

# LABORATÓRIO DE CIRCUITOS ELÉTRICOS

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## Experiência 7 Redes de 1ª Ordem

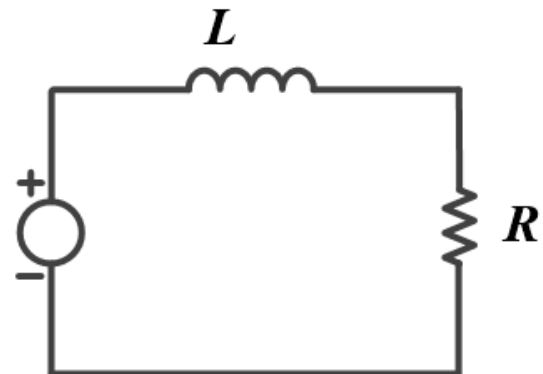
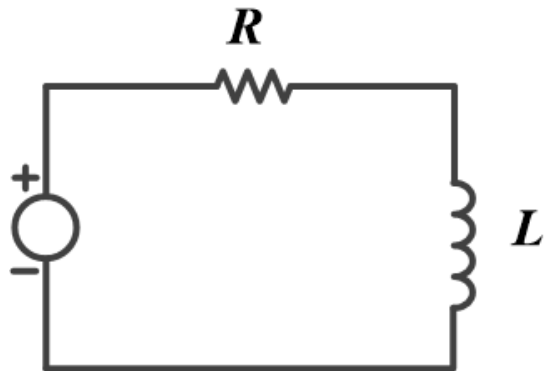
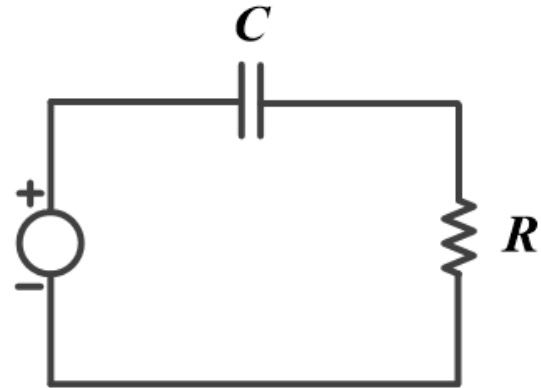
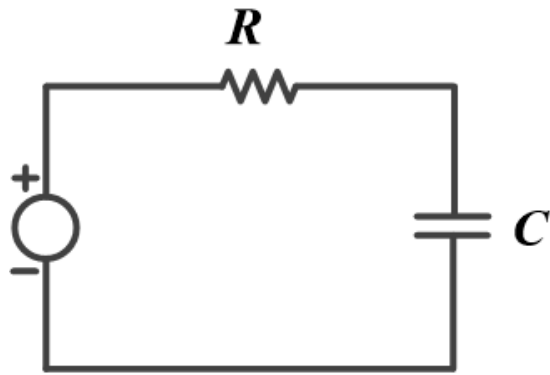
Aula online – 15/06/2021

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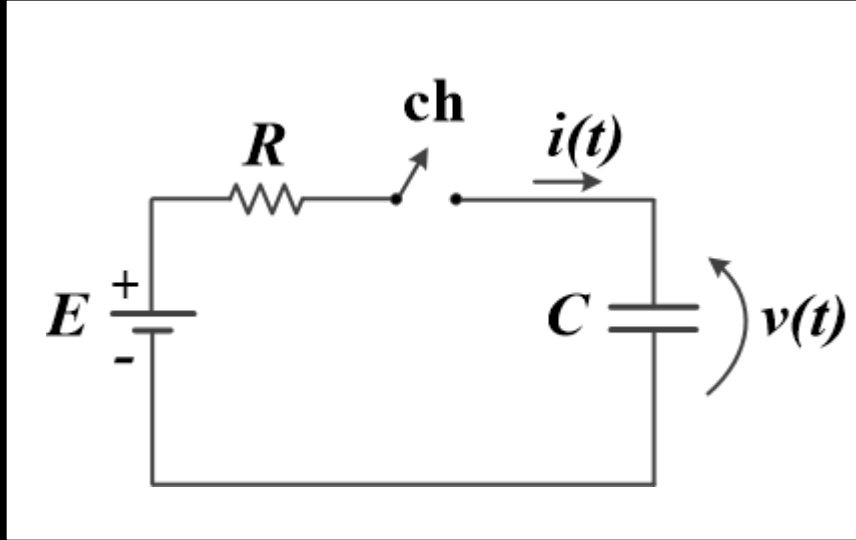
# Objetivos

