Revisão de Eletricidade
Circuitos Elétricos

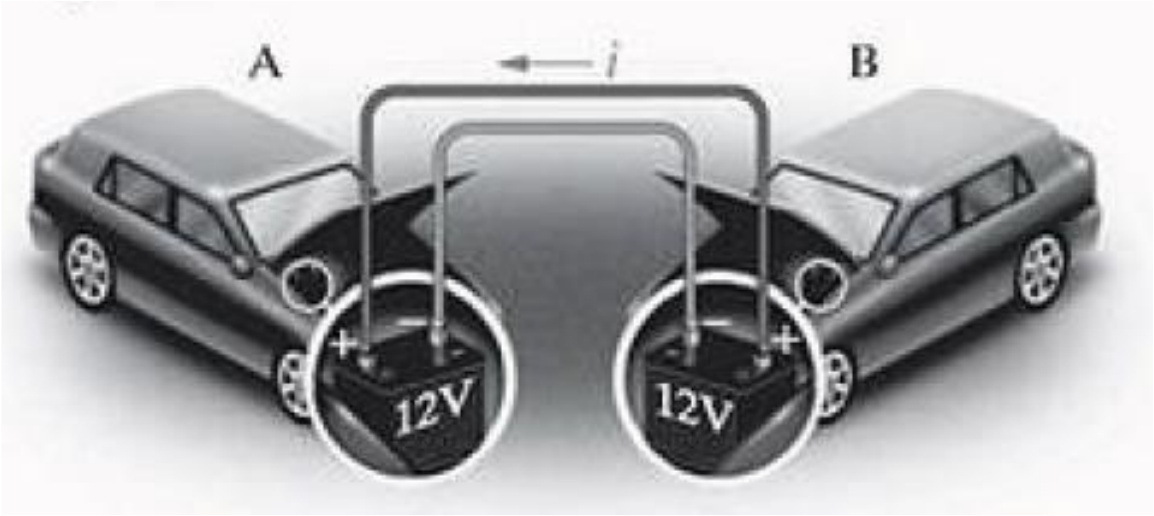
O que mais importa?

- Tensão
- Corrente
- Potência
- Energia

Ferramental básico

- Funções (plano x, y)
- Derivadas e integrais
- Funções senoidais
- Série e Transformada de Fourier

Bateria descarregada!



a) Qual dos carros está com a bateria descarregada?

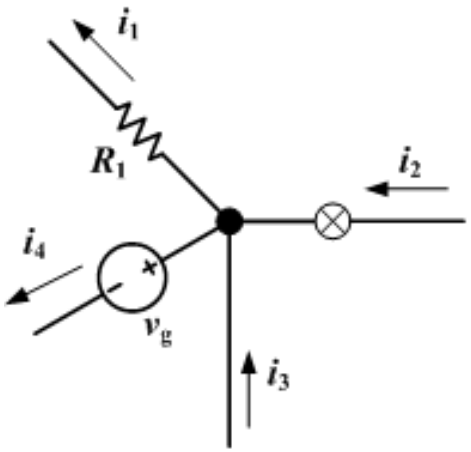
b) Considere que $i = 10$ A. Se a conexão ficar ativa por 1 minuto, quanta energia será transferida?

1ª Lei de Kirchhoff (Lei das Correntes ou Leis dos Nós)

Em um nó, a soma das correntes elétricas que entram é igual à soma das correntes que saem, ou seja, um nó não acumula carga:

$$\sum_{k=1}^{N} i_k = 0$$

Ex.:



$$i_1 + i_4 = i_2 + i_3$$

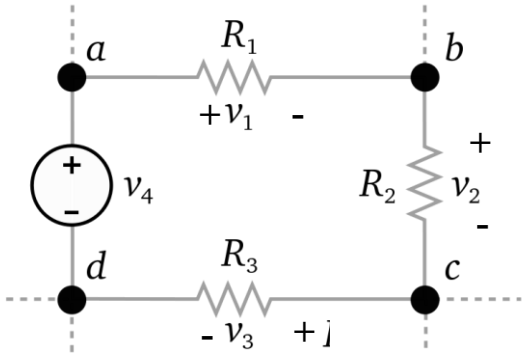
Isso é devido ao Princípio da Conservação da Carga Elétrica, o qual estabelece que num ponto qualquer a quantidade de carga elétrica que chega deve ser exatamente igual à quantidade que sai.

2ª Lei de Kirchhoff (Lei das Tensões ou Leis das Malhas)

A soma algébrica das tensões em um percurso fechado é nula:

$$\sum_{k=1}^{N} v_k = 0$$

Ex.:



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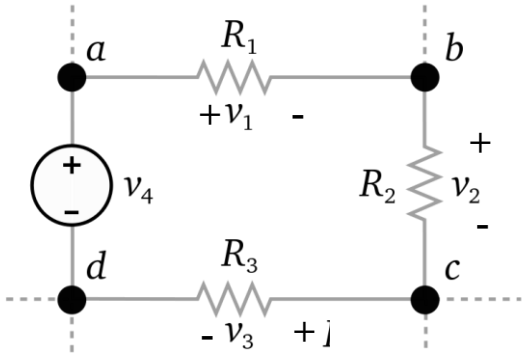
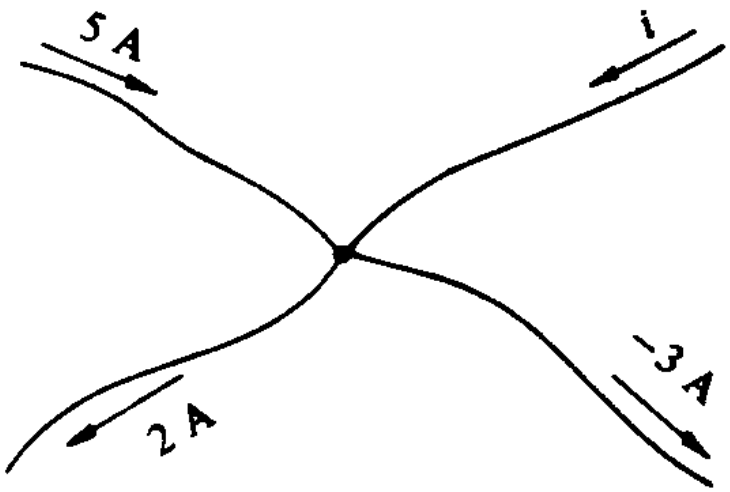
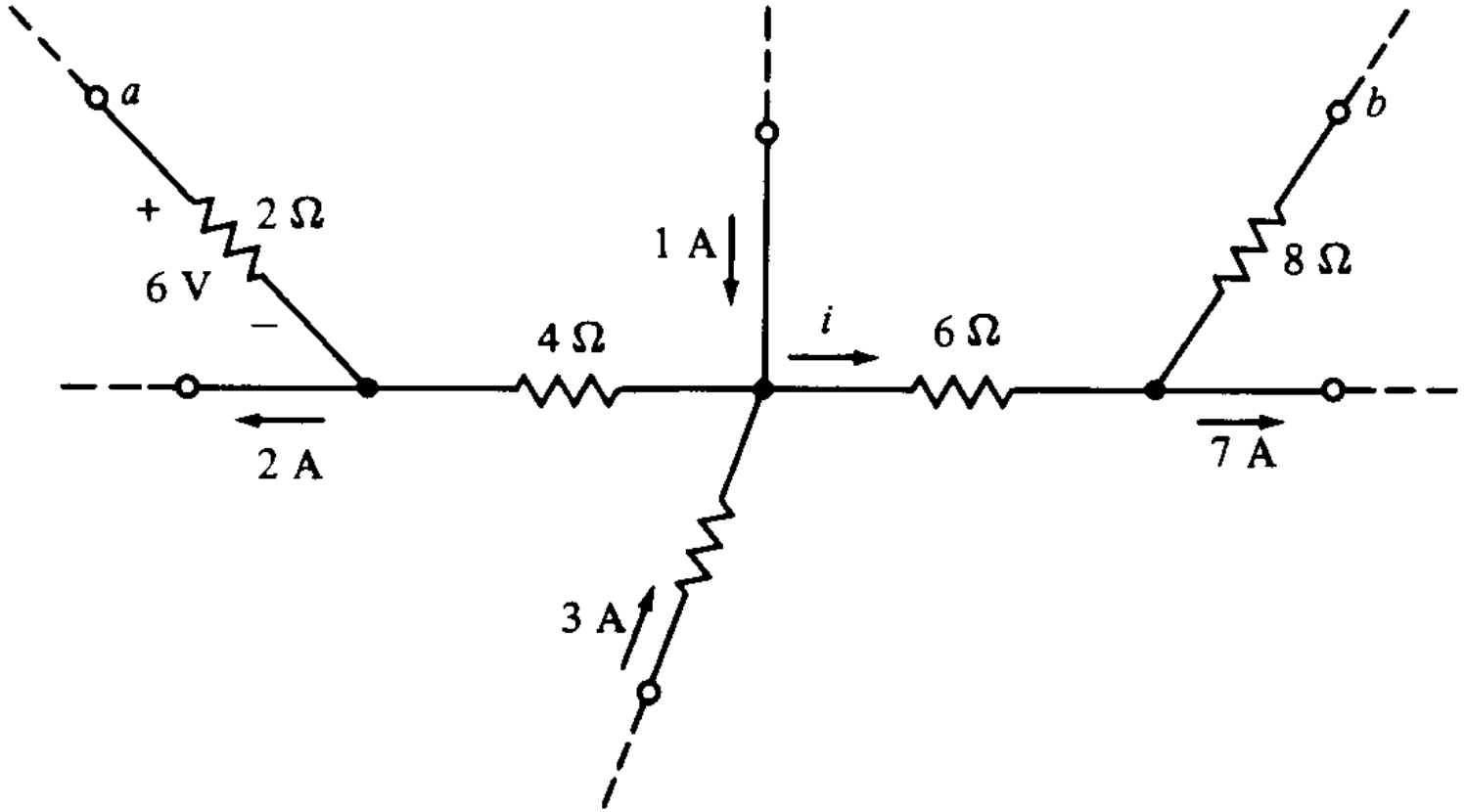


$$v_1 + v_2 + v_3 - v_4 = 0$$

Quanto vale *i*?



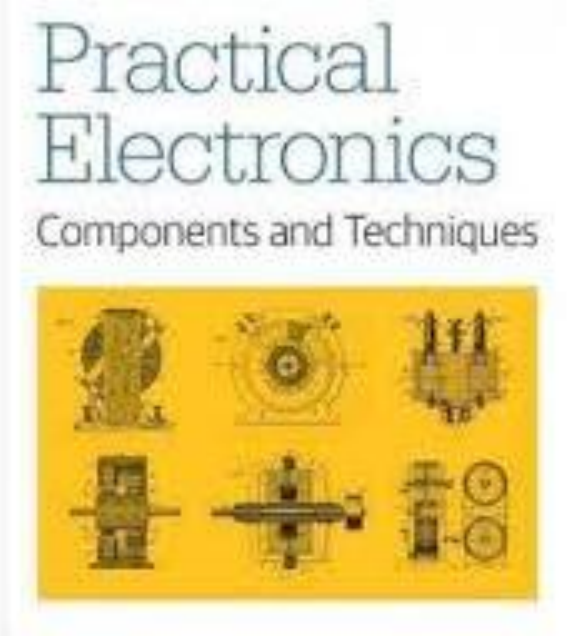
Exercício: Calcule i e v_{ab}?



