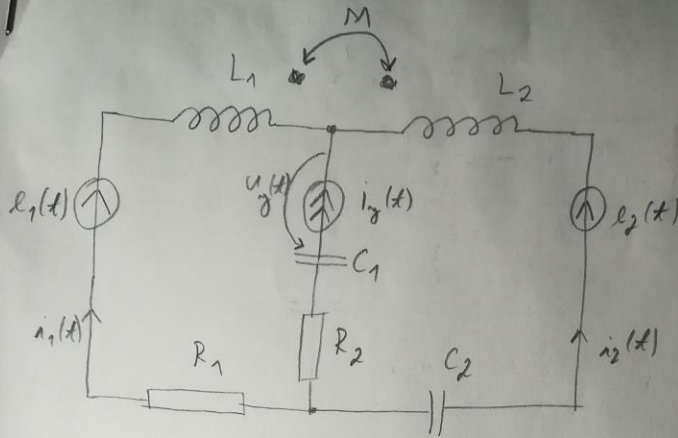
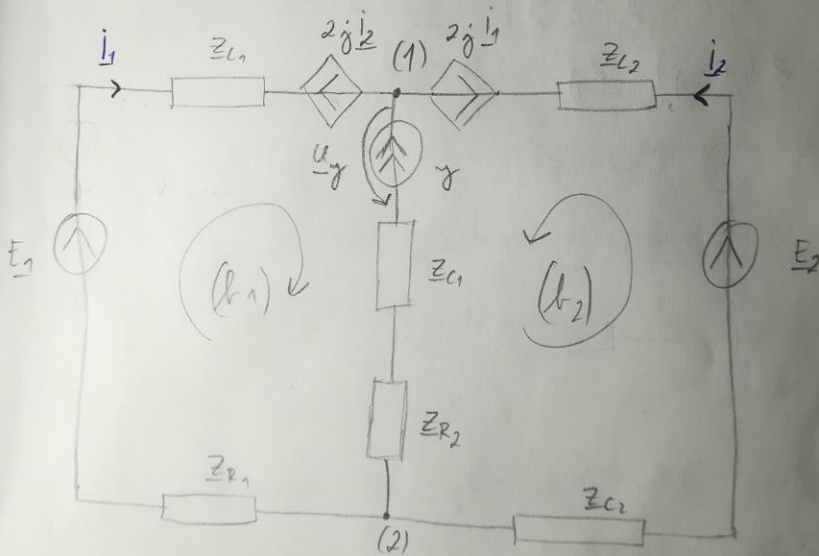


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$$\begin{aligned} e_1 &= 2\sqrt{2} \sin 100\pi t \\ e_2(t) &= 4 \sin(100\pi t + \frac{\pi}{4}) \\ i_g(t) &= 2\sqrt{2} \sin(100\pi t) \\ R_1 &= 3.5 \Omega; R_2 = 1 \Omega; \\ L_1 &= \frac{40}{\pi} \text{ mH}; \\ L_2 &= M = \frac{20}{\pi} \text{ mH} \\ C_1 &= C_2 = \frac{10}{3\pi} \text{ mF} \end{aligned}$$



Currentii I_1 și I_2 intra în borneli marcate și sursele comandate sunt orientate spre borneli marcate.

$$\underline{Z}_{L1} = j\omega L_1 = j \cdot 100\pi \cdot \frac{40}{\pi} \cdot 10^{-3} \text{H} \Rightarrow \underline{Z}_{L1} = 4j$$

$$\underline{Z}_{L2} = j\omega L_2 = j \cdot 100\pi \cdot \frac{20}{\pi} \cdot 10^{-3} \text{H} \Rightarrow \underline{Z}_{L2} = 2j$$

$$\underline{Z}_{C1} = \frac{-j}{\omega C_1} = \frac{-j}{100\pi \cdot \frac{10}{3\pi} \cdot 10^{-3} \text{F}} \Rightarrow \underline{Z}_{C1} = -3j$$

$$\underline{Z}_{C2} = \frac{-j}{\omega C_2} = \frac{-j}{100\pi \cdot \frac{10}{3\pi} \cdot 10^{-3} \text{F}} \Rightarrow \underline{Z}_{C2} = -3j$$

$$\underline{Z}_{R1} = 3$$

$$\underline{Z}_{R2} = 1$$

$$\underline{E}_1 = 2 e^{j \cdot 0} = 2$$

$$\underline{E}_2 = 2\sqrt{2} e^{j \frac{\pi}{4}} = 2\sqrt{2} \left(\frac{\sqrt{2}}{2} + j \frac{\sqrt{2}}{2} \right) \Rightarrow \underline{E}_2 = 2(1+j)$$

