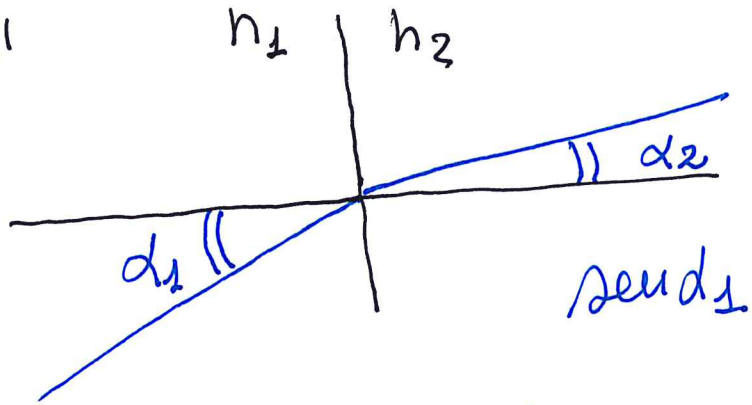
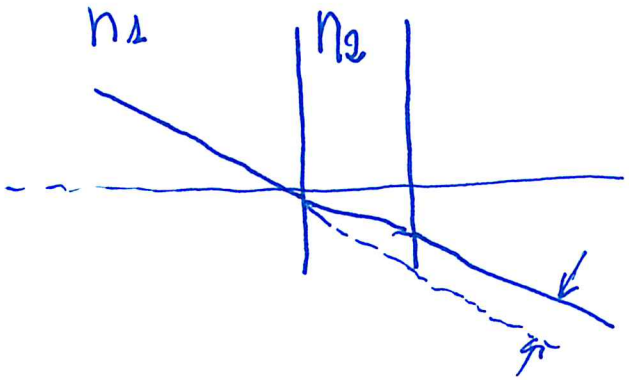
Rifrazione Snell



$$\text{sen}\,\alpha_1 \cdot n_1 = \text{sen}\,\alpha_2\, n_2$$

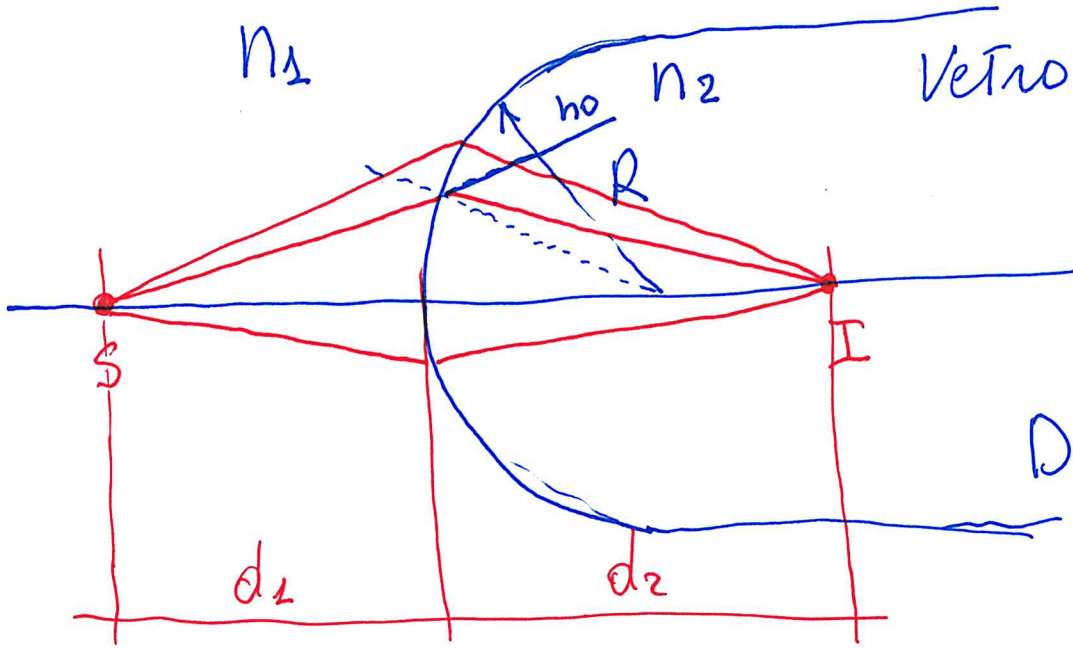
$$n_1 = \frac{c}{v_1} \qquad n_2 = \frac{c}{v_2}$$



1 è il vuoto (aria)

