

# task\_c9fj1si7l797equs\_with\_calculation

## Student Group

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impedance, phasor, cutoff, exam ee1 SS2023

## Exercise E6 Complex voltage dividers

(written test, approx. 16 % of a 60-minute written test, SS2023)

7. Draw the circuit diagram of the circuit with the following data. The resulting phasor for the total impedance  $\underline{Z}$  is given. Choose an appropriate scaling factor and write it down.

- $R = 1.1 \text{ k}\Omega$

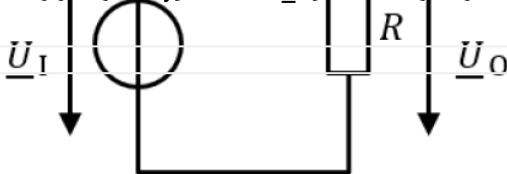
Solution  $L = 3.5 \text{ mH}$

Solution  $\underline{U}_I = 5 \text{ V}$

$$\underline{Z} = 50 \text{ k}\Omega$$

$$\underline{U}_O = 0.5 \text{ V} - j \cdot 1.5 \text{ V}$$

At the cutoff frequency the absolute values of impedances  $|\underline{Z}_L|$  is equal to  $|\underline{Z}_R|$ . This leads to  $\sqrt{R^2} = \sqrt{(\omega L)^2}$   $R = \omega L$   $1.1 \text{ k}\Omega = 2\pi \cdot 150 \text{ kHz} \cdot L$   $L = \frac{1.1 \text{ k}\Omega}{2\pi \cdot 150 \text{ kHz}} = 3.5 \text{ mH}$



.. Calculate the impedance  $\underline{Z}_L$ .

Solution

$$\underline{Z}_L = j \cdot \omega L = j \cdot 2\pi \cdot 150 \text{ kHz} \cdot 3.5 \text{ mH}$$

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