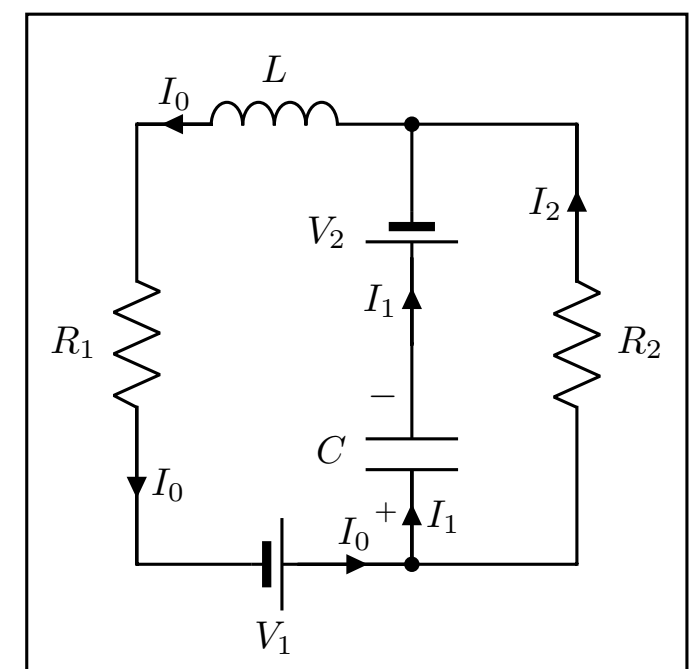


Física III

Aula remota de 07/07/2020
Circuitos elétricos

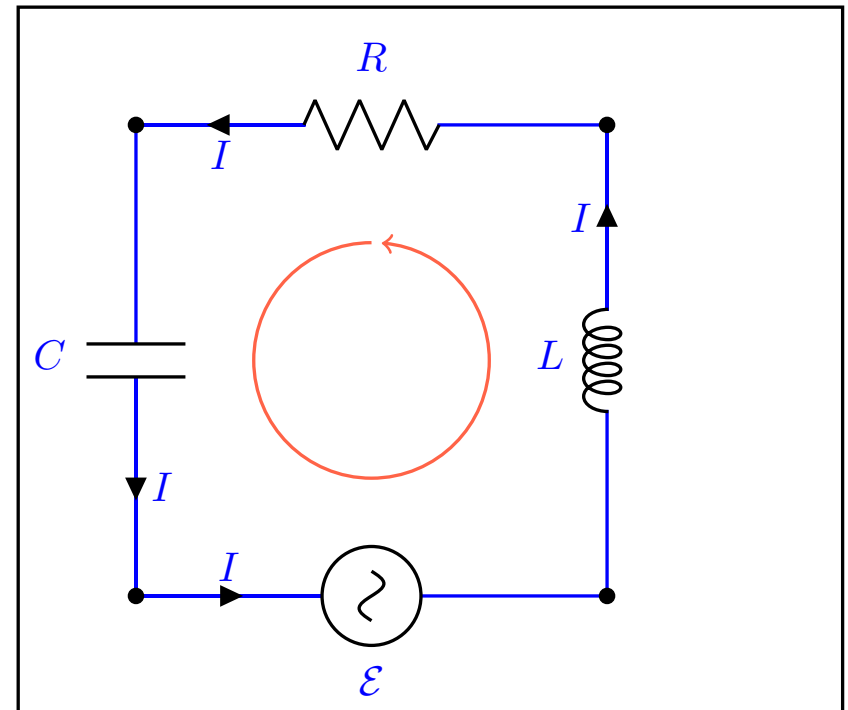


Leis de Kirchhoff

Malhas

$$\sum_j \Delta V_j = - \frac{d\Phi}{dt}$$

$$\sum_j \Delta V_j = 0$$

