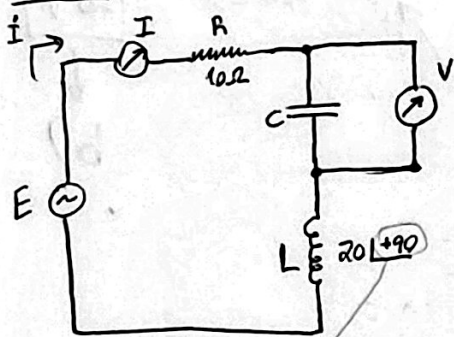


Ex 02

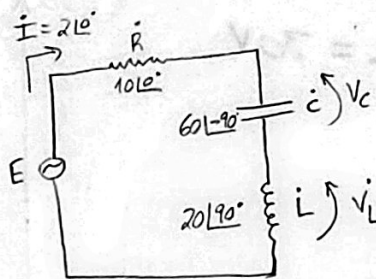


$$I = 2A$$

$$V = 60V$$

$$f = 50Hz$$

$$\dot{I} = 2\angle 0^\circ A$$



$$a) \dot{C} = \frac{\dot{V}}{\dot{I}} = \frac{60\angle 90^\circ - 180^\circ}{2\angle 0^\circ} = 30\angle -90^\circ \Omega \Rightarrow \dot{C} = \frac{1}{j\omega C} \Rightarrow C = \frac{1}{j\omega \dot{C}} = \frac{1}{j \cdot 2\pi \cdot 50 \cdot 30\angle -90^\circ} = 106,1 \mu F$$

$$b) \dot{E} = \dot{I}(\dot{R} + \dot{C} + \dot{L}) = 2\angle 0^\circ (10\angle 0^\circ + 30\angle -90^\circ + 20\angle 90^\circ) = 28,284\angle -45^\circ \Rightarrow \dot{E} = 20\sqrt{2}\angle -45^\circ V$$

$$E(t) = |\dot{E}| \cdot \sqrt{2} \cos(2\pi f \cdot t + \phi) = 20\sqrt{2} \cdot \sqrt{2} \cos(2\pi \cdot 50 \cdot t - 45^\circ) \Rightarrow E(t) = 40 \cos(100\pi t - 45^\circ) V$$

Atividade 1

$$V = 12V$$

$$R_1 = 1k\Omega$$

$$R_2 = 2k\Omega$$

$$L = 1H$$

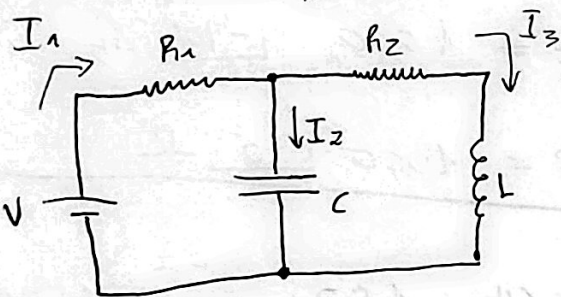
$$C = 0,5F$$

Ex 01

$$I_2 = 0$$

$$I_1 = \frac{V}{R_1 + R_2} = \frac{12}{1 + 2} = 4mA$$

$\rightarrow k\Omega \rightarrow mA$



$$Ex 02 \quad \dot{V} = 40 - j40 \quad \dot{I} = 4 + j3$$

$$a) V_{ef} = |\dot{V}| = \sqrt{2 \cdot 40^2} = 56,57V$$

$$I_{ef} = |\dot{I}| = \sqrt{4^2 + 3^2} = 5A$$

$$b) \left. \begin{array}{l} \dot{V} = 56,57\angle -45^\circ \\ \dot{I} = 5\angle 36,87^\circ \end{array} \right\} \dot{Z} = \frac{\dot{V}}{\dot{I}} = \frac{56,57\angle -45^\circ}{5\angle 36,87^\circ} = 11,31\angle -81,87^\circ \Omega$$

c) A fase da impedância está atrasada em relação à tensão, logo, é um bipolo capacitivo.