$$\underline{E} = 2 e^{-j \frac{\pi}{2}} = 2(0-j) = -2j \Rightarrow \underline{E} = -2j$$

$$M = \frac{20}{\pi} \cdot 10^{-3} \text{H} \Rightarrow j\omega M \underline{i}_2 = j \cdot 100\pi \cdot \frac{20}{\pi} \cdot 10^{-3} \text{H} \underline{i}_2 = 2j \underline{i}_2$$

$$j\omega M \underline{i}_1 = j \cdot 100\pi \cdot \frac{20}{\pi} \cdot 10^{-3} \text{H} \underline{i}_1 = 2j \underline{i}_1$$

$$(1): \underline{i}_1 + \underline{i}_2 + \underline{E} = 0$$

$$(1_1): \underline{i}_1 \underline{Z}_{L1} - \underline{E} \underline{Z}_{C1} - \underline{E} \underline{Z}_{R1} + \underline{i}_1 \underline{Z}_{R1} + 2j \underline{i}_2 + \underline{U}_E = \underline{E}_1$$

$$(1_2): \underline{i}_2 \underline{Z}_{L2} - \underline{E} \underline{Z}_{C2} + \underline{E} \underline{Z}_{R2} + \underline{i}_2 \underline{Z}_{C2} + 2j \underline{i}_1 = \underline{E}_2$$

$$\underline{i}_1 + \underline{i}_2 = 2j$$

$$\begin{cases} 4j \underline{i}_1 + 2j(-3j) + 2j + 3 \underline{i}_1 + 2j \underline{i}_2 + \underline{U}_E = 2 & (-) \\ 2j \underline{i}_2 + 2j(-3j) + 2j \cdot 1 - 3j \underline{i}_2 + 2j \underline{i}_1 + \underline{U}_E = 2 + 2j \end{cases}$$

$$\begin{cases} \underline{i}_1 + \underline{i}_2 = 2j & (1.) \\ (4j+3) \underline{i}_1 + 2j \underline{i}_2 + \underline{U}_E = -4 - 2j & (-) \\ 2j \underline{i}_1 - j \underline{i}_2 + \underline{U}_E = -4 & (-) \end{cases} \Rightarrow \begin{cases} (2j+3) \underline{i}_1 + 3j \underline{i}_2 = -2j & (2.) \end{cases}$$

$$12 \Rightarrow \begin{cases} i_2 = 2j - i_1 \\ (2j+3)i_1 + 3ji_2 = -2j \end{cases} \Rightarrow 2ji_1 + 3i_1 + 3j(2j - i_1) = -2j$$

$$2ji_1 + 3i_1 - 6 - 3ji_1 = -2j$$

$$i_1(3-j) = 6-2j \Rightarrow \boxed{i_1 = 2}$$

$$\boxed{i_2 = 2j - 2}$$

$$2ji_1 - ji_2 + u_y = -4$$

$$\left. \begin{aligned} &\Rightarrow u_y = -4 - 2j \cdot 2 + j(2j - 2) \\ &u_y = -4 - 4j - 2 - 2j \\ &u_y = -6 - 6j \end{aligned} \right\}$$

Verificăm soluțiile cu Bilanțul Puterilor:

$$P_c = 3 \cdot 4 + 1 \cdot 4 = 16$$

$$Q_c = 4 \cdot 4 + 2 \cdot 8 + (-3) \cdot 4 + (-3) \cdot 8 = -20$$

$$S_y = E_1 \cdot i_1^* + E_2 \cdot i_2^* + u_y = 2 \cdot 2 + 2(1+j) \cdot 2(-1-j) + (-6-6j) \cdot (-2j)$$

$$S_y = 4 + 4(1-1+2j) - 12j + 12 = 4 - 8j - 12j + 12 = 16 - 20j$$

$$P_c \neq S_y \quad ; \quad \text{Im}(S_y) = Q_c$$

$$S_y = 16 - 20j$$

$$i_1 = 2 = \sqrt{2^2 + 0^2} \angle \arctan \frac{0}{2} = 2 \angle 0$$

$$\boxed{i_1(t) = 2\sqrt{2} \sin(100\pi t)}$$

$$i_2 = -2 + 2j = \sqrt{(-2)^2 + 2^2} \angle \arctan^{-1} = 2\sqrt{2} \angle \left(-\frac{\pi}{4}\right)$$

$$\boxed{i_2(t) = 4 \sin\left(100\pi t - \frac{\pi}{4}\right)}$$