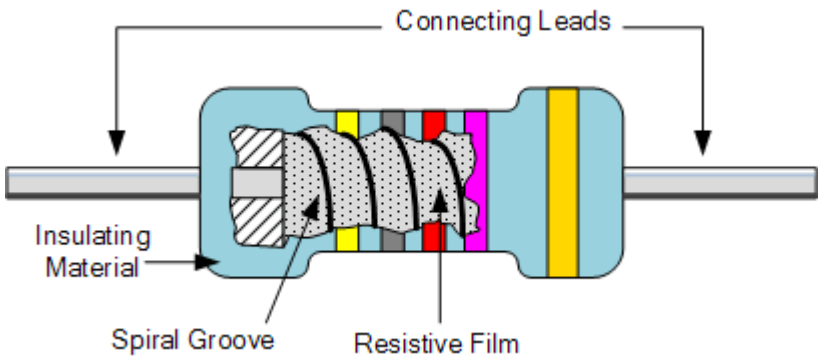
Outras Ferramentas *(de análise)*

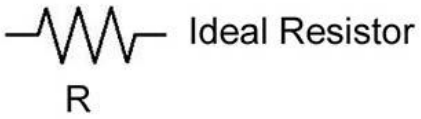
- Divisor de tensão
- Divisor de corrente
- Máxima transferência de potência
- Casamento de impedâncias

Considerações Práticas

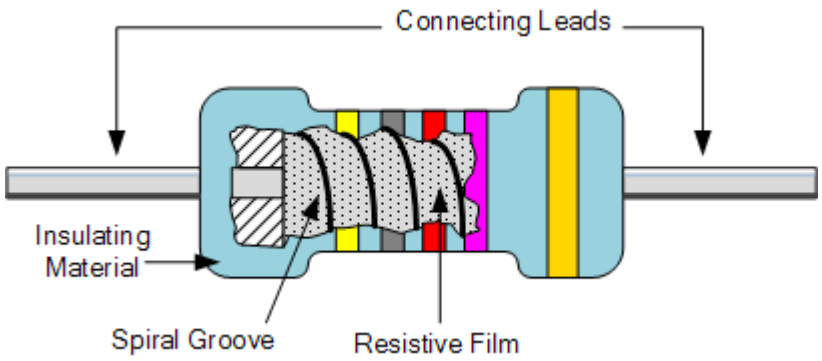


Resistores


Connecting Leads
Insulating Material
Spiral Groove
Resistive Film


Ideal Resistor
R

Resistores


Connecting Leads
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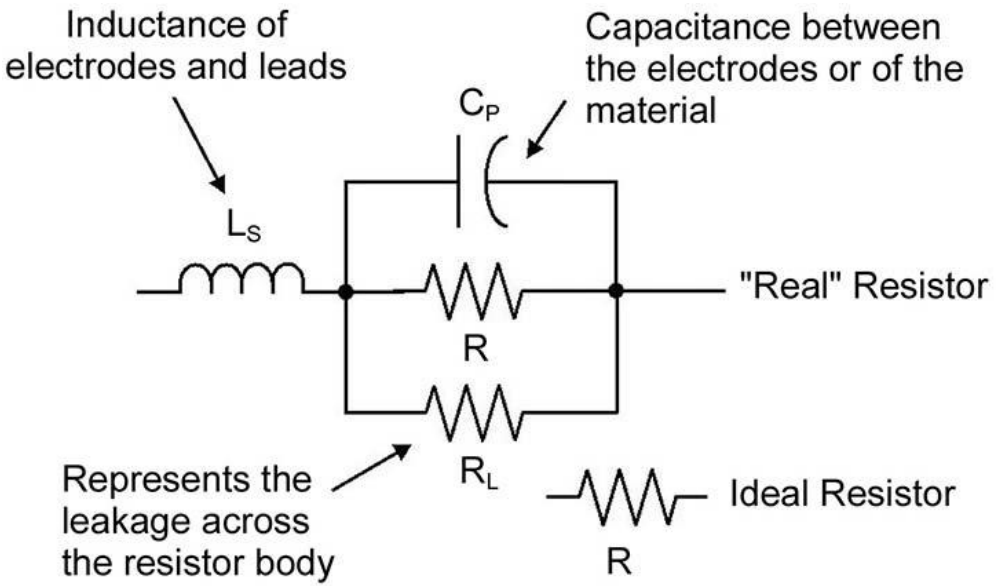
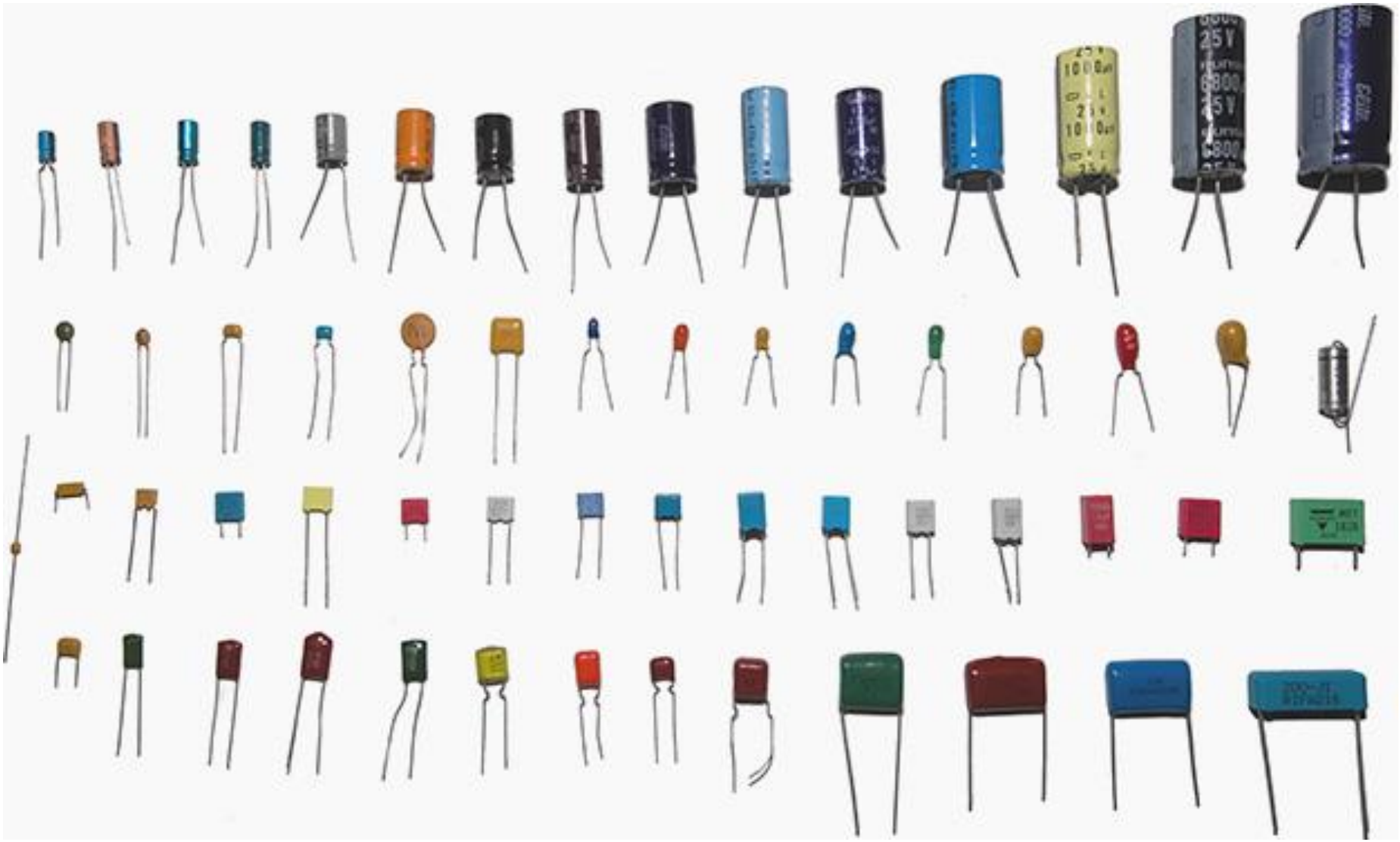
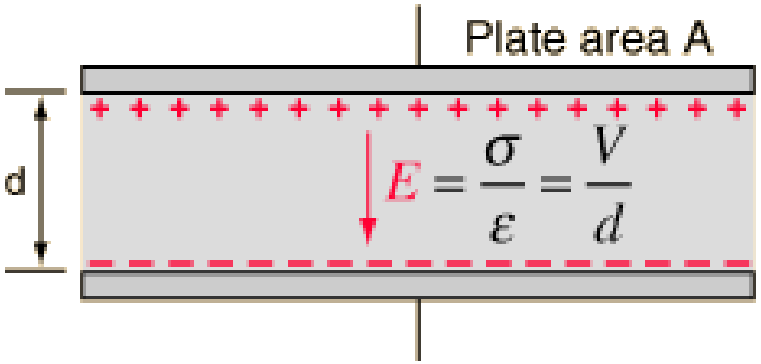
Resistive Film


