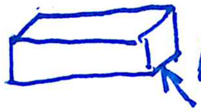
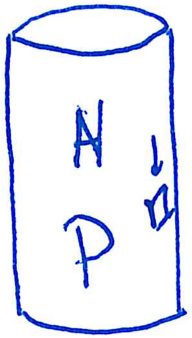


m $V(T) = V_0 (1 + \beta T)$ $T\ [°C]$ (1)

β = coeff. di dilatazione vol.



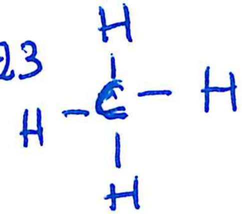
O_2 He

V

$\begin{cases} N & \text{numero di molecole (atomi)} \\ n & \text{moli} \end{cases}$

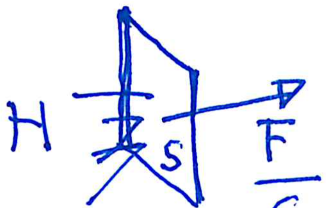
1 mole CH_4 g $(12 + 1 + 1 + 1 + 1) = 16$ g

H_2 $= 6{,}02 \cdot 10^{23}$



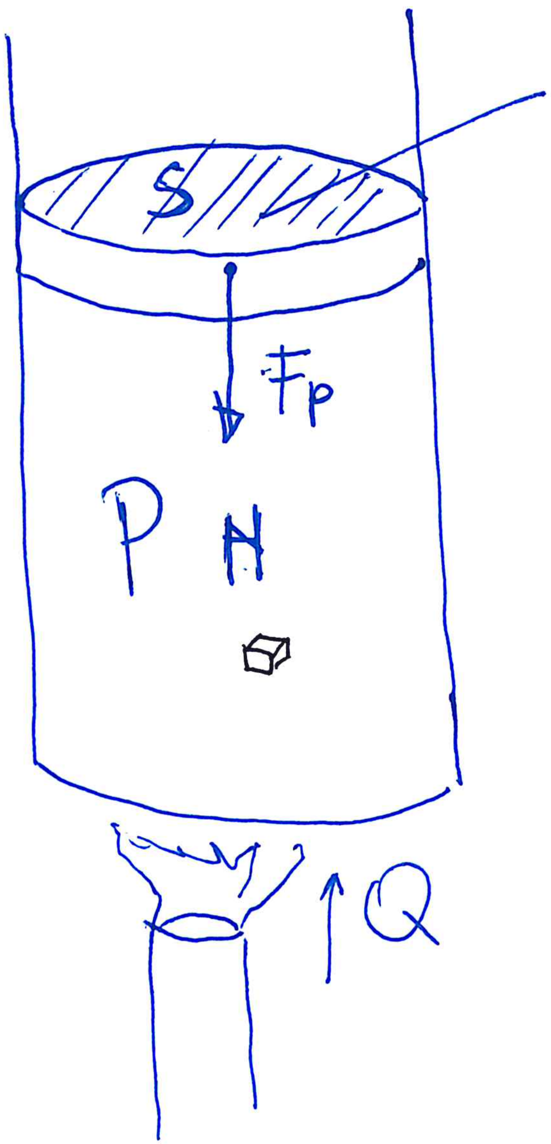
P

T



$\frac{F}{S} = P$

