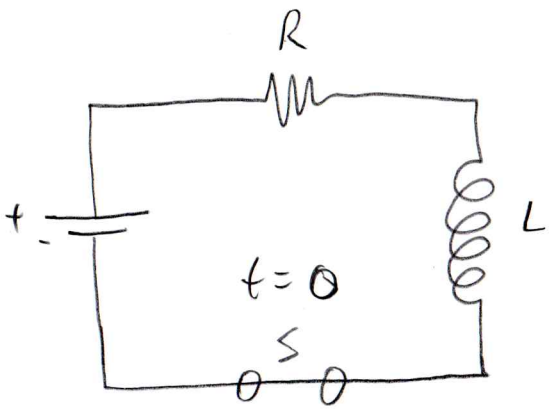
Cap 30 Ex 51



Valor de τ_L p/ 0,1 % de i final.

Circuito de carga de um indutor:

$$i = \underbrace{\frac{\mathcal{E}}{R}}_{I_0}\left(1 - e^{-t/\tau_L}\right)$$

Onde $\tau_L = \frac{L}{R}$

Queremos calcular o tempo para que a corrente chegue ao valor 0,999 de I_0 (0,1%)

Portanto:

$$0,999\, I_0 = I_0\left(1 - e^{-t/\tau_L}\right)$$

$$0,999 = 1 - e^{-t/\tau_L}$$

$$0,001 = e^{-t/\tau_L}$$

Aplicando Ln temos:

$$\ln(0,001) = -\frac{t}{\tau_L}$$

$$-6,907 = -\frac{t}{\tau_L}$$

$$t \cong 6,91\, \tau_L$$