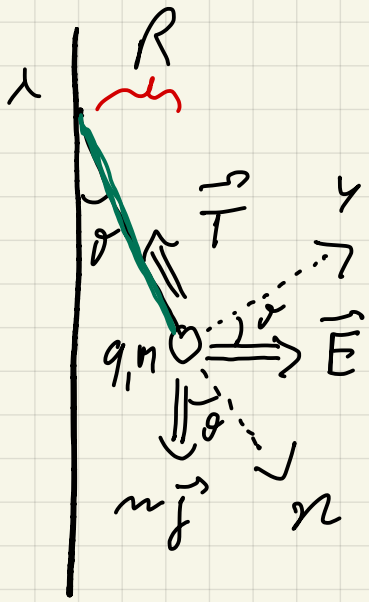


1) $E = \frac{\lambda}{2\pi\epsilon_0 R}$ $R = L \sin \vartheta$ all'equilibrio
 $F_n = F_T = 0$



$$F_T = qE \cos \vartheta - mg \sin \vartheta = 0$$

$$q \frac{\lambda \cos \vartheta}{2\pi\epsilon_0 L \sin \vartheta} = mg \sin \vartheta$$

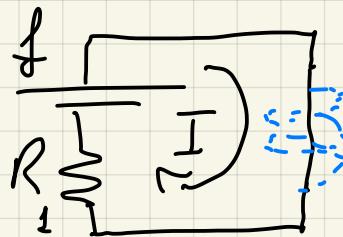
$$m = \frac{q\lambda \cos \vartheta}{2\pi\epsilon_0 L g \sin^2 \vartheta} = 5.65 \times 10^{-4} \text{ kg}$$

2) $C_{\text{tot}} = C_0 + C_2 = \frac{d(d-x)\epsilon_0}{h} + \frac{dx\epsilon_0\epsilon_2}{h} = \frac{d\epsilon_0}{h} \{x(\epsilon_2-1) + d\}$

$$F_n = + \frac{dU_c}{dx} \Big|_{\delta = \cos i} = \frac{\partial}{\partial x} \left\{ \frac{C \delta^2}{2} \right\} = \frac{\delta^2}{2} \frac{dC}{dx} =$$

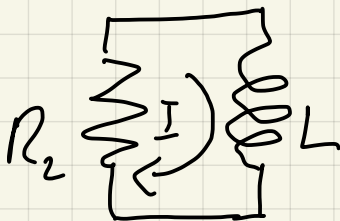
$$= \frac{\delta^2}{2} \frac{d\epsilon_0}{h} (\epsilon_2 - 1)$$

3) $t \leq 0$ REGIME



$$I_0 = I_L(t=0) = \frac{\delta}{R_1}$$

$t > 0$



$$I_L = I_0 e^{-t/\tau} = \frac{\delta}{R_1} e^{-t/\tau}$$

$$\tau = L/R_2 \quad M_L = \frac{1}{2} L I^2 = \frac{1}{2} \frac{\delta^2}{R_1^2} e^{-\frac{2t}{\tau}}$$

4) I TRATTI LUNGO γ NON DANNO CONTRIBUTO

$$\left(\text{SE } \vec{dB} = \frac{\mu_0}{4\pi} \frac{d\vec{l} \times \vec{\Delta r}}{\Delta r^3} \quad \vec{dl} \text{ e } \vec{\Delta r} \text{ sono // lungo } \gamma \right).$$

Contributo solo delle SEMISPIRE $\vec{B}(0) = \frac{\mu_0 I}{2R} \hat{z}$

$$B(a) = \left\{ \frac{B_A(0)}{2} + \frac{B_B(0)}{2} \right\} \hat{z} = \frac{\mu_0 I}{4} \left\{ \frac{1}{R_A} + \frac{1}{R_B} \right\} \hat{z}$$

$$5) \varphi(\vec{B}) = N S B = \frac{N S B_0 t}{\Delta t} \quad \mathcal{E}_{\text{em}} = - \frac{d\varphi}{dt} = - \frac{N S B_0}{\Delta t} = - 8 \times 10^2 \text{ V}$$

$$i = \frac{\mathcal{E}_{\text{em}}}{R} = - 1.6 \times 10^2 \text{ A} \quad q = \int_0^{\Delta t} i dt = - \frac{N S B_0}{R} = 0.16 \text{ C}$$

$$\mathcal{L} = q \mathcal{E}_{\text{em}} = \frac{N^2 S^2 B_0^2}{R \Delta t} = 1.28 \times 10^2 \text{ J}$$