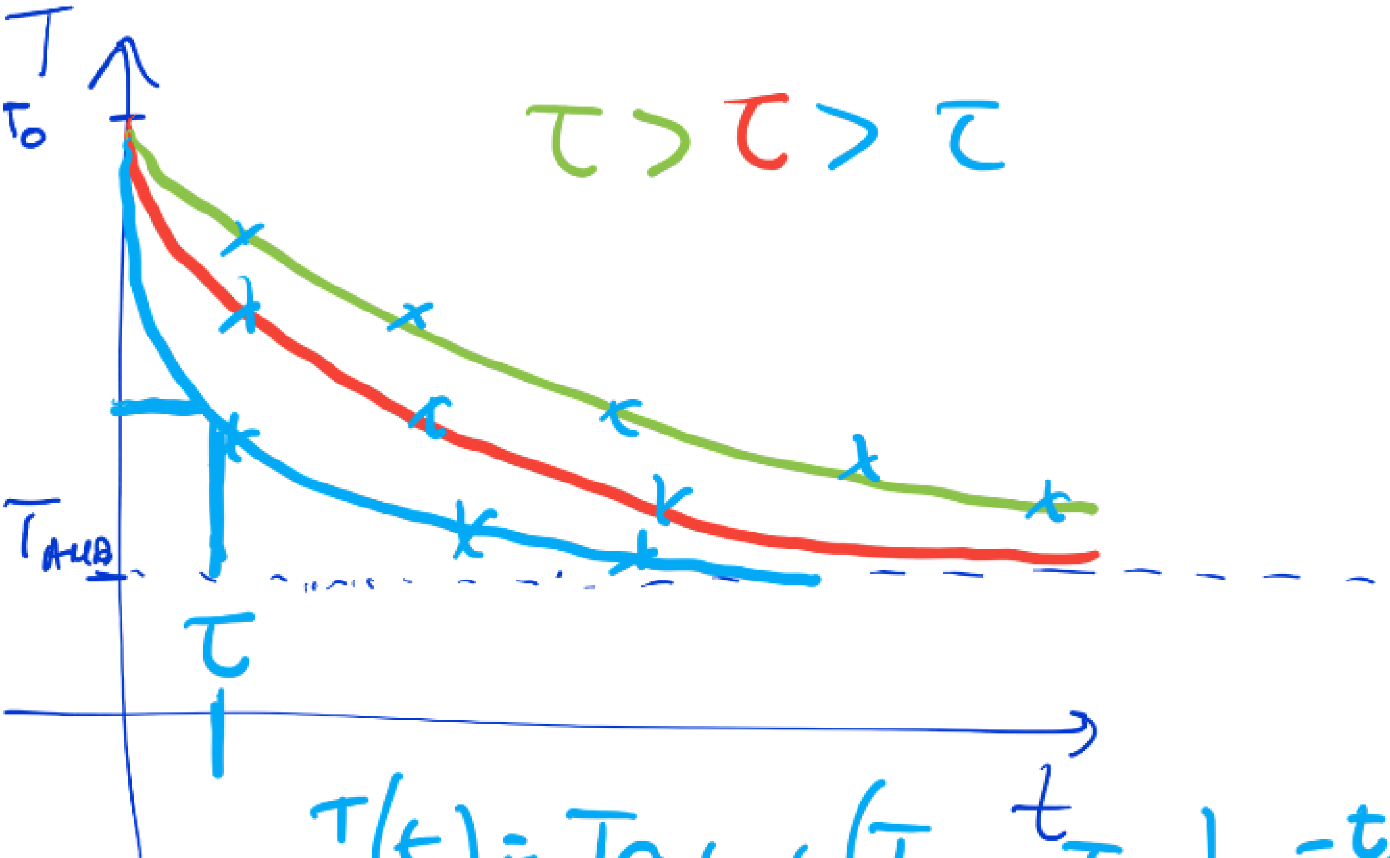
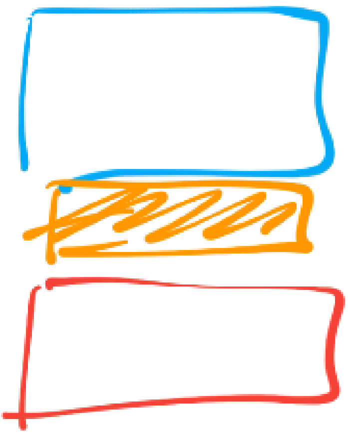
f3b-20190611-U04C04-transferencia-2