1. Analisar o comportamento de circuito RC e RL no domínio de tempo
  - Constante do tempo
  - Resposta permanente e transitória
1. Aplicar circuito RC e AmpOp para construir um oscilador de onda quadrada

# 1. Rede de 1ª ordem



## 2. Comportamento do Circuito RC



Condição Inicial:

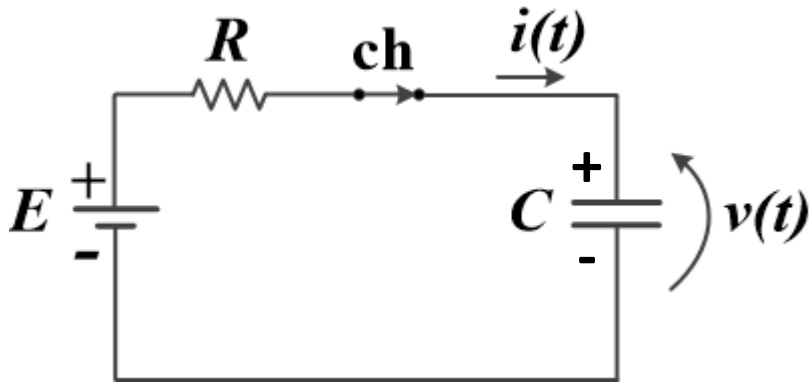
$$v = 0 ; i = 0$$

Vamos fechar a chave  
no instante  $t = 0$

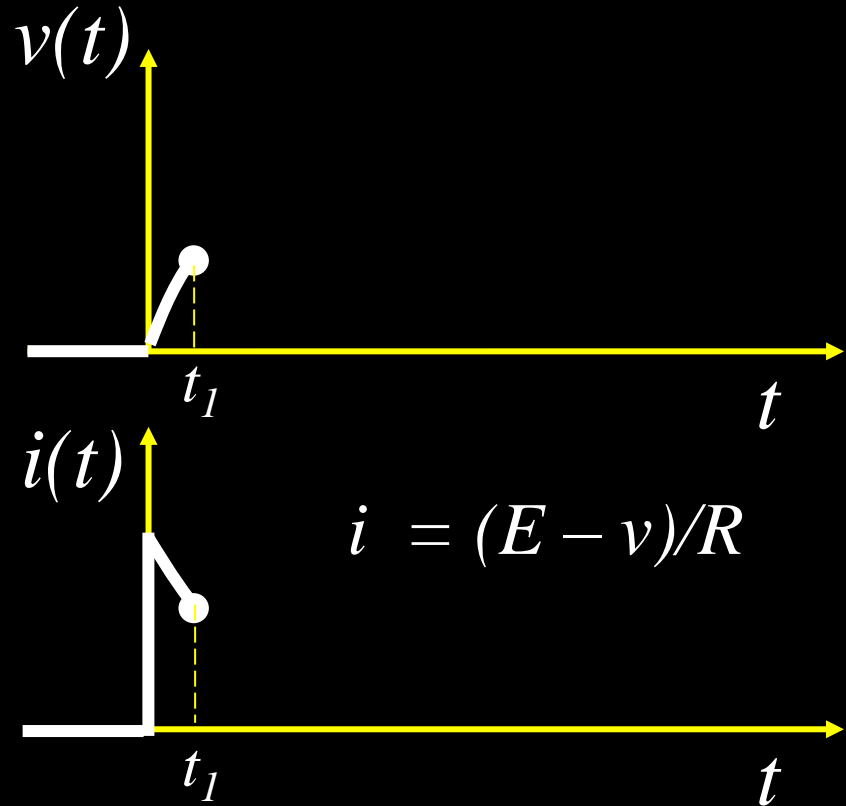
O que vai acontecer  
com  $v(t)$  e  $i(t)$  ?

