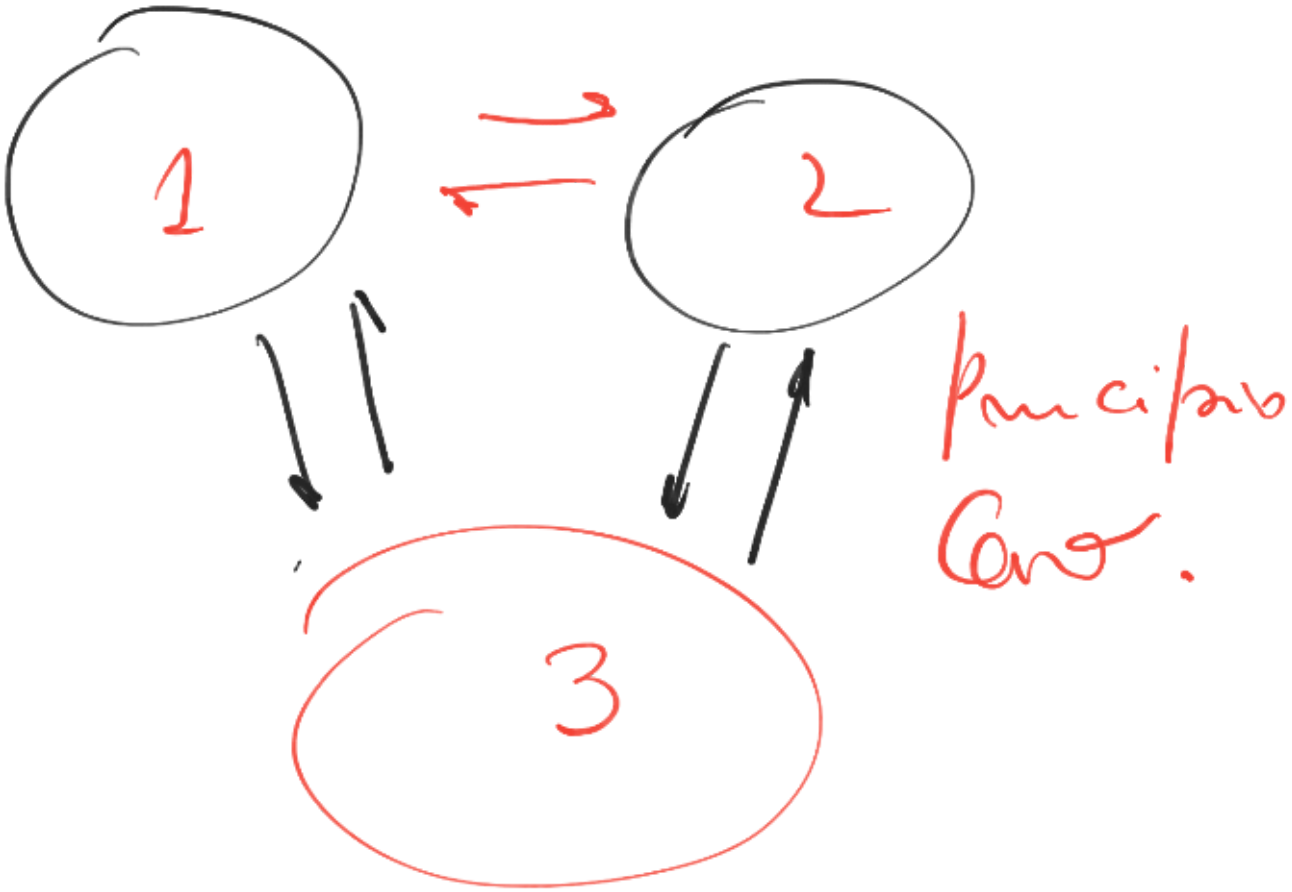
Calor



$$\vec{F} = \frac{d}{dt}\vec{p}$$

$$P = \frac{2}{3}\left(\frac{N}{V}\right)\left(\frac{1}{2}m\langle v^2\rangle\right)$$

$$m\,\frac{\left(v_1^2 + v_2^2 + v_3^2 + \ldots v_N^2\right)}{N}$$

$$m\,\frac{1}{N}\sum_{i=1}^{N} v_i^2$$

$$\left\langle \frac{1}{2}mv^2 \right\rangle$$

$$\langle E_K \rangle$$

$$PV = nRT$$

$$R = \frac{PV}{nT} = N_A k_B$$

$$R = 8{,}314 \ \frac{J}{mol\,K}$$

$$R = 0{,}082 \ \frac{L\,atm}{K\,mol}$$

$$T = \frac{1}{k_B} \frac{2}{3} \langle E_k \rangle$$

$$T = \frac{1}{k_B} \frac{2}{3} \frac{1}{2} m \langle v^2 \rangle$$

$$\langle v^2 \rangle = \frac{3T k_B N_A}{m N_A}$$

($k_B N_A = R$, $m N_A = M$)

$$\langle v^2 \rangle = \frac{3RT}{M}$$

$$v_{RMS} = \sqrt{\langle v^2 \rangle}$$

$$\boxed{v_{RMS} = \sqrt{\frac{3RT}{M}}}$$

O_2

$M_{O_2} = 32\,g/mol$

$M_{He} = 4\,g/mol \qquad T = 300\,K$

$v_{RMS}^{He} = 1370\,m/s$

$v_e = 11186\,m/s$

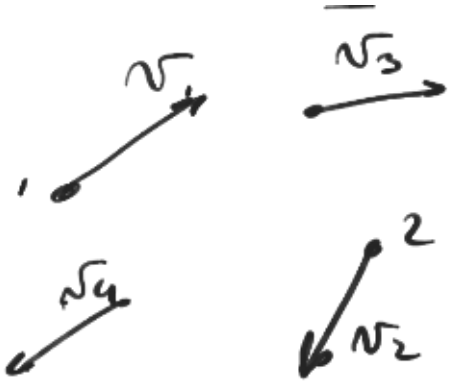
$m_1 = 1\,kg \qquad m_2 = 99\,kg$

$\langle m \rangle = 50\,kg$

$m_1 = 51\,kg \qquad m_2 = 49\,kg$

$\langle m \rangle = 50\,kg$

Dados: $\{1, 2, 3, 4, 5, 6\}$.



$$|v_1| + |v_2| + |v_3| + |v_4| \neq 0$$

¿Cuál es la distrib. de prob. del $|\vec{v}|$?

$$|\vec{v}| = \sqrt{v_x^2 + v_y^2 + v_z^2}$$

$$f(v) = \underbrace{\frac{4}{\sqrt{\pi}} \left(\frac{m}{2kT}\right)^{3/2}}_{} v^2 \underbrace{e^{-\frac{\frac{1}{2}mv^2}{kT}}}_{}$$

$$= e^{-E_c/kT}$$

$$F(E) = \frac{2}{\sqrt{\pi}} \left(\frac{1}{kT}\right)^{3/2} \sqrt{E}\, e^{-E/kT}$$