UNIVERZA V LJUBLJANI
Fakulteta za elektrotehniko

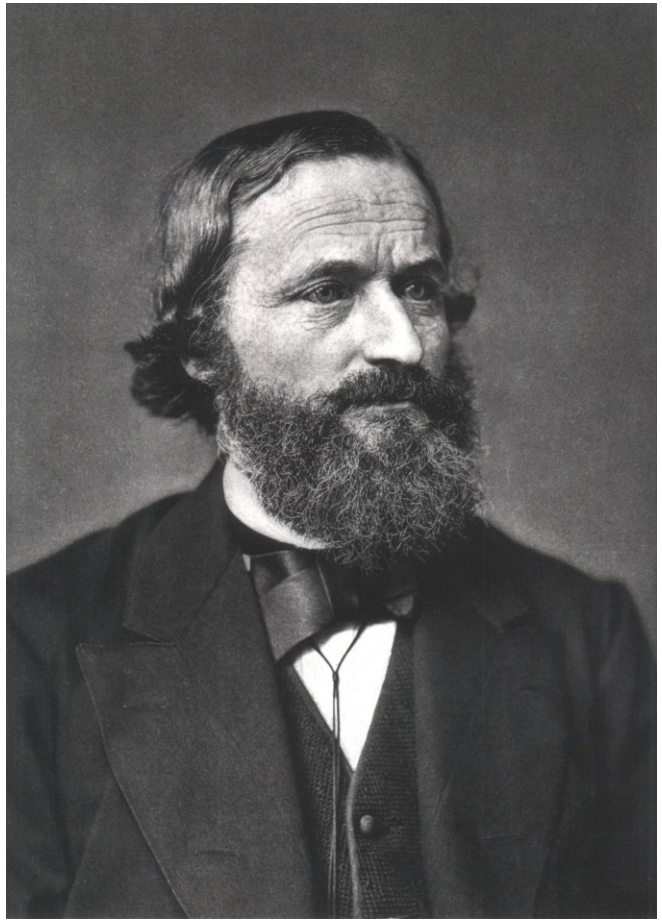
Seminar in delavnica

Načrtovanje elektronike za EMC

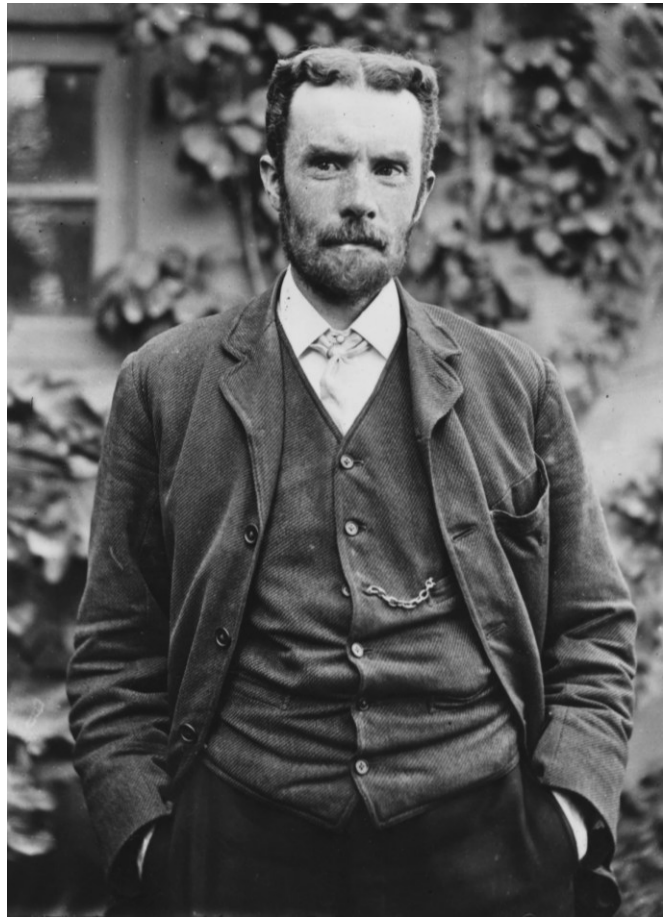
S-parametri

Izr. prof. dr. Marko Jankovec

Univerza v Ljubljani
Fakulteta za elektrotehniko
Tržaška 25, SI-1000 Ljubljana, Slovenia