# 2.2 Comportamento em $t = t_1$

Fig. 1

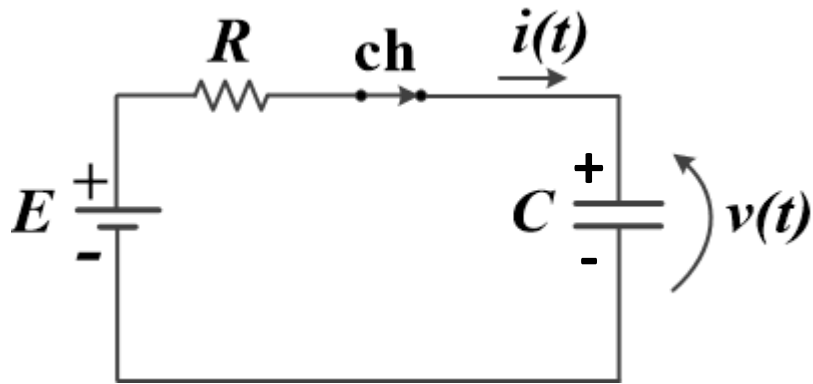


$$v = 0 ; i = 0 \quad (t < 0)$$

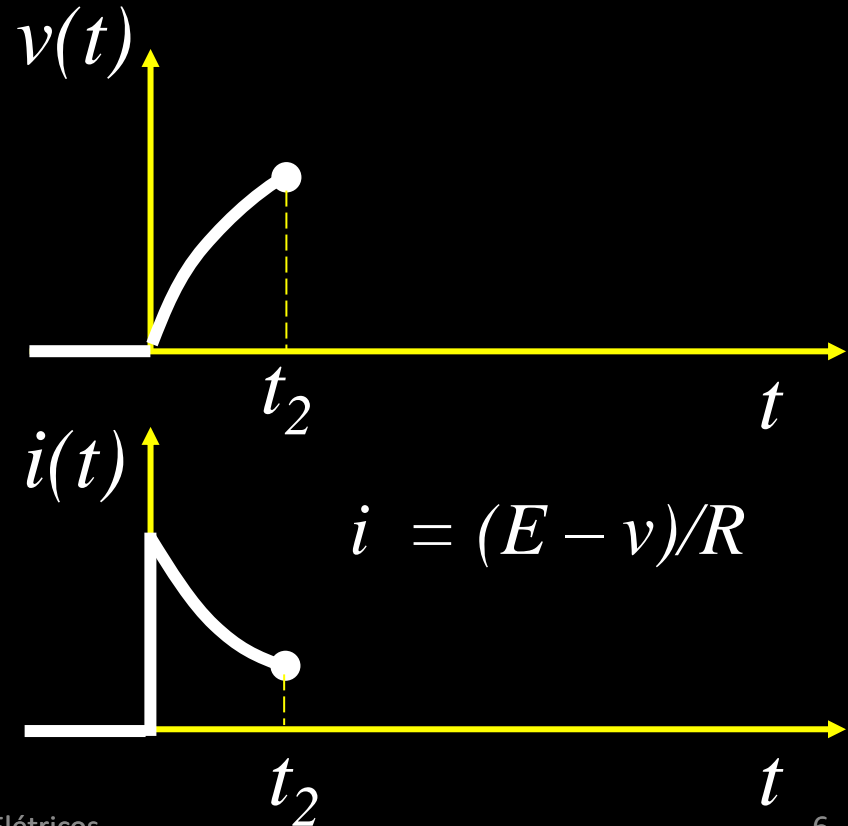