Inductance of electrodes and leads
Capacitance between the electrodes or of the material
C_P
L_S
"Real" Resistor
R
R_L
Represents the leakage across the resistor body
Ideal Resistor
R

Capacitores



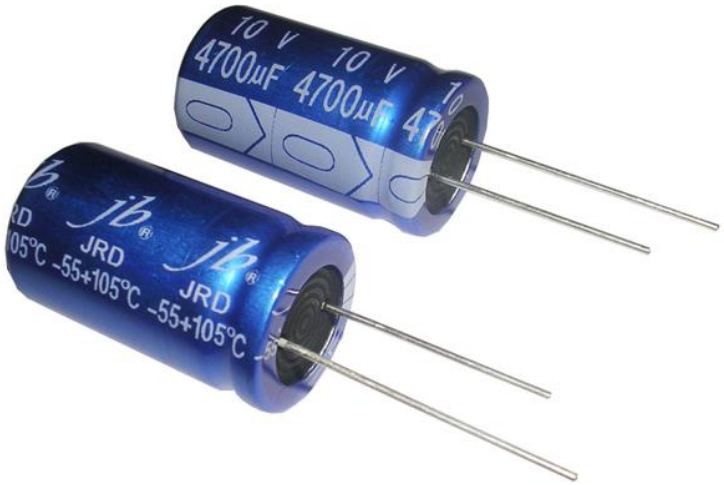
Capacitores de placas paralelas

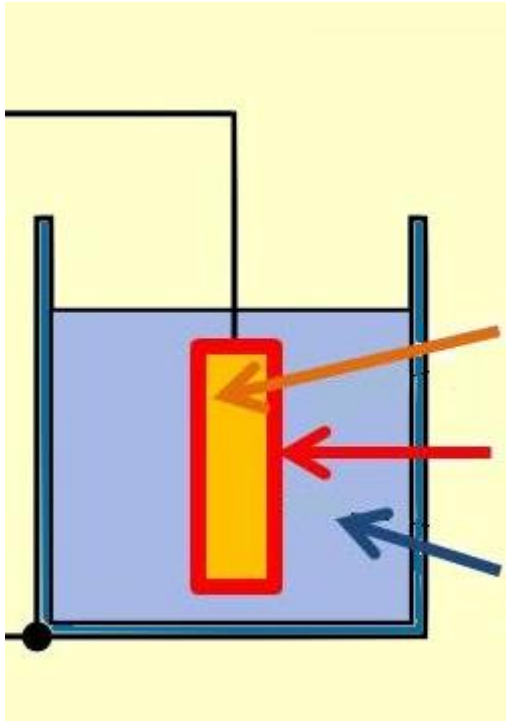


Eq. Física (estrutural)

