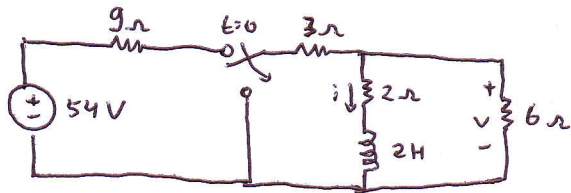
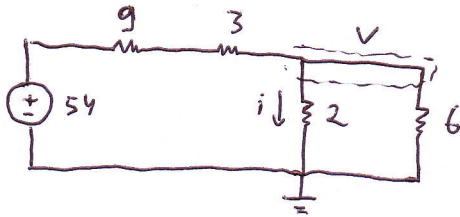


Tentukan i dan v untuk $t > 0$:



Jawab:

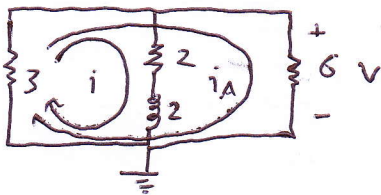
Rangkaian saat $t = 0^-$:



KCL:

$$\begin{aligned} \frac{V-54}{12} + \frac{V}{2} + \frac{V}{6} &= 0 \times 12 \\ V-54 + 6V + 2V &= 0 \\ 9V &= 54 \\ V &= 6 \text{ volt} \end{aligned} \quad \left| \quad i = \frac{6}{2} = 3A \right.$$

Rangkaian saat $t = 0^+$:



KVL i_A :

$$3(i + i_A) + 6i_A = 0$$

$$3i + 9i_A = 0$$

$$i_A = -\frac{1}{3}i$$

KVL i :

$$3(i + i_A) + 2i + L \frac{di}{dt} = 0$$

$$3i + 3i_A + 2i + 2 \frac{di}{dt} = 0$$

$$5i + 3\left(-\frac{1}{3}i\right) + 2 \frac{di}{dt} = 0$$

$$2 \frac{di}{dt} = -4i$$

$$\frac{di}{dt} = -2i$$

$$\int \frac{di}{i} = \int -2 dt$$

$$\ln i = -2t + k$$

$$i = e^k \cdot e^{-2t}$$

Saat $t = 0$: $i = 3A$

$$3 = e^k \cdot e^0$$

$$\therefore e^k = 3$$

$$i = 3 \cdot e^{-2t} \text{ Ampere}$$

$$V = 6 \cdot i_A$$

$$= 6 \cdot \left(-\frac{1}{3}i\right)$$

$$= 6 \cdot \left(-\frac{1}{3} \cdot 3 \cdot e^{-2t}\right)$$

$$= -6 \cdot e^{-2t} \text{ Volt}$$