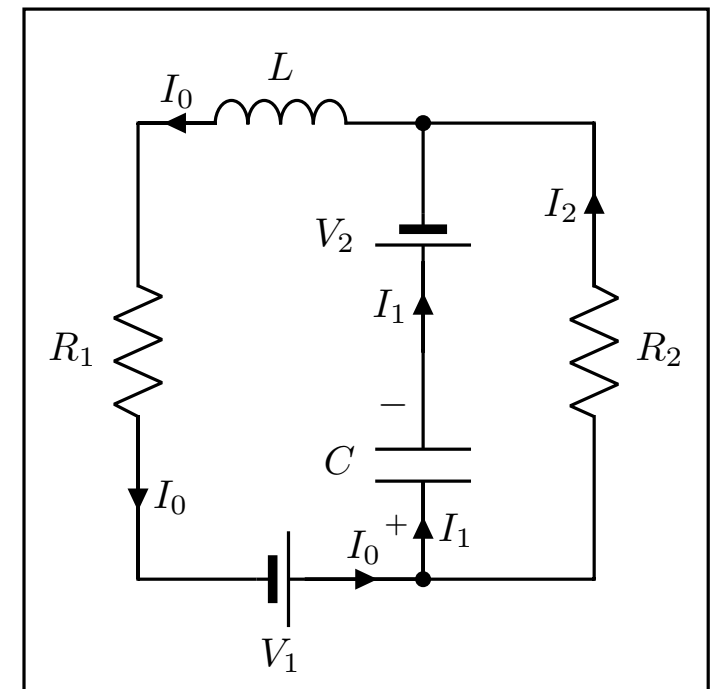


Leis de Kirchhoff

Nós

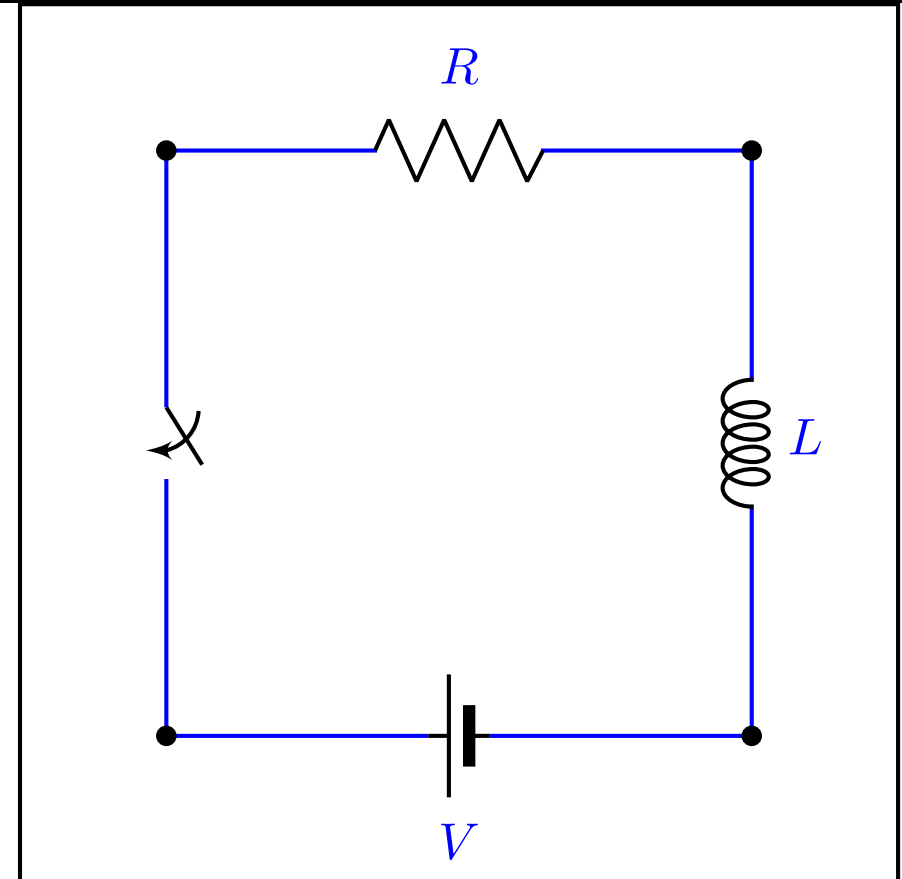
$$\sum_j I_j = -\frac{dq}{dt}$$

$$\sum_j I_j = 0$$



Pratique o que aprendeu

$$I(t) = ?$$

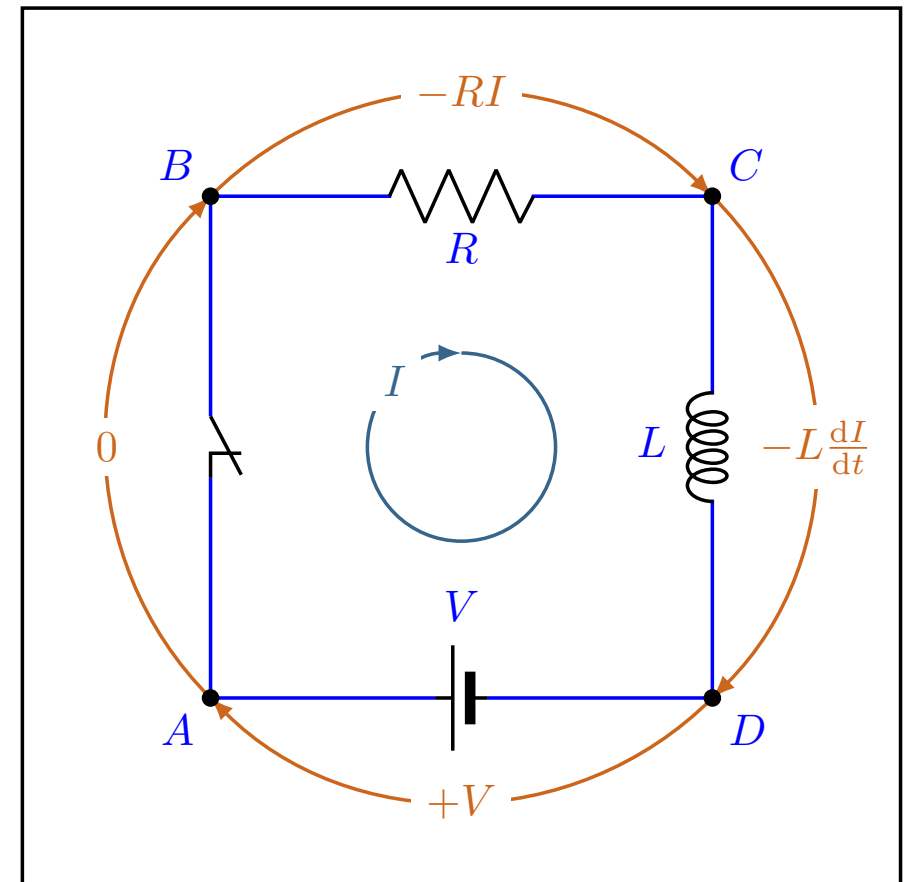


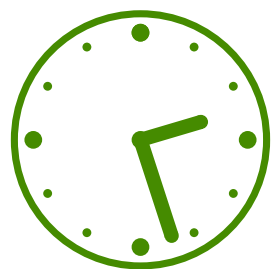
