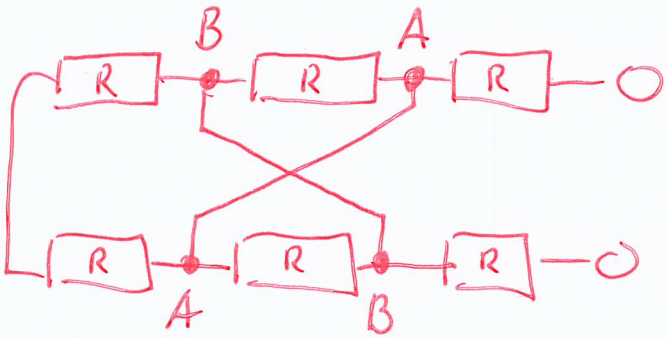
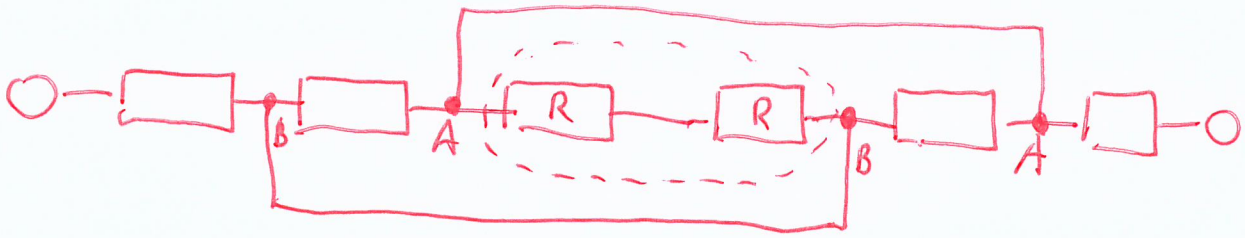
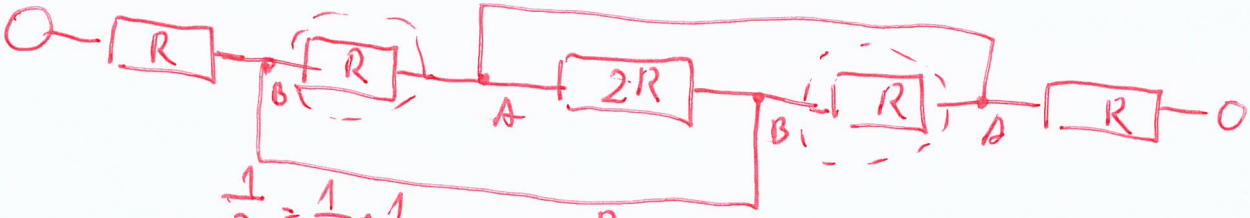
Zadanie 1