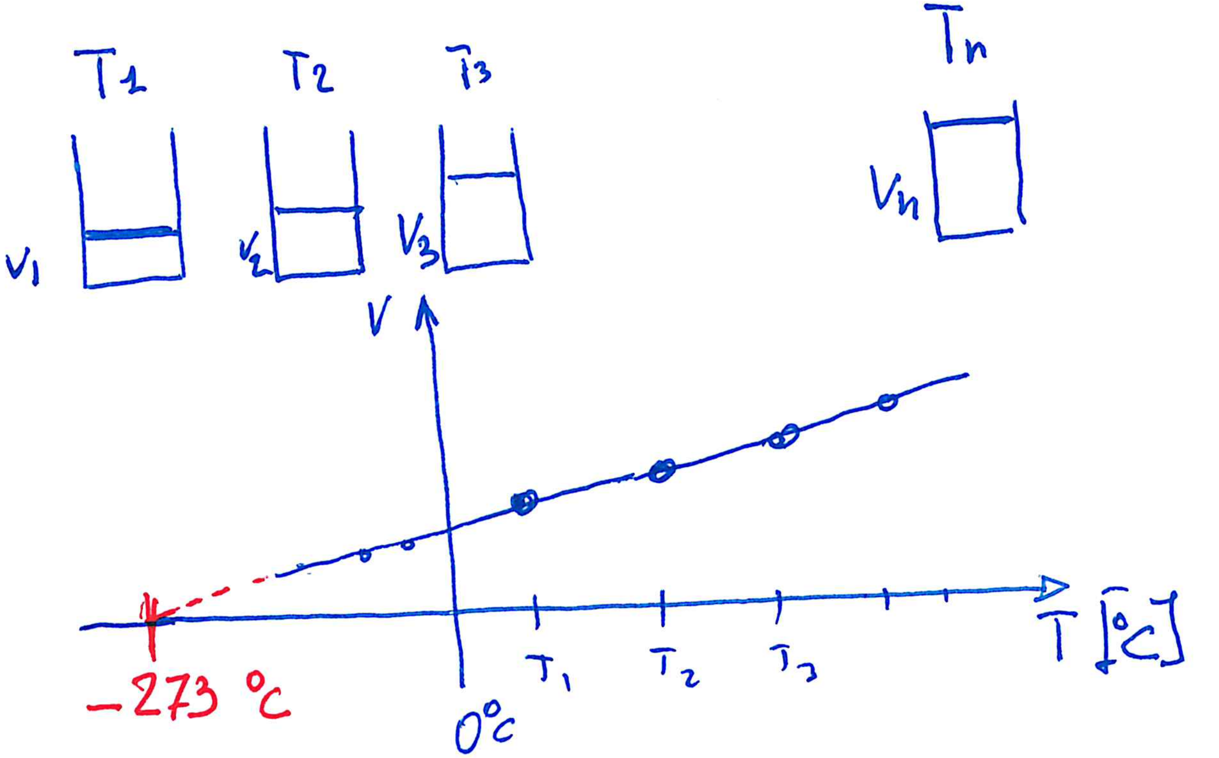
Pressione costante



m_p massa Pistone

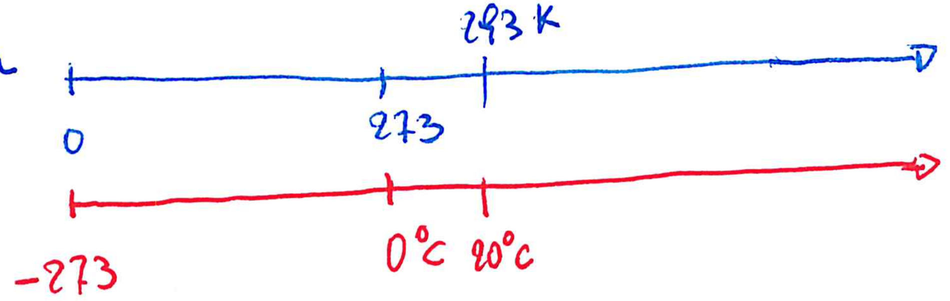
$F_p = m_p \cdot g$

$$P = \frac{m_p \cdot g}{S} \; [Pa]$$

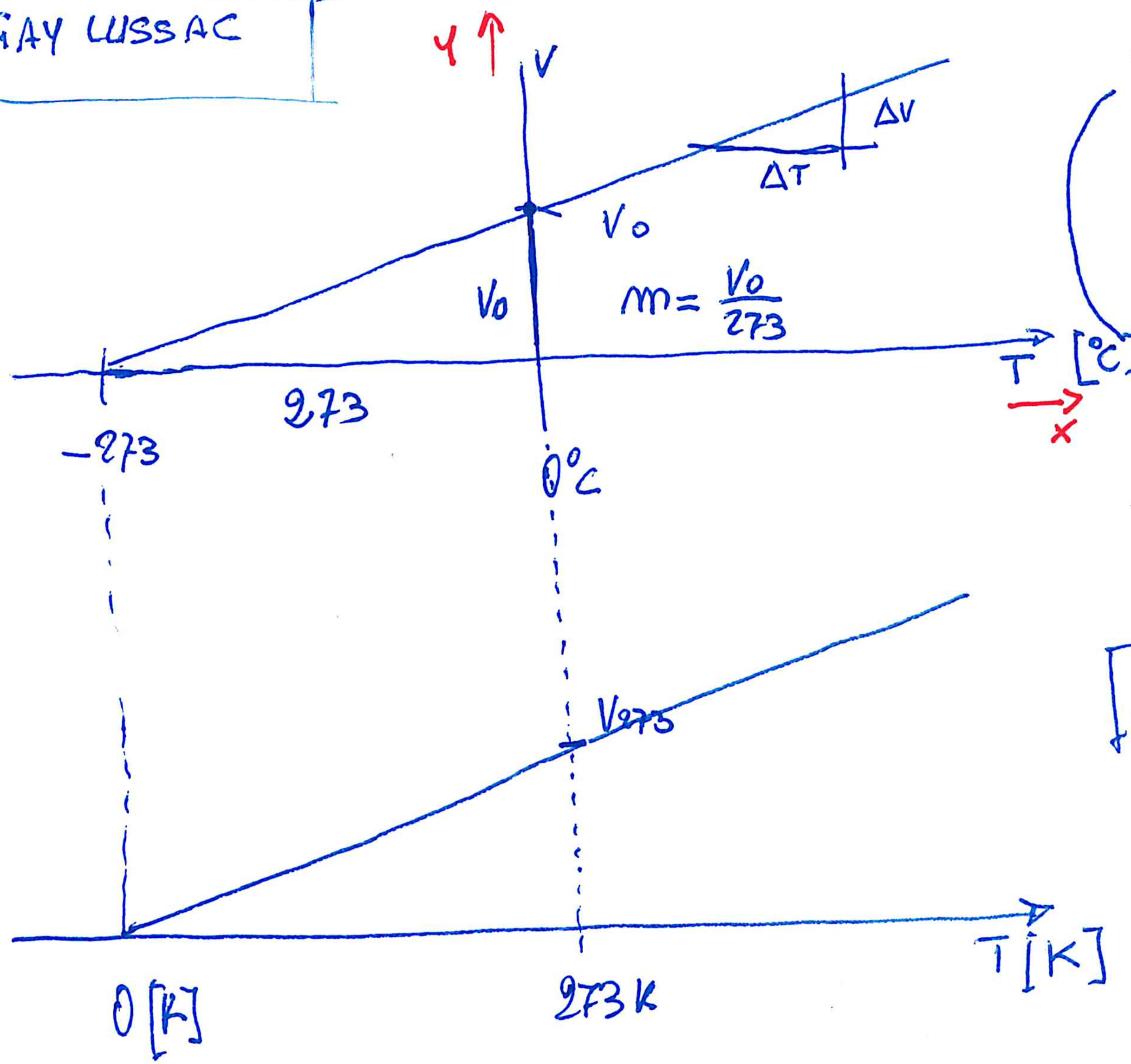


[K] Temperatura assoluta

Temperatura [°C]