Pratique o que aprendeu

$$A \rightarrow B \rightarrow C \rightarrow D$$

$$\Rightarrow 0 - RI - L \frac{dI}{dt} + V = 0$$

$$V = L \frac{dI}{dt} + RI$$

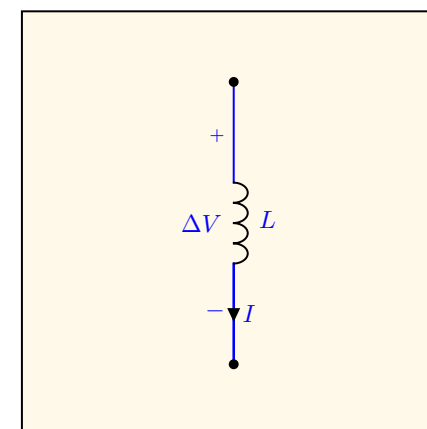
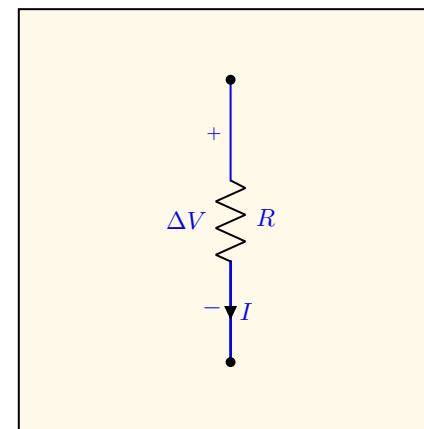


