

task_9xy69axg3gi3nr26_with_calculation

Student Group

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Exercise E1 Complex series circuit**(written test, approx. 8 % of a 120-minute written test, SS2021)**

A) Determine the absolute value of the result $\underline{Z}_C$ in Ω of the series circuit using an impedance vector diagram. Pay attention to the correct dimensioning.

a) Determine the complex impedance $\underline{Z}_C$.

Result

$\underline{Z}_C = -j \cdot 804 \, \Omega$

Path

The complex impedance $\underline{Z}_C$ is given as

$$\underline{Z}_C = \frac{1}{j \cdot 2\pi \cdot f \cdot C} = \frac{-j}{2\pi \cdot 40 \cdot 10^3 \, \text{Hz} \cdot 4.95 \cdot 10^{-9} \, \text{F}} = -j \cdot 803.81... \, \Omega$$

Based on the diagram: $|\underline{Z}| = 828 \, \Omega$

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