

# task\_uzbbnoz8abe6201d\_with\_calculation

## Student Group

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## Table of Contents

Exercise E3 Impedances at Frequencies (written test, approx. 14 % of a 60-minute written test, SS2023) .....	2
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exam ee1 SS2023

Exercise E3 Impedances at Frequencies (written test, approx. 14 % of a 60-minute written test, SS2023)

At an impedance with  $Z = 50 - j10 \Omega$  a current  $I = 10 \text{ A}$  flows. The value of the real power is  $P = 400 \text{ W}$ . The voltage across the impedance is  $V = 500 \text{ V}$ . The result is a series combination of a resistor  $R = 50 \Omega$  and an inductor  $L = 15.9 \text{ mH}$ .

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Solution
Solution
\begin{align*} f_0 = 500 \text{ Hz} \quad \omega = 2\pi f_0 = 3141.59 \text{ rad/s} \\ X_{L1} = \omega L_1 = 15.9 \text{ m}\Omega \end{align*}

\begin{align*} X_{C2} &= -j \frac{1}{\omega C_2} = -j 31.8 \text{ }\Omega \\ X_{L1} &= j \omega L_1 = j 15.9 \text{ m}\Omega \end{align*}

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Last update: 2023/08/17 06:46