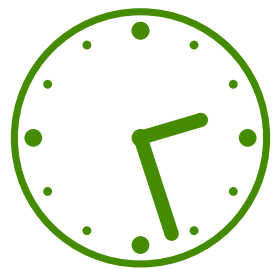


Escalas de tempo

$$\Delta V = RI$$

$$[\Delta V] = [R][I]$$

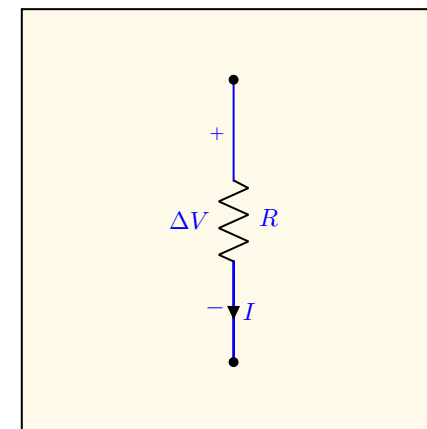




Escalas de tempo

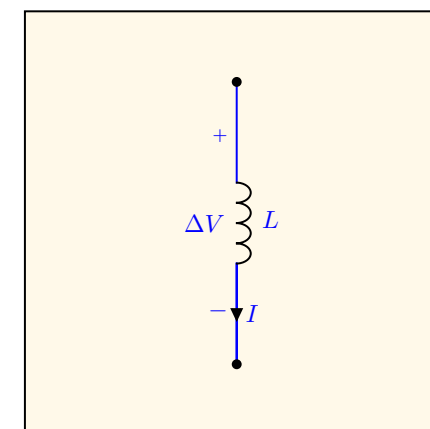
$$\Delta V = RI$$

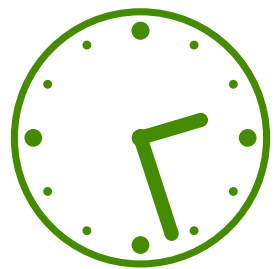
$$[\Delta V] = [R][I]$$



$$\Delta V = -L \frac{dI}{dt}$$

$$[\Delta V] = [L] \left[\frac{dI}{dt} \right]$$

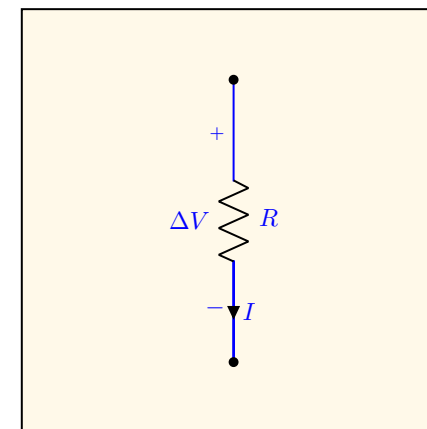




Escalas de tempo

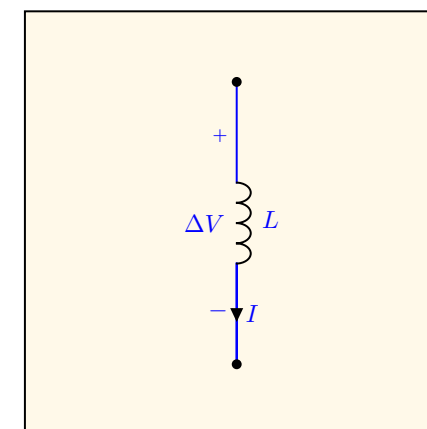
$$\Delta V = RI$$

$$[\Delta V] = [R][I]$$



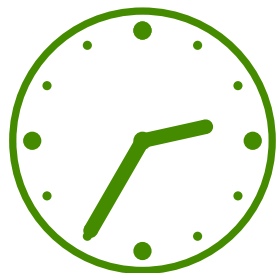
$$\Delta V = -L \frac{dI}{dt}$$

$$[\Delta V] = [L] \left[\frac{dI}{dt} \right]$$



$$[\Delta t] = \left[\frac{L}{R} \right]$$

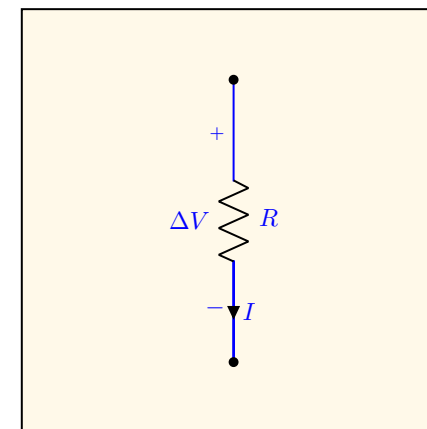
