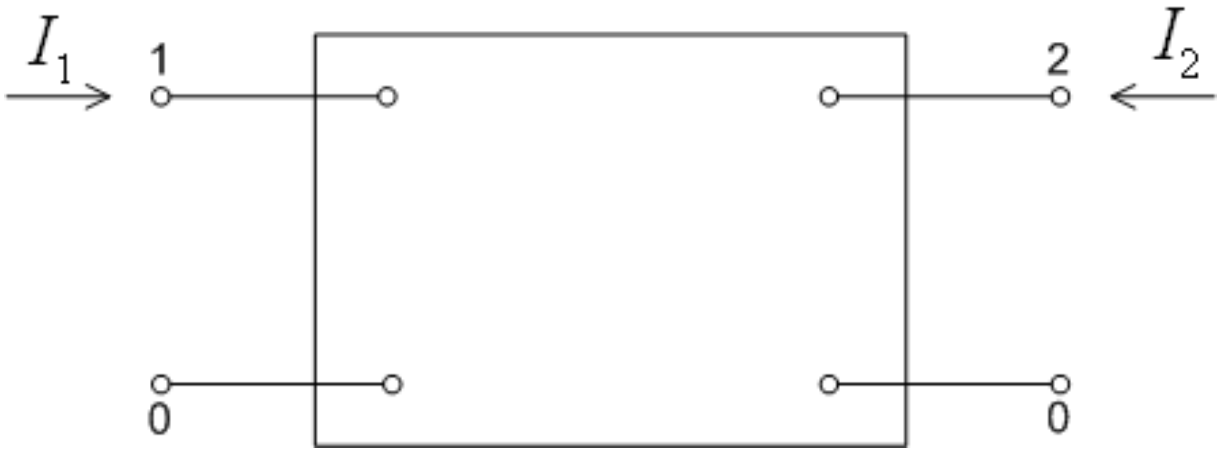
ANALIZA ELEKTROENERGETSKOG SUSTAVA

Predavanje br. 4.

