EJERCICIO 2

1) a) $mg = IBL \Rightarrow \boxed{I = \frac{mg}{BL}}$

b) $V + \mathcal{E} - RI = 0$

$$\mathcal{E} = -\frac{d\phi}{dt} = -BL\frac{dz}{dt} = -BLv$$

$$V - BLv - RI = 0$$

$$v = \frac{V - RI}{BL} = \frac{V - R\frac{mg}{BL}}{BL}$$

$$\boxed{v = \frac{V - R\frac{mg}{BL}}{BL}}$$

c) $W_R = RI^2$ $\quad \boxed{W_R = R\left(\frac{mg}{BL}\right)^2}$

d) $W_V = VI =$ $\quad \boxed{W_V = V\frac{mg}{BL}}$

$$W_V - W_R = mg\left(\frac{V - R\frac{mg}{BL}}{BL}\right)$$

$$\Rightarrow \boxed{W_V - W_R = mgv}$$

VARIACIÓN DE LA ENERGIA POTENCIAL GRAVITATORIA

e) $V \geq \dfrac{R m g}{BL}$ [ver (b)]

EJERCICIO 1

a) $\boxed{I_1 = \dfrac{V}{R_1}}$ $\boxed{I_2 = 0}$

b) $\boxed{Q = C V \dfrac{R_2}{R_1 + R_2}}$

c) $\dfrac{q}{C} - RI - L\dfrac{dI}{dt} = 0$

$I = -\dfrac{dq}{dt}$

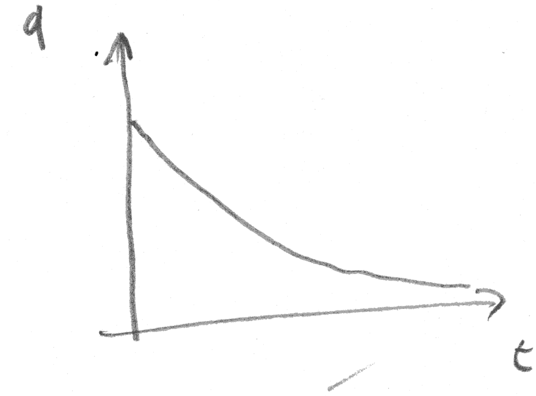
$\dfrac{q}{C} + R\dfrac{dq}{dt} + L\dfrac{d^2q}{dt^2} = 0$

PRUEBO $q(t) = A e^{\lambda t}$

$\Rightarrow L\lambda^2 + R\lambda + \dfrac{1}{C} = 0$

$\lambda^2 + \dfrac{R}{L}\lambda + \dfrac{1}{LC} = 0$

PARA QUE $\lambda \in \mathbb{R}$

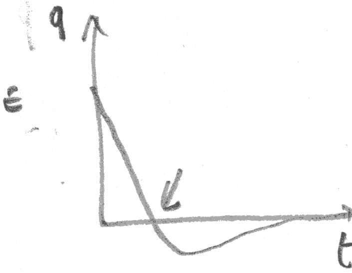


$$\frac{R^2}{L^2} - \frac{4}{LC} \geq 0$$

$$\Rightarrow \frac{R^2}{L} \geq \frac{4}{C}$$

$$\Rightarrow \boxed{L \leq \frac{R^2 C}{4}}$$

SI ESTA CONDICION NO SE CUMPLE $q(t)$ OSCILA Y CAMBIA DE SIGNO



EJERCICIO 3

a) $$\boxed{\varphi = 2n \frac{(x_1 - x_2)}{\lambda} \cdot 2\pi}$$

b) CONTRIBUCION DEL RECORRIDO EN LA CELDA A LA DIFERENCIA DE FASE.

CON AIRE $\varphi_1 = 4\pi n \frac{L}{\lambda}$

SIN AIRE $\varphi_0 = 4\pi \frac{L}{\lambda}$ $(n = 1)$

DIFERENCIA : $\varphi_1 - \varphi_0 = 2\pi N$ $(N = 88)$

$$4\pi \frac{L}{\lambda}(n-1) = 2\pi N.$$

$$\Rightarrow n-1 = \frac{N\lambda}{2L}$$

$$n-1 = \frac{88 \times 6.3 \times 10^{-7}}{2 \times 0,1} = 2,8 \times 10^{-4}$$

$$\boxed{n_{AIRE} = 1,00028}$$