$$Q = C.V \qquad \textit{Eq. elétrica}$$

Capacitores eletrolíticos



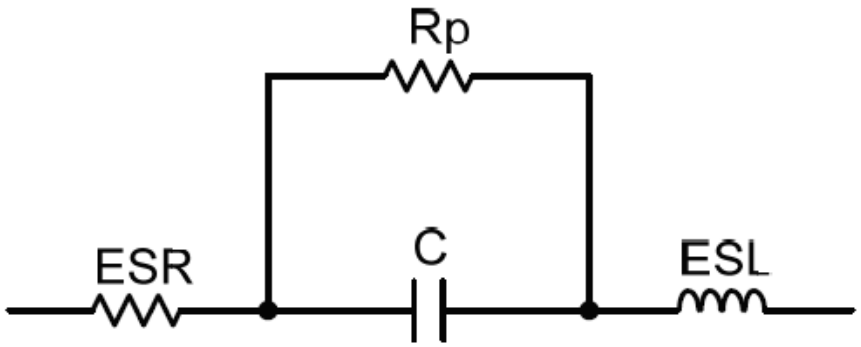


Anodo

Eletrólito

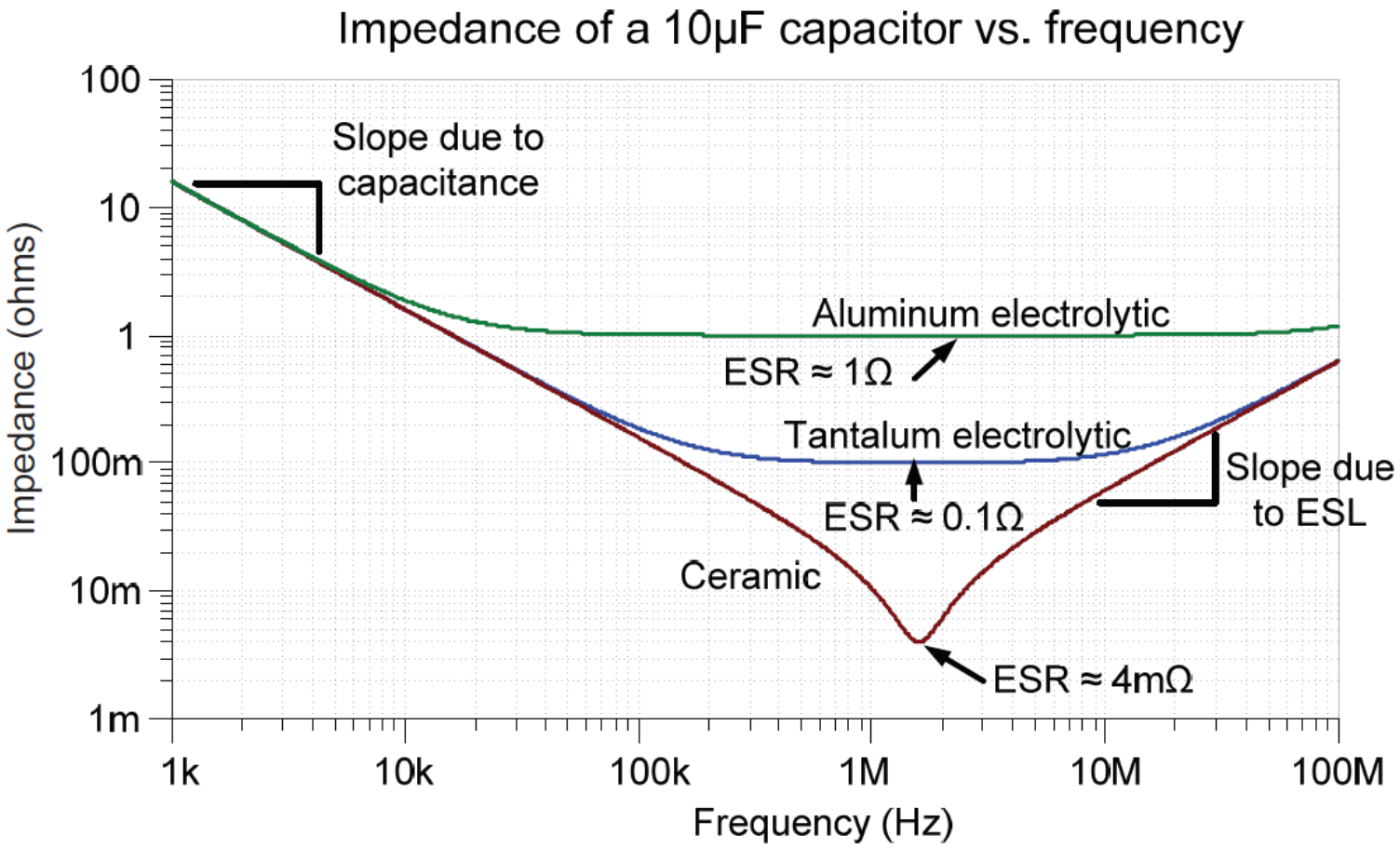
Catodo

Capacitores reais

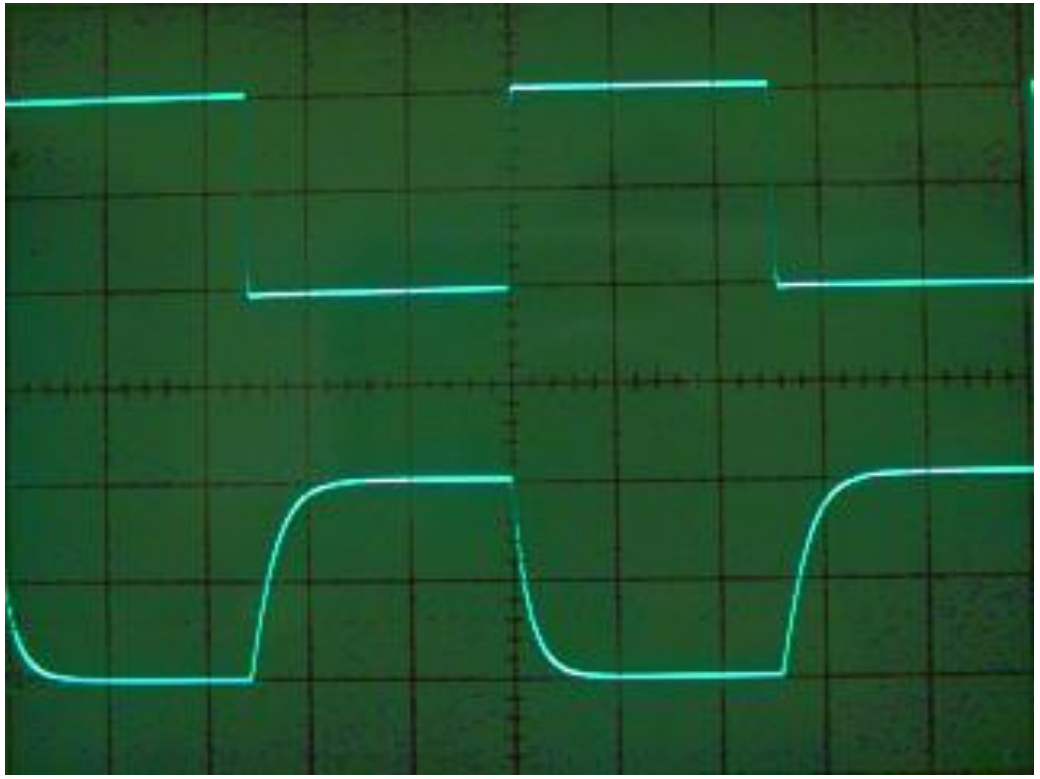


C – capacitância nominal
ESR – resistência equivalente série
ESL – indutância equivalente série
Rp – resistência equivalente paralela