GAY LUSSAC



$$V(T) = V_0 + \frac{V_0}{273} \cdot T$$

$$y(x) = q + mx$$

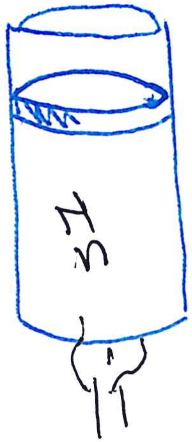
$$V(T) = V_0 \left(1 + \frac{1}{273} \cdot T\right)$$

$$\frac{1}{273} = \beta_V \text{ dei GAS}$$

[K] $V(T) = \left(\frac{V_{273}}{273}\right) T$

$$y(x) = mx$$

[K] $V = \text{cost.} \cdot T$



P

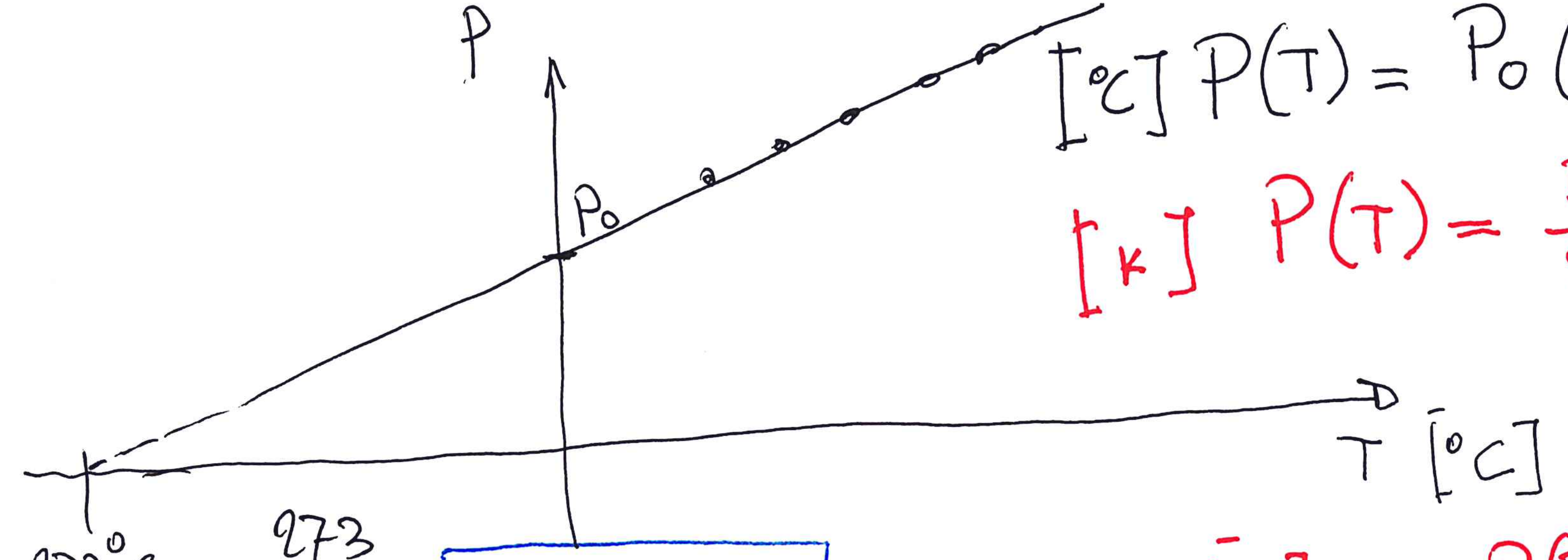
V. volume COSTANTE

n, H costanti

T

$T_1 \quad T_2 \quad T_3 \; \dots \; T_n$

$P_1 \quad P_2 \quad P_3 \; . \quad P_n$



