

task_kricv9fh7haauo6q_with_calculation

Student Group

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Exercise E1 Complex Impedance Circuit

(written test, approx. 15 % of a 60-minute written test, WS2022)

[illegible]

Solution A linear source is connected with an inductor of $330 \sim \{\rm \mu H\}$ and a capacitor of $0.22 \sim \{\rm \mu F\}$, all in series.

Result

$$\begin{aligned} Z &= 107.31 \angle 11.1^\circ \text{ m}\Omega \text{ and } Z_{\text{load}} = 48.2 \sim \Omega \\ Z &= 19.8 \sim \Omega \end{aligned}$$

Draw the circuit diagram of the given circuit.

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label all components, voltages, and currents.
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$$\begin{aligned} Z &= \{ \{ \hat{U} \} \over \{ \hat{I} \} \} \parallel \hat{I} \} &= \{ \{ \hat{U} \} \over \{ Z \} \} \parallel \end{aligned}$$

$$\{ \{1\} \over {2\pi \cdot f \cdot C} \} \parallel \&= \{ \{1\} \over {2\pi \cdot 15}$$

$$f_{\text{res}} \approx 0.22 \text{ kHz} \cdot \mu\text{F}$$

[illegible]

$$\frac{\hat{U}}{Z} \cdot \frac{1}{\sqrt{2}}$$

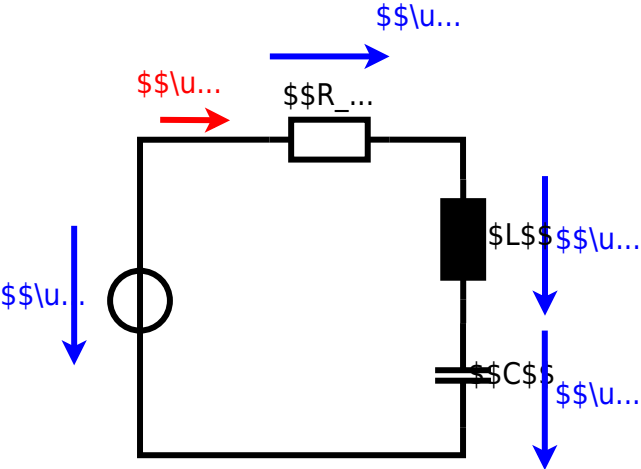
$$\forall \beta \in [0, \frac{1}{\sqrt{\kappa}}] \quad \overline{\Omega}(\beta) \leq \frac{1}{2\pi} \cdot 15$$

$$\sim \{\text{kHz}\} \cdot 330 \sim \{\text{μH}\} \}$$

$$\underline{Z} \cdot \underline{L} + \underline{Z} \cdot \underline{C} = \underline{R} + \underline{Z} \cdot \underline{C}$$

$$\begin{aligned} \underline{Z} &= R + \underline{Z}_L + \underline{Z}_C \\ \dot{Z}_L &= R + \dot{Z}_L - \dot{Z}_C \\ \underline{Z} &= \end{aligned}$$

$$\sqrt{R^2 + (\underline{Z} - L - \underline{Z} - C)^2}$$



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