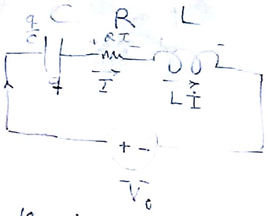


$$I = \frac{dq}{dt} = \dot{q} \qquad \dot{I} = \ddot{q}$$

$$\frac{q}{c} + RI + L\dot{I} = V_0$$

$$\frac{q}{c} + R\dot{q} + L\ddot{q} = V_0$$

$$e^{st} \begin{cases} s_1 \\ s_2 \end{cases} \qquad \alpha_1 e^{s_1 t} + \alpha_2 e^{s_2 t} + V_0 C$$

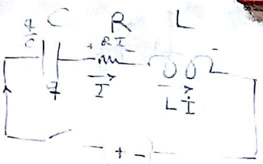
$$\ddot{Z} + A\dot{Z} + BZ = C \quad (0)$$

$$Z = e^{st} \qquad \boxed{S^2 + AS + B = 0}$$

$$S_1 = \frac{-A + \sqrt{A^2 - 4B}}{2}$$

$$S_2 = \frac{-A - \sqrt{A^2 - 4B}}{2}$$

$$Z = \alpha_1 e^{s_1 t} + \alpha_2 e^{s_2 t} + \frac{C}{B}$$



$t<0$

$t>0$

V_0

$I = \frac{dq}{dt} = \dot q \qquad \dot I = \ddot q$

$\Delta q = \int_{0^-}^{0^+} I \, dt$

$\frac{q}{C} + RI + L\dot I = V_0$

(1) $\frac{q}{C} + R\dot q + L\ddot q = V_0$

$e^{st} \to s_1, \; s_2$

$\dot q(0) = I_0 = 0$

$q(0) = q_0 = 0$

$q = \alpha_1 e^{s_1 t} + \alpha_2 e^{s_2 t} + V_0 C$

$\ddot Z + A\dot Z + BZ = C$

$Z = e^{st} \qquad \boxed{s^2 + As + B = 0}$

$s_1 = \frac{-A + \sqrt{A^2 - 4B}}{2}$

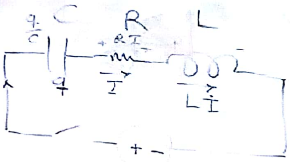
$s_2 = \frac{-A - \sqrt{A^2 - 4B}}{2}$

$Z = \alpha_1 e^{s_1 t} + \alpha_2 e^{s_2 t} + \frac{C}{B}$

$q = \alpha_1 e^{s_1 t} + \alpha_2 e^{s_2 t} + V_0 C$

$\dot q = \alpha_1 s_1 e^{s_1 t} + \alpha_2 s_2 e^{s_2 t}$

$$\begin{cases} \alpha_1 + \alpha_2 + V_0 C = 0 \\ \alpha_1 s_1 + \alpha_2 s_2 = 0 \end{cases}$$



$S = -\gamma \pm \sqrt{\gamma^2 - \omega^2}$

$q + RCI + LC\dot{I} = V_0 C$

(1) $\frac{q}{LC} + \frac{R\dot{q}}{L} + \ddot{q} = \frac{V_0}{L}$

$\ddot{Z} + A\dot{Z} + BZ = C$ 0

$Z = e^{St}$ $\left[S^2 + AS + B = 0 \right]$

$S_1 = \frac{-A + \sqrt{A^2 - 4B}}{2}$

$S_2 = \frac{-A - \sqrt{A^2 - 4B}}{2}$

$Z = \alpha_1 e^{S_1 t} + \alpha_2 e^{S_2 t} + \frac{C}{B}$

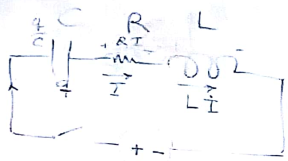
$\alpha_1 e^{S_1 t} + \alpha_2 e^{S_2 t} + V_0 C$

$e^{-\gamma t} \left[A \sin(\Omega t) + B \cos(\Omega t) \right]$

$A e^{-\gamma t} + B t e^{-\gamma t}$

$q = \alpha_1 e^{S_1 t} + \alpha_2 e^{S_2 t} + V_0 C$

$\dot{q} = \alpha_1 S_1 e^{S_1 t} + \alpha_2 S_2 e^{S_2 t}$



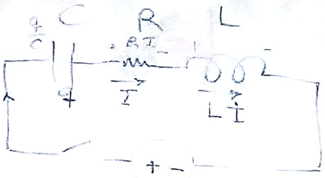
$$\frac{q}{c} + \dot{q}R + \ddot{q}L = \delta_{(t)} \rightarrow q$$

$$\frac{z}{c} + \dot{z}R + \ddot{z}L = U_{(t)}$$

$$z = Ae^{-\gamma t} \sin(\Omega t) U_{(t)}$$

$$\dot{q} = A\,\delta(t) \times e^{-\gamma t} \sin(\Omega t) - \gamma A e^{-\gamma t} \sin(\Omega t) U_{(t)}$$

$$+ A\Omega e^{-\gamma t} \cos(\Omega t) U_{(t)}$$

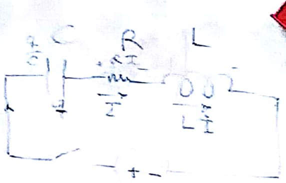


$$\frac{q}{C} + \dot{q}R + \ddot{q}L = \delta_{(t)} \to q$$

$$\frac{z}{C} + \dot{z}R + \ddot{z}L = v_{(t)}$$

$$\ddot{q} + A\dot{q} + Bq = \dot{\delta}_{(t)} + 2\delta_{(t)}$$

$$q = 2\frac{dz}{dt} + \frac{d^2 z}{dt^2}$$



$$\int_{0^-}^{0^+} \frac{q}{C} + \dot{q}R + \ddot{q}L = \delta_{(t)}$$

$$\frac{q}{C} + \dot{q}R + \ddot{q}L = 0$$

$$\int_{0^-}^{0^+} \delta(t)\,dt = 1$$

$$\dot{q}_{(t)} = \int_0^t \ddot{q}\,dt$$

$$q_{(t)} = \int_0^t \int_0^t \ddot{q}\,dt\,dt$$

0^+

$$\int_{0^-}^{0^+} \left[\frac{1}{C} \int_0^t \int_0^t \ddot{q}\,dt\,dt + R \int_0^t \ddot{q}\,dt + L\ddot{q} \right] dt = 1$$

$$\int_{0^-}^{0^+} L\ddot{q}\,dt = 1$$

$$\dot{q}_{(0^+)} - \dot{q}_{(0^-)} = \frac{1}{L}$$