## 2.3 Comportamento em $t = t_2$

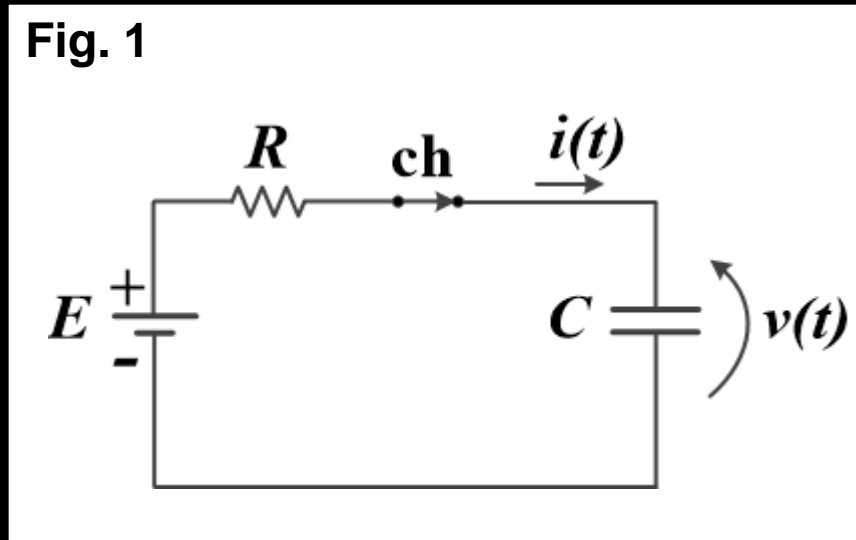
Fig. 1



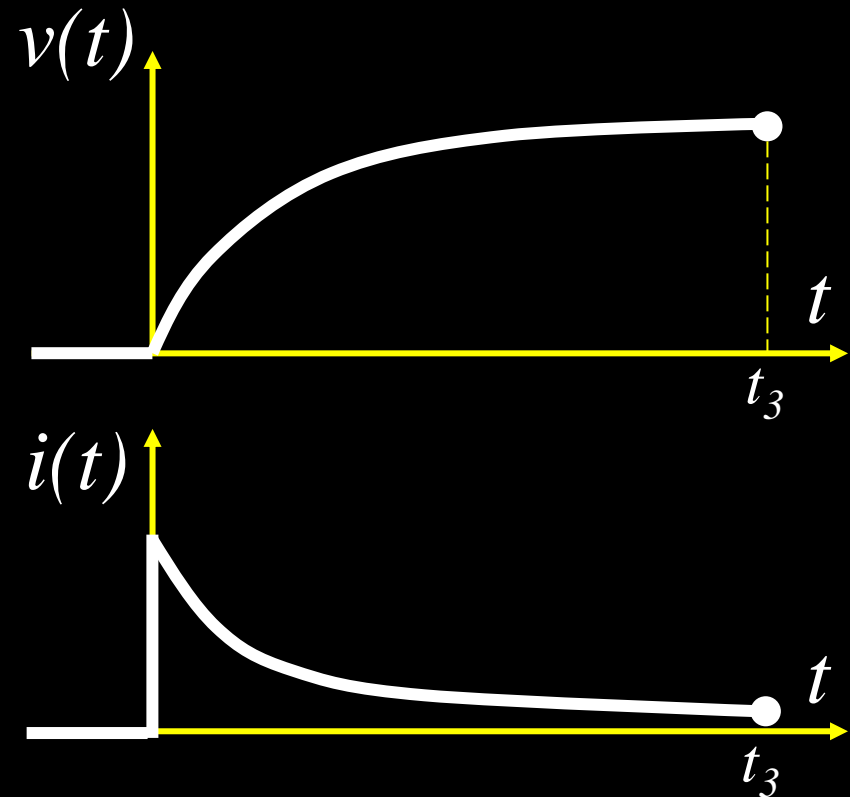
$$v = 0 ; i = 0 \quad (t < 0)$$



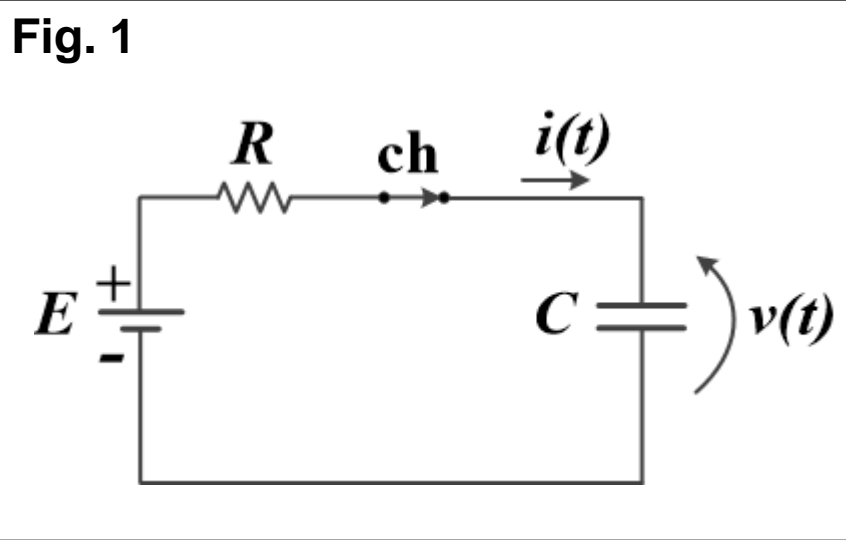