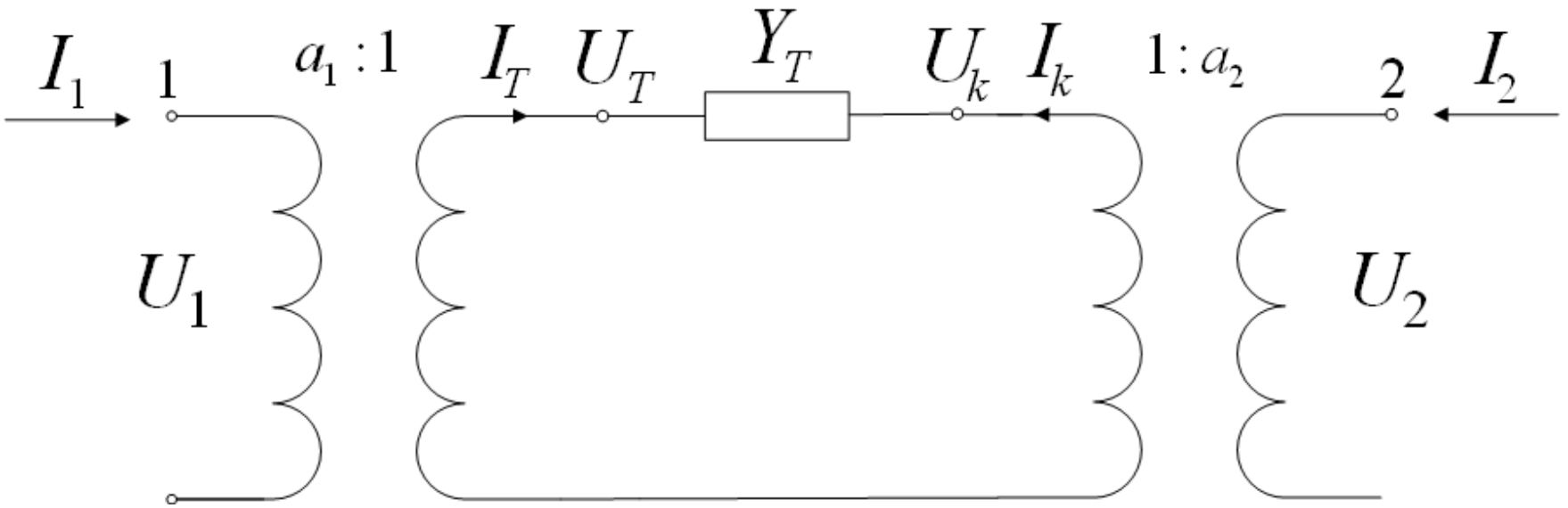
- Matrični oblik transformatora



$$\begin{vmatrix} I_1 \\ I_2 \end{vmatrix} = \begin{vmatrix} Y_{12} + Y_{01} & -Y_{12} \\ -Y_{12} & Y_{12} + Y_{02} \end{vmatrix} \cdot \begin{vmatrix} U_1 \\ U_2 \end{vmatrix}$$

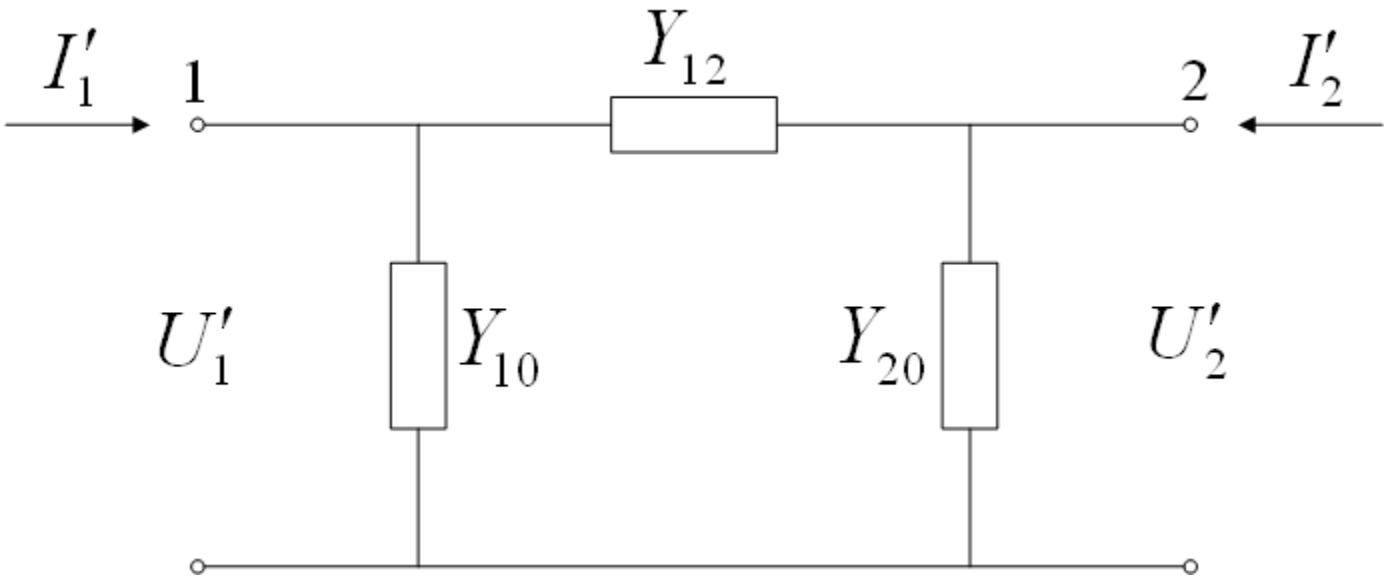
$$\begin{vmatrix} I_1 \\ I_2 \end{vmatrix} = \begin{vmatrix} \frac{Y_T}{a} + Y_T \cdot \frac{1}{a} \cdot \left[\frac{1}{a} - 1\right] & -\frac{Y_T}{a} \\ -\frac{Y_T}{a} & \frac{Y_T}{a} + Y_T \cdot \left[1 - \frac{1}{a}\right] \end{vmatrix} \cdot \begin{vmatrix} U_1 \\ U_2 \end{vmatrix}$$

$$\begin{vmatrix} I_1 \\ I_2 \end{vmatrix} = \begin{vmatrix} \frac{Y_T}{a^2} & -\frac{Y_T}{a} \\ -\frac{Y_T}{a} & Y_T \end{vmatrix} \cdot \begin{vmatrix} U_1 \\ U_2 \end{vmatrix}$$