$$T(t) = T_{amb} + (T_0 - T_{amb})\, e^{-t/\tau}$$

$$t = \tau \quad T(\tau) = T_{amb} + (T_0 - T_{amb})\, e^{-1}$$



$$\frac{dQ}{dt} \propto \frac{A}{d}(T_c - T_f)$$

$$\frac{dQ}{dt} = h\, A\, \Delta T$$

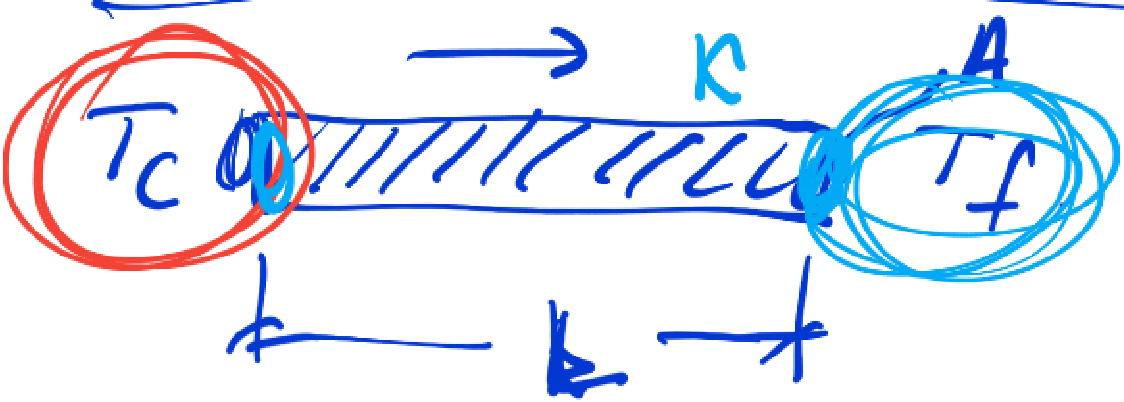
$$\frac{dQ}{dt} = K\left(\frac{A}{d}\right)(T_c - T_f) \quad \left(h = \frac{K}{d}\right)$$

dt ... $(d$ ...

constante de pérdida del material.

K coeficiente de conductividad térmica

$$[K] = \frac{J\,m}{s\,m^2 K} \Rightarrow \boxed{[K] = \frac{W}{m\,K}}$$



$$\frac{dQ}{dt} = k\,\frac{A}{L}\,(T_c - T_f)$$

$$[KA] = [K][A] = W \cdot \cancel{m}^2 = W$$

$[L]\,[L]\,[J]^{-}$ $\overline{[L]}$ $\overline{\cancel{M}LK}$ $\overline{\cancel{M}L}$ $\overline{K}$

$$I_Q \overset{def}{=} \frac{dQ}{dt}$$

$$I_q = \underbrace{\left(\frac{k\,A}{L}\right)}_{1/R} \Delta T$$

Ley de Ohm

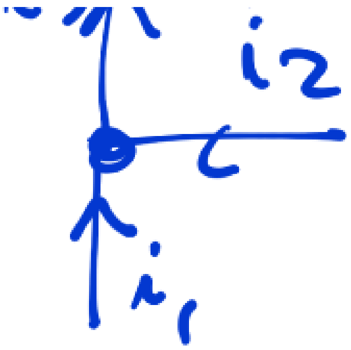
$$V = i\,R$$

$$I_q = \frac{\Delta T}{R} \Rightarrow \boxed{\Delta T = I_q\,R}$$

Electrica	Calor..
$\frac{V}{i} = R$	$\frac{\Delta T}{I_q} = R$

$i3h$. $i = i_2 + i.$

$i_3 = i_2$ ...