## 2.4 Comportamento em $t = t_3$



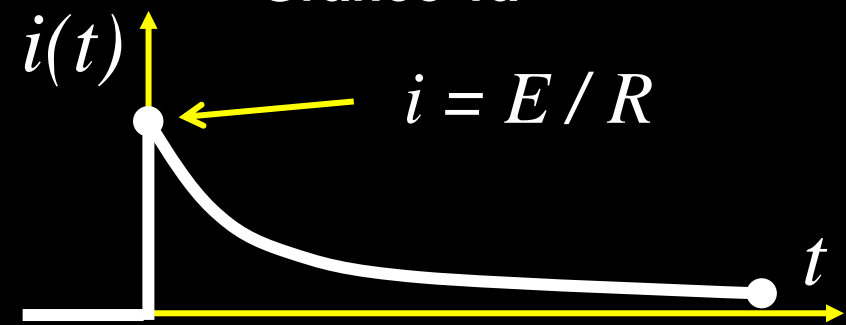
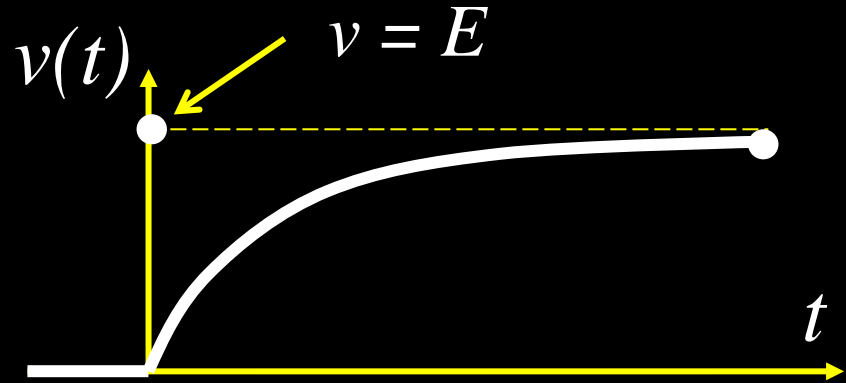
$$v = 0 ; i = 0 \quad (t < 0)$$