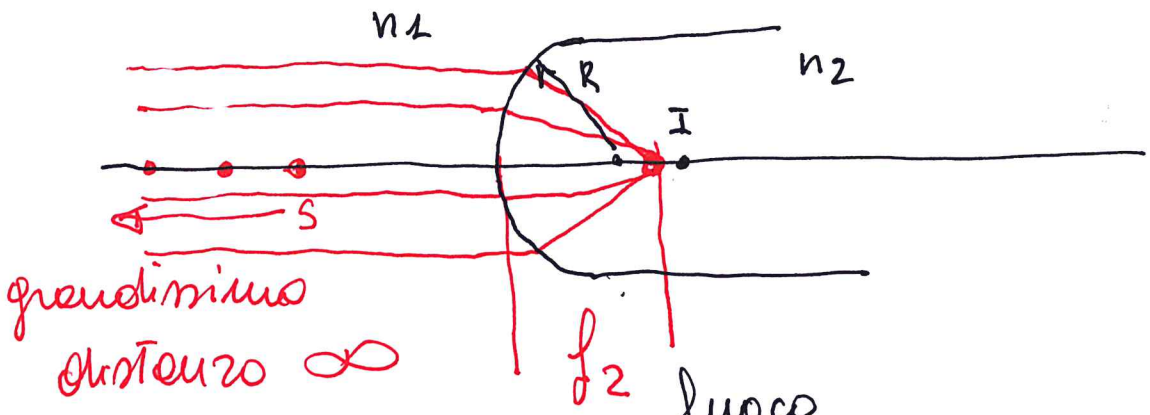
$$n = 1$$

$$n_{mezzi} > 1$$



DIOTTRO

$$\frac{n_1}{d_1} + \frac{n_2}{d_2} = \frac{n_2 - n_1}{R}$$



fuoco del Diottro

$$\frac{n_1}{\infty} + \frac{n_2}{d_2} = \frac{n_2 - n_1}{R}$$

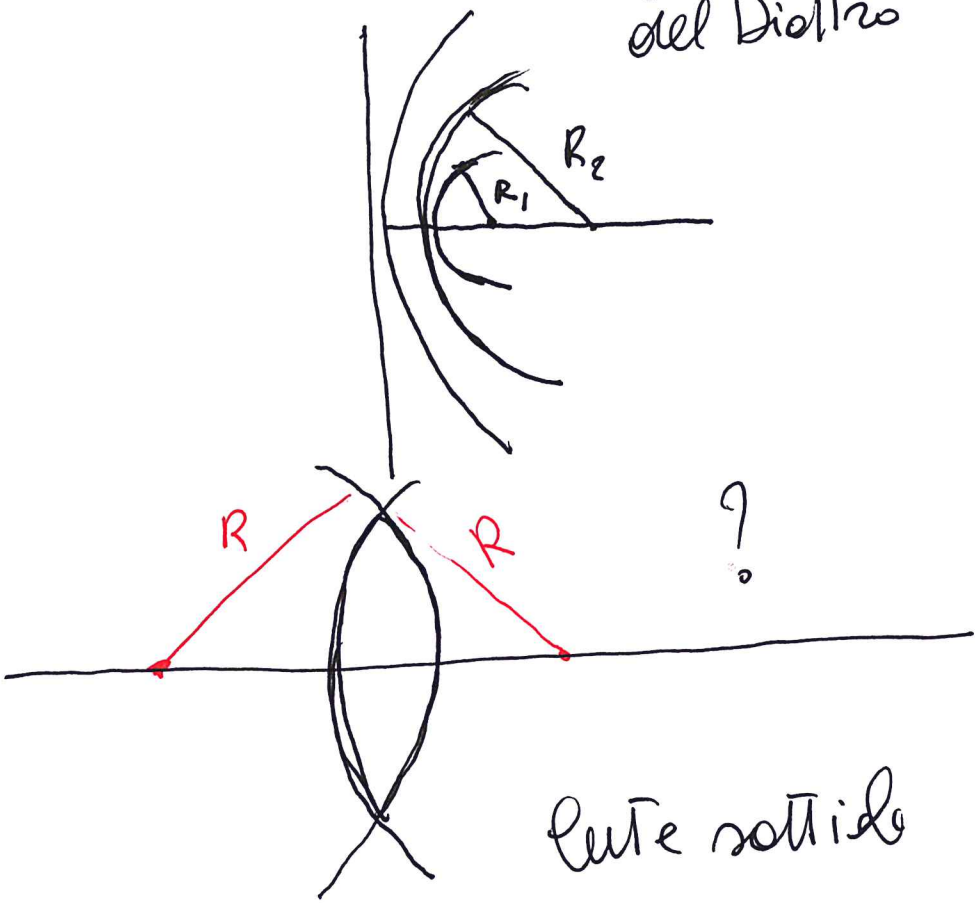
$$0 + \frac{n_2}{d_2} = \frac{n_2 - n_1}{R}$$

