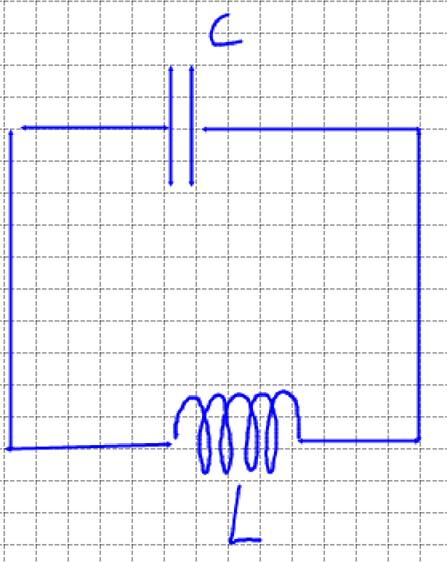


$$-L\frac{di(t)}{dt} - \frac{Q(t)}{C} = 0$$

$$L\frac{di(t)}{dt} + \frac{Q(t)}{C} = 0 \qquad (A)$$

$$i(t) = \frac{dQ(t)}{dt} \qquad (B)$$

calcoliamo la derivata in ambo i membri della (A):

$$L\frac{d^2 i(t)}{dt^2} = -\frac{1}{C}\frac{dQ(t)}{dt} \rightarrow i(t) \ \text{(per (B))}$$

$$\frac{d^2 i(t)}{dt^2} = -\frac{1}{LC}\, i(t) \qquad (C)$$

$$\Downarrow$$

$$\boxed{\ddot{i}(t) = -\frac{1}{LC}\, i(t)}$$

EQUAZIONE DIFFERENZIALE.

una soluzione generale è $i(t) = i_0\cos(\omega t + \varphi_0)$

$$\frac{di(t)}{dt} = -i_0\omega\,\mathrm{sen}(\omega t + \varphi_0) \qquad (1)$$

$$D\big(f(\omega t + \varphi_0)\big) = f'(\omega t + \varphi_0)\cdot\omega$$

$$\frac{d^2 i(t)}{dt^2} = -i_0\omega^2\cos(\omega t + \varphi_0) \qquad (2)$$

$$\cancel{-}\cancel{i_0}\,\omega^2\cancel{\cos(\omega t + \varphi_0)} = \cancel{-}\frac{1}{LC}\cancel{i_0}\cancel{\cos(\omega t + \varphi_0)}$$

$$\omega^2 = \frac{1}{LC}$$

$$\omega = \sqrt{\frac{1}{LC}}$$

$$i(t) = \frac{dQ(t)}{dt} \qquad \int i(t)\,dt = \int \frac{dQ(t)}{\cancel{dt}}\cancel{dt}$$

$$\int i(t)\,dt = Q(t)$$

$$i(t) = i_0\cos(\omega t + \varphi_0)$$

$$Q(t) = \frac{i_0}{\omega}\,\mathrm{sen}(\omega t + \varphi_0)$$

$$\frac{dQ(t)}{dt} = \frac{i_0}{\cancel{\omega}}\cancel{\omega}\cos(\omega t + \varphi_0) = i(t)$$

$$\Delta V_C = \frac{Q(t)}{C}$$

$$Q(t) = \frac{i_0}{\omega} \operatorname{sen}(\omega t + \varphi_0)$$

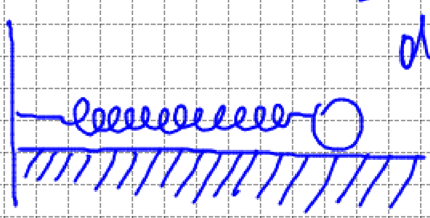
$$\Delta V_C = \frac{i_0}{\omega C} \operatorname{sen}(\omega t + \varphi_0) \qquad \omega = \frac{1}{\sqrt{LC}}$$

$$\Delta V_C = \frac{i_0}{C} \sqrt{LC} \operatorname{sen}(\omega t + \varphi_0)$$

$$\Delta V_C = i_0 \sqrt{\frac{L}{C}} \operatorname{sen}(\omega t + \varphi_0)$$

$$a(t) = \frac{dv(t)}{dt} \qquad v(t) = \frac{ds(t)}{dt}$$

$$a(t) = \frac{d^2 s(t)}{dt^2}$$



$$\bar{F} = -K \Delta s$$

$$m\, a(t) = -K\, ds(t)$$

è l'analoga della C $\leftarrow$ $$\frac{d^2 s(t)}{dt^2} = -\frac{K}{m} ds(t)$$