

task_kmp8r8y6lvwjnoc3_with_calculation

Student Group

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magnetic potential, exam ee2 SS2024

Exercise E13 Magnetic Potential (written test, approx. 8 % of a 120-minute written test, SS2024)

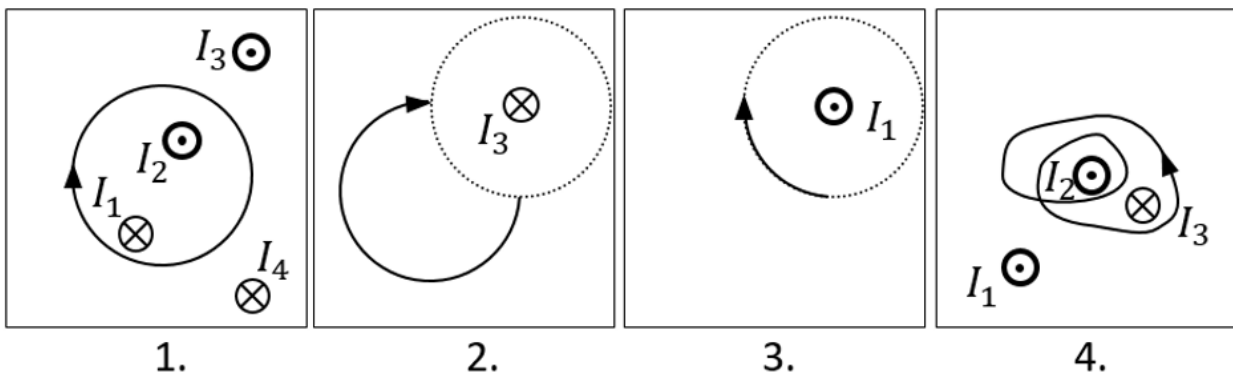
Calculate the magnetic potential difference $\oint \vec{V} \cdot d\vec{s}$ for the following paths as shown by the solid lines.

Dotted lines are only for there for symmetry aspects!

The wires conduct the following currents:

- $|I_1| = 2 \text{ A}$
- $|I_2| = 5 \text{ A}$
- $|I_3| = 11 \text{ A}$
- $|I_4| = 7 \text{ A}$

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: $\oint I_1 - I_2 = -3 \text{ A}$
2. Task: $\oint \frac{1}{4} I_3 = \frac{11}{4} \text{ A}$ (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: $-\oint \frac{1}{4} I_1 = -0.5 \text{ A}$
4. Task: $\oint 2 \cdot I_2 - 1 \cdot I_3 = -1 \text{ A}$

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