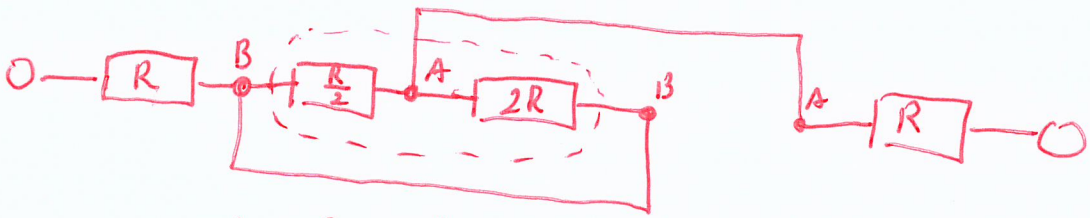




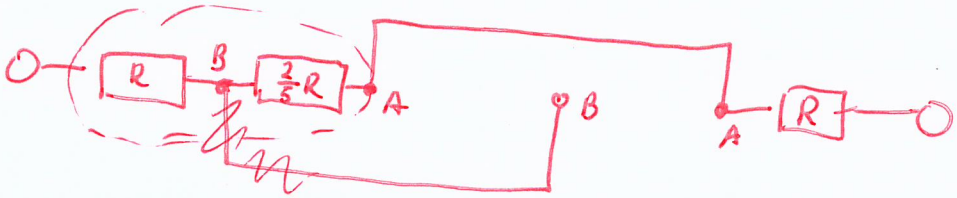
$R_2 = R + R = 2R$



$\frac{1}{R_2} = \frac{1}{R} + \frac{1}{R} \Rightarrow R_2 = \frac{R}{2}$

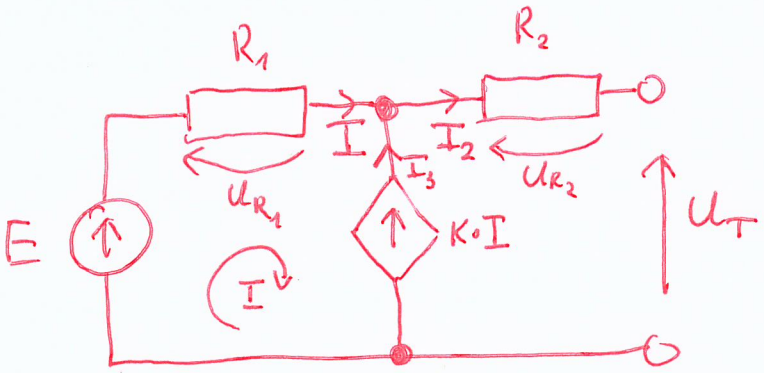


$\frac{1}{R_2} = \frac{2}{R} + \frac{1}{2R} = \frac{4}{2R} + \frac{1}{2R} = \frac{5}{2R} \Rightarrow R_2 = \frac{2}{5}R$



$R_2 = 2\frac{2}{5}R$

Zadanie 2



$E - U_{R_1} - K \cdot I = 0 \Rightarrow E - R_1 \cdot I - K \cdot I = 0$

$I_2 = 0$

$E = R_1 I + K \cdot I$

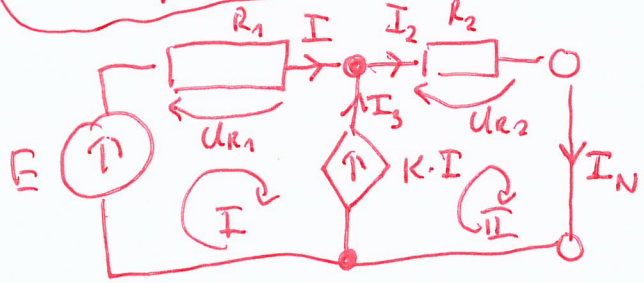
$I = -I_3$

$E = I(R_1 + k)$

$U_T = K \cdot I$

$\frac{E}{R_1 + K} = I$

$$U_T = \frac{K}{R_1 + K} E$$



$E - U_{R_1} - K \cdot I = 0 \Rightarrow I = \frac{E}{R_1 + K}$

$I + I_3 = I_2$

$K \cdot I - U_{R_2} = 0$

$I_2 = I_N$

$$R_T = \frac{U_T}{I_N}$$

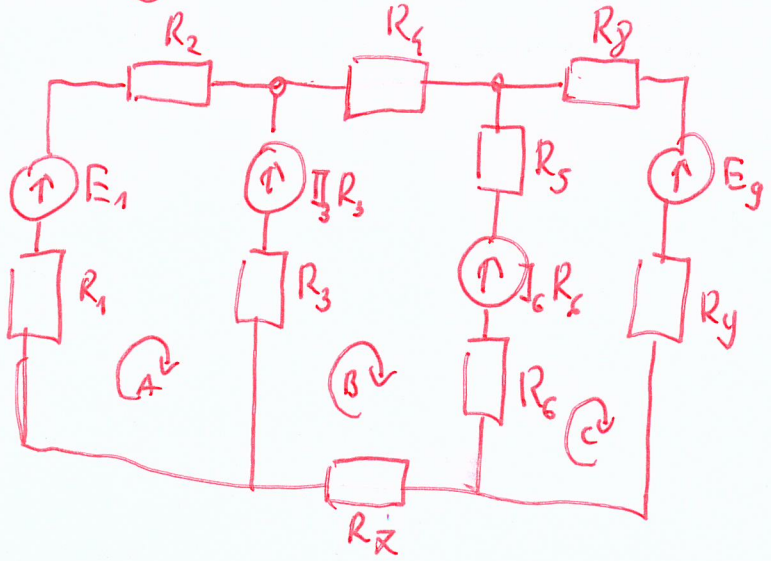
$$R_T = \frac{K}{R_1 + K} \cdot E \cdot \frac{(R_1 + K) \cdot R_2}{K \cdot E}$$