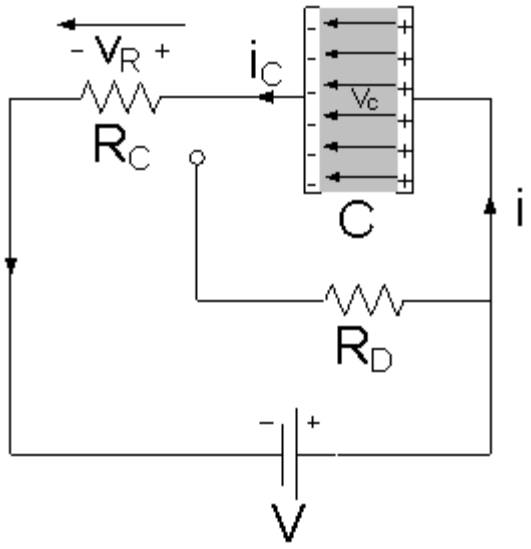
Capacitores reais – resposta em frequência

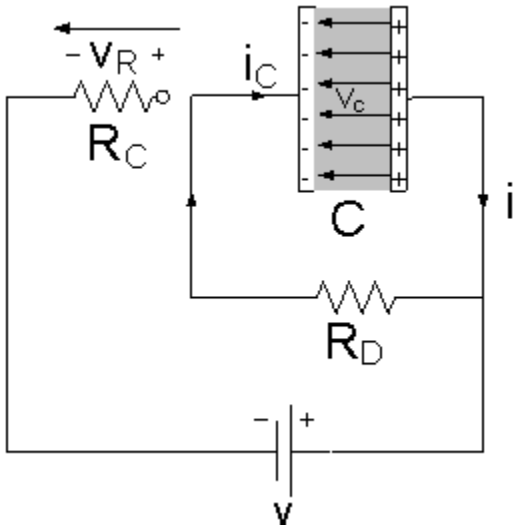


Capacitores em circuitos digitais

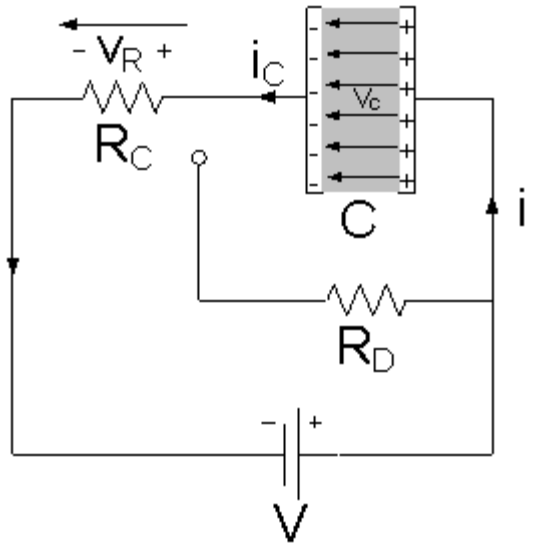


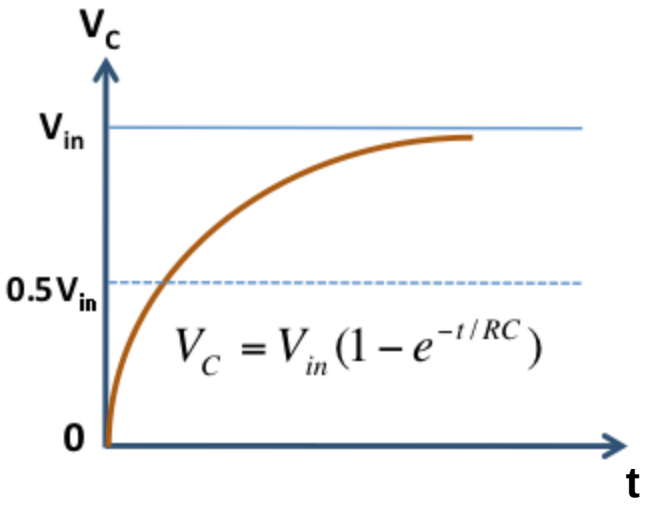
Carga e descarga



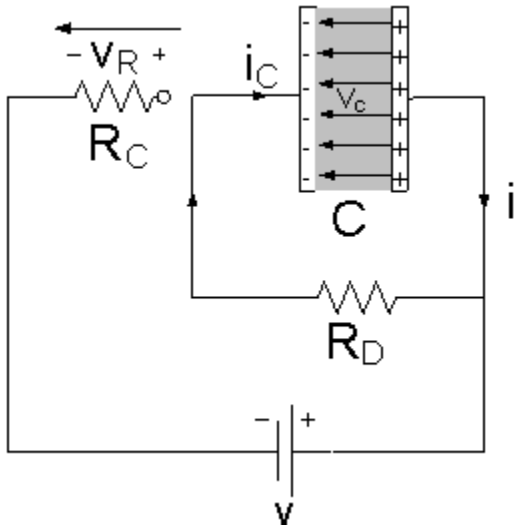


