

Kolokwium 2, zadanie 1, grupa B

Rozwiązanie:

$$\frac{|U|}{|U_r|} = \frac{1}{\sqrt{1+\xi^2}} = \frac{1}{\sqrt{5}}$$

$$1+\xi^2 = 5$$

$$\xi = 2 \text{ (poniewa\u017c } \omega > \omega_0)$$

1 pkt

$$\xi = Q \cdot \nu \approx \frac{Q \cdot 2(\omega - \omega_0)}{\omega_0} = 2$$

$$\frac{Q \cdot (1,01 \omega_0 - \omega_0)}{\omega_0} = 1$$

$$Q \cdot 0,01 = 1$$

$$Q = 100$$

1 pkt

$$Q = \frac{1}{g \cdot G} \Rightarrow g = \frac{1}{Q \cdot G} = \frac{1}{100 \cdot 5 \cdot 10^{-6}} = \frac{1}{5 \cdot 10^{-4}} = 2 \cdot 10^3 = \underline{\underline{2 \text{ k}\Omega}} \quad 1 \text{ pkt}$$

$$g = \sqrt{\frac{L}{C}} \Rightarrow L = g^2 \cdot C = 4 \cdot 10^6 \Omega^2 \cdot 1 \cdot 10^{-9} \text{ F} = 4 \cdot 10^{-3} \text{ H} = \underline{\underline{4 \text{ mH}}} \quad 1 \text{ pkt}$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{4 \cdot 10^{-3} \cdot 10^{-9}}} = \frac{1}{2 \cdot 10^{-6}} = 0,5 \text{ Mrad/s} \quad 1 \text{ pkt}$$

$$\Delta \omega /_{3\text{dB}} = \frac{\omega_0}{Q} = \frac{0,5 \cdot 10^6}{100} = \underline{\underline{5 \text{ krad/s}}} \quad 1 \text{ pkt}$$

1 pkt

6 pkt