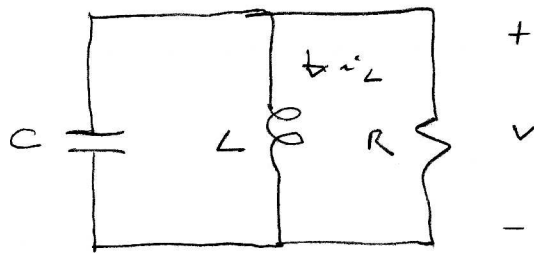


6.3

$$v(t) = 125 e^{-4000t} (\cos 3000t - 2 \sin 3000t)$$

$$C = 50 \text{ nF}$$

$$s = -\alpha \pm \sqrt{\alpha^2 - \omega_0^2}$$

$$\alpha = 4000 = \frac{1}{2RC}$$

$$\begin{aligned} \hookrightarrow R &= \frac{1}{2 \times 4000 \times 50 \times 10^{-9}} \\ &= \underline{2.5 \text{ k}} \end{aligned}$$

$$\sqrt{\omega_0^2 - \alpha^2} = 3000$$

$$\omega_0^2 = (3000)^2 + (4000)^2 = (5000)^2$$

$$\frac{1}{LC} = (5000)^2 \rightarrow \underline{L = 0.8 \text{ H}}$$

$$V_0 = V(0+) = \underline{125 \text{ V}}$$

$$I_0 = i_L(0+) = \frac{-V}{R} \Big|_{0+} - C \frac{dV}{dt} \Big|_{0+}$$

$$\begin{aligned} \frac{dV}{dt} = & 125 (-4000) e^{-4000t} (\cos 3000t - 2 \sin 3000t) \\ & + 125 (3000) e^{-4000t} (-\sin 3000t - 2 \cos 3000t) \end{aligned}$$

$$\frac{dV}{dt} \Big|_{0+} = 125 (-4000 - 2 \times 3000) = 1.25 \times 10^6 \text{ V/s}$$

$$\frac{-V}{R} \Big|_{0+} = -50 \text{ mA}$$

$$-C \frac{dV}{dt} \Big|_{0+} = -62.5 \text{ mA}$$

$$\hookrightarrow I_0 = -112.5 \text{ mA}$$

$$\begin{aligned} i_L(t) &= \frac{-V(t)}{R} - C \frac{dV}{dt} \\ &= -(50 \text{ mA}) e^{-4000t} (\cos 3000t - 2 \sin 3000t) \\ &\quad - (25 \text{ mA}) e^{-4000t} (\cos 3000t - 2 \sin 3000t) \\ &\quad + (18.75 \text{ mA}) e^{-4000t} (-\sin 3000t - 2 \cos 3000t) \\ &= -(112.5 \text{ mA}) e^{-4000t} \cos 3000t \\ &\quad + (131.25 \text{ mA}) e^{-4000t} \sin 3000t \end{aligned}$$