

$$\omega = 2 \cdot \pi \cdot f$$

$$\pi \cong 3,14$$

$$f = 50 \text{ [Hz]}$$

$$U = 230 \text{ [V AC]}$$

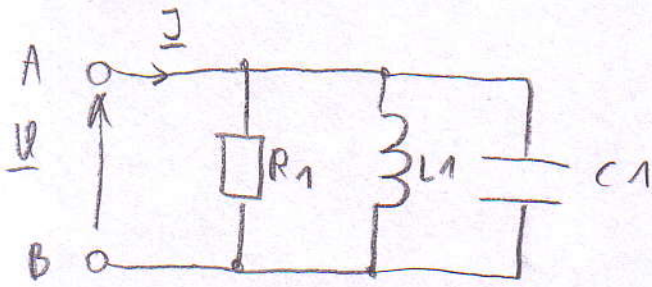
$$R_1 = 2 \text{ [\Omega]}$$

$$L_1 = 100 \text{ [mH]}$$

$$C_1 = 2 \text{ [\mu F]}$$

$$\underline{I} = ?$$

$$\varphi_u = 0 \text{ [rad]}$$



$$\underline{Z}_{R1} = R_1 = 2$$

$$\underline{Z}_{L1} = j \cdot \omega \cdot L_1 = j \cdot 2 \cdot \pi \cdot f \cdot L_1 = j \cdot 2 \cdot \pi \cdot 50 \cdot 0,1 = j \cdot 314 \cdot 0,1 = j \cdot 31,4$$

$$\underline{Z}_{L1} = j \cdot 31,4 \text{ [\Omega]}$$

$$\underline{Z}_{C1} = -j \cdot \frac{1}{\omega C} = -j \cdot \frac{1}{2 \cdot \pi \cdot f \cdot 2 \cdot 10^{-6}} = -j \cdot \frac{10^6}{628} \cong 1592,36 \cdot (-j)$$

$$\underline{Z}_{C1} = -j \cdot 1592,36 \text{ [\Omega]}$$

$$\underline{U} = \underline{Z} \cdot \underline{I} \rightarrow \underline{I} = \frac{\underline{U}}{\underline{Z}} \rightarrow \underline{I} = \underline{U} \cdot \underline{Y} \quad \underline{Z} = \frac{1}{\underline{Y}} \quad \underline{Y} = \frac{1}{\underline{Z}}$$

$$\underline{Y}_{R1} = \frac{1}{\underline{Z}_{R1}} = \frac{1}{2} \text{ [S]}$$

$$\underline{Y}_{L1} = \frac{1}{\underline{Z}_{L1}} = \frac{1}{j \cdot 31,4} = -j \cdot \frac{1}{31,4} \text{ [S]}$$

$$\underline{Y}_{C1} = \frac{1}{\underline{Z}_{C1}} = \frac{1}{-j \cdot 1592,36} = j \cdot \frac{1}{1592,36}$$

$$\underline{Y}_{AB} = \underline{Y}_{R1} + \underline{Y}_{L1} + \underline{Y}_{C1} = 0,5 - j \cdot 0,03$$

$$\underline{Y}_{AB} = \sqrt{(0,5)^2 + (0,03)^2} \cdot e^{j \cdot \arctan \frac{0,03}{0,5}} = 0,2509 \cdot e^{j \cdot 0,06}$$

$$\underline{I} = \underline{U} \cdot \underline{Y} = U \cdot e^{j \cdot \varphi_u} \cdot Y \cdot e^{j \cdot \arctan \frac{B}{G}} = 230 \cdot e^{j \cdot 0} \cdot 0,2509 \cdot e^{j \cdot 0,06}$$

$$\underline{I} = 57,707 \cdot e^{j \cdot 0,06}$$

$$\underline{I} = I \cdot e^{j \cdot \varphi_I}$$