$$[°C] \quad P(T) = P_0\left(1 + \frac{1}{273} \cdot T\right)$$

$$[K] \quad P(T) = \frac{P_0}{273} \cdot T$$

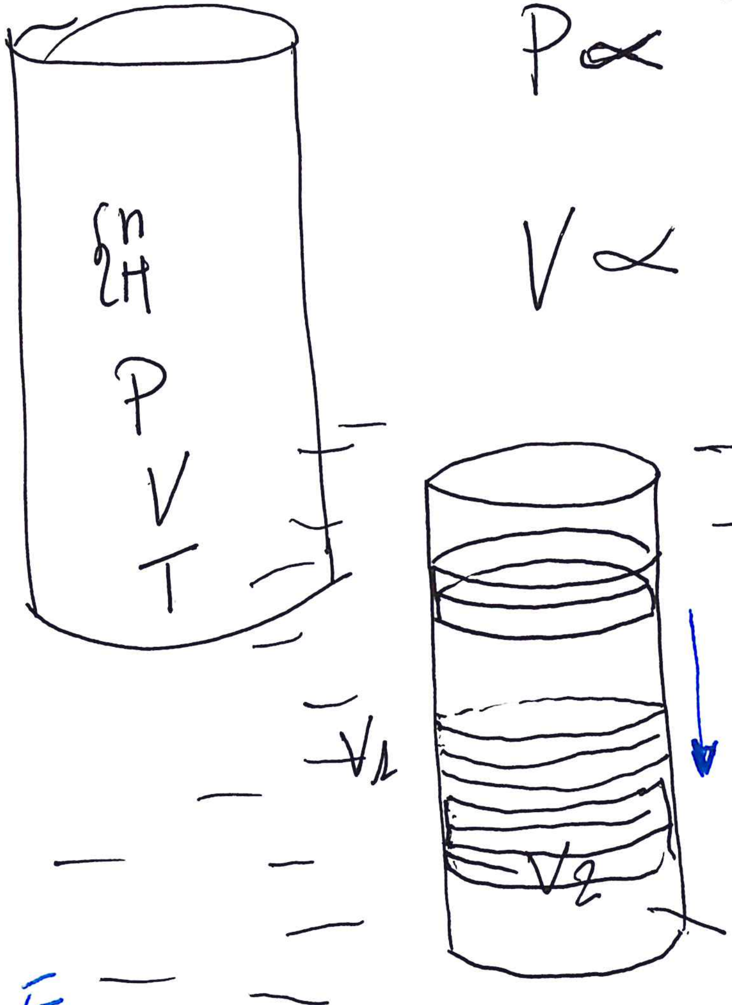
CHARLES →

$$[K] \quad P(T) = \text{cost.} \cdot T$$

[K]

$P \propto T[K]$ se V è costante

$V \propto T_K$ se P è costante



H_2O

T costante

$P = \frac{m_p g}{S}$

$\frac{2mg}{S}$

$3mg$

$V_3 = \frac{1}{3} V_1$

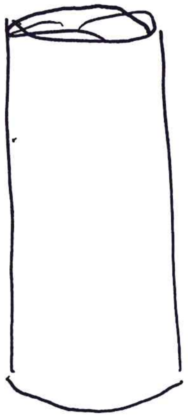
P_1	$2P_1$	$3P_1$
V_1	$\frac{V_1}{2}$	$\frac{V_1}{3}$
P_1V_1	P_1V_1	P_1V_1