# 2.5 Comportamento Exponencial

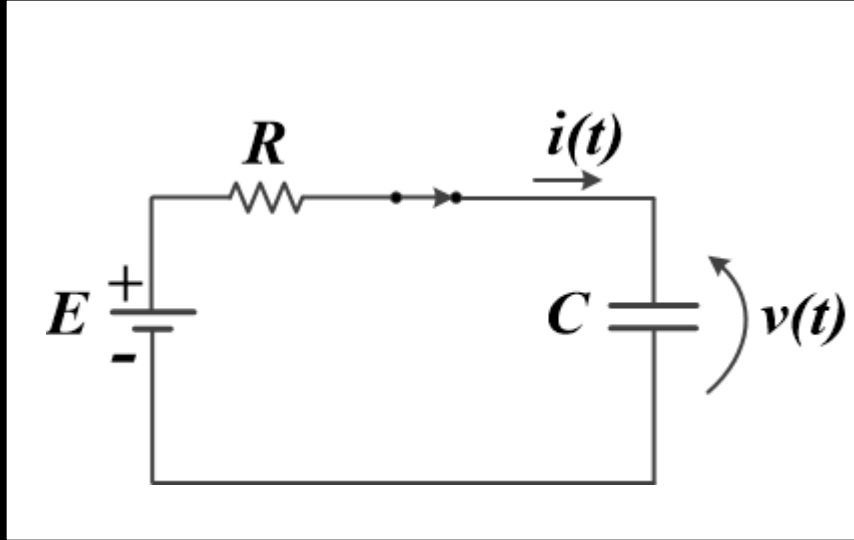


$$v = 0 ; i = 0 \quad (t < 0)$$





## 2.6 Equações



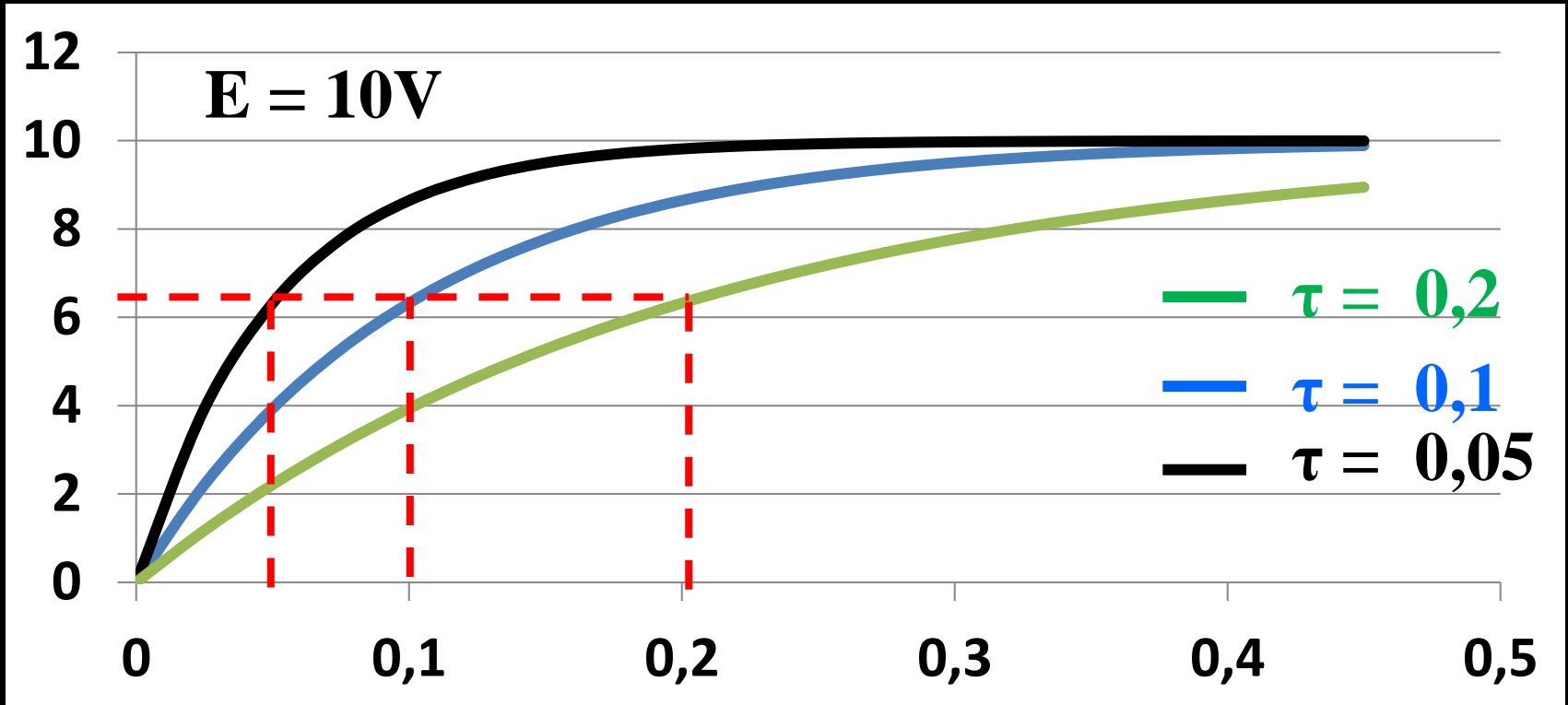
