task_kmp8r8y6lvwjnoc3_with_calculation

Student Group

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magnetic potential, exam ee2 SS2024

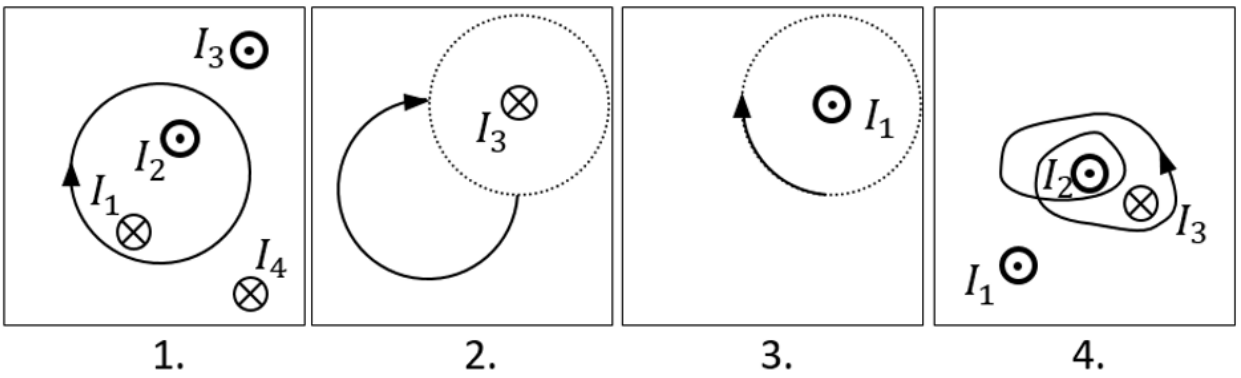
Exercise E12 Magnetic Potential
(written test, approx. 8 % of a 120-minute written test, SS2024)

Calculate the magnetic potential difference $V_\rm m$ for the following paths as shown by the solid lines.
Dotted lines are only for there for symmetry aspects!

The wires conduct the following currents:

- $|I_1|=2 ~\rm A$
- $|I_2|=5 ~\rm A$
- $|I_3|=11 ~\rm A$
- $|I_4|=7 ~\rm A$

Pay attention to the signs of the currents (given by the diagrams) and of the results!



Result

Based on the right-hand rule and the part of a full revolution the following results:

1. Task: $+I_1 - I_2 = -3 ~\rm A$
2. Task: $+{{1}\over{4}} I3 = 11/4 ~\rm A$ (it does not matter which way the path goes from the startpoint to the endpoint, as long as it has the same direction and number of revolutions)
3. Task: $-{{1}\over{4}} I1 = -0.5 ~\rm A$
4. Task: $+2 \cdot I_2 - 1 \cdot I_3 = -1 ~\rm A$