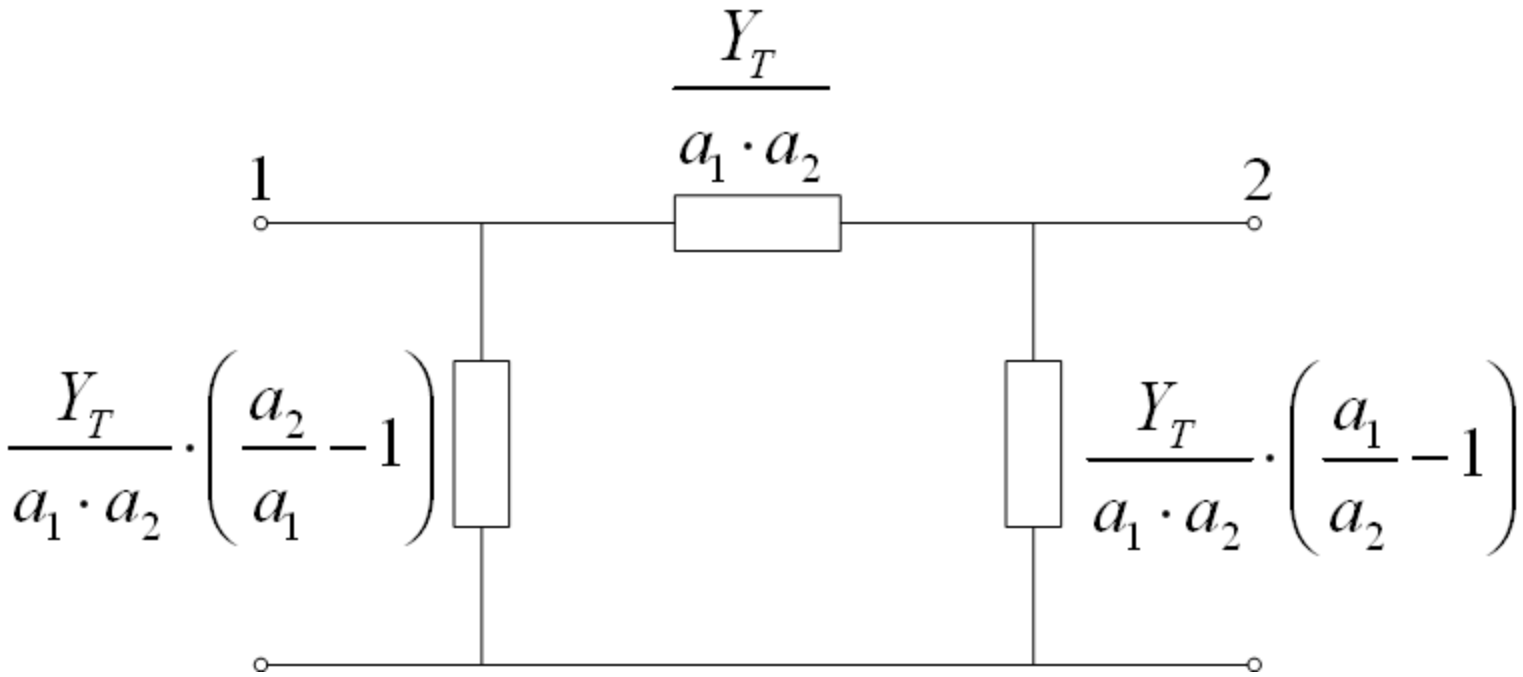
$$I_1 = \left(U_1 \cdot \frac{a_2}{a_1} - U_2 \right) \cdot \frac{Y_T}{a_1 \cdot a_2}$$

$$I_2 = \left(U_2 \cdot \frac{a_1}{a_2} - U_1 \right) \cdot \frac{Y_T}{a_1 \cdot a_2}$$



