

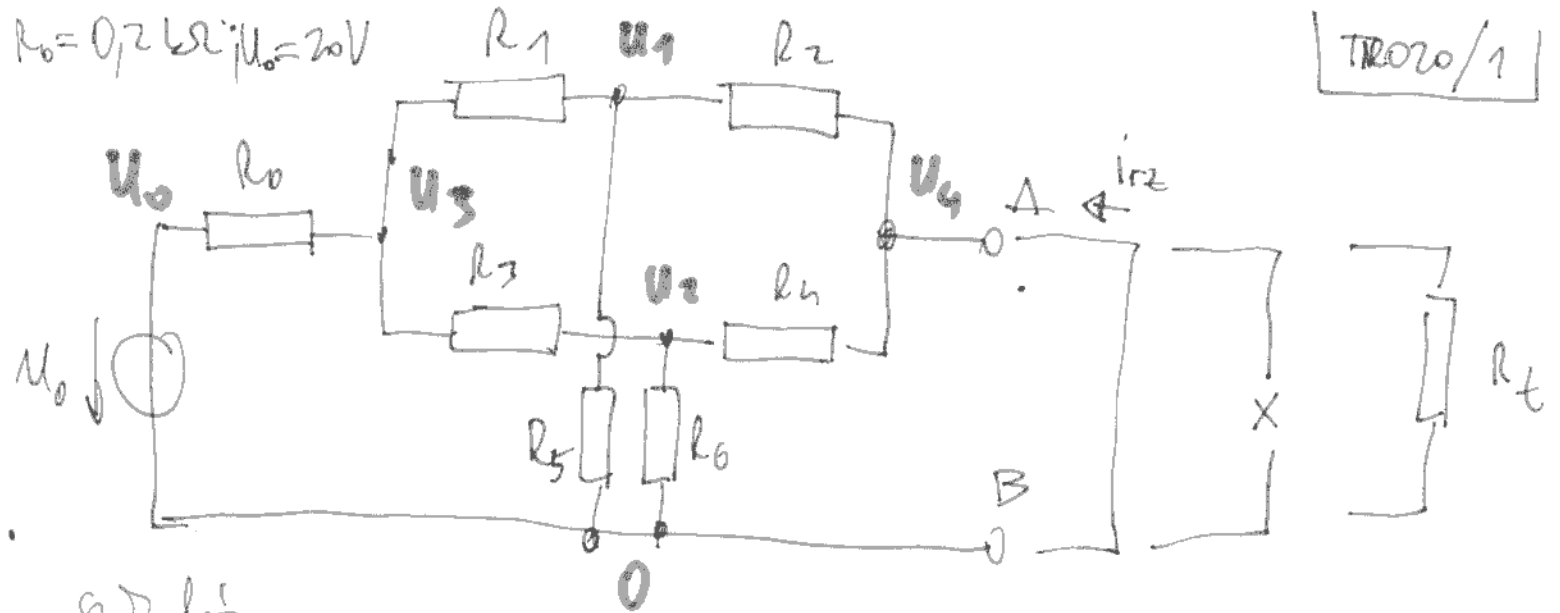
$$R_1 = 15 \text{ k}\Omega; R_2 = 2 \text{ k}\Omega$$

$$R_3 = 2 \text{ k}\Omega; R_4 = 15 \text{ k}\Omega$$

$$R_5 = 1 \text{ k}\Omega; R_6 = 2 \text{ k}\Omega$$

$$R_0 = 0,2 \text{ k}\Omega; U_0 = 20 \text{ V}$$

TR020/1



matrix

$$\begin{pmatrix} 2,1667 & 0 & -0,6667 & -0,5 \\ 0 & 1,625 & -0,5 & -0,625 \\ -0,6667 & -0,5 & 0,1667 & 0 \\ -0,5 & -0,625 & 0 & 1,125 \end{pmatrix}$$

$$\begin{pmatrix} U_1 \\ U_2 \\ U_3 \\ U_4 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 100 \\ 0 \end{pmatrix}$$

matrix

$$\textcircled{I} \quad \frac{U_1 - U_3}{R_1} + \frac{U_1}{R_5} + \frac{U_1 + U_4}{R_2} = 0 \rightarrow \left( \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_5} \right) U_1 - \frac{1}{R_1} U_3 - \frac{1}{R_2} U_4 = 0$$

$$\textcircled{II} \quad \frac{U_2 - U_3}{R_3} + \frac{U_2}{R_6} + \frac{U_2 - U_4}{R_4} = 0 \rightarrow \left( \frac{1}{R_3} + \frac{1}{R_4} + \frac{1}{R_6} \right) U_2 - \frac{1}{R_3} U_3 - \frac{1}{R_4} U_4 = 0$$

$$\textcircled{III} \quad \frac{U_3 - U_0}{R_0} + \frac{U_3 - U_1}{R_1} + \frac{U_3 - U_2}{R_3} = 0 \rightarrow -\frac{1}{R_1} U_1 - \frac{1}{R_3} U_2 + \left( \frac{1}{R_1} + \frac{1}{R_0} + \frac{1}{R_3} \right) U_3 = \frac{U_0}{R_0}$$