$$R_T = R_2$$

$\frac{K}{R_1 + K} \cdot E - I_2 \cdot R_2 = 0 \Rightarrow \frac{K}{R_1 + K} \cdot E = I_2 \cdot R_2$

$\frac{K}{R_1 + K} \cdot \frac{1}{R_2} \cdot E = I_2 = I_N$

Zadanie 3

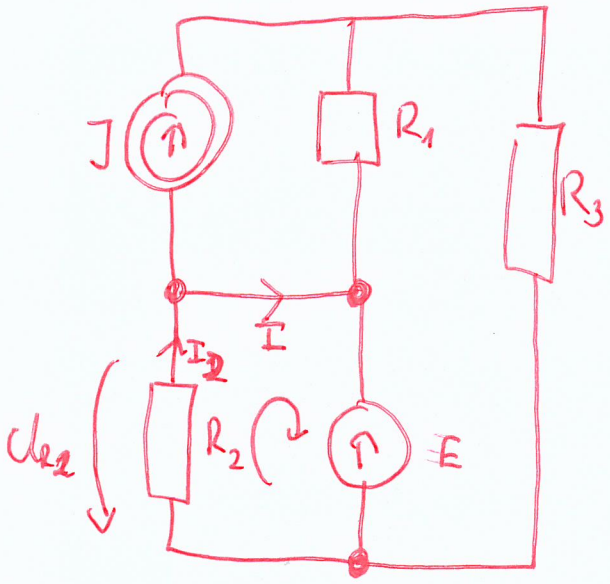


$$\left[\begin{array}{c|c|c} R_1+R_2+R_3 & -R_3 & 0 \\ \hline -R_3 & R_3+R_4+R_5+R_6+R_x & -R_5-R_6 \\ \hline 0 & -R_5-R_6 & R_5+R_6+R_7+R_7 \end{array}\right]\left[\begin{array}{c} I_A \\ I_B \\ I_C \end{array}\right]=\left[\begin{array}{c} E_1-J_3R_3 \\ J_3R_3-J_6R_6 \\ J_6R_6-E_7 \end{array}\right]$$

$$\left[\begin{array}{ccc} 1+1+2 & -2 & 0 \\ -2 & 2+2+1+1+1 & -1-1 \\ 0 & -1-1 & 1+1+1+1 \end{array}\right]\left[\begin{array}{c} I_A \\ I_B \\ I_C \end{array}\right]=\left[\begin{array}{c} 2-0{,}5\cdot 2 \\ 0{,}5\cdot 2-2\cdot 1 \\ 2\cdot 1-1 \end{array}\right]$$

$$\left[\begin{array}{ccc} 4 & -2 & 0 \\ -2 & 7 & -2 \\ 0 & -2 & 4 \end{array}\right]\left[\begin{array}{c} I_A \\ I_B \\ I_C \end{array}\right]=\left[\begin{array}{c} 1 \\ -1 \\ 1 \end{array}\right]$$

Zadanie 4



$$-U_{e_2} - E = 0$$

$$-R_2 \cdot I_2 = E$$

$$I_2 = -\frac{E}{R_2}$$

$$I + J = I_2$$

$$I = I_2 - J$$

$$I = -\frac{E}{R_2} - J$$