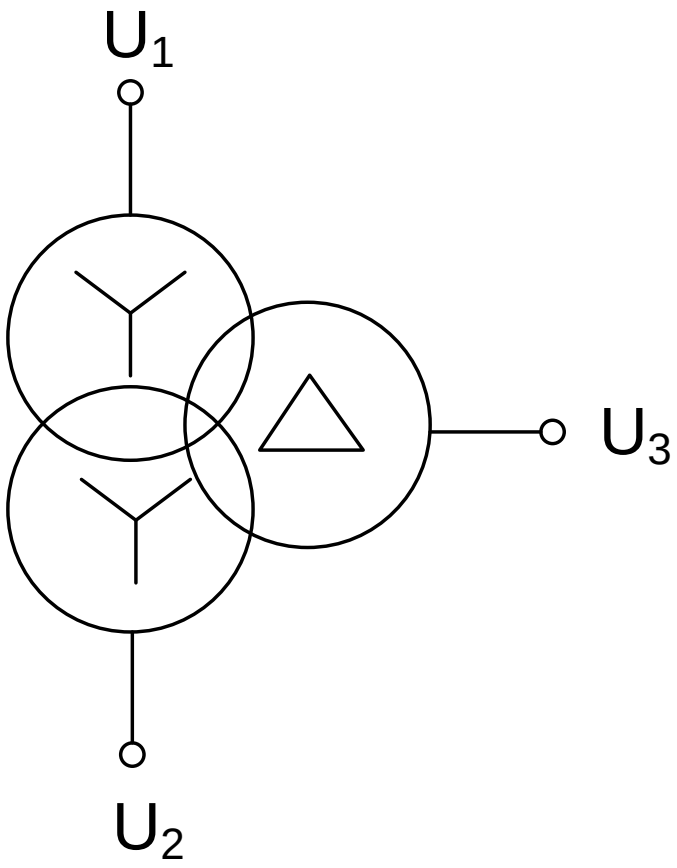
$$I_1' = \left(U_1' - U_2'\right) \cdot Y_{12} + U_1' \cdot Y_{10}$$

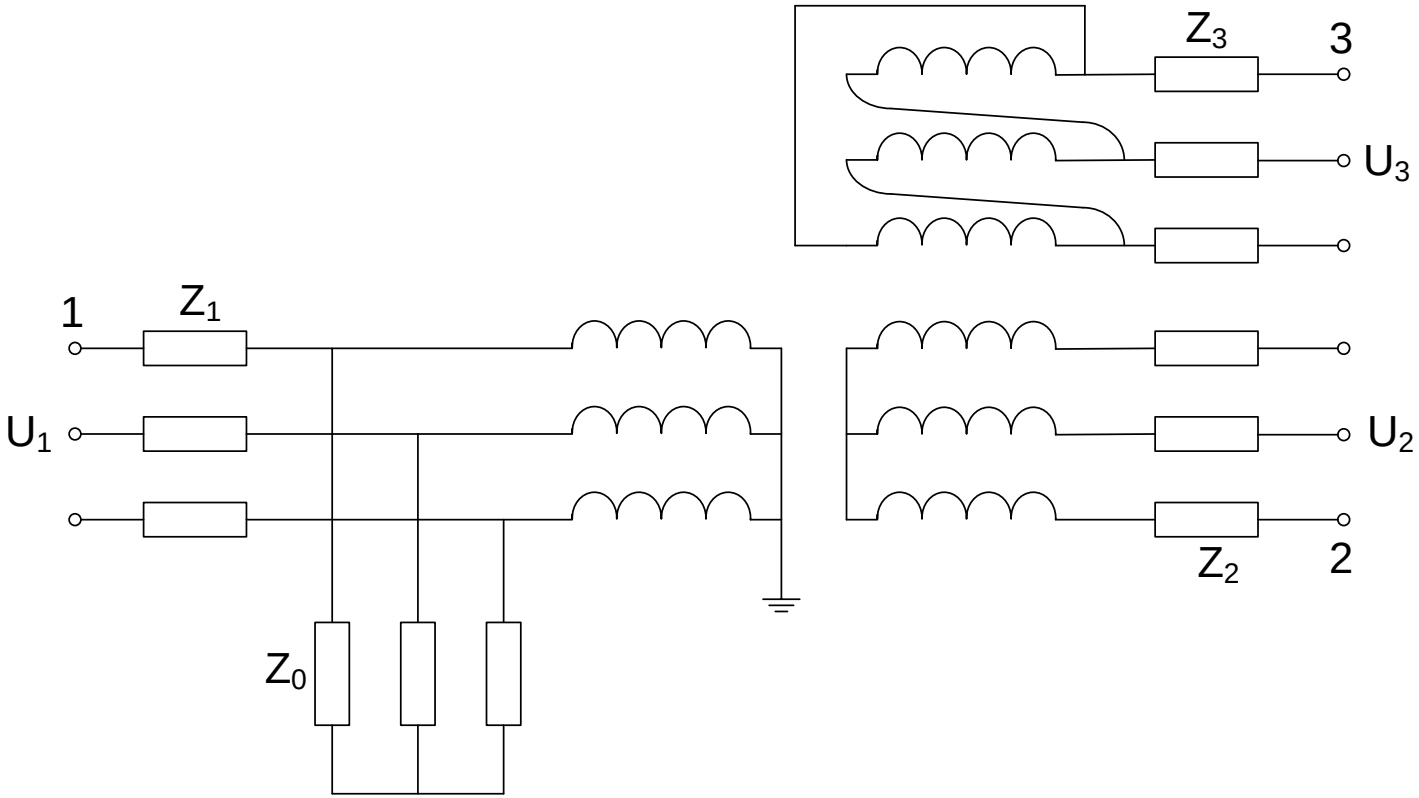
$$I_2' = \left(U_2' - U_1'\right) \cdot Y_{12} + U_2' \cdot Y_{20}$$



