task_uzbbnoz8abe6201d_with_calculation

Student Group

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Table of Contents

exam ee1 SS2023

Exercise E8 Impedances at Frequencies
(written test, approx. 14 % of a 60-minute written test, SS2023)

At which frequencies show the following components the given absolute value of the impedance
2. An inductor with $L_2 = 502 ~\rm mH$, where an AC voltage of $U_2 = 6.8 ~\rm V$ generates a current $I_2 = 1 ~\rm mA$.
3. A capacitor with $C_3 = 5.6 ~\rm nF$.
Result
1. An inductor with $X_{L1} = 60 ~\rm m\Omega$ and $L_1 = 15.9 ~\rm \mu H$.

Solution
Solution

\begin{align*} f_1 = 600 ~{\rm Hz} \end{align*} [illegible]
kHz}\end{align*}

\begin{align*} X_{C3} &= {{1}\over{\omega_3 \cdot C_3}} [illegible]

\begin{align*} X_{L1} &= \omega_1 \cdot L_1 = 2\pi f_1 \cdot L_1 \\ \rightarrow f_1 &= {{X_{L1}}\over{2\pi \cdot L_1}} \\ &= {{60 ~\rm m\Omega}\over{2\pi \cdot 15.9 ~\rm \mu H}} \\ &= {{60 \cdot 10^{-3}}\over{2\pi \cdot 15.9 \cdot 10^{-6}}} \rm {{V/A}\over{Vs/A}} \\ \end{align*}

[illegible] \end{align*}

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