$$E = Ri + v$$

$$E = RC \frac{dv}{dt} + v$$

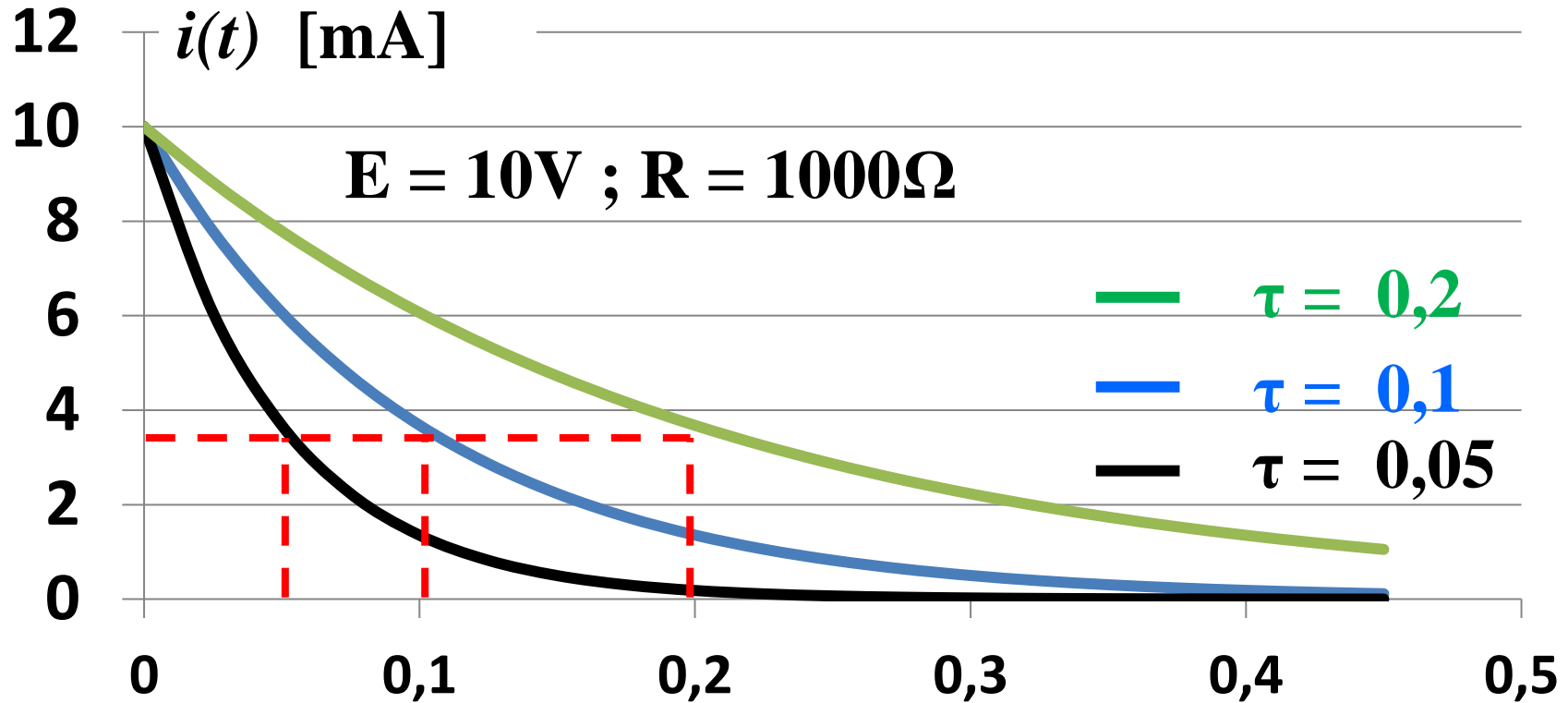
$$\frac{dv}{dt} + \frac{1}{RC} v = \frac{1}{RC} E$$