$$\tau = \frac{L}{R}$$



Escalas de tempo

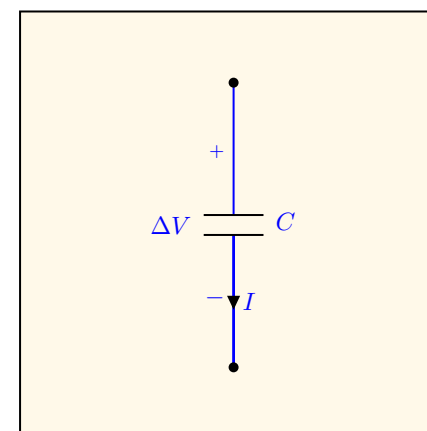
$$\Delta V = RI$$

$$[\Delta V] = [R] \left[\frac{dQ}{dt} \right]$$



$$\Delta V = \frac{Q}{C}$$

$$[\Delta V] = \frac{[Q]}{[C]}$$



$$[\Delta t] = [RC]$$

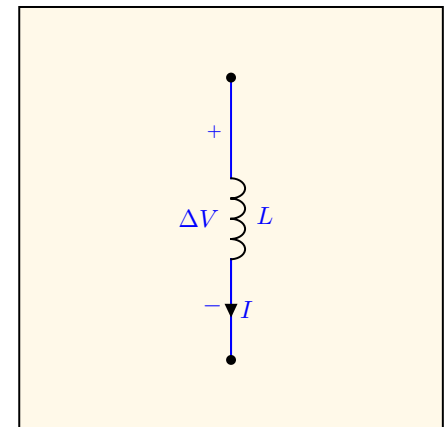
$$\tau = RC$$



Escalas de tempo

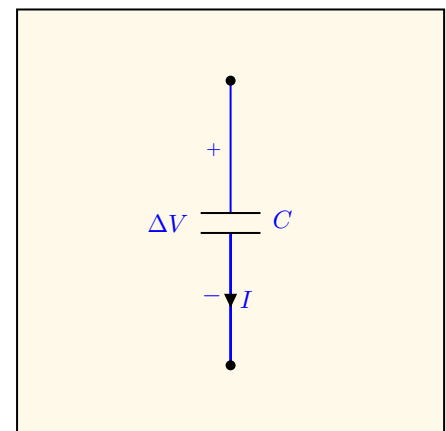
$$\Delta V = -L \frac{dI}{dt}$$

$$[\Delta V] = [L] \frac{[Q]}{[\Delta t]^2}$$



$$\Delta V = \frac{Q}{C}$$

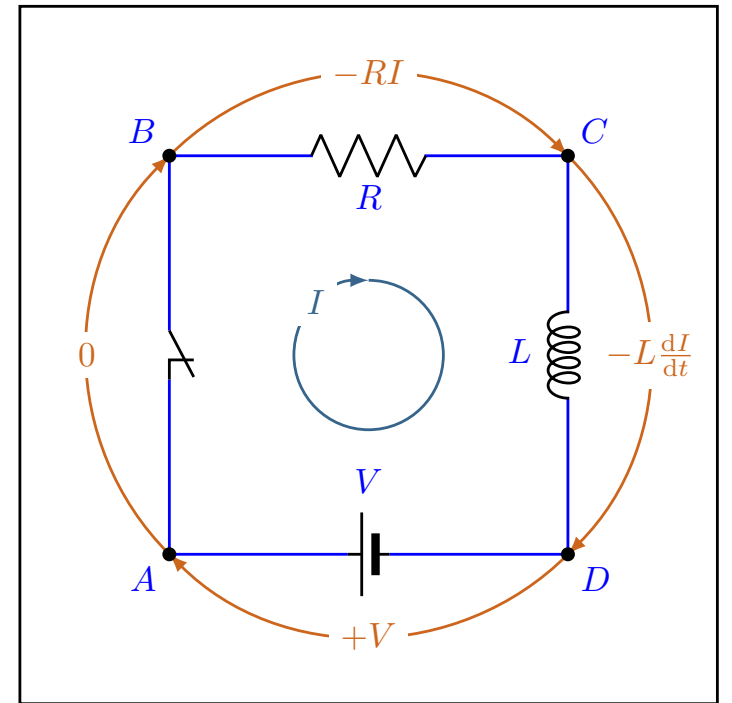
$$[\Delta V] = \frac{[Q]}{[C]}$$



$$[\Delta t]^2 = [LC]$$

$$\tau = \sqrt{LC}$$

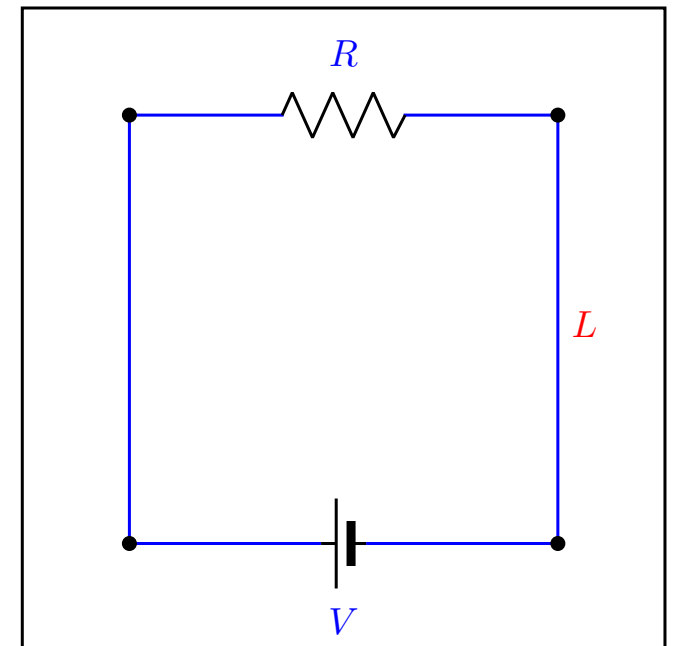
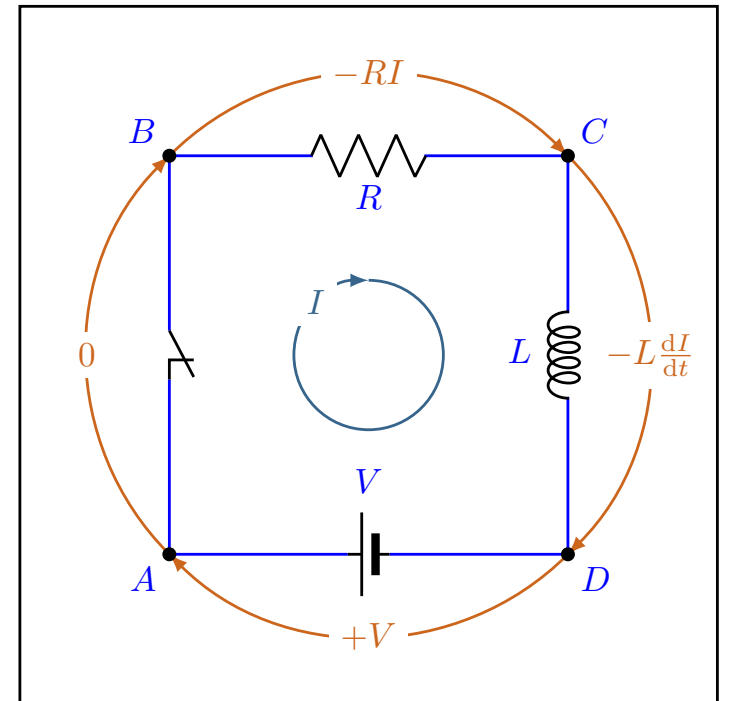
$$V = L \frac{dI}{dt} + RI$$