$$\frac{1}{R} = k\frac{A}{L} \Rightarrow \boxed{R = \frac{L}{kA}}$$

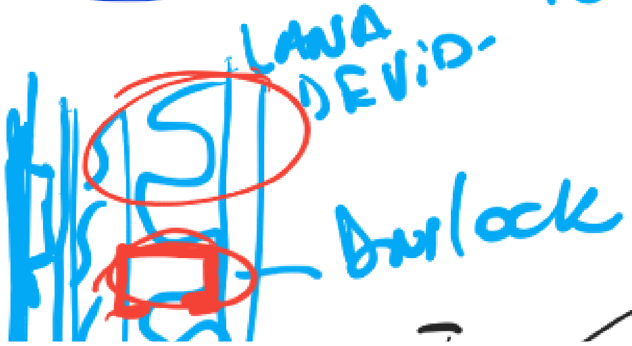
Resistencia térmica

$$[R] = \frac{K}{W}$$

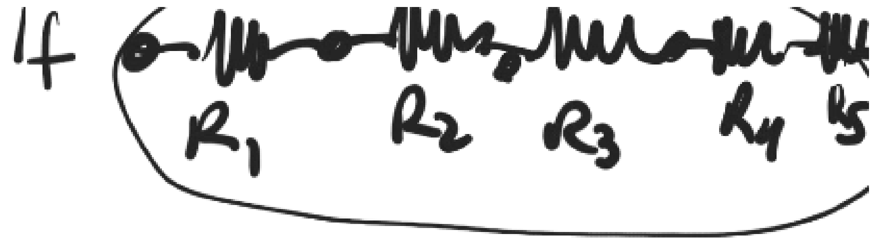
$$\boxed{\Delta T = I_Q R}$$

$$\frac{I_Q}{\Delta T} = \frac{1}{R}$$

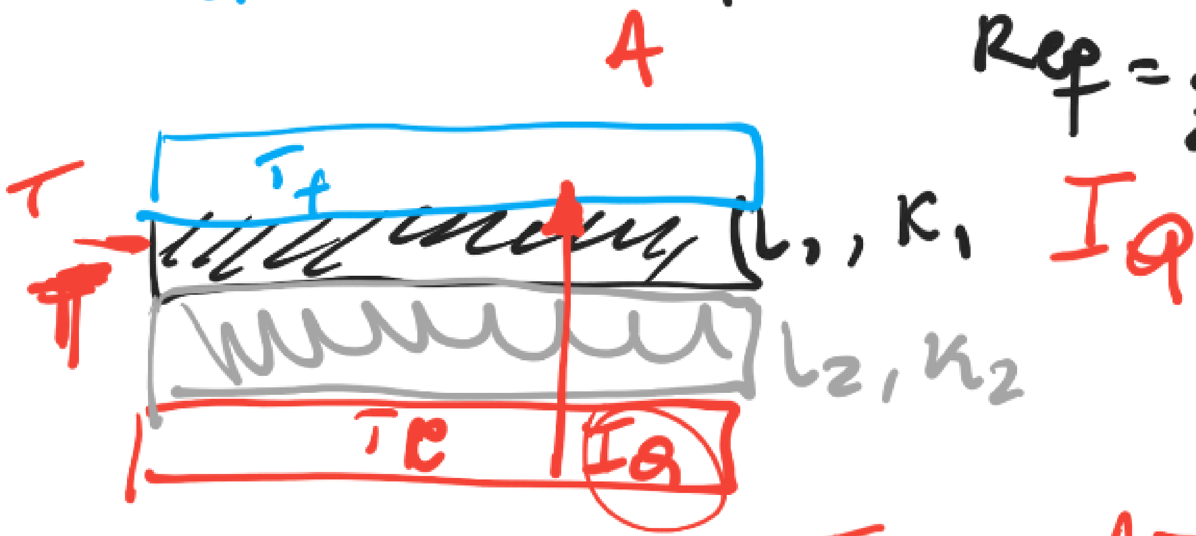
Telgopor – Porfel – Esfumo pol:

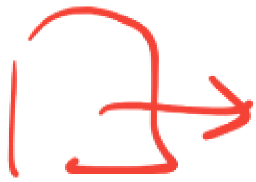


TC

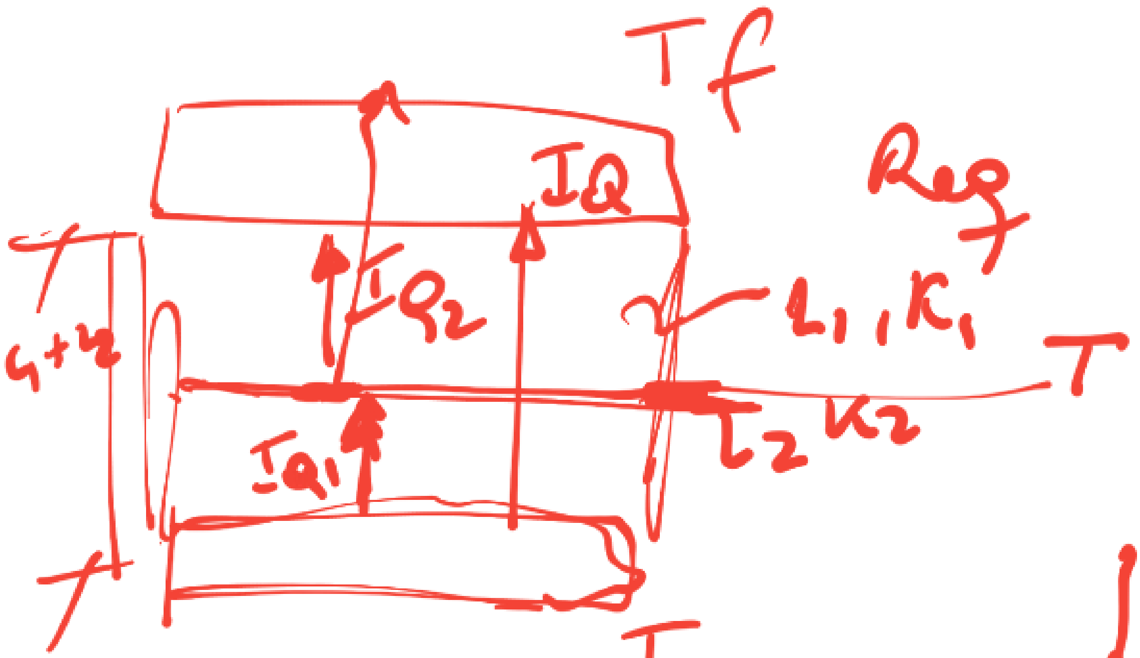


$$R_{eq} = \sum_{i=1}^{n} R_i$$





$$I_Q = \frac{\Delta T}{R}$$



$$I_{Q_1} = \frac{T_c - T}{\;}$$

R_1

$$\left.I_{\varphi_2} = \frac{T - T_f}{R_2}\right\} = \quad \uparrow i_{\varphi_1}$$

$$I_{\varphi_1} = I_{\varphi_2} \Rightarrow \frac{T_c - T}{R_1} = \frac{T - T_f}{R_2}$$

$$T_c R_2 - T R_2 = T R_1 - T_f R_1$$

$$T_c R_2 + T_f R_1 = T(R_1 + R_2)$$

$$\Rightarrow T = \frac{T_c R_2 + T_f R_1}{R_1 + R_2}$$

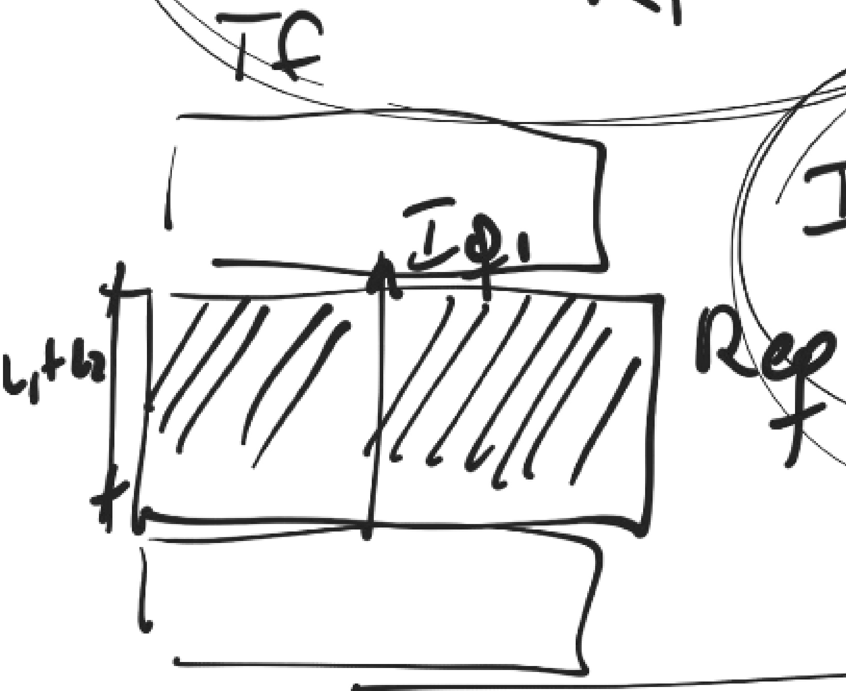
$$I_{\varphi_1} = \frac{T_c - T}{R_1} = \frac{1}{R_1}\left(T_c - \frac{T_c R_2 + T_f R_1}{R_1 + R_2}\right)$$