$$\frac{n_2}{f_2} = \frac{n_2 - n_1}{R}$$

Reciproco di entrambe

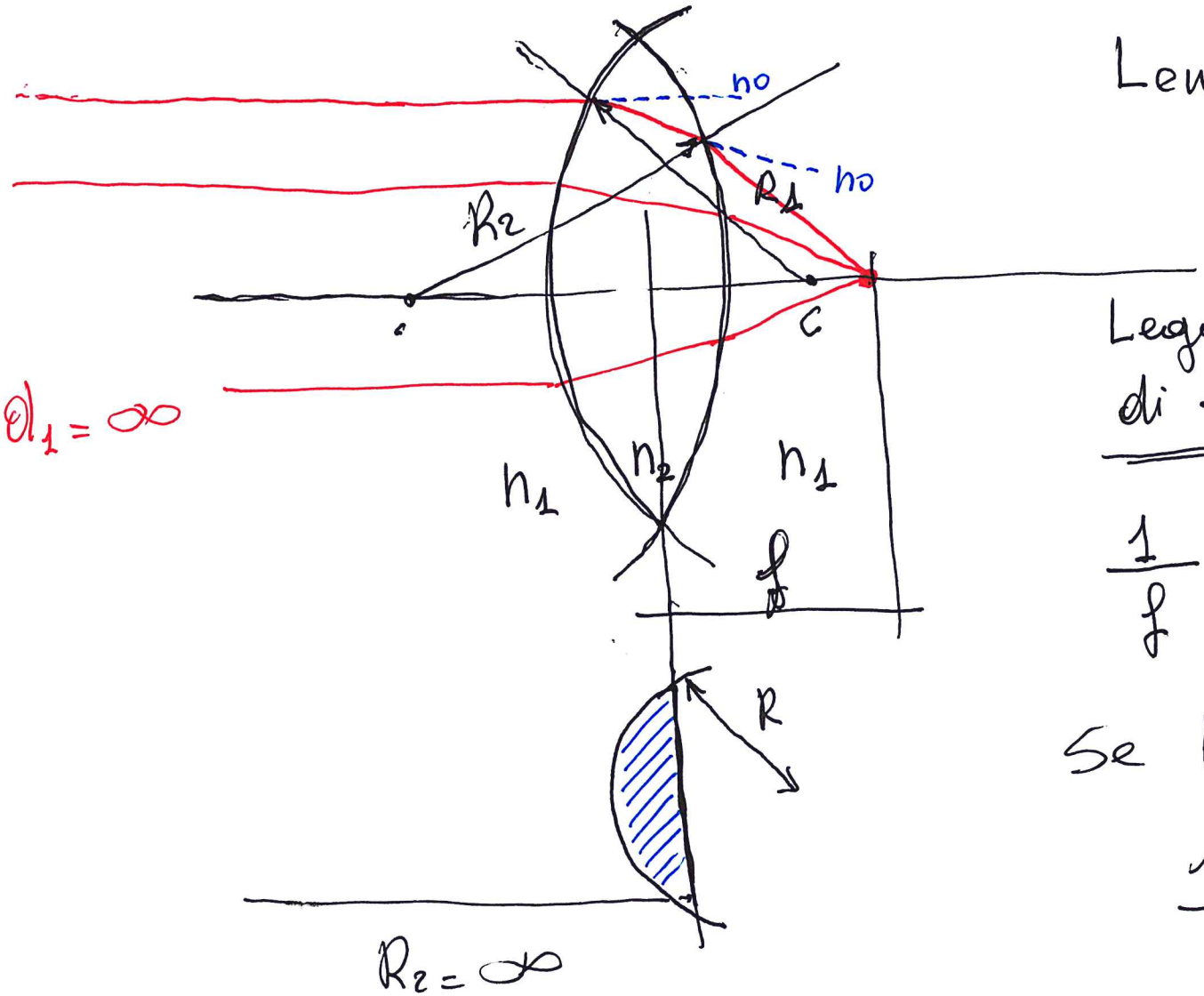
$$\frac{f_2}{n_2} = \frac{R}{n_2 - n_1}$$

$$\boxed{f_2 = \frac{n_2}{n_2 - n_1} \cdot R}$$



Lente sottile

Lente convergente



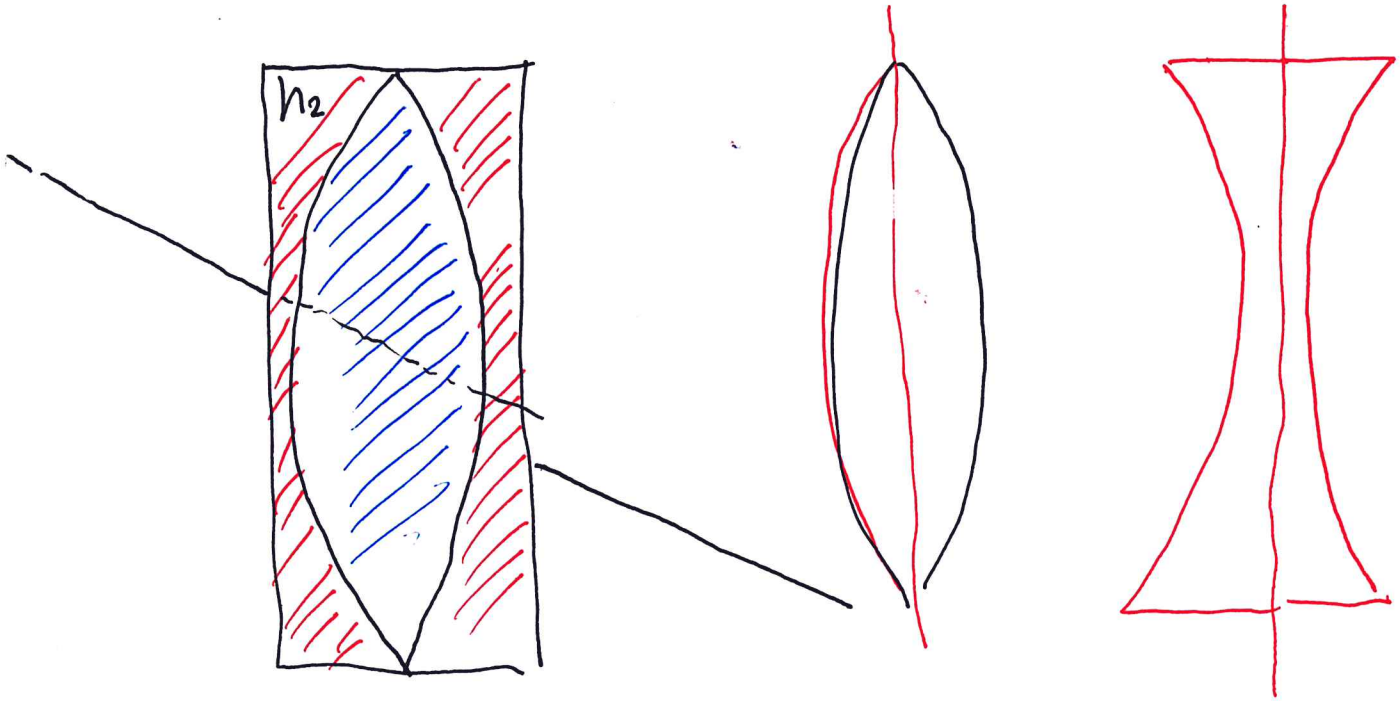
Legge dei fabbricatori di lenti

$$\frac{1}{f} = (n_2 - n_1)\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$$

