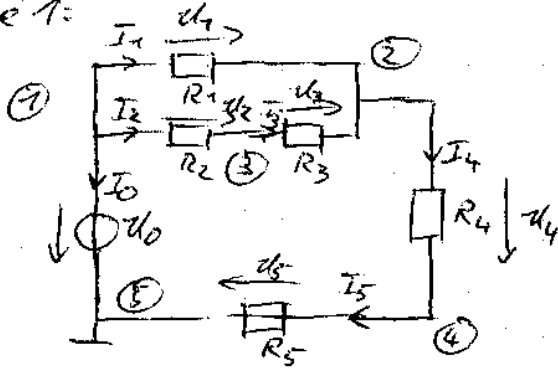


Aufgabe 1:



a), b) siehe Zeichnung

c) Knoten 1:  $i_0 + i_1 + i_2 = 0$   
 Knoten 2:  $-i_1 - i_3 + i_4 = 0$   
 Knoten 3:  $-i_2 + i_3 = 0$   
 Knoten 4:  $-i_4 + i_5 = 0$   
 Knoten 5:  $-i_0 = 0$        $-i_5 = 0$

d)

$$\begin{aligned} u_{K1} - u_{K5} &= u_0 \\ u_{K1} - u_{K2} &= u_1 \\ u_{K1} - u_{K3} &= u_2 \\ -u_{K2} + u_{K3} &= u_3 \\ u_{K2} - u_{K4} &= u_4 \\ u_{K4} - u_{K5} &= u_5 \end{aligned}$$

e) KCL:

$$\begin{bmatrix} 1 & 1 & 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & -1 & 1 & 0 \\ 0 & 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 & 1 \\ -1 & 0 & 0 & 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} i_0 \\ \vdots \\ i_5 \end{bmatrix} = \underline{0}$$

KVL:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & -1 \\ 1 & -1 & 0 & 0 & 0 \\ 1 & 0 & -1 & 0 & 0 \\ 0 & -1 & 1 & 0 & 0 \\ 0 & 1 & 0 & -1 & 0 \\ 0 & 0 & 0 & 1 & -1 \end{bmatrix} \begin{bmatrix} u_{K1} \\ \vdots \\ u_{K5} \end{bmatrix} = \begin{bmatrix} u_0 \\ u_1 \\ u_2 \\ u_3 \\ u_4 \\ u_5 \end{bmatrix}$$

$$\underline{A} \underline{i} = \underline{0} \quad \underline{A}^T \underline{u}_K = \underline{u}$$

Aufgabe 2:

a)  $U = U_1 = U_2$

b)  $I = I_1 + I_2$

c)  $U_1 = R_1 I_1$      $U_2 = R_2 I_2$

d)  $I_1 = I - I_2 = I - \frac{U_2}{R_2} = I - \frac{U_1}{R_2} = I - \frac{R_1}{R_2} I_1$

$$I_1 + \frac{R_1}{R_2} I_1 = I$$

$$I_1 = \frac{I}{1 + \frac{R_1}{R_2}} = \frac{R_2 I}{R_1 + R_2}$$