BOYLE

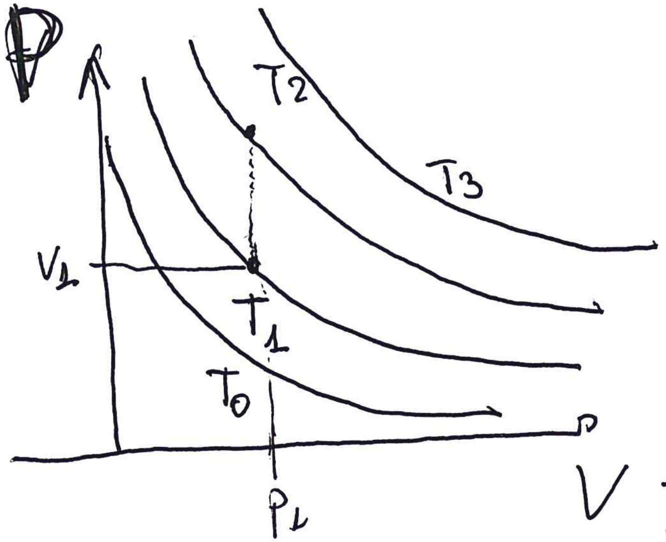
$\boxed{PV = \text{costante}}$

T è costante

⑥



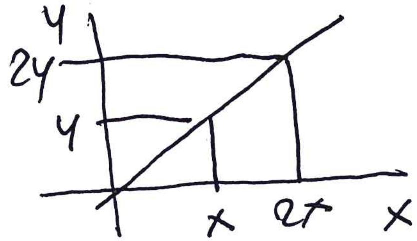
$P \cdot V =$ costante



Iperbole

$\frac{x}{y}$ = costante $= m$

$x = my$



Proporzionalità diretta

$x \cdot y =$ cost $= m$

$y = \frac{m}{x}$

Proporzionalità inversa

Al raddoppiare di uno l'altra dimezza

al triplicare di uno l'altra diventa 1/3

T cost $\quad P \cdot V =$ costante $\quad$ Boyle

P cost $\quad V \propto T$

V cost $\quad P \propto T$

n

N $\quad$ R costante dei GAS

$PV \propto T$

LEGGE DEI GAS PERFETTI

$$\begin{cases} PV \propto nT \Longrightarrow PV = RnT \\ PV \propto NT \qquad PV = kNT \end{cases}$$

Boltzman

CALCOLO DEL VOLUME DI UNA mole di GAS

$$PV = n N_a \frac{R}{N_a} T$$

N_a Numero di Avogadro

$$PV = N K T \quad [K]$$

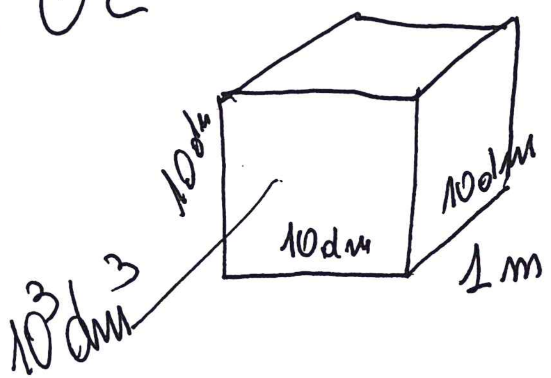
$$PV = nRT$$

$$R = 8.314 \frac{J}{mole\,K}$$

CH_4 16g 1 mole $n = 1$

$P_{atm} = 101{,}3$ KPa $\quad 100 \cdot 10^3\,Pa = 100\,KPa$

$T = 0°C$

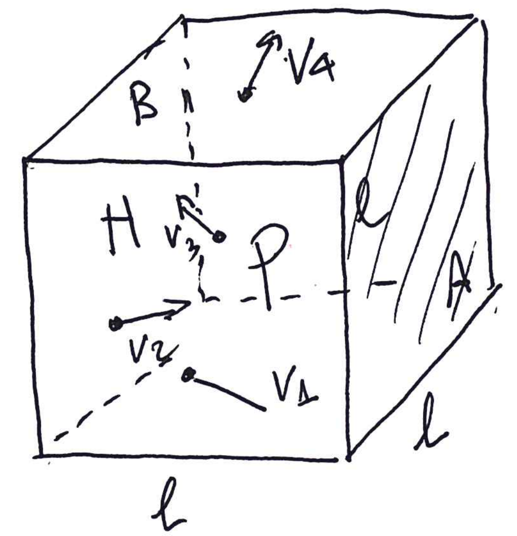


$$V = \frac{nRT}{p} = \frac{1 \cdot 8{,}314 \cdot 273}{101{,}3 \cdot 10^3}$$

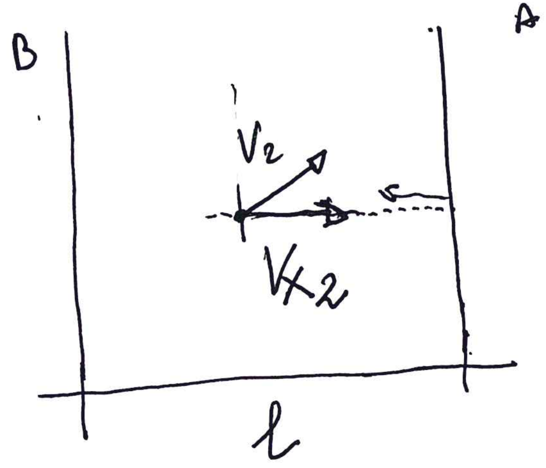
$$22.4 \cdot 10^{-3}\ m^3 \Rightarrow 22{,}4\ dm^3$$