Se $R_1 = R_2 = R$

$$\frac{1}{f} = (n_2 - n_1)\frac{2}{R}$$

$$\frac{1}{f} = (n_2 - n_1)\frac{1}{R}$$

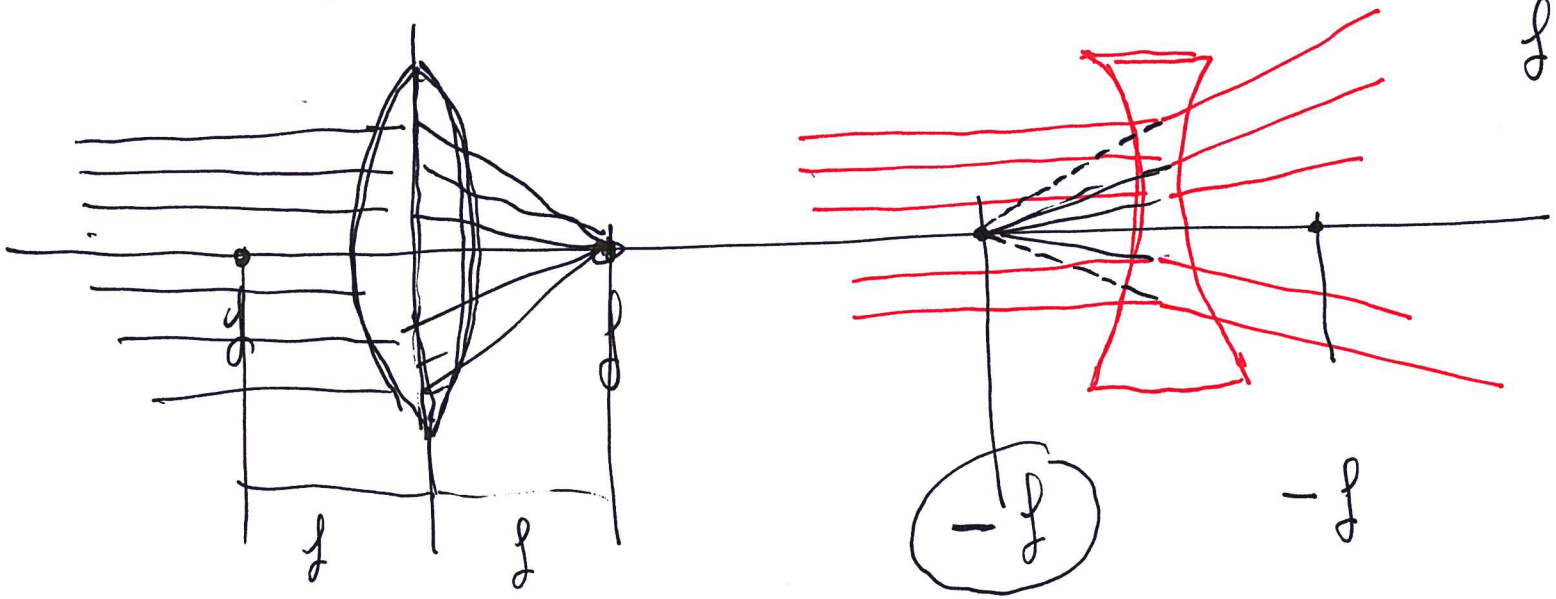


Convergente

Divergente

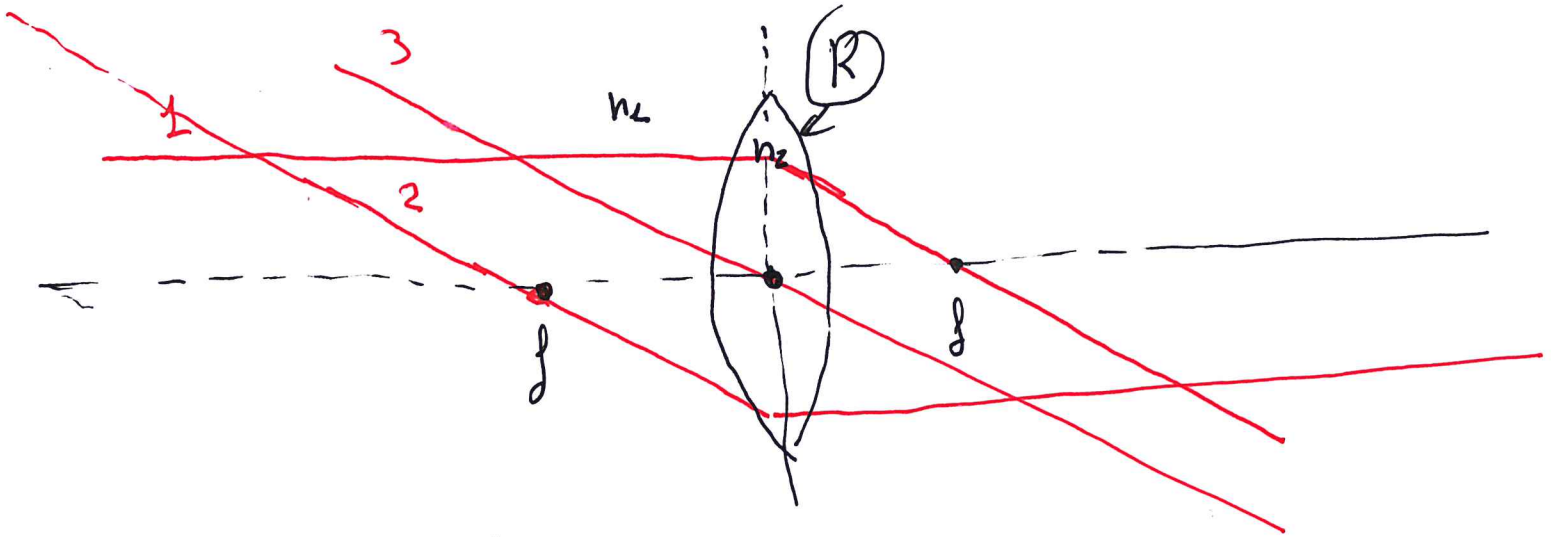
$f = 0.5\,m$

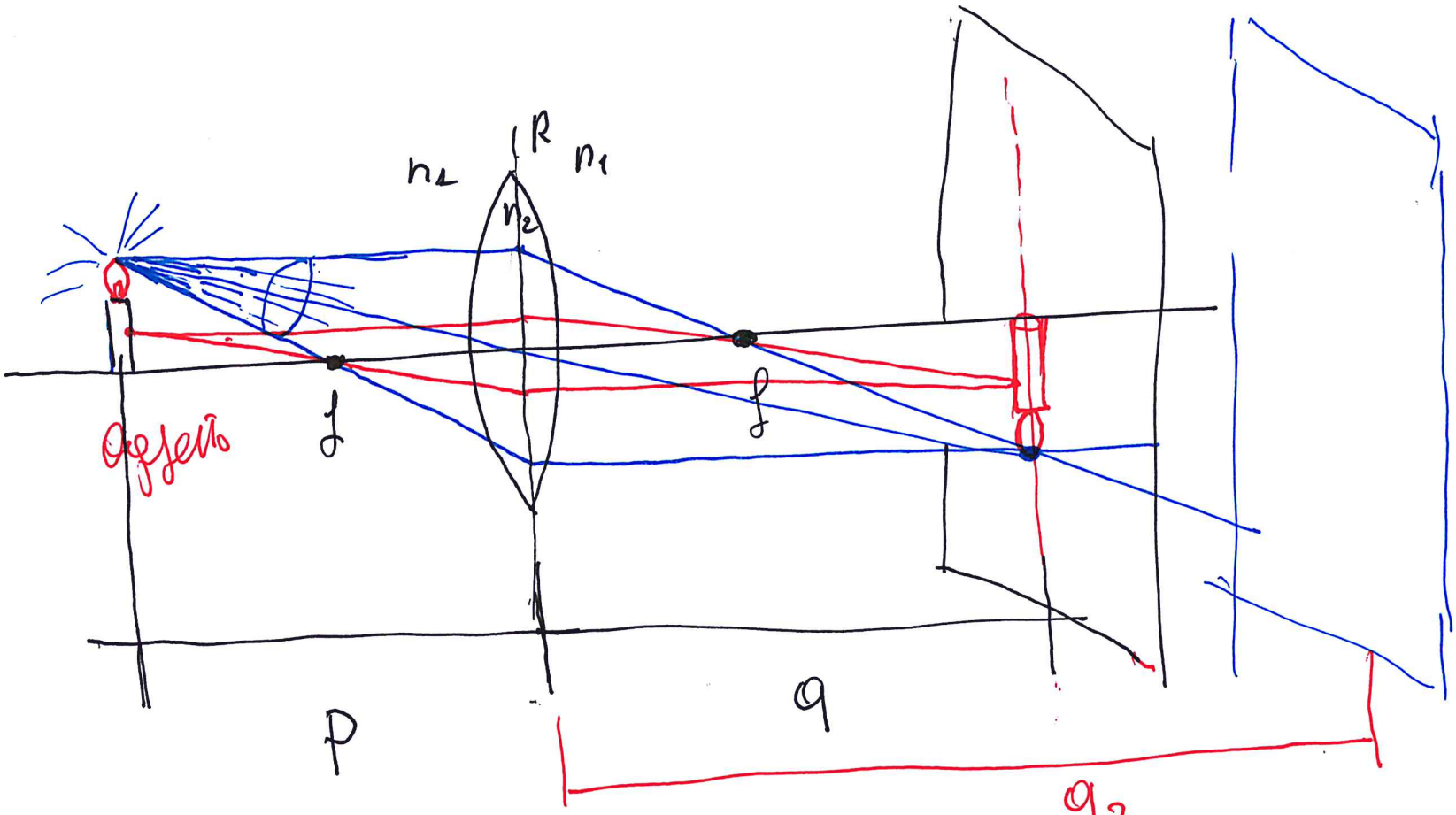
$f = -0,5\,m$



Legge dei punti coniugati

1) Se un raggio di luce è // all'asse ottico dopo la lente passa per il fuoco
2) Se un raggio " " passa per il fuoco della " è // all'asse ottico
3) " " passa per il centro della lente non viene deviato

