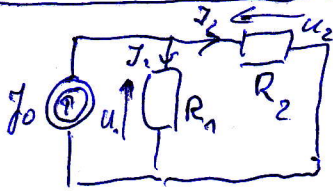


Kolokwium 2, ~~Ćwiczenie~~ Zadanie 2, grupa D

Rozwiązanie:

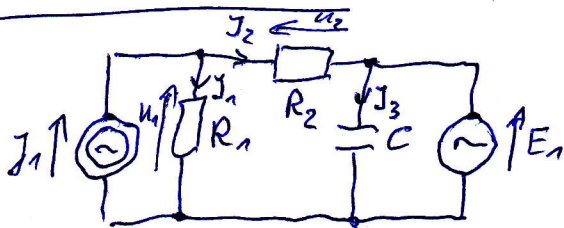
Analiza dla $\omega=0$



$$P_1^{(0)} = u_1 J_1 = J_1^2 R_1$$

$$R = R_1 = R_2 \Rightarrow J_1 = J_2 = \frac{J_0}{2} \Rightarrow P_1^{(0)} = P_2^{(0)} = \frac{J_0^2}{4} \cdot R_1 = \underline{\underline{4 \text{ mW}}}$$

Analiza dla $\omega=\omega_0$



$$J_1 = J_1 + J_2 \Rightarrow J_2 = J_1 + J_1$$

$$J_1 \cdot R_1 = J_2 \cdot R + E_1$$

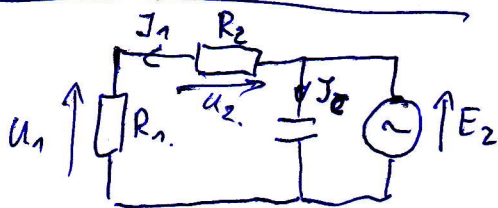
$$J_1 R_1 = (J_1 - J_2) R_2 + E_1 \Rightarrow J_1 = \frac{E_1 + J_1 R_2}{R_1 + R_2} = \frac{8 + 4 \cdot 10^{-3} \cdot 10^3}{2 \cdot 10^3} = 6 \text{ mA}$$

$$P_1^{(1)} = \frac{1}{2} \operatorname{Re} \{ u_1 \cdot J_1^* \} = \frac{1}{2} |J_1|^2 \cdot R_1 = \frac{1}{2} \cdot 36 \cdot 10^{-6} \cdot 10^3 = \underline{\underline{18 \text{ mW}}}$$

$$J_2 = J_1 - J_1 = 4 \text{ mA} - 6 \text{ mA} = -2 \text{ mA}$$

$$P_2^{(1)} = \frac{1}{2} |J_2|^2 \cdot R_2 = \frac{1}{2} \cdot 4 \cdot 10^{-6} \cdot 10^3 = \underline{\underline{1 \text{ mW}}}$$

Analiza dla $\omega=2\omega_0$



$$R = R_1 = R_2 \Rightarrow u_1 = u_2 = \frac{E_2}{2} \Rightarrow P_1^{(2)} = P_2^{(2)}$$

$$P_1^{(2)} = \frac{1}{2} \operatorname{Re} \{ u_1 \cdot J_1^* \} = \frac{1}{2} \operatorname{Re} \frac{|u_1|^2}{R} = \frac{1}{2} \frac{E_2^2}{4R} = \frac{4}{8 \cdot 10^3} = 0,5 \text{ mW}$$

$$P_2^{(2)} = 0,5 \text{ mW}$$

Odp:

$$P_1 = P_1^{(0)} + P_1^{(1)} + P_1^{(2)} = 4 \text{ mW} + 18 \text{ mW} + 0,5 \text{ mW} = \underline{\underline{22,5 \text{ mW}}}$$

$$P_2 = P_2^{(0)} + P_2^{(1)} + P_2^{(2)} = 4 \text{ mW} + 1 \text{ mW} + 0,5 \text{ mW} = \underline{\underline{5,5 \text{ mW}}}$$