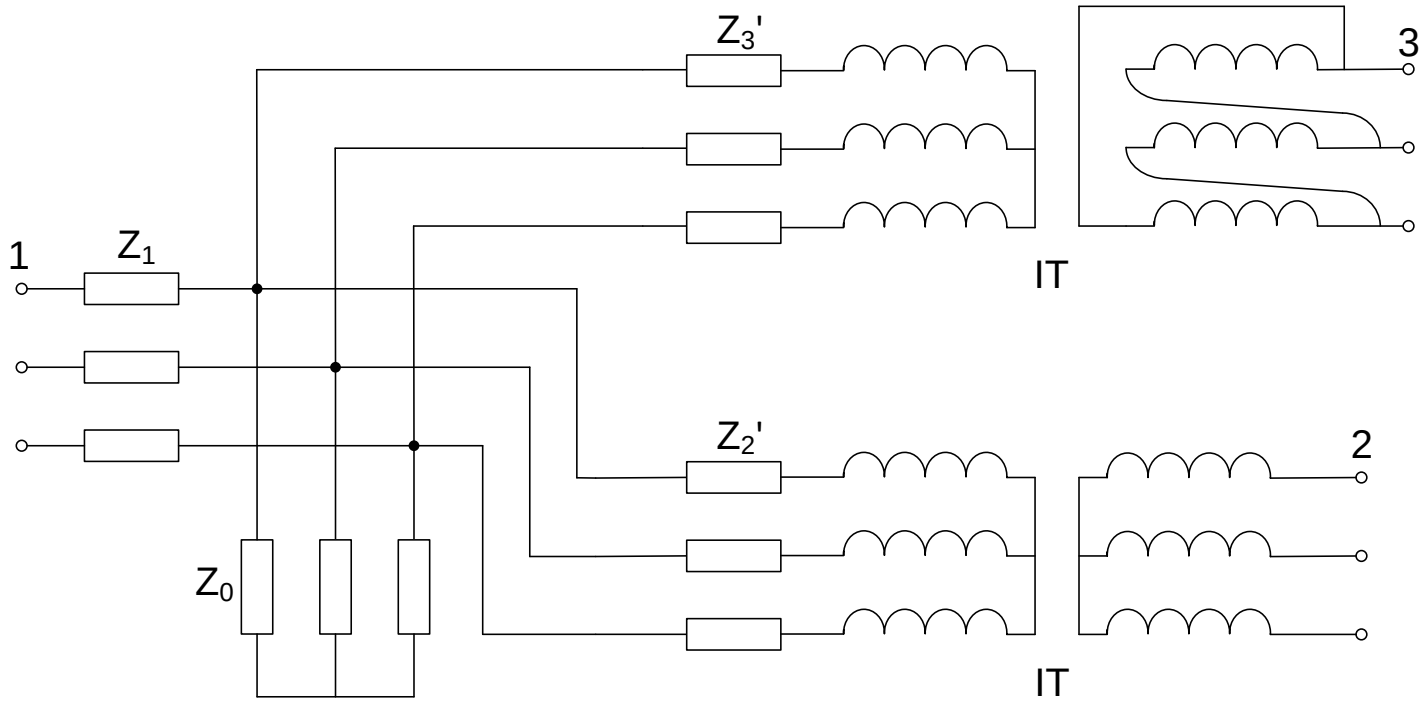
$$\begin{vmatrix} I_1 \\ I_2 \end{vmatrix} = \begin{vmatrix} \frac{Y_T}{a_1^2} & -\frac{Y_T}{a_1 \cdot a_2} \\ -\frac{Y_T}{a_1 \cdot a_2} & \frac{Y_T}{a_2^2} \end{vmatrix} \cdot \begin{vmatrix} U_1 \\ U_2 \end{vmatrix}$$