$$I = I_p + I_h$$

$$I_p = \frac{V}{R}$$

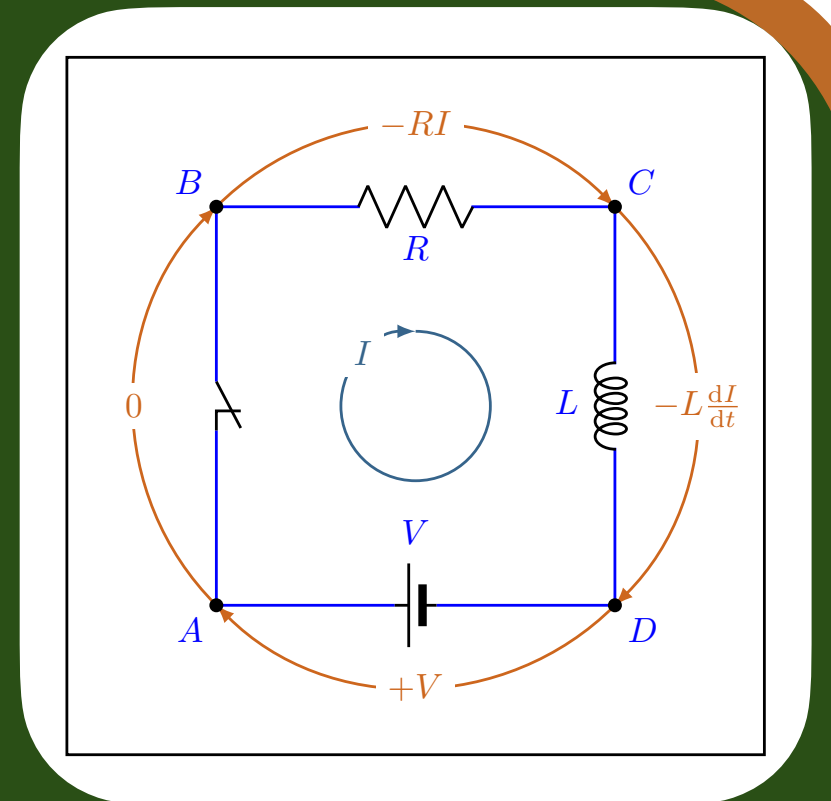
$$V = L \frac{dI}{dt} + RI$$



$$V = L \frac{dI}{dt} + RI$$

$$I = I_p + I_h$$

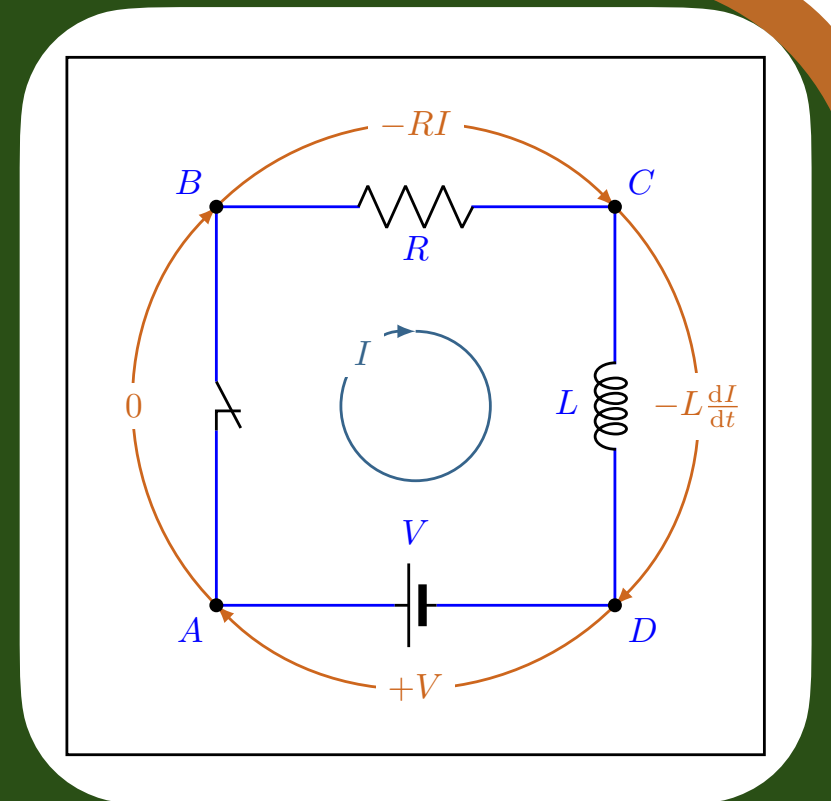
$$I_p = \frac{V}{R}$$



$$V = L \frac{dI}{dt} + RI$$

$$I = I_p + I_h$$

$$I_p = \frac{V}{R}$$

