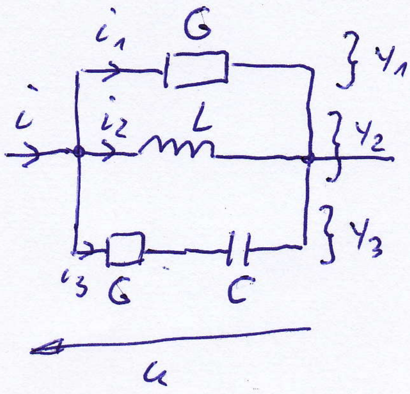
KOLOKWIUM I, grupa C

ZADANIE 2: Rozwiązanie



Wyznaczamy admitancje dla każdej gałęzi:

$$Y_1 = G$$

$$Y_2 = \frac{1}{j\omega L}$$

$$Y_3 = \frac{G \cdot j\omega C}{G + j\omega C}$$

$$U = J/Y = \frac{J}{Y_1 + Y_2 + Y_3} = \frac{J_1}{Y_1} = \frac{J_2}{Y_2} = \frac{J_3}{Y_3}$$

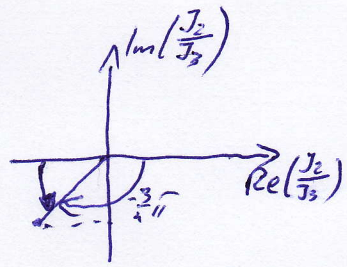
$$\Downarrow$$

$$\frac{J_1}{J_2} = \frac{Y_1}{Y_2} = \frac{G}{\frac{1}{j\omega L}} = j\omega G L$$

Z warunku zadania:

$$|J_1| = |J_2| \Rightarrow \frac{|J_1|}{|J_2|} = 1 = \omega G L \Rightarrow G = \frac{1}{\omega L} = \underline{\underline{0{,}5\,mS}} \quad (3pkt)$$

$$\frac{J_2}{J_3} = \frac{Y_2}{Y_3} = \frac{\frac{1}{j\omega L}}{\frac{G j\omega C}{G + j\omega C}} = -\frac{G + j\omega C}{\omega^2 G L C}$$



Z warunku zadania:

$$\arg\left(\frac{J_2}{J_3}\right) = -\frac{3}{4}\pi$$

$$\arg\left(\frac{J_2}{J_3}\right) = -\pi + \operatorname{arctg}\left(\frac{\omega C}{G}\right) = -\frac{3}{4}\pi$$

$$\operatorname{arctg}\left(\frac{\omega C}{G}\right) = \frac{\pi}{4}$$

$$\frac{\omega C}{G} = 1 \Rightarrow C = \frac{G}{\omega} = \underline{\underline{0{,}5\,nF}} \quad (3pkt)$$