- TRONAMOTNI TRANSFORMATOR

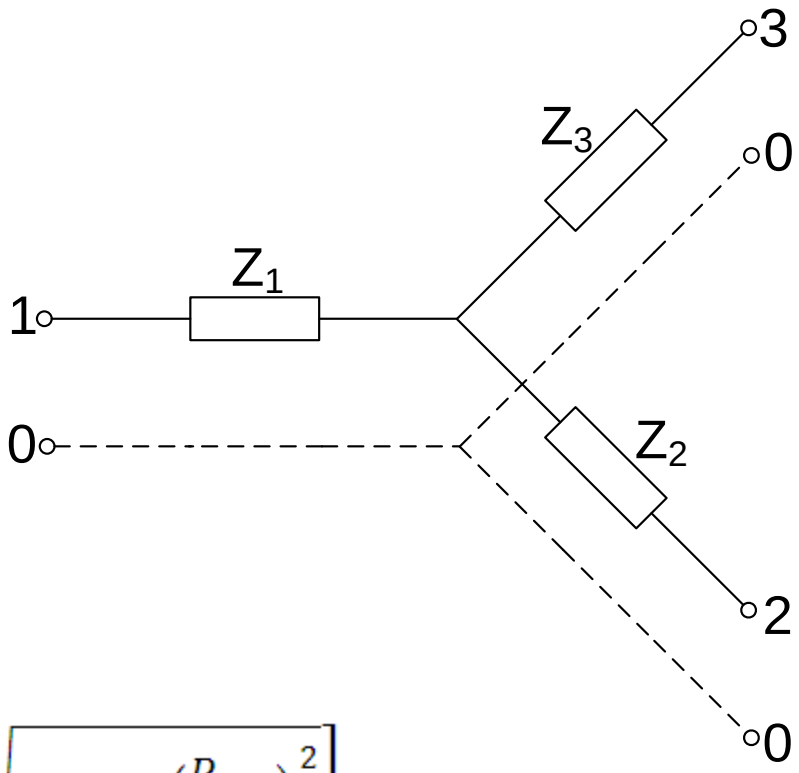




- Zadano: u_{k12}, u_{k13} i u_{k23} i to kao relativni brojevi (jedinične vrijednosti)



$$Z_2' = \left(\frac{U_1}{U_2}\right)^2 \cdot Z_2 \quad ; \quad Z_3' = \left(\frac{U_1}{U_3}\right)^2 \cdot Z_3$$



$$Z_{12} = \frac{U_{n1}^2}{S_{n12}} \left[\frac{P_{k12}}{S_{n12}} + j \sqrt{u_{k12}^2 - \left(\frac{P_{k12}}{S_{n12}} \right)^2} \right] [\Omega]$$

$$Z_{13} = \frac{U_{n1}^2}{S_{n13}} \left[\frac{P_{k13}}{S_{n13}} + j \sqrt{u_{k13}^2 - \left(\frac{P_{k13}}{S_{n13}} \right)^2} \right] [\Omega]$$

