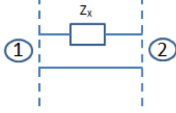


### Calcolo matrice scattering

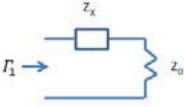


$S_{11} = \Gamma_1 \Big|_{\substack{a_2=0 \\ Z_L=Z_0}}$

Proprietà

$S_{11} = S_{22}$  (Simmetria)

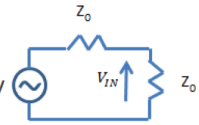
$S_{21} = S_{12}$  (Reciprocità)



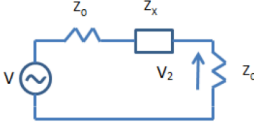
$S_{11} = \Gamma_1 = \frac{(Z_X + Z_0) - Z_0}{(Z_X + Z_0) + Z_0} = \frac{Z_X}{Z_X + 2Z_0}$

$S_{21} = \frac{b_2}{a_1} \Big|_{\substack{a_2=0 \\ Z_L=Z_0}} = \frac{V_2}{V_{IN}}$

dove  $a_1 = V_{IN}$  (onda incidente)



$V_{IN} = \frac{V}{2}$




$b_2 = V_2 = V \cdot \frac{Z_0}{2Z_0 + Z_X}$

$S_{21} = V \cdot \frac{Z_0}{2Z_0 + Z_X} \cdot \frac{2}{V} = \frac{2Z_0}{2Z_0 + Z_X}$

proprietà strutture sollevate

$S_{11} + S_{12} = 1$

### Rete a T



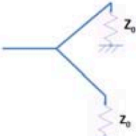
$S_{11} = \Gamma_1 \Big|_{\substack{a_2=a_3=0 \\ Z_2=Z_3=Z_0}}$

Proprietà

$S_{11} = S_{22} = S_{33}$  Simmetria

$S_{12} = S_{23} = S_{31}$  Simmetria

$S_{13} = S_{32} = S_{21}$

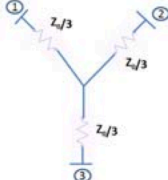


$\Gamma_1 = \frac{\frac{Z_0}{2} - Z_0}{\frac{Z_0}{2} + Z_0} = \frac{Z_0 - 2Z_0}{Z_0 + 2Z_0} = -\frac{1}{3}$

Essendo una struttura sollevata

$S_{11} + S_{12} + S_{13} = 1 \Rightarrow S_{13} = S_{12} = \frac{2}{3}$

Divisore di potenza resistivo



$Z_{IN} = Z_1 \Big|_{\substack{a_2=a_3=0 \\ Z_2=Z_3=Z_0}} = \frac{\left(\frac{Z_0}{3} + Z_0\right)}{2} + \frac{Z_0}{3} = Z_0$

Quindi  $S_{11} = 0$

Essendo una struttura sollevata

$S_{11} + S_{12} + S_{13} = 1 \Rightarrow S_{12} = S_{13} = \frac{1}{2}$