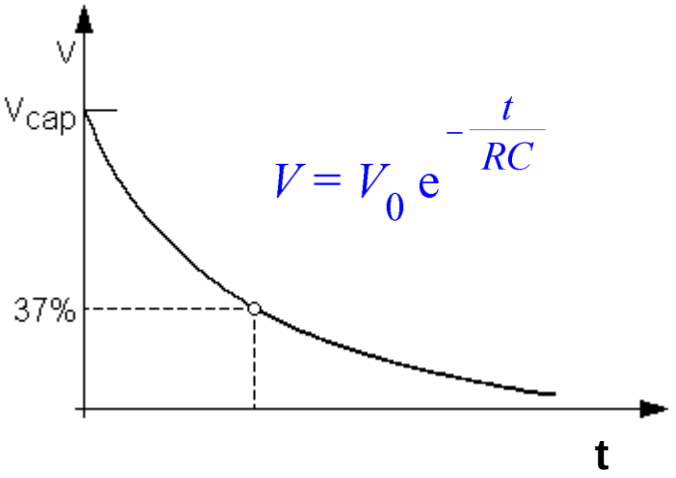
1 - Carga





2 - Descarga





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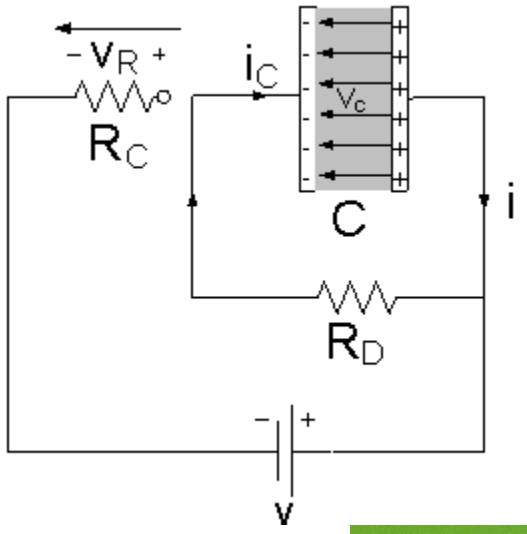
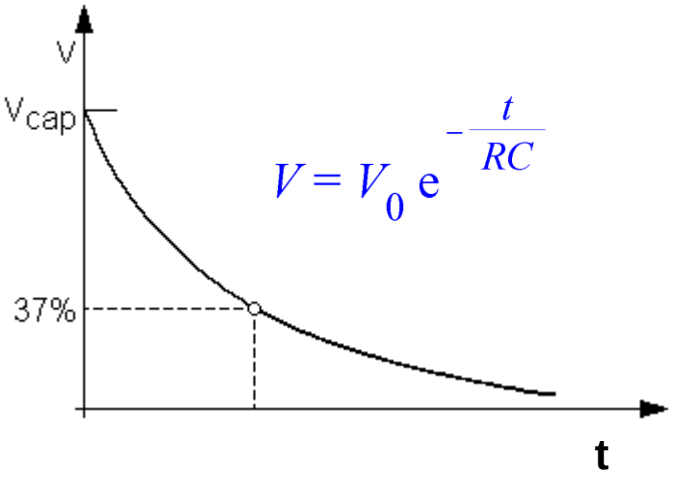
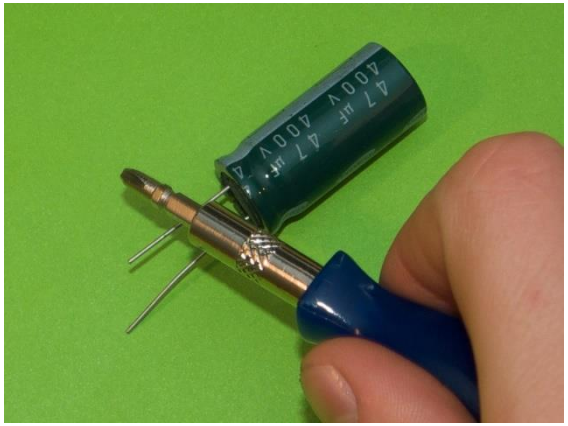
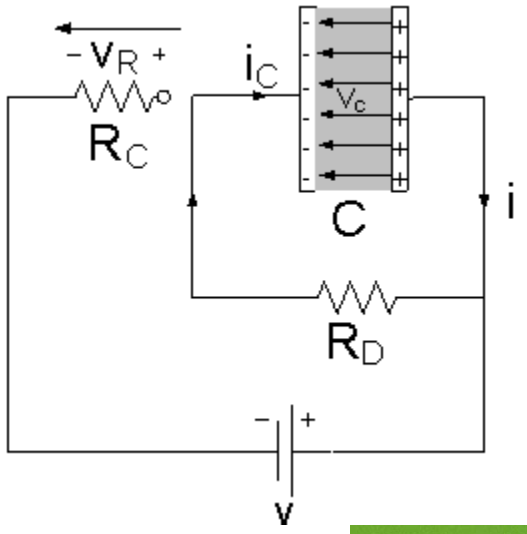
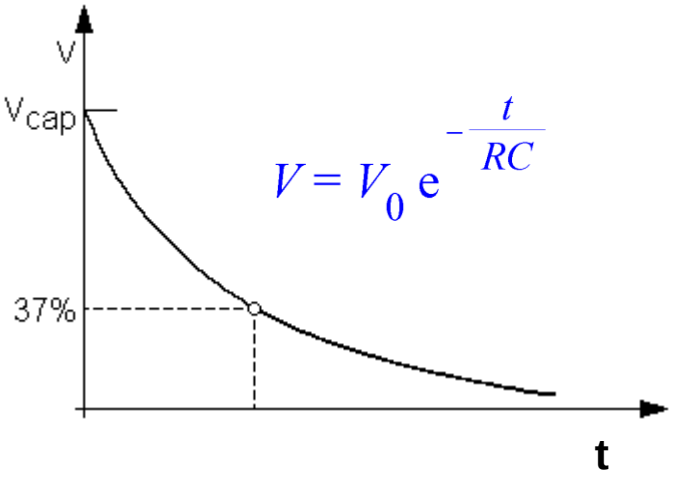