$$22{,}4\ l$$

TEORIA CINETICA DEI GAS



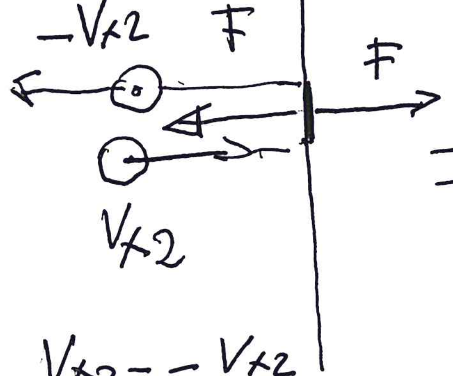
$$V_1 \quad V_2 \quad V_3 \; \ldots\ldots \; V_n$$
$$m \quad m \quad m \qquad\qquad m$$



$$\Delta t = \frac{2l}{V_{x2}}$$

$$V = \frac{S}{\Delta t} = \frac{2l}{\Delta t}$$

URTO CON LA PARETE



$$V_{x2} - -V_{x2}$$
$$2V_{x2}$$

$$m\Delta V = F\Delta t$$

$$F = \frac{m2V_{x2}}{\Delta t}$$

$$F = \frac{m2V_{x2}}{\frac{2l}{V_{x2}}}$$

$$F = \frac{m2V_{x2}^2}{2l}$$

(10)

$2l\,F = m\,\cancel{2}\,V_x^2$

$F \cdot l = m\,V_{x_2}^2$

$\frac{F}{A} \cdot A \cdot l = m\,V_{x_2}^2$

$(P \cdot V)_{\Delta pot} = m\,V_{x_2}^2$

$h_1\ h_2\ h_3 \ldots h_{10}$

$\bar{h} = \frac{h_1 + h_2 + \ldots h_{10}}{10}$

$\bar{h} = \frac{h_1 + h_2 \ldots h_n}{n}$

$\bar{h} \cdot n = (h_1 + h_2 + h_3 \ldots h_n)$

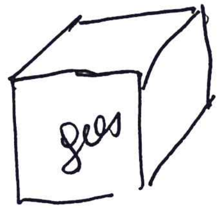
PROPIETA' DELLA MEDIA

$PV = m\,V_{1x}^2 + m\,V_{2x}^2 + m\,V_{3x}^2 \ldots + m\,V_{xn}^2$

$= m\,(V_{1x}^2 + V_{2x}^2 + V_{3x}^3 + \ldots V_{nx}^2)$

$PV = m\,N\,\overline{V_x^2}$

$= \cancel{m} N m\,\frac{\overline{V^2}}{3}$



$\overline{V^2} \neq 0$

$\overline{V_2^2}\ x$

$\overline{V_y^2}$

$\overline{V_z^2}$

$\overline{V_x^2} = \overline{V_y^2} = \overline{V_{zz}^2}$

$\overline{V^2} = 3\,\overline{V_{2x}}$

$$PV = H\left(\frac{1}{2} m\overline{v^2}\right) \cdot \frac{2}{3}$$

$$PV = nRT$$

$$PV = \frac{2}{3} \overline{U}$$

$H\overline{E_c}$ = Energia cinetica totale degli atomi nella scatola

$\overline{U}$ energia interna

$$PV = H\overline{E_c} \cdot \frac{2}{3}$$

$$\frac{3}{2} PV = HE_c$$