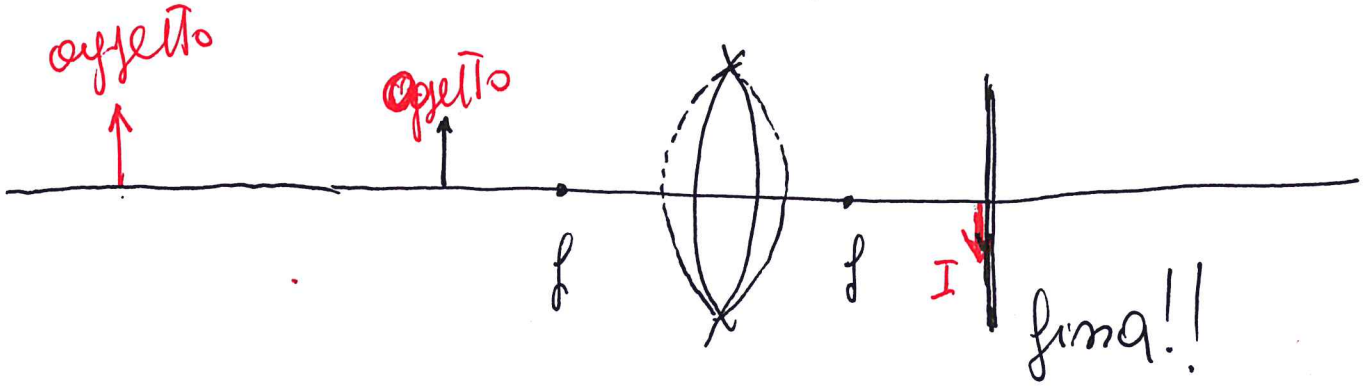




$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$$

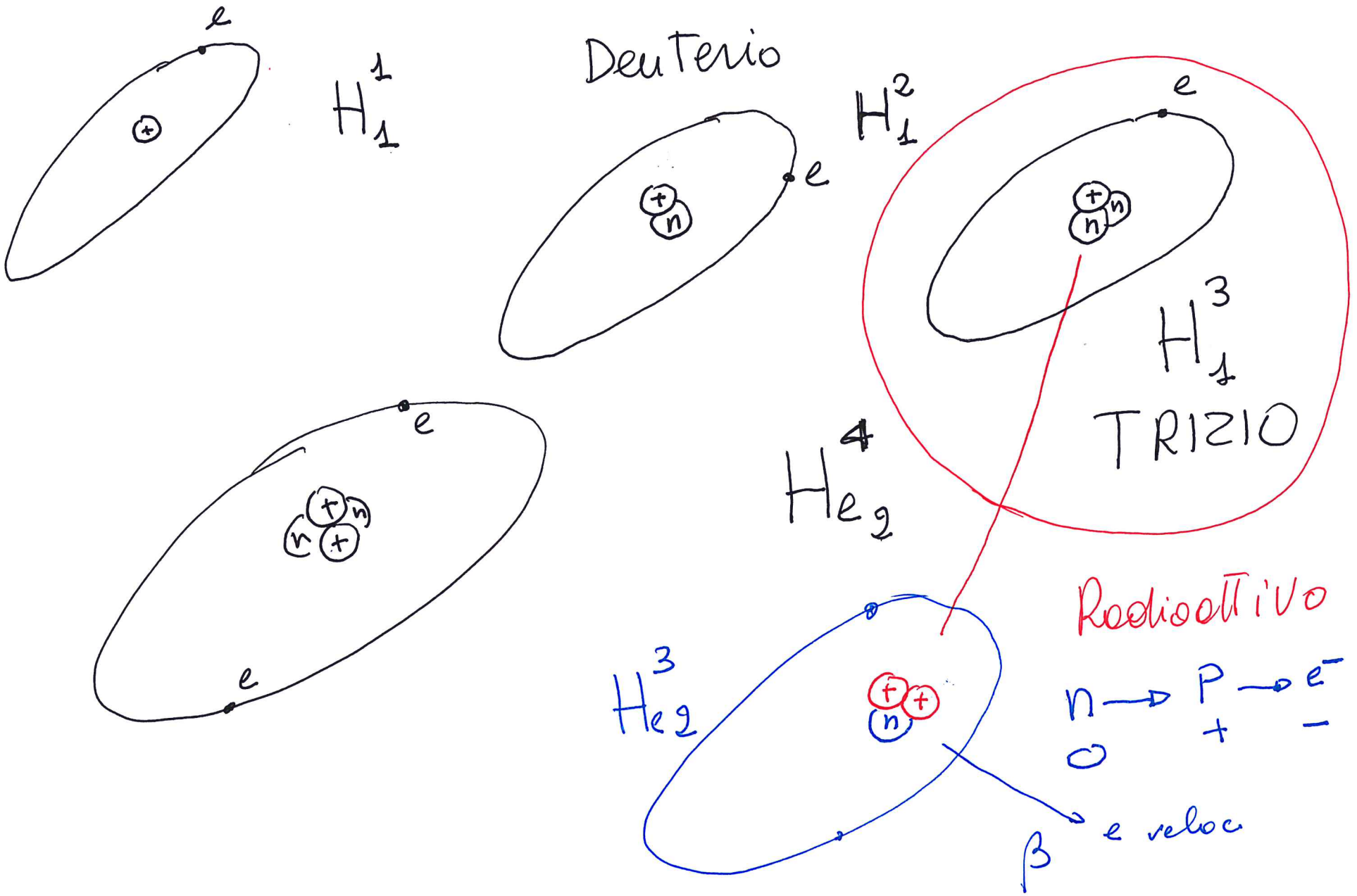
legge dei punti coniugati

$q \uparrow \Rightarrow \frac{1}{q} \downarrow$ $\quad \frac{1}{p} \uparrow \quad p \downarrow$



