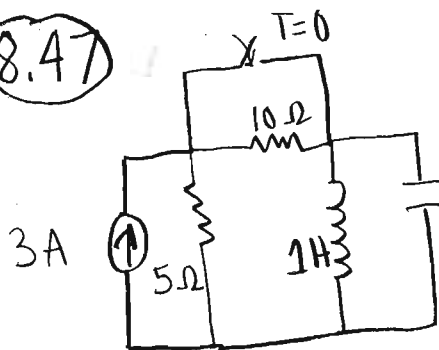
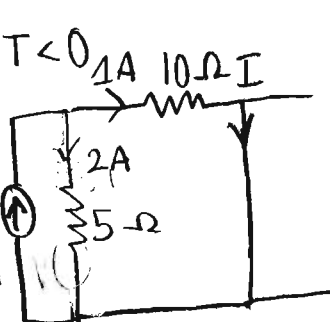


8.47



$$I_C = C \frac{dV}{dt} \quad T < 0$$

$$V_L = L \frac{dI}{dt}$$

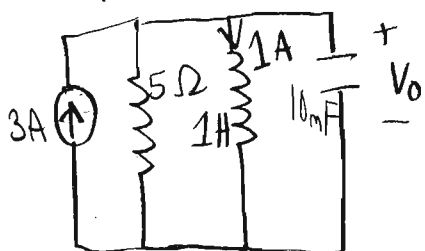


$$I_i = 1A$$

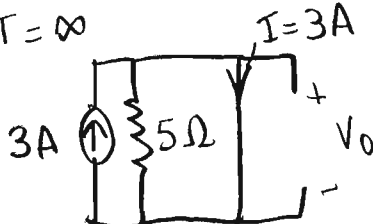
$$V_0(0^-) = 0V$$

$$V_0(0^+) = 0V$$

T > 0



T = ∞



$$\frac{dV_0(0^+)}{dt} = \frac{I_C}{C}$$

$$\frac{dV_0}{dt} = 200$$

$$-3A + \frac{V_0}{5\Omega} + I_L + I_C = 0 \Rightarrow \frac{V_0}{5\Omega} + \frac{1}{L} \int_{-\infty}^t V_0 dt + C \frac{dV_0}{dt} = 3A$$

$$\frac{d^2 V_0}{dt^2} + \frac{1}{RC} \frac{dV_0}{dt} + \frac{1}{LC} = 0 \Rightarrow s^2 + \frac{1}{RC}s + \frac{1}{LC} = 0$$

$$\alpha = \frac{1}{2RC} = \frac{1}{2 \cdot 5\Omega \cdot 10mF} = 10 \quad \omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{1H \cdot 10mF}} = 10$$

$$V_0(t) = (A + Bt)e^{-10t} u(t) V$$

$$V_0(0) = A = 0$$

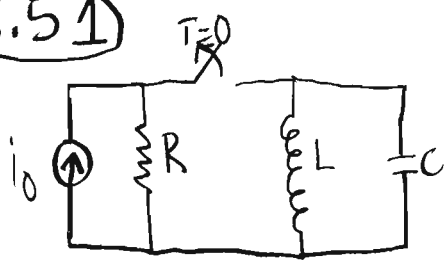
$$\frac{dV_0}{dt} = -10Bte^{-10t} + Be^{-10t}$$

$$B = 200$$

$$V_0(t) = 200te^{-10t} u(t) V$$

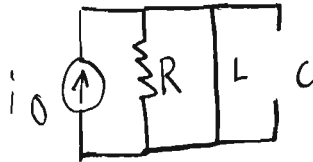
H W 8

8.51



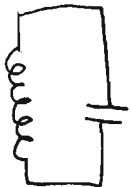
$$I_C = C \frac{dV}{dt} < 0$$

$$V_L = L \frac{dI}{dt}$$



$$\begin{aligned} I_L &= i_0 \\ V_C &= 0 \\ I_C &= 0 \\ V_L &= 0 \end{aligned}$$

$T > 0$



$$L \frac{di}{dt} + V_C = 0$$

$$\frac{d^2 i}{dt^2} + \frac{1}{LC} = 0 \Rightarrow s^2 + 0s + \frac{1}{LC} = 0$$

$$\frac{dV}{dt} = I_C = I_L = i_0$$

$$s_{1,2} = -0 \pm \sqrt{0^2 - \left(\frac{1}{\sqrt{LC}}\right)^2} \quad \omega_0 = \omega_d = \frac{1}{\sqrt{LC}}$$

$$V(t) = (A \cos \frac{1}{\sqrt{LC}} t + B \sin \frac{1}{\sqrt{LC}} t) u(t) \text{ V}$$

$$V(0) = 0 = A$$

$$\frac{dV}{dt} = \frac{1}{\sqrt{LC}} A \sin \frac{1}{\sqrt{LC}} t + \frac{1}{\sqrt{LC}} B \cos \frac{1}{\sqrt{LC}} t$$

$$\frac{i_0}{C} = \frac{1}{\sqrt{LC}} \cdot B \quad B = \frac{\sqrt{LC} \cdot i_0}{C}$$

$$V(t) = \left(\frac{\sqrt{LC} \cdot i_0}{C} \sin \frac{1}{\sqrt{LC}} t \right) u(t) \text{ V} \quad \omega_0 = \frac{1}{\sqrt{LC}}$$

$$V(t) = \left(\frac{i_0}{\omega_0 \cdot C} \right) \sin \omega_0 t u(t) \text{ V}$$