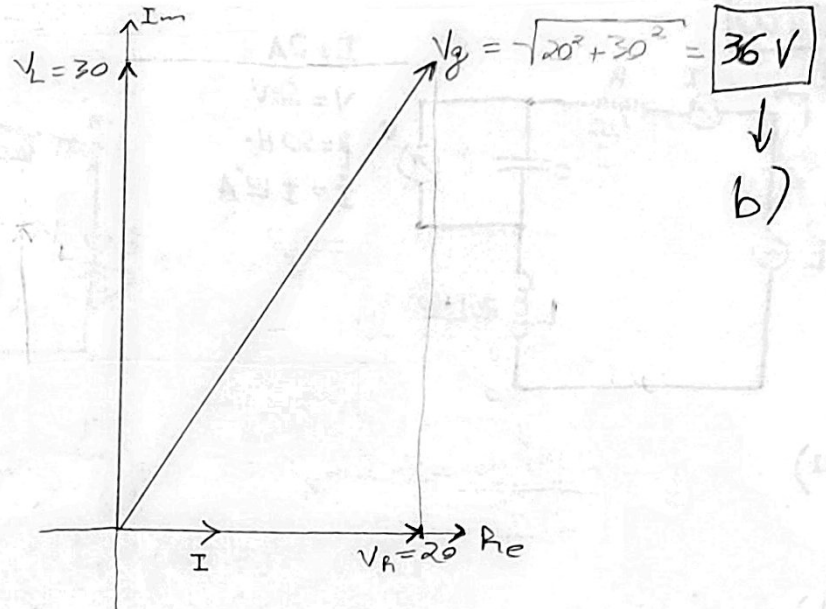
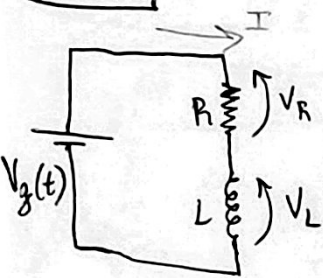
Ex 03

~~30V (2A)~~

$$V_R = 20V$$

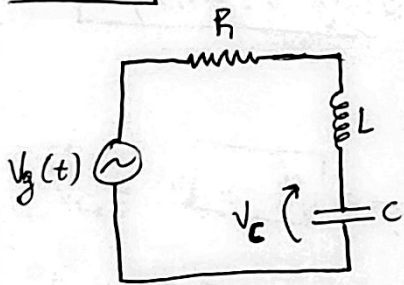
$$V_L = 30V$$

a)



b)

Ex 04 |  $V_g(t) = 90 \cos(5000t)$ ,  $R = 35\Omega$ ,  $L = 0,2H$ ,  $C = 0,2\mu F$

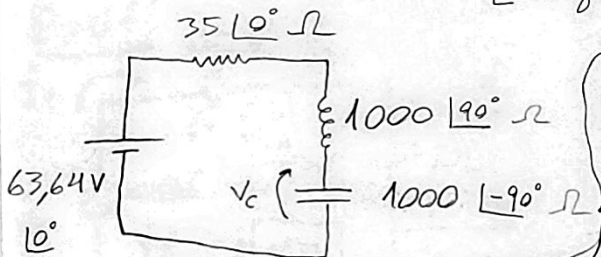


a)  $\omega = 5000 = 2\pi f \Rightarrow f = 795,77 \text{ Hz}$

$$V_{ef} = \frac{90}{\sqrt{2}} = 63,64V$$

$$\dot{C} = \frac{1}{j\omega C} = \frac{1}{j \cdot 5000 \cdot 0,2 \cdot 10^{-6}} = 1000 \angle -90^\circ \Omega$$

$$\dot{L} = j\omega L = j \cdot 5000 \cdot 0,2 = 1000 \angle 90^\circ \Omega$$



b)  $I_{ef} = \frac{V_{ef}}{R} = \frac{63,64}{35} = 1,82A \Rightarrow I = 1,82 \angle 0^\circ A$

$$V_c = \dot{C} \cdot \dot{I} = 1000 \angle -90^\circ \cdot 1,82 \angle 0^\circ \Rightarrow$$

$$\Rightarrow \dot{V}_c = 1820 \angle -90^\circ V$$

c)  $V_c(t) = \sqrt{2} \cdot |\dot{V}_c| \cos(\omega t) = 1820\sqrt{2} \cos(5000t - 90^\circ) V$