

# task\_rdz03rspbwusy7wk\_with\_calculation

## Student Group

First Name	Surname	Matrikel Nr.

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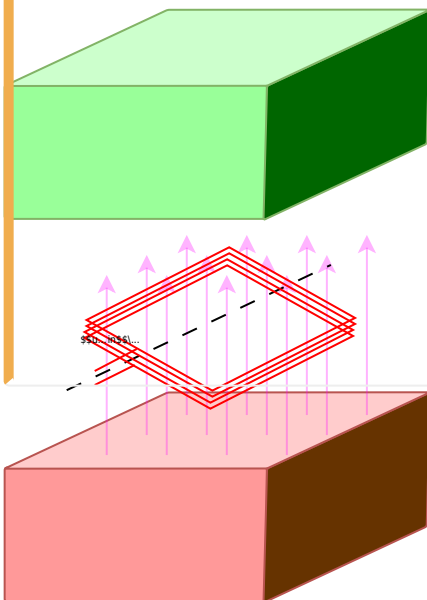
induction, flux, induced voltage, exam ee2 SS2021

### Exercise E1 Coil in a magnetic Field (written test, approx. 4 % of a 120-minute written test, SS2021)

A coil with a number of turns  $n = 300$  and a cross-sectional area  $A = 600 \text{ cm}^2$  is located in a homogeneous magnetic field.

The rotation of the coil causes a sinusoidal change in the magnetic field in the coil with the frequency  $f = 80 \text{ Hz}$ .

The maximum value of the magnetic flux density in the coil is  $\hat{B} = 2 \cdot 10^{-6} \text{ Vs/cm}^2$ .



Derive the formula for the voltage induced in the coil and calculate the voltage amplitude.

Path

The induced voltage is given by:

$$\begin{aligned} U_{\text{ind}} &= - \frac{\text{d}\Psi}{\text{d}t} \quad \&= - n \frac{\text{d}\Phi}{\text{d}t} \end{aligned}$$

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