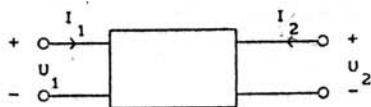


PRETVORBA PARAMETARA CETVEROPOLA



Ako su smjerovi napona i struja kao na slici, vrijede slijedeće matrice parametara i pripadne transformacije:

PARAMETRI	Z	Y	h
Z	$\begin{bmatrix} z_{11} & z_{12} \\ z_{21} & z_{22} \end{bmatrix}$	$\begin{bmatrix} \frac{y_{22}}{\Delta y} & -\frac{y_{12}}{\Delta y} \\ -\frac{y_{21}}{\Delta y} & \frac{y_{11}}{\Delta y} \end{bmatrix}$	$\begin{bmatrix} \frac{\Delta h}{h_{22}} & \frac{h_{12}}{h_{22}} \\ -\frac{h_{21}}{h_{22}} & \frac{1}{h_{22}} \end{bmatrix}$
Y	$\begin{bmatrix} \frac{z_{22}}{\Delta z} & -\frac{z_{12}}{\Delta z} \\ -\frac{z_{21}}{\Delta z} & \frac{z_{11}}{\Delta z} \end{bmatrix}$	$\begin{bmatrix} y_{11} & y_{12} \\ y_{21} & y_{22} \end{bmatrix}$	$\begin{bmatrix} \frac{1}{h_{11}} & -\frac{h_{12}}{h_{11}} \\ \frac{h_{21}}{h_{11}} & \frac{\Delta h}{h_{11}} \end{bmatrix}$
h	$\begin{bmatrix} \frac{\Delta z}{z_{22}} & \frac{z_{12}}{z_{22}} \\ -\frac{z_{21}}{z_{22}} & \frac{1}{z_{22}} \end{bmatrix}$	$\begin{bmatrix} \frac{1}{y_{11}} & -\frac{y_{12}}{y_{11}} \\ \frac{y_{21}}{y_{11}} & \frac{\Delta y}{y_{11}} \end{bmatrix}$	$\begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix}$
g	$\begin{bmatrix} \frac{1}{z_{11}} & -\frac{z_{12}}{z_{11}} \\ \frac{z_{21}}{z_{11}} & \frac{\Delta z}{z_{11}} \end{bmatrix}$	$\begin{bmatrix} \frac{\Delta y}{y_{22}} & \frac{y_{12}}{y_{22}} \\ -\frac{y_{21}}{y_{22}} & \frac{1}{y_{22}} \end{bmatrix}$	$\begin{bmatrix} \frac{h_{22}}{\Delta h} & -\frac{h_{12}}{\Delta h} \\ -\frac{h_{21}}{\Delta h} & \frac{h_{11}}{\Delta h} \end{bmatrix}$
A ₁	$\begin{bmatrix} \frac{z_{11}}{z_{21}} & \frac{\Delta z}{z_{21}} \\ \frac{1}{z_{21}} & \frac{z_{22}}{z_{21}} \end{bmatrix}$	$\begin{bmatrix} -\frac{y_{22}}{y_{21}} & -\frac{1}{y_{21}} \\ -\frac{\Delta y}{y_{21}} & -\frac{y_{11}}{y_{21}} \end{bmatrix}$	$\begin{bmatrix} -\frac{\Delta h}{h_{21}} & -\frac{h_{11}}{h_{21}} \\ -\frac{h_{22}}{h_{21}} & -\frac{1}{h_{21}} \end{bmatrix}$
A ₂	$\begin{bmatrix} \frac{z_{22}}{z_{12}} & \frac{\Delta z}{z_{12}} \\ \frac{1}{z_{12}} & \frac{z_{11}}{z_{12}} \end{bmatrix}$	$\begin{bmatrix} -\frac{y_{11}}{y_{12}} & -\frac{1}{y_{12}} \\ -\frac{\Delta y}{y_{12}} & -\frac{y_{22}}{y_{12}} \end{bmatrix}$	$\begin{bmatrix} \frac{1}{h_{12}} & \frac{h_{11}}{h_{12}} \\ \frac{h_{22}}{h_{12}} & \frac{\Delta h}{h_{12}} \end{bmatrix}$