$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f} = (n_2 - n_1)\frac{2}{R}$$

RADIOATTIVITA'



$n \longrightarrow + + e^- \longrightarrow \bar{\nu}$

$A \longrightarrow A$

massa atomica circa lo stesso

n° atomico aumenta di 1

$Z \longrightarrow Z+$

$H_1^3 \longrightarrow \beta \longrightarrow He_2^3$

$I_{53}^{131} \xrightarrow{\beta^-} ?_{54}^{131} \longrightarrow Xe_{54}^{131}$

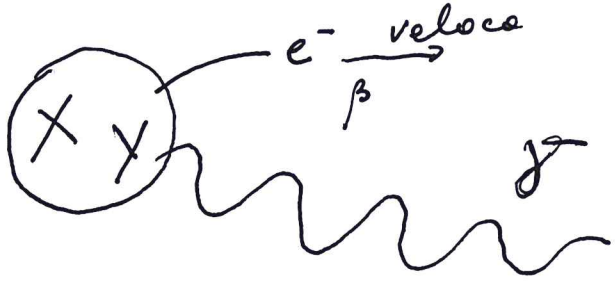
radioattivo

β^-

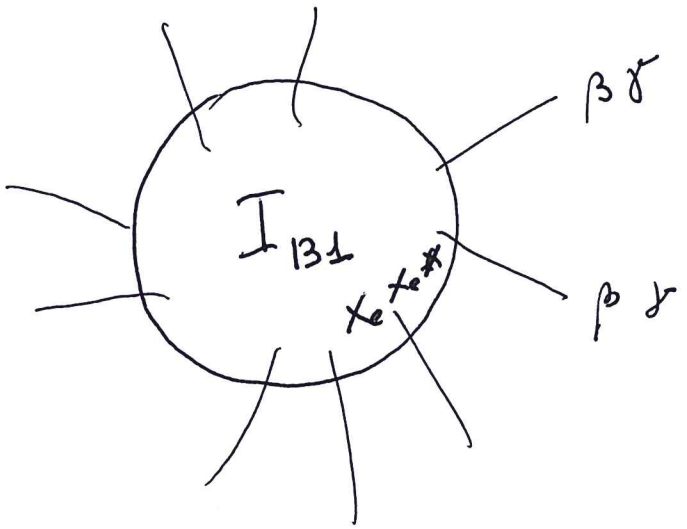
$Cs_{55}^{137} \xrightarrow{\beta^-} Ba_{56}^{137}$