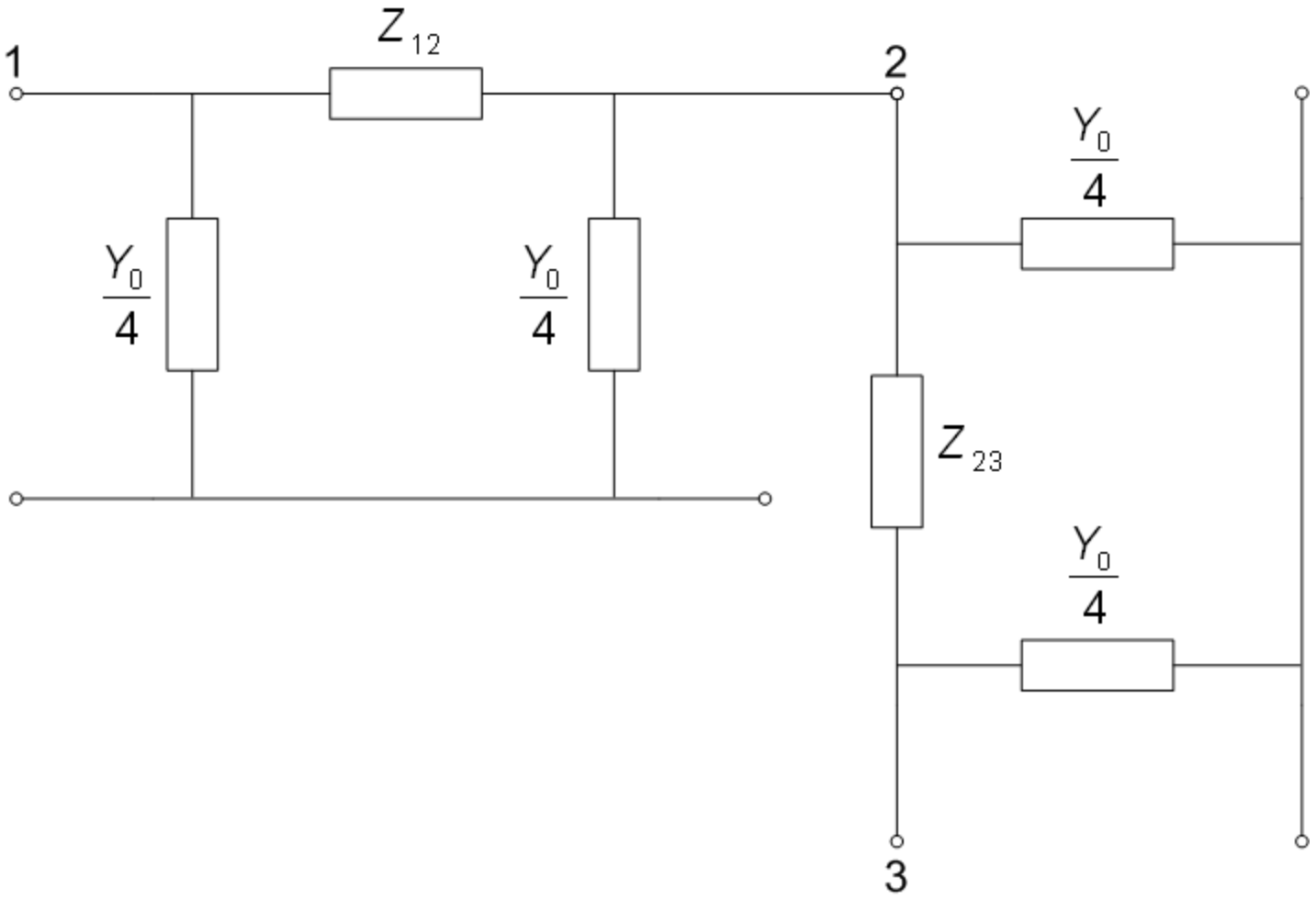
$$Z_{23} = \frac{U_{n1}^2}{S_{n23}} \left[\frac{P_{k23}}{S_{n23}} + j \sqrt{u_{k23}^2 - \left(\frac{P_{k23}}{S_{n23}} \right)^2} \right] [\Omega]$$