PARAMETRI	g	A ₁	A ₂
Z	$\begin{bmatrix} \frac{1}{g_{11}} & -\frac{g_{12}}{g_{11}} \\ \frac{g_{21}}{g_{11}} & \frac{\Delta g}{g_{11}} \end{bmatrix}$	$\begin{bmatrix} \frac{A}{C} & \frac{\Delta A}{C} \\ \frac{1}{C} & \frac{D}{C} \end{bmatrix}$	$\begin{bmatrix} \frac{D}{C} & \frac{1}{C} \\ \frac{\Delta A}{C} & \frac{A}{C} \end{bmatrix}$
Y	$\begin{bmatrix} \frac{\Delta g}{g_{22}} & \frac{g_{12}}{g_{22}} \\ -\frac{g_{21}}{g_{22}} & \frac{1}{g_{22}} \end{bmatrix}$	$\begin{bmatrix} \frac{B}{D} & -\frac{\Delta A}{B} \\ -\frac{1}{B} & \frac{A}{B} \end{bmatrix}$	$\begin{bmatrix} \frac{A}{B} & -\frac{1}{B} \\ -\frac{\Delta A}{B} & \frac{D}{B} \end{bmatrix}$
h	$\begin{bmatrix} \frac{g_{22}}{\Delta g} & -\frac{g_{12}}{\Delta g} \\ -\frac{g_{21}}{\Delta g} & \frac{g_{11}}{\Delta g} \end{bmatrix}$	$\begin{bmatrix} \frac{B}{D} & \frac{\Delta A}{D} \\ -\frac{1}{D} & \frac{C}{D} \end{bmatrix}$	$\begin{bmatrix} \frac{B}{A} & \frac{1}{A} \\ -\frac{\Delta A}{A} & \frac{C}{A} \end{bmatrix}$
g	$\begin{bmatrix} g_{11} & g_{12} \\ g_{21} & g_{22} \end{bmatrix}$	$\begin{bmatrix} \frac{C}{A} & -\frac{\Delta A}{A} \\ \frac{1}{A} & \frac{B}{A} \end{bmatrix}$	$\begin{bmatrix} \frac{C}{D} & -\frac{1}{D} \\ \frac{\Delta A}{D} & \frac{B}{D} \end{bmatrix}$
A ₁	$\begin{bmatrix} \frac{1}{g_{21}} & \frac{g_{22}}{g_{21}} \\ \frac{g_{11}}{g_{21}} & \frac{\Delta g}{g_{21}} \end{bmatrix}$	$\begin{bmatrix} A & B \\ C & D \end{bmatrix}$	$\begin{bmatrix} \frac{D}{\Delta A} & \frac{B}{\Delta A} \\ \frac{C}{\Delta A} & \frac{A}{\Delta A} \end{bmatrix}$
A ₂	$\begin{bmatrix} -\frac{\Delta g}{g_{12}} & -\frac{g_{22}}{g_{12}} \\ -\frac{g_{21}}{g_{12}} & -\frac{1}{g_{12}} \end{bmatrix}$	$\begin{bmatrix} \frac{D}{\Delta A} & \frac{B}{\Delta A} \\ \frac{C}{\Delta A} & \frac{A}{\Delta A} \end{bmatrix}$	$\begin{bmatrix} A & B \\ C & D \end{bmatrix}$

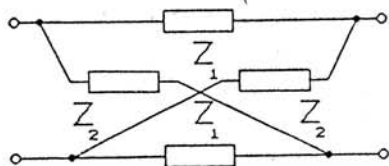
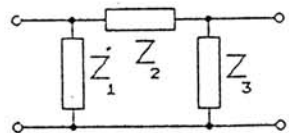
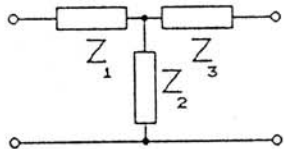
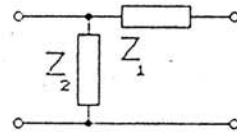
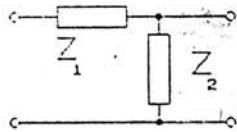
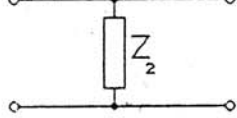
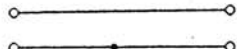
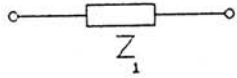
Oznaka Δ označava determinantu matrice. Na primjer:

$$\Delta z = z_{11}z_{22} - z_{12}z_{21}$$

$$\Delta A = AD - BC$$

OSNOVNE KONFIGURACIJE ČETVEROPOLA I PRIPADNI PARAMETRI

ČETVEROPOL



Z-PARAMETRI

 ∞

$$\begin{bmatrix} Z_2 & -Z_2 \\ Z_2 & -Z_2 \end{bmatrix}$$

$$\begin{bmatrix} \frac{Z_1}{2} & -2Z_2 \\ 2Z_2 & -2Z_2 \end{bmatrix}$$

$$\begin{bmatrix} 2Z_2 & -2Z_2 \\ 2Z_2 & -\left(\frac{Z_1}{2} + 2Z_2\right) \end{bmatrix}$$

$$\begin{bmatrix} Z_1 + Z_2 & -Z_2 \\ Z_2 & -(Z_2 + Z_3) \end{bmatrix}$$

$$\begin{bmatrix} \frac{Z_1(Z_2 + Z_3)}{Z_1 + Z_2 + Z_3} & -\frac{Z_1 Z_3}{Z_1 + Z_2 + Z_3} \\ \frac{Z_1 Z_3}{Z_1 + Z_2 + Z_3} & -\frac{Z_3(Z_1 + Z_2)}{Z_1 + Z_2 + Z_3} \end{bmatrix}$$

$$\begin{bmatrix} \frac{Z_1 + Z_2}{2} & \frac{Z_2 - Z_1}{2} \\ \frac{Z_2 - Z_1}{2} & \frac{Z_1 + Z_2}{2} \end{bmatrix}$$

Y-PARAMETRI

$$\begin{bmatrix} \frac{1}{Z_1} & -\frac{1}{Z_1} \\ +\frac{1}{Z_1} & -\frac{1}{Z_1} \end{bmatrix}$$

 ∞

$$\begin{bmatrix} \frac{2}{Z_1} & -\frac{2}{Z_1} \\ +\frac{2}{Z_1} & -\left(\frac{2}{Z_1} + \frac{1}{2Z_2}\right) \end{bmatrix}$$

$$\begin{bmatrix} \frac{2}{Z_1} + \frac{1}{2Z_2} & -\frac{2}{Z_1} \\ +\frac{2}{Z_1} & -\frac{2}{Z_1} \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{Z_1 + \frac{Z_2 Z_3}{Z_2 + Z_3}} & -\frac{1}{Z_1 + Z_3 + \frac{Z_1 Z_3}{Z_2}} \\ +\frac{1}{Z_1 + Z_3 + \frac{Z_1 Z_3}{Z_2}} & -\frac{1}{Z_3 + \frac{Z_1 Z_2}{Z_1 + Z_2}} \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{Z_1} + \frac{1}{Z_2} & -\frac{1}{Z_2} \\ +\frac{1}{Z_2} & -\left(\frac{1}{Z_2} + \frac{1}{Z_3}\right) \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{2Z_1} + \frac{1}{2Z_2} & -\left(\frac{1}{2Z_1} - \frac{1}{2Z_2}\right) \\ +\left(\frac{1}{2Z_1} - \frac{1}{2Z_2}\right) & -\left(\frac{1}{2Z_1} + \frac{1}{2Z_2}\right) \end{bmatrix}$$

A-PARAMETRI

$$\begin{bmatrix} 1 & Z_1 \\ 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 \\ \frac{1}{Z_2} & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 + \frac{Z_1}{4Z_2} & \frac{Z_1}{2} \\ \frac{1}{2Z_2} & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & \frac{Z_1}{2} \\ \frac{1}{2Z_2} & 1 + \frac{Z_1}{4Z_2} \end{bmatrix}$$

$$\begin{bmatrix} \frac{Z_1}{Z_2} + 1 & Z_1 + Z_3 + \frac{Z_1 Z_3}{Z_2} \\ \frac{1}{Z_2} & \frac{Z_3}{Z_2} + 1 \end{bmatrix}$$

$$\begin{bmatrix} \frac{Z_2}{Z_3} + 1 & Z_2 \\ \frac{1}{Z_1} + \frac{1}{Z_3} + \frac{Z_2}{Z_1 Z_3} & \frac{Z_2}{Z_1} + 1 \end{bmatrix}$$

$$\begin{bmatrix} \frac{Z_2 + Z_1}{Z_2 - Z_1} & \frac{2Z_2 Z_1}{Z_2 - Z_1} \\ \frac{2}{Z_2 - Z_1} & \frac{Z_2 + Z_1}{Z_2 - Z_1} \end{bmatrix}$$