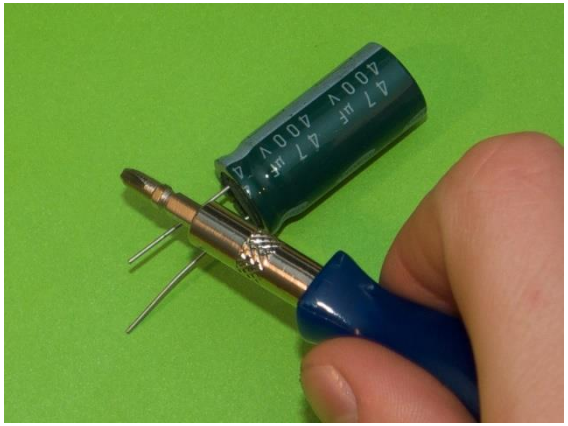




2 - Descarga

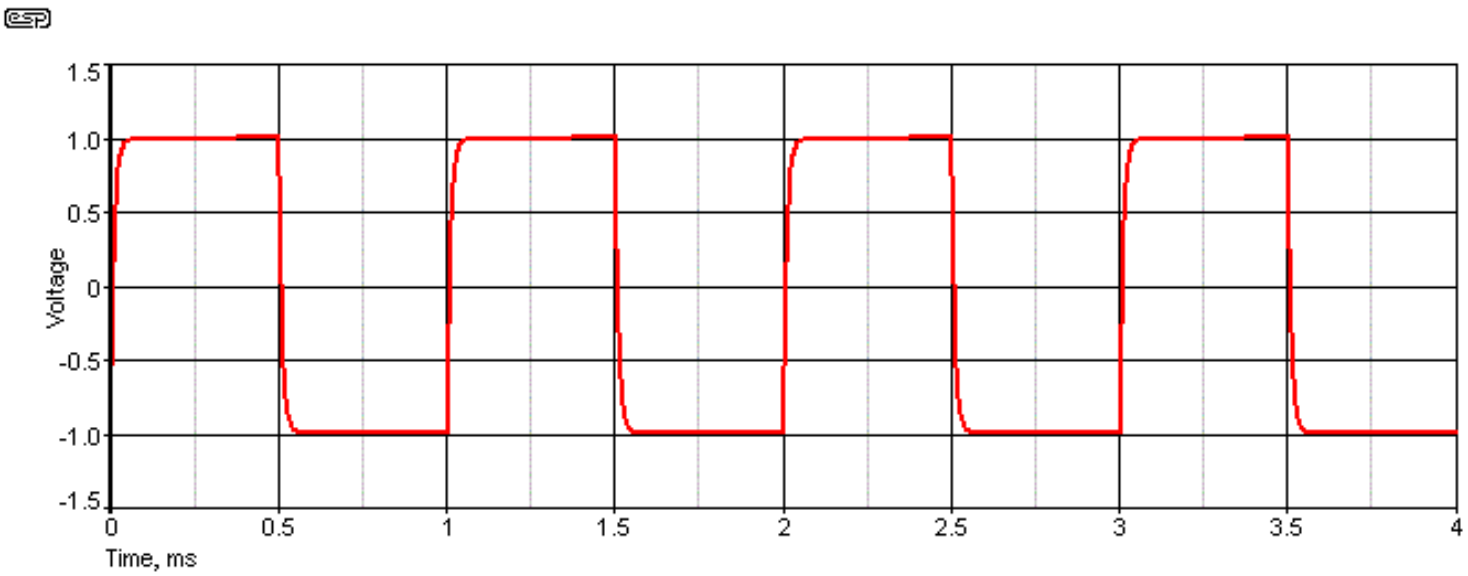




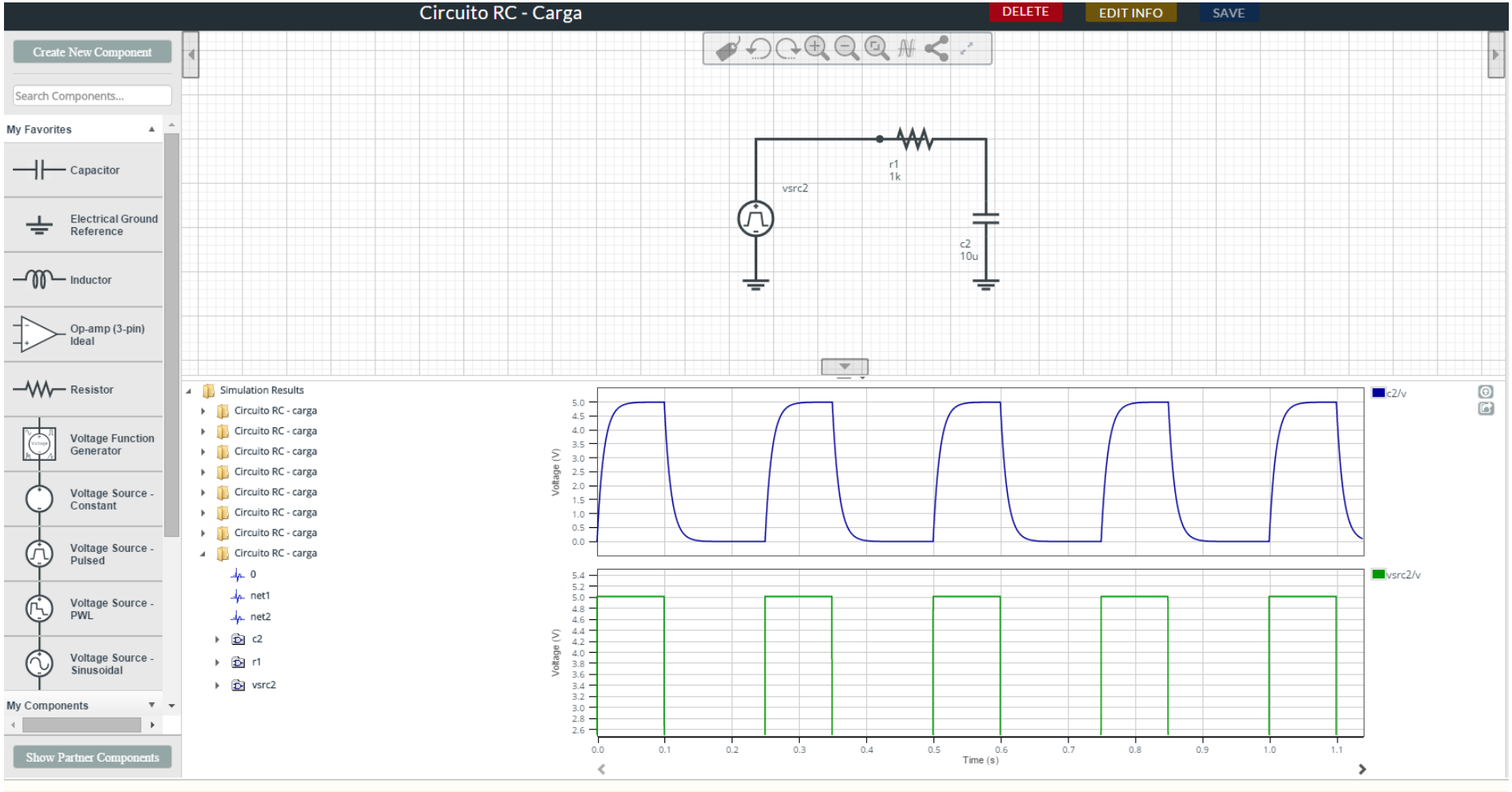


Cuidado!!!

3 – Carga & Descarga



Simulação com Systemvision



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