radioattive

$X_Z^A \xrightarrow{\beta} Y_{Z+1}^A$



Tutte le sorgenti di radiazione β emettono anche radiazioni γ



$$\Delta T = 90_s$$

ΔN 1500 atomi di I_{131} → 1500 atomi Xe^{131}

$$\frac{\Delta N}{\Delta T} = \frac{1500}{20} = 75$$

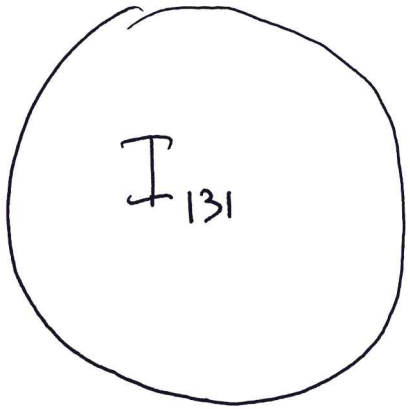
75 decadimenti al secondo

Attività di una sorgente radioattiva

$A = 75$ Bq $\quad \frac{1 \text{ dec}}{\text{sec}}$

Ci

$1\,Ci = 37 \cdot 10^{9}$ Bq



H

gH

ΔH

ΔT

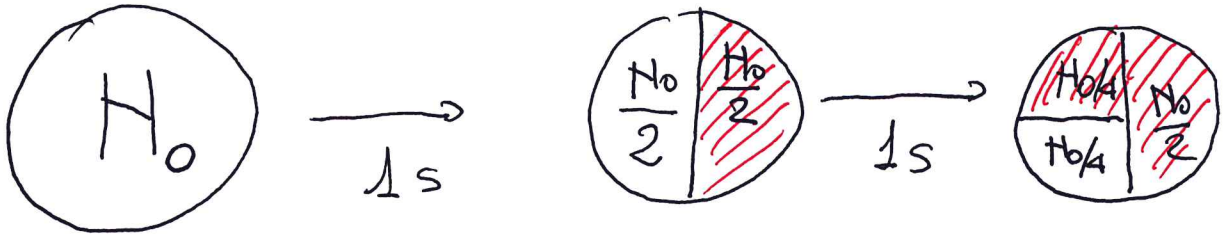
$\frac{\Delta H}{\Delta T} = A$

$\Delta H = \lambda H \Delta T$

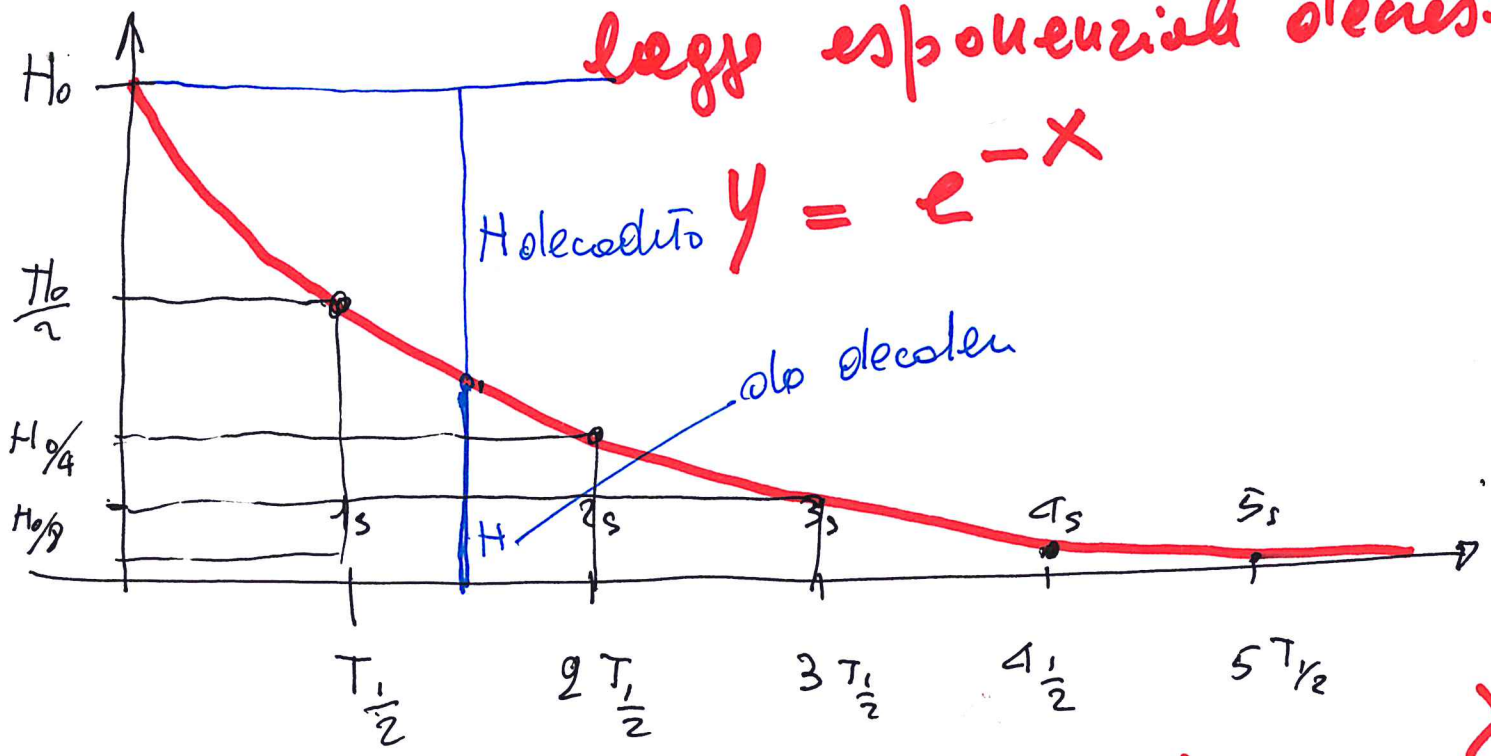
λ costante di decadimento

$\lambda \left[\frac{1}{s}\right]$

Esempio



Tempo di dimezzamento $T_{\frac{1}{2}} = 1\,s$



$$N(t) = N_0\, e^{-\lambda \cdot t}$$

$$\lambda = \frac{\ln 2}{T_{\frac{1}{2}}}$$

$T_{\frac{1}{2}}$ $\quad N(T_{\frac{1}{2}}) = N_0\, e^{-\lambda T_{\frac{1}{2}}} \Rightarrow \frac{N_0}{2} = N_0\, e^{-\lambda T_{\frac{1}{2}}}$

$\frac{1}{2} = e^{-\lambda T_{\frac{1}{2}}}$ [ln] $\quad \ln\frac{1}{2} = -\lambda \cdot T_{\frac{1}{2}} \quad +\ln 2 = +\lambda \cdot T_{\frac{1}{2}}$

$T_{\frac{1}{2}}$ I_{131} = 8 giorni

$$\lambda\ I_{131} = \frac{\ln 2}{8\ \text{giorni}} = \frac{0,6931}{8} = 0,086\ \text{giorni}^{-1}$$

T_c^{99m} $T_{\frac{1}{2}}$ 6 ore $\lambda = \frac{\ln 2}{6} \simeq 0,115\ h^{-1}$

Attività $\frac{\Delta N}{\Delta T} = N \cdot \lambda$ $N = N_0 e^{-\lambda T}$

$$A(t) = \left(\frac{\Delta N}{\Delta t}\right)(t) = \lambda N_0 e^{-\lambda t}$$

$$A = \lambda \cdot N_0 e^{-\lambda t} = \lambda \cdot N(t)$$

$\frac{3500\ Bq}{3,2 \cdot 10^{-3}} = (N)$

$\frac{A}{\lambda} = N(t)$

N^0 di atomi di cesio dopo