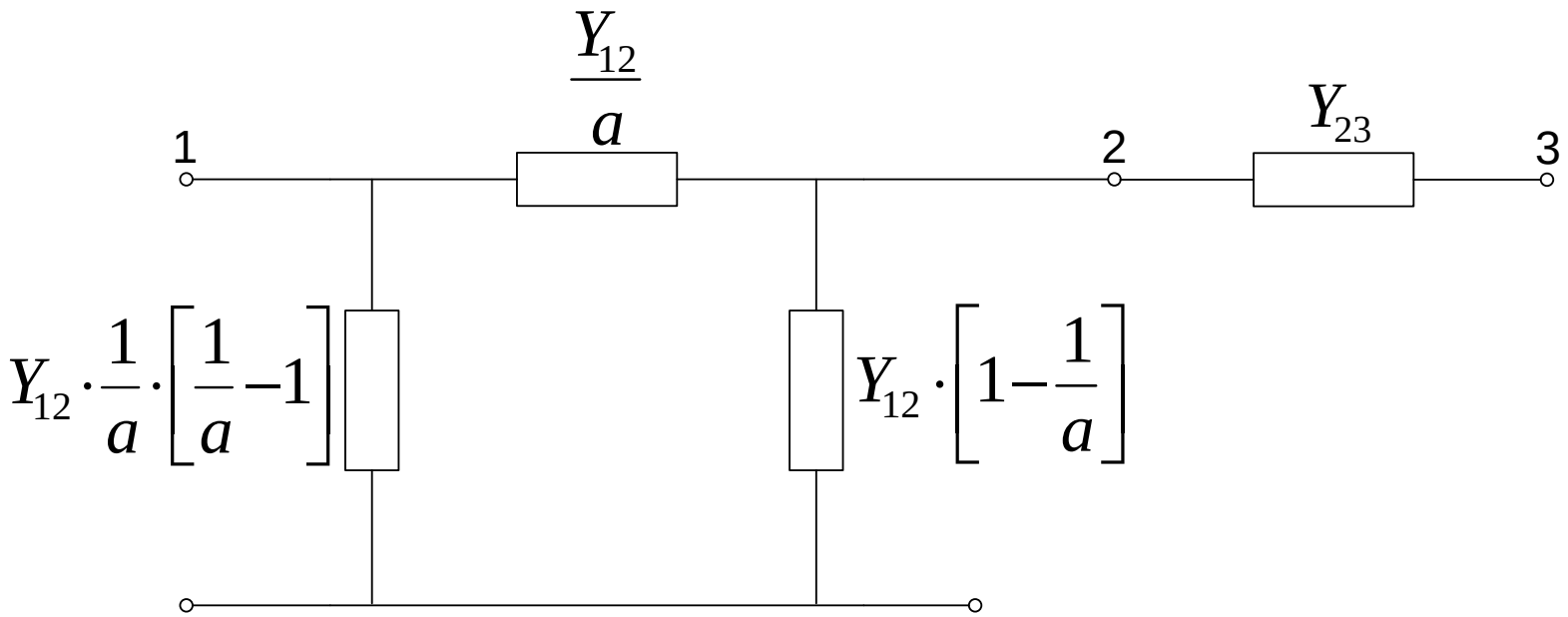
$$Z_{12} = Z_1 + Z_2$$
$$Z_{13} = Z_1 + Z_3$$
$$Z_{23} = Z_2 + Z_3$$

$$Z_1 = \frac{1}{2}(Z_{12} + Z_{13} - Z_{23})$$

$$Z_2 = \frac{1}{2}(Z_{12} + Z_{23} - Z_{13})$$

$$Z_3 = \frac{1}{2}(Z_{13} + Z_{23} - Z_{12})$$


1
2
3
Z_{12}
Z_{23}
$\frac{Y_0}{4}$
$\frac{Y_0}{4}$
$\frac{Y_0}{4}$
$\frac{Y_0}{4}$


$\frac{Y_{12}}{a}$
Y_{23}
1
2
3
$Y_{12} \cdot \frac{1}{a} \cdot \left[\frac{1}{a} - 1\right]$
$Y_{12} \cdot \left[1 - \frac{1}{a}\right]$