$$\textcircled{IVa} \quad \frac{U_4 - U_1}{R_2} + \frac{U_4 - U_2}{R_4} = 0 \rightarrow -\frac{1}{R_2} U_1 - \frac{1}{R_4} U_2 + \left( \frac{1}{R_2} + \frac{1}{R_4} \right) U_4 = 0$$

$$\textcircled{IVb} \quad U_4 = 0 \rightarrow U_4 = 0$$

$$U_1 = 7,2814 \text{ V}$$

$$U_2 = 8,5063 \text{ V}$$

$$U_3 = 17,6931 \text{ V}$$

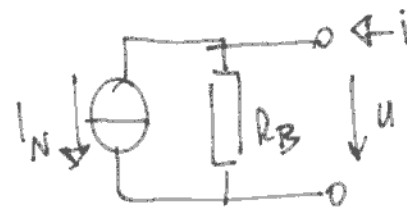
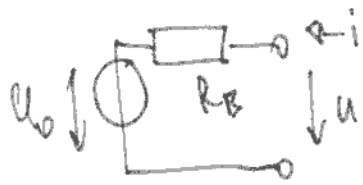
$$U_4 = 7,9619 \text{ V}$$

matrix

$$\boxed{U_T = 7,9619 \text{ V}}$$

rundet

$$U_T = U_{02}$$



TN 2020/2

működés  $I_{N0} \rightarrow I_{N1}$

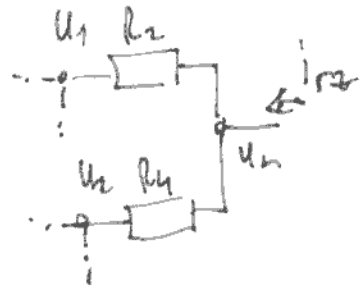
$$\begin{pmatrix} 2,1667 & 0 & -0,6667 & -0,5 \\ 0 & 1,6250 & -0,5 & -0,625 \\ -0,6667 & -0,5 & 6,1667 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} U_1 \\ U_2 \\ U_3 \\ U_4 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 100 \\ 0 \end{pmatrix}$$

$$U_1 = 5,2980 \text{ V}$$

$$U_2 = 5,2980 \text{ V}$$

$$U_3 = 17,2185 \text{ V}$$

$$U_4 = 0$$

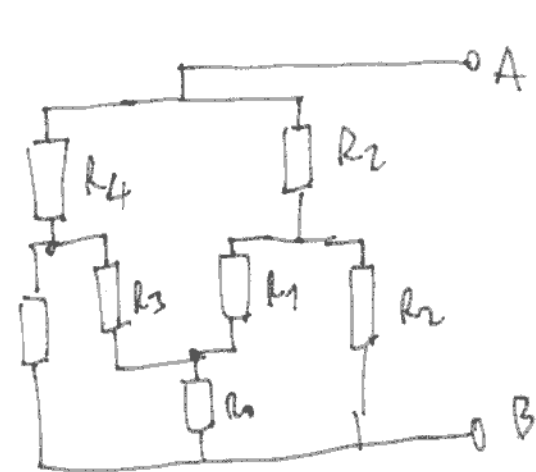
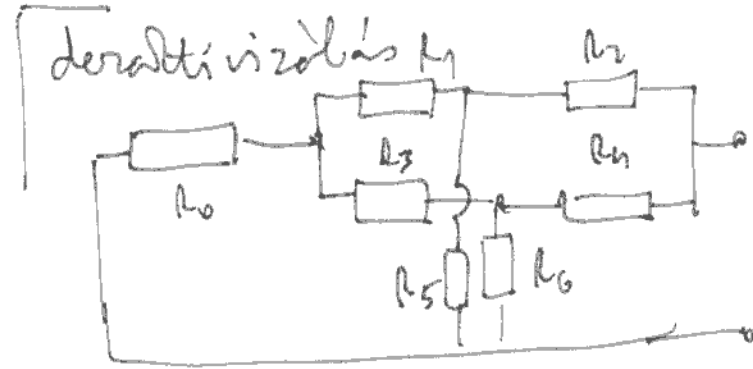


$$-i_{R2} + \frac{U_4 - U_1}{R_2} + \frac{U_4 - U_2}{R_4} = 0$$

$$i_{R2} = \frac{U_4 - U_1}{R_2} + \frac{U_4 - U_2}{R_4} = -5,9603 \text{ mA}$$

$$I_N = -5,9603 \text{ mA}$$

$$R_B = -\frac{U_T}{I_N} = 1,3358 \text{ k}\Omega$$



amiből  
 $\Delta \rightarrow Y$  átváltás  
 $Y \rightarrow \Delta$  -val  
 lehetne átalakítani

Teljesítményvesztés:

$$R_A = R_B = 1,3358 \text{ k}\Omega; P_{max} = \frac{U_T^2}{4R_B} = 11,864 \text{ mW}$$