cinetic
$\sum_{i=1}^{n} m_i\upsilon_i = \text{const}$	$\sum_{i=1}^{n} I_i\omega_i = \text{const}$
Lucrul și energia cinetică	
$L = Fs = \frac{m\upsilon_2^2}{2} - \frac{m\upsilon_1^2}{2}$	$L = M\varphi = \frac{I\omega_2^2}{2} - \frac{I\omega_1^2}{2}$