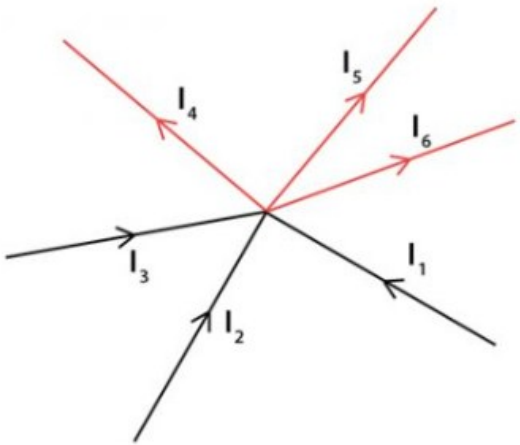


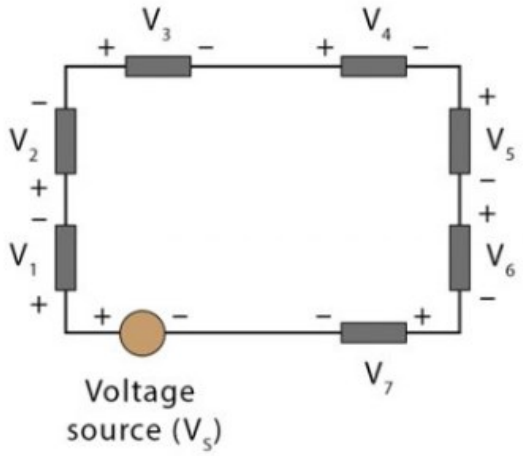
Namesto uvoda



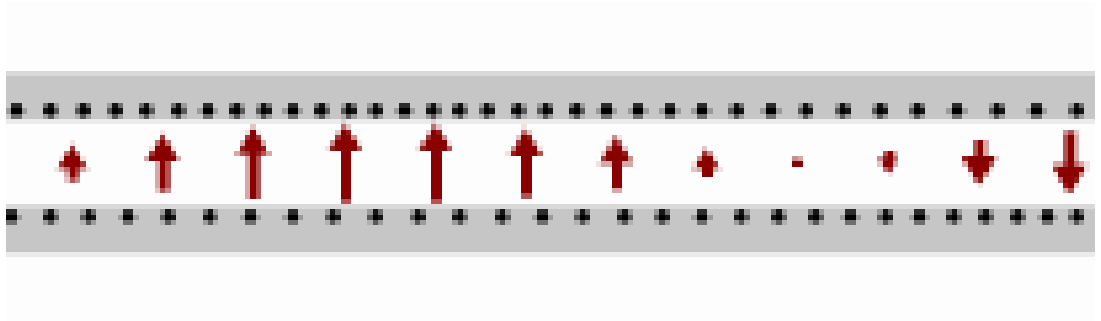
Namesto uvoda

Kirchoff

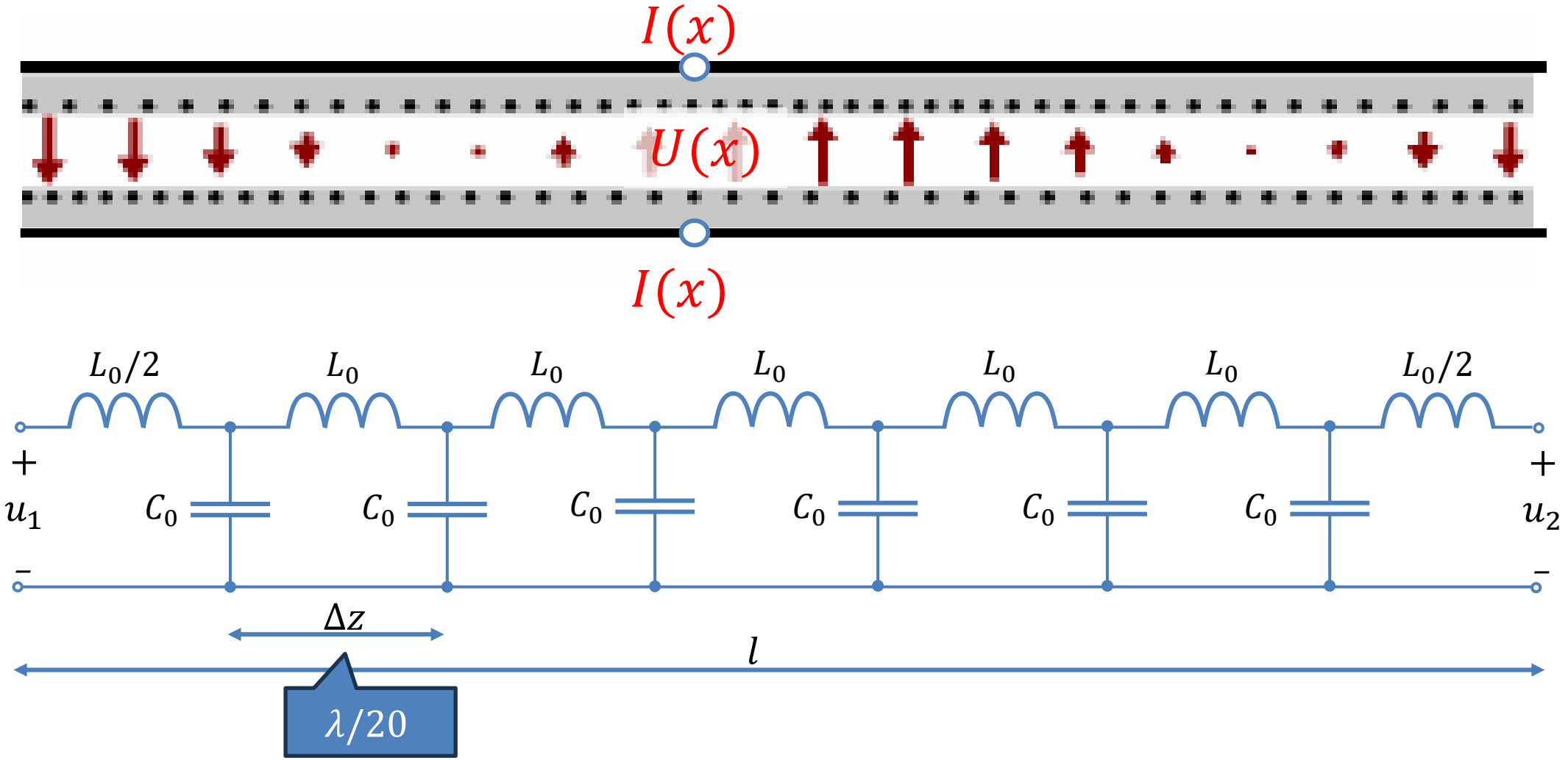




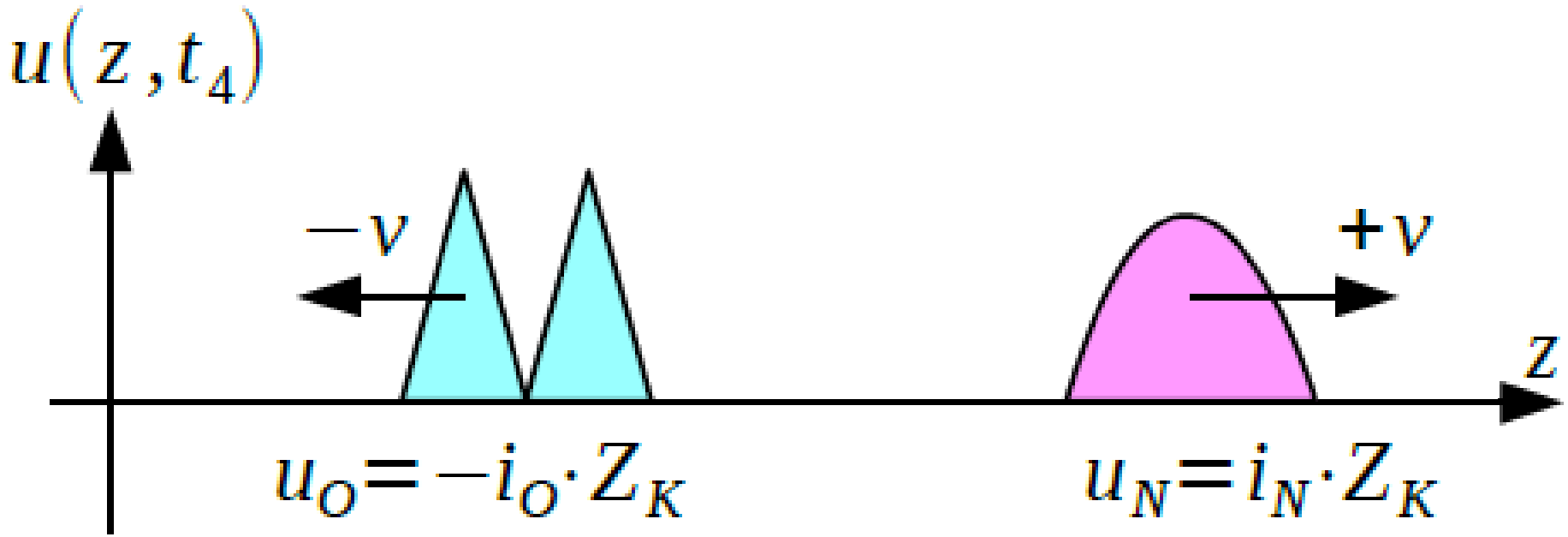
Heaviside



Prenosna linija - TEM

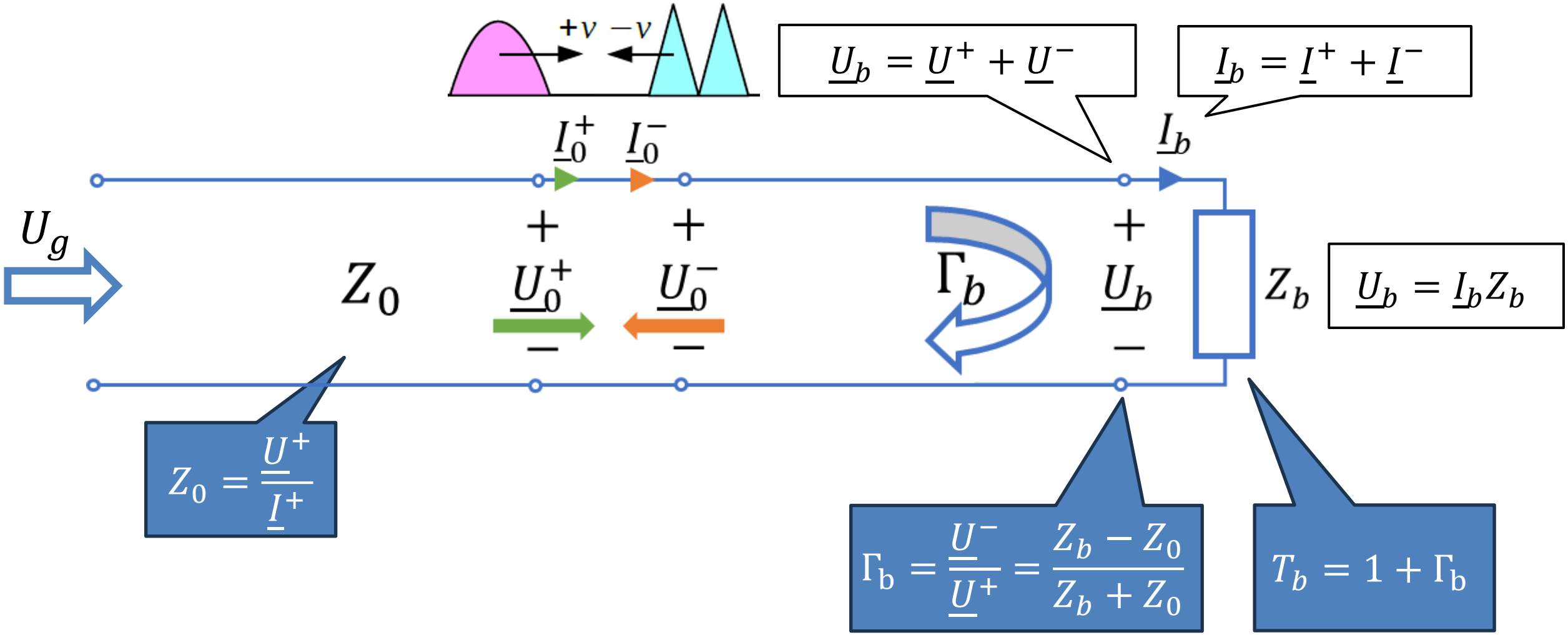


Vizualizacija rešitve

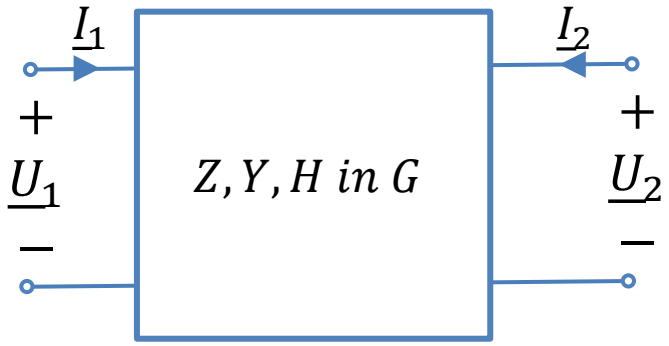


Matjaž Vidmar, Elektrodinamika, p.2.7

Osnovne lastnosti zaključene prenosne linije



Parametri četveropolov



