task_ezrkjzifcegttcpc_with_calculation

Student Group

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resonance, resonant circuit, RMS, power, exam ee2 SS2021

Exercise E1 Resonant Circuit
(written test, approx. 4 % of a 120-minute written test, SS2021)

shall be considered in the following.

A voltage with the RMS value $U_{\rm RMS} = 110~\rm V$ is applied between the terminals of each winding.

Through each of the windings, there is a current with an RMS value $I_{\rm RMS} = 5 ~\rm A$ and a phase shift of $\varphi = +25°$ compared to the voltage.

a) Draw the circuit diagram.

The active power P is given by: $P = 3 \cdot U \cdot I \cdot \sin(\varphi)$

For the given values, the active power is: $P = 3 \cdot 110~\rm V \cdot 5~\rm A \cdot \sin(25°) = 1610.888...~\rm W$

By this (and showing in the example in the image below), One can see, that $I_\rm L= \sqrt{3} \cdot I_{\rm RMS} = \sqrt{3} \cdot 5~\rm A$