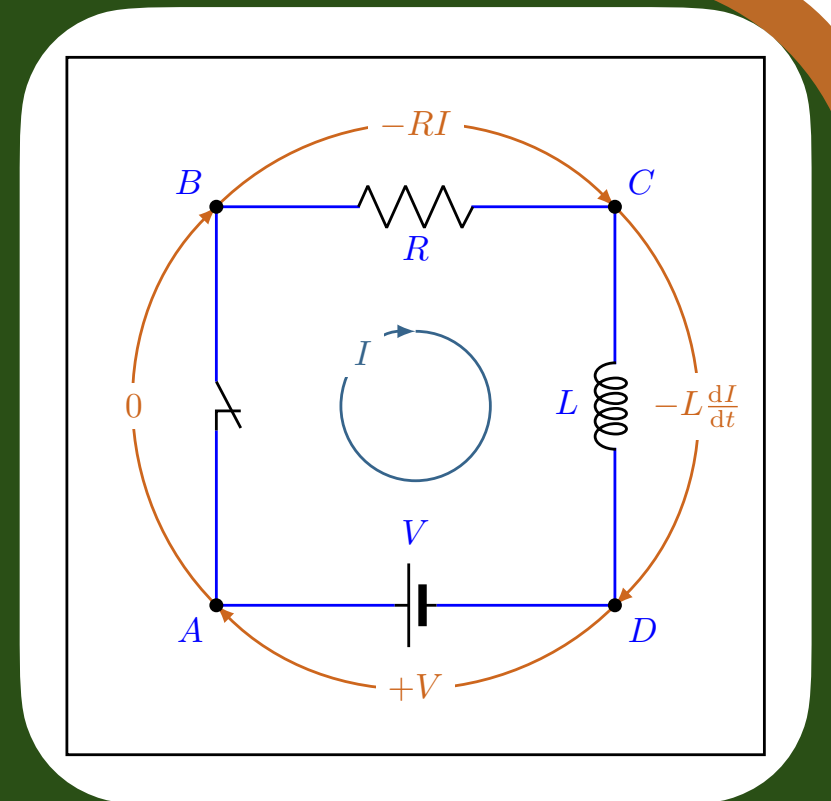


$$L \frac{dI_h}{dt} + RI_h = 0$$

$$V = L \frac{dI}{dt} + RI$$

$$I = I_p + I_h$$

$$I_p = \frac{V}{R}$$



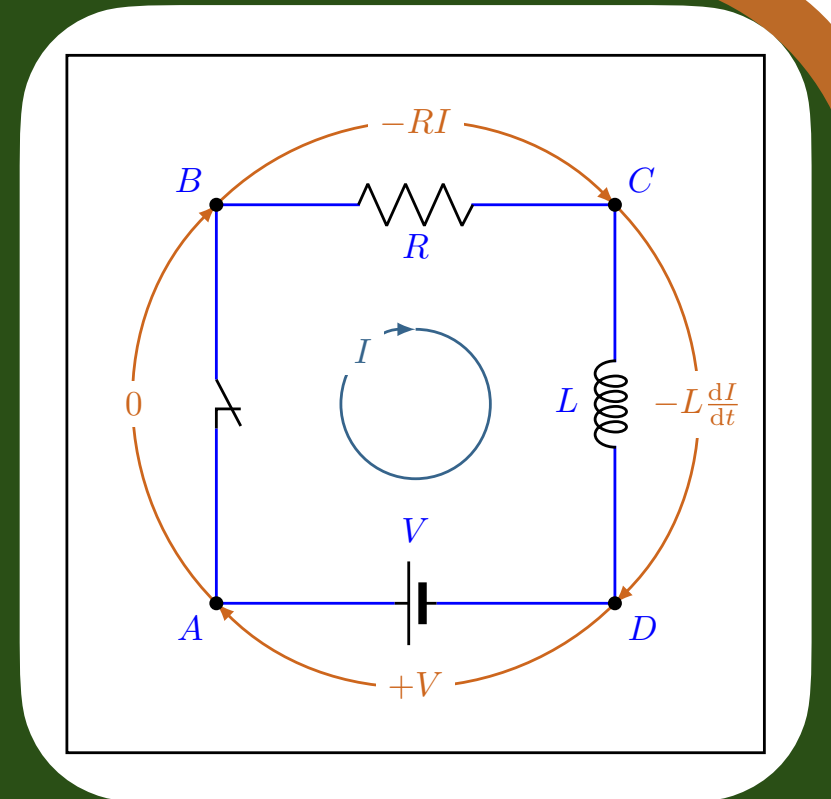
$$L \frac{dI_h}{dt} + RI_h = 0$$

$$\frac{dI_h}{dt} = -\frac{R}{L} I_h$$

$$V = L \frac{dI}{dt} + RI$$