Serijska vezava

$$\begin{bmatrix}\underline{U}_1\\ \underline{U}_2\end{bmatrix} = \begin{bmatrix}z_{11} & z_{12}\\ z_{21} & z_{22}\end{bmatrix} \cdot \begin{bmatrix}\underline{I}_1\\ \underline{I}_2\end{bmatrix}$$

Hibridna vezava

$$\begin{bmatrix}\underline{U}_1\\ \underline{I}_2\end{bmatrix} = \begin{bmatrix}h_{11} & h_{12}\\ h_{21} & h_{22}\end{bmatrix} \cdot \begin{bmatrix}\underline{I}_1\\ \underline{U}_2\end{bmatrix}$$

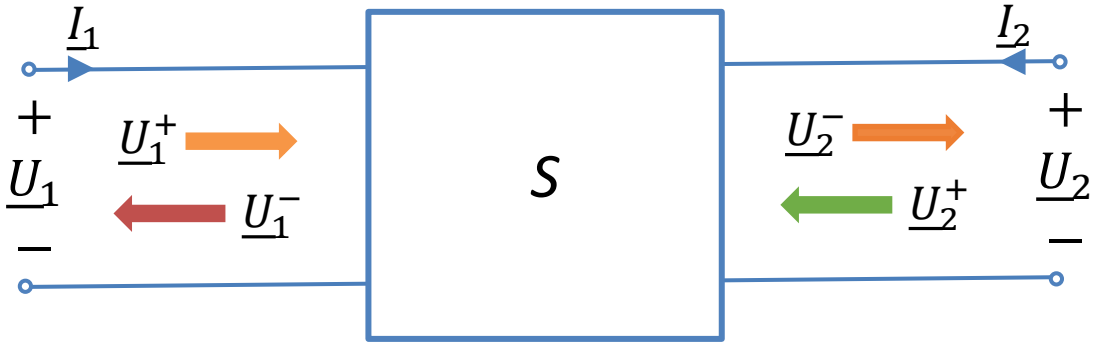
Paralelna vezava