$$\Rightarrow I_{\varphi_1} = \frac{1}{R_1}\left(\frac{T_c R_1 + \cancel{T_c R_2} - \cancel{T_c R_2} - T_f R_1}{R_1 + R_2}\right)$$

$$I_{\varphi_1} = \frac{1}{R_1}\left(\frac{T_c R_1 - T_f R_1}{R_1 + R_2}\right)$$

$$I_{\varphi_1} = \frac{1}{\cancel{R_1}} \frac{(T_c - T_f)\cancel{R_1}}{R_1 + R_2}$$

$$\Rightarrow I_{\varphi_1} = \frac{T_c - T_f}{R_1 + R_2}$$



$$I_{\varphi_1} = \frac{\Delta T}{R_{eq}}$$

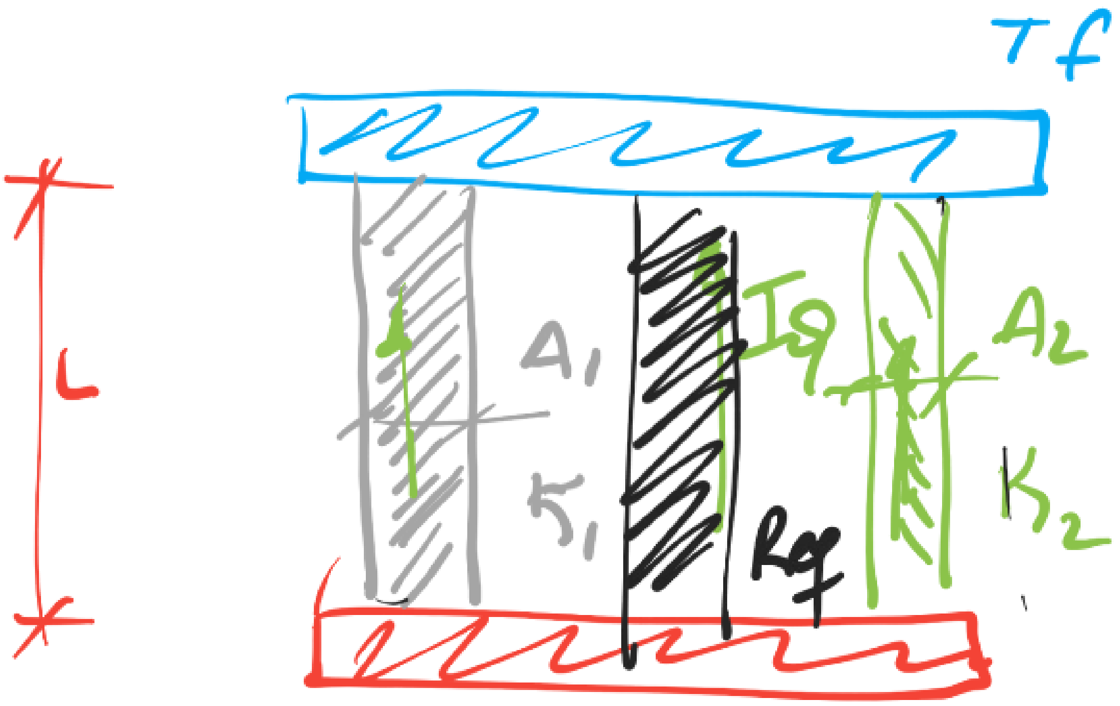
T_c

$$\boxed{R_{eq} = R_1 + R_2}$$

h S D:

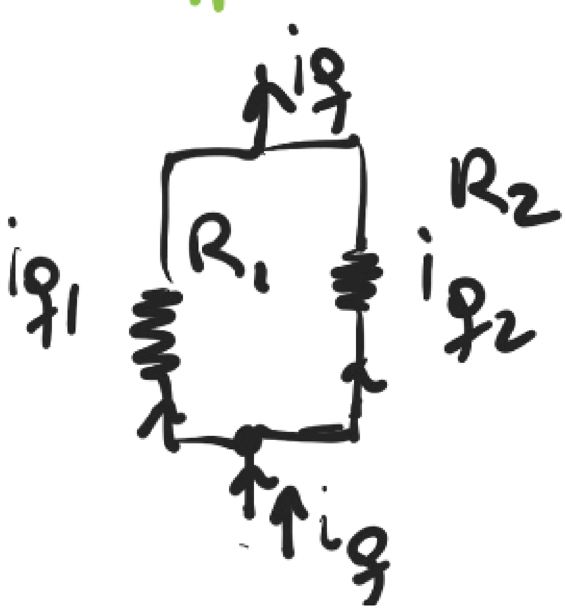
$K_{eq} = \sum K_i$

Resist. en paralelo:



$$\dot{I}_q = \dot{I}_{q_1} + \dot{I}_{q_2}$$

$$R_i = \frac{L_i}{K_i A_i}$$



$$I_{\varphi_i} = \frac{\Delta T}{R_i}$$

$$I_\varphi = \sum I_{\varphi i}$$

$$I_\varphi = I_{\varphi 1} + I_{\varphi 2}$$

$$= \frac{\Delta T}{R_1} + \frac{\Delta T}{R_2}$$

$$I_\varphi = \cancel{\Delta T}\left(\frac{1}{R_1} + \frac{1}{R_2}\right) = \frac{\Delta T}{R_{eq}}$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\boxed{\frac{1}{\ } = \sum \frac{1}{\ }}$$ Resisten

Ref	Ri	paralelo.

Emisión de energía EM por cuerpo negro.

$$\lambda_{max} = \frac{b}{T} = \frac{2{,}98\ mm\,K}{T}$$

T = 1000 K

$T = 1000\,K$

$$\lambda_{max} = \frac{2{,}98\ mm\ \cancel{K}}{1000\ \cancel{K}}$$

$$\simeq 3\ \mu m$$

$T = 6000\ K.$

$\lambda_{max} = 500\ nm$ Verde Amarillo.

$$\boxed{\frac{dQ}{dt} = \epsilon\,\sigma\,A\,T^4}$$

Ley de Stefan Boltzmann

$$\sigma = 5{,}67 \times 10^{-8}\ \frac{W}{m^2 K^4}$$

$0 < \epsilon \leq 1$ Radiación.

$$\frac{dQ_c}{dt} = -\sigma A_c T_c^4$$

$$\frac{dQ_f}{dt} = \sigma A_f T_f^4$$

$$\boxed{\frac{dQ_c}{dt} = \sigma A \left(T_f^4 - T_c^4\right)}$$

$$\frac{dQ_c}{dT} = \epsilon \sigma \left(T_f^4 - T_c^4\right) A$$

$$= \epsilon \sigma \left(T_f^2 - T_c^2\right)\left(T_f^2 + T_c^2\right) A$$

$$= \epsilon \sigma \left(T_f - T_c\right)\left(T_f + T_c\right) A \left(T_f^2 + T_c^2\right)$$

$$T_c \simeq T_f \qquad \simeq T_f$$

$$\frac{dQ_c}{dT} \cong \epsilon \sigma A (T_f + T_f)(T_f^2 + T_f^2) \cdot (T_f - T_c)$$

$$\cong \epsilon \sigma A (2T_f)(2T_f^2)\Delta T$$

$$\simeq \underbrace{\epsilon \sigma \quad 4T_f^3}_{h} A \Delta T$$

$$\boxed{\frac{dQ}{dt} = h \ A \ \Delta T}$$

Ley de Newton

Última modificación: 22:46