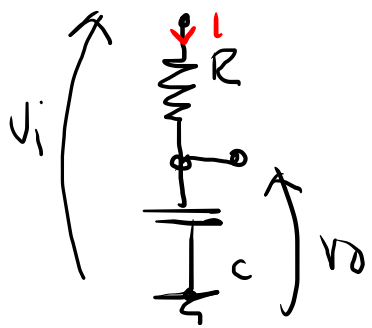
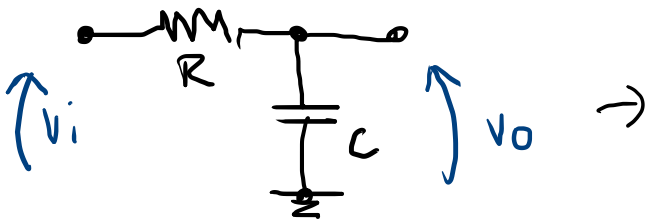
E 16h

Filtro Passa Basso





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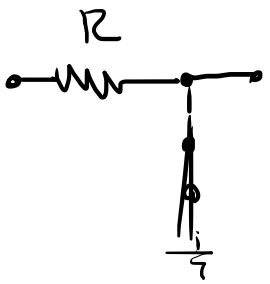
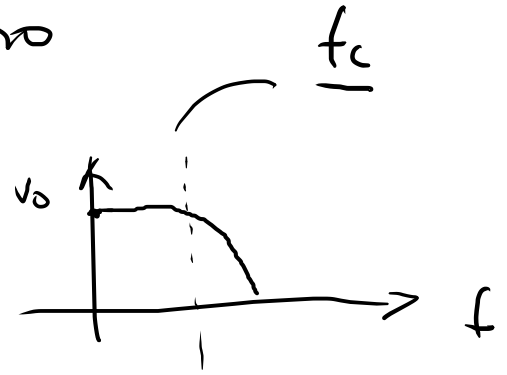
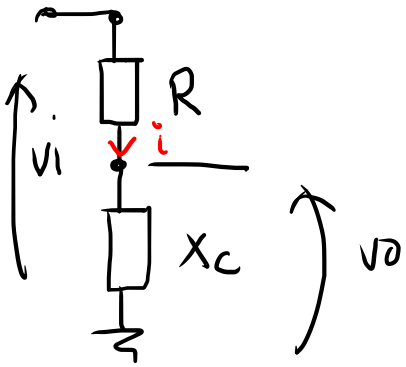




$$X_C = -j\frac{1}{\omega C} =$$

$$i = \frac{V_i}{Z_{tot}} = \frac{V_i}{R + X_C}$$



$$V_0 = i \cdot X_C = \frac{V_i}{R + X_C} \cdot X_C$$

$j \cdot j = -1$

$$X_C = -\frac{j}{j}\frac{1}{\omega C} = \frac{1}{j\omega C}$$

$$V_o = V_i \cdot \frac{X_c}{R + X_c}$$

$$\frac{V_o}{V_i} = A = \frac{X_c}{R + X_c} = \frac{\frac{1}{j\omega C}}{R + \frac{1}{j\omega C}} =$$

$$A = \frac{\frac{1}{j\omega C}}{\frac{j\omega C \cdot R + 1}{j\omega C}} = \frac{1}{1 + j\omega RC} \rightarrow \tau$$

$$A = \frac{1}{1 + j\frac{\omega}{\omega_c}}$$

$$\omega_c = 2\pi f_c$$

$$\omega_c = \frac{1}{RC}$$

$$\frac{1}{RC} = 2\pi f_c$$

$$2\pi f_c = \frac{1}{RC} \rightarrow f_c = \frac{1}{2\pi RC}$$

$C = 10\,nF = 10 \cdot 10^{-9}\,F$

$R = 10\,k = 10 \cdot 10^{3}\,\Omega$

$$f_c = \frac{1}{2\pi RC} = \frac{1}{2\pi \cdot 10 \cdot 10^{3} \cdot 10 \cdot 10^{-9}} = \frac{1}{2\pi \cdot 10^{-4}} =$$

$$= \frac{10^{4}}{2\pi} = \frac{10000}{2\pi} = 1590\ Hz$$