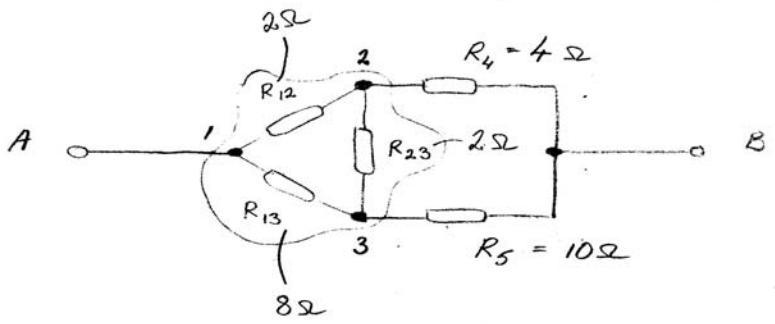
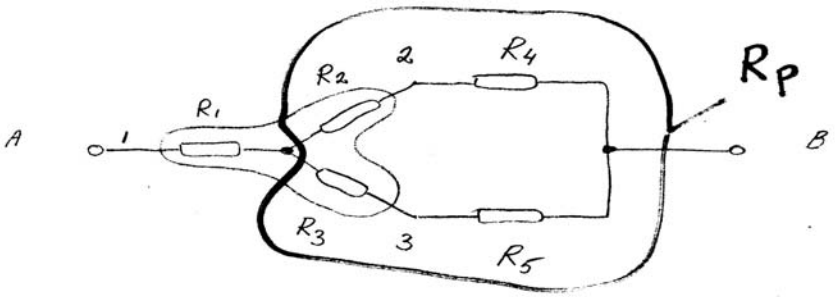
Lösning med D/Y-transformation:

A4.1





$$R_1 = \frac{R_{12} \cdot R_{13}}{R} \qquad R = R_{12} + R_{13} + R_{23}$$

$$R_2 = \frac{R_{12} \cdot R_{23}}{R} \qquad R = 12\ \Omega$$

$$R_3 = \frac{R_{13} \cdot R_{23}}{R} \qquad R_1 = \frac{4}{3}\ \Omega \approx 1,333$$

$$R_2 = \frac{1}{3}\ \Omega \approx 0,333$$

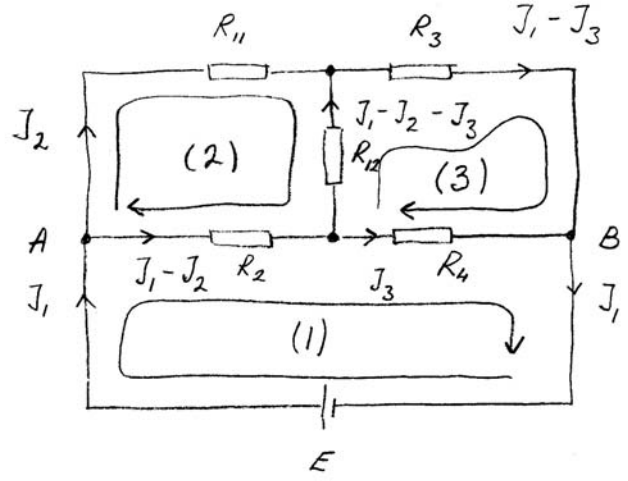
$$R_3 = \frac{4}{3}\ \Omega \approx 1,333$$

$$R_{AB} = R_1 + \boldsymbol{R_P}$$

$$\frac{1}{\boldsymbol{R_P}} = \frac{1}{R_2 + R_4} + \frac{1}{R_3 + R_5} \Rightarrow \boldsymbol{R_P} = 3,135\ \Omega$$

$$R_{AB} \approx 1,333 + 3,135\ \Omega = 4,47\ \Omega$$

Alternativ lösning med slinganalys (Kirchhoffs spänningslag):



$$R_{AB} = \frac{E}{J_1} \quad \ldots \quad (*)$$

$$+E - R_2(J_1 - J_2) - R_4 J_3 = 0 \quad \ldots \quad (1)$$

$$-R_{11} J_2 + R_{12}(J_1 - J_2 - J_3) + R_2(J_1 - J_2) = 0 \ldots (2)$$

$$-R_{12}(J_1 - J_2 - J_3) - R_3(J_1 - J_3) + R_4 J_3 = 0 \ldots (3)$$

NUMERISKT :

$$\begin{aligned} 8J_1 - 8J_2 + 10J_3 &= E \quad \ldots (1) \\ 10J_1 - 12J_2 - 2J_3 &= 0 \quad \ldots (2) \\ -6J_1 + 2J_2 + 16J_3 &= 0 \quad \ldots (3) \end{aligned}$$

$$\left(\begin{array}{ccc|c} 8 & -8 & 10 & E \\ 10 & -12 & -2 & 0 \\ -6 & 2 & 16 & 0 \end{array}\right) \sim \left\{\begin{array}{l} (1) + 5\cdot(2) \\ 8\cdot(2) + (3) \end{array}\right\} \sim \left(\begin{array}{ccc|c} 58 & -68 & 0 & E \\ 74 & -94 & 0 & 0 \\ -6 & 2 & 16 & 0 \end{array}\right) \sim \left\{(1) - \frac{68}{94}\cdot(2)\right\}$$

$(J_1 \quad J_2 \quad J_3)$

$$\sim \left(\begin{array}{ccc|c} 4{,}47 & 0 & 0 & E \\ 74 & -94 & 0 & 0 \\ -6 & 2 & 16 & 0 \end{array}\right) \quad \Rightarrow J_1 \approx \frac{E}{4{,}47} \quad \text{INS I } (*) \Rightarrow$$

$$R_{AB} \approx 4{,}47 \ \Omega$$