

# task\_jfzImsucghsqvop5\_with\_calculation

## Student Group

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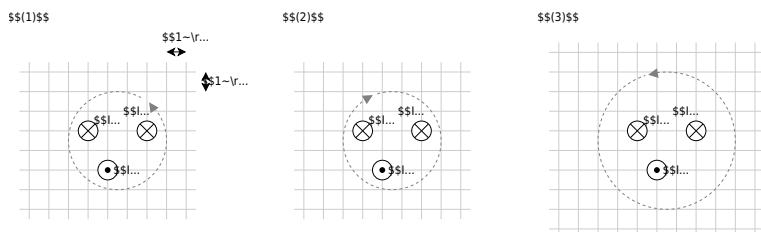
**Exercise E1 Magnetic Voltage**  
**(written test, approx. 6 % of a 120-minute written test, SS2021)**

The following images show cross-sections of electrical cables.

A closed path is shown as a dashed line. The magnetic voltage  $\theta$  on these paths shall be analyzed.

The following values are given for the currents:

- $I_1 = 4 \text{ A}$
- $I_2 = 0 \text{ A}$
- $I_3 = 1 \text{ A}$
- $I_4 = 4 \text{ A}$



Specify which magnetic voltages  $\theta_{(1)}$ ,  $\theta_{(2)}$ , and  $\theta_{(3)}$  result. Note the direction of the path in each case!

Path

For the resulting current the direction of the path has to be considered with the right-hand rule:

- $I_{(1)} = +I_2 - I_1 - I_3 \quad \rightarrow \quad \theta_{(1)} = 2 \text{ A} - 5 \text{ A} - 1 \text{ A}$
- $I_{(2)} = +I_3 + I_4 - I_1 \quad \rightarrow \quad \theta_{(2)} = 1 \text{ A} + 4 \text{ A} - 5 \text{ A}$
- $I_{(3)} = +I_3 - I_4 - I_2 \quad \rightarrow \quad \theta_{(3)} = 1 \text{ A} - 4 \text{ A} - 2 \text{ A}$

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