$$I = I_p + I_h$$

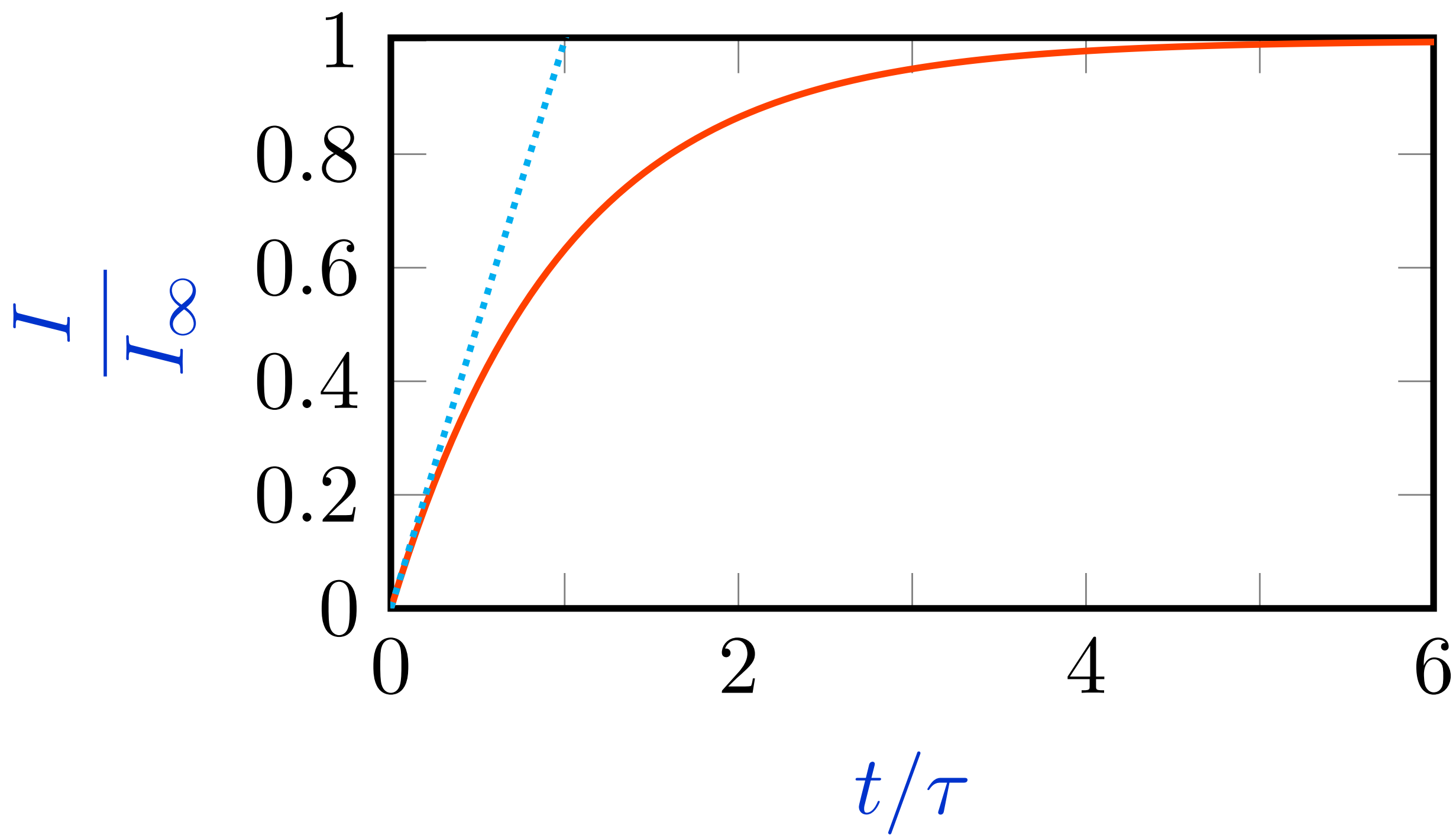
$$I_p = \frac{V}{R}$$



$$L \frac{dI_h}{dt} + RI_h = 0$$

$$\frac{dI_h}{dt} = -\frac{R}{L} I_h$$

$$I_h(t) = A \exp\left(-\frac{Rt}{L}\right)$$



$$I_\infty = \frac{V}{R}$$

$$\tau = \frac{L}{R}$$

Pratique o que aprendeu