$$v = E(1 - e^{-t/RC})$$

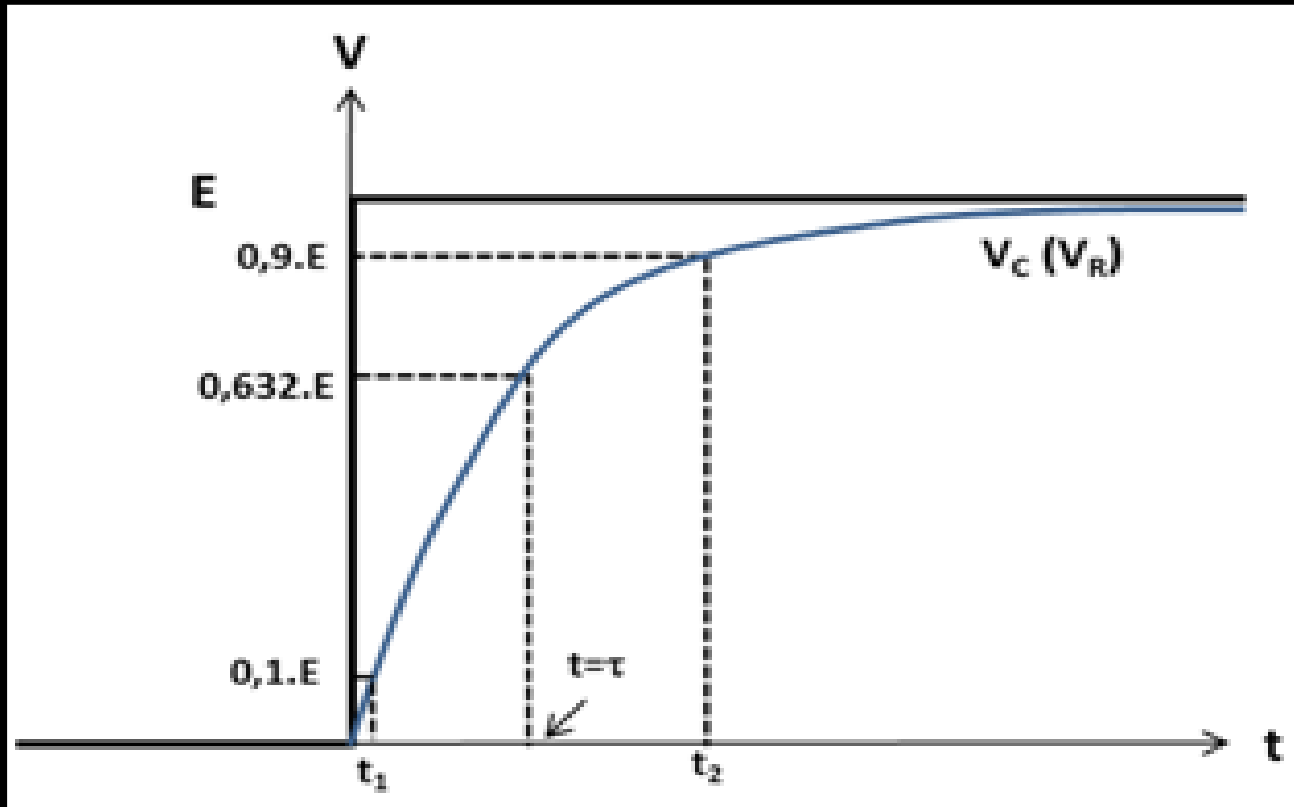
# Comportamento da tensão



# Comportamento da corrente

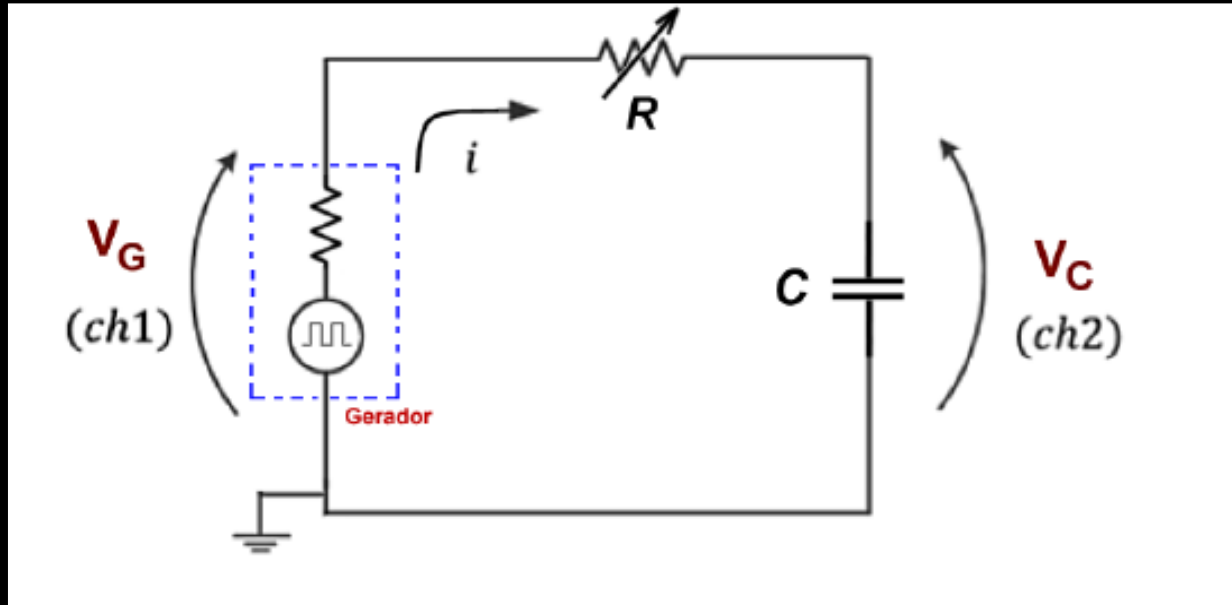


# Tempo de subida: $t_r = t_2 - t_1$



# Parte Experimental

## Circuito RC



# Parte Experimental

## Circuito RL