$$\begin{bmatrix}\underline{I}_1\\ \underline{I}_2\end{bmatrix} = \begin{bmatrix}y_{11} & y_{12}\\ y_{21} & y_{22}\end{bmatrix} \cdot \begin{bmatrix}\underline{U}_1\\ \underline{U}_2\end{bmatrix}$$

Hibridna vezava

$$\begin{bmatrix}\underline{I}_1\\ \underline{U}_2\end{bmatrix} = \begin{bmatrix}g_{11} & g_{12}\\ g_{21} & g_{22}\end{bmatrix} \cdot \begin{bmatrix}\underline{U}_1\\ \underline{I}_2\end{bmatrix}$$

S parametri



Vhodna odbojnost

$\underline{U_1^-}/\underline{U_1^+}\big|_{\underline{U_2^+}=0}$

$\underline{U_1^-}/\underline{U_2^+}\big|_{U_1^+=0}$

Izolacijski koeficient

$$\begin{bmatrix}\underline{U_1^-}\\ \underline{U_2^-}\end{bmatrix} = \begin{bmatrix}S_{11} & S_{12}\\ S_{21} & S_{22}\end{bmatrix} \cdot \begin{bmatrix}\underline{U_1^+}\\ \underline{U_2^+}\end{bmatrix}$$

Transmisijski koeficient

$\underline{U_2^-}/\underline{U_1^+}\big|_{\underline{U_2^+}=0}$

$\underline{U_2^-}/\underline{U_2^+}\big|_{U_1^+=0}$

Izhodna odbojnost

M. Steer RFDEsign_vol3, p16