NETWORK ANALYSIS AND SYNTHESIS

Two Port Networks

Modifying the two port network:

We take a look at the original equations and the equations describing the new port conditions.

$$\begin{bmatrix} V_1 \\ V_2 \end{bmatrix} = \begin{bmatrix} 20 & 8 \\ 8 & 12 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \end{bmatrix}$$

$V_1 = 10 - 6I_1$

$V_2 = -4I_2$

So we have,

$$10 - 6I_1 = 20I_1 + 8I_2$$

$$-4I_2 = 8I_1 + 12I_2$$

* notes

Two Port Networks

Modifying the two port network:

Rearranging the equations gives,

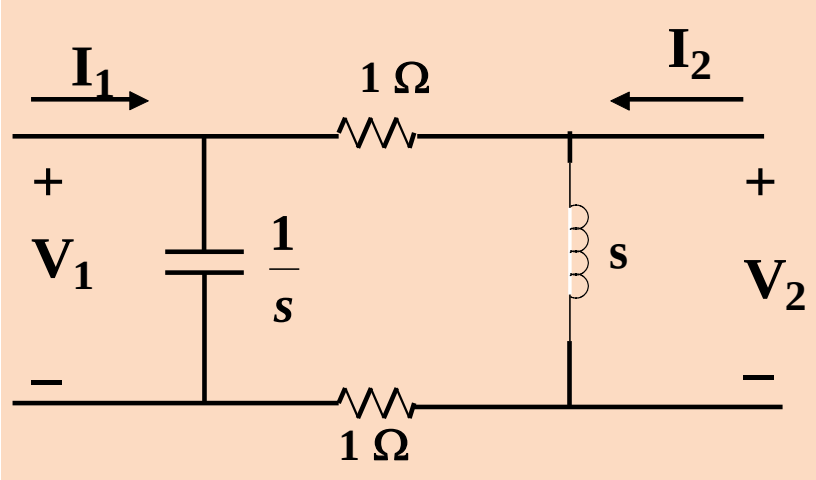
$$\begin{bmatrix} I_1 \\ I_2 \end{bmatrix} = \begin{bmatrix} \quad \end{bmatrix}^{-1} \begin{bmatrix} \quad \end{bmatrix}$$

$$\begin{bmatrix} I_1 \\ I_2 \end{bmatrix} = \begin{bmatrix} \quad \end{bmatrix}$$

Two Port Networks

Y Parameters and Beyond:

Given the following network.



(a) Find the Y parameters for the network.

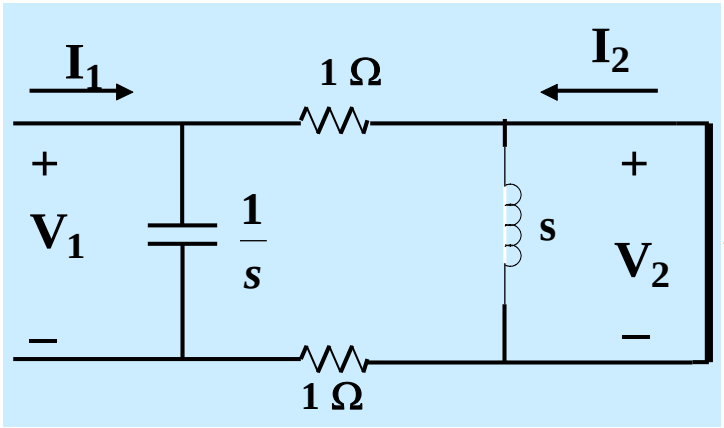
(b) From the Y parameters find the z parameters

Two Port Networks

Y Parameter Example

$I_1 = y_{11}V_1 + y_{12}V_2$

$I_2 = y_{21}V_1 + y_{22}V_2$



To find y_{11}

short

$$y_{11} = \frac{I_1}{V_1}\Big|_{V_2=0} \qquad y_{12} = \frac{I_1}{V_2}\Big|_{V_1=0}$$

$$y_{21} = \frac{I_2}{V_1}\Big|_{V_2=0} \qquad y_{22} = \frac{I_2}{V_2}\Big|_{V_1=0}$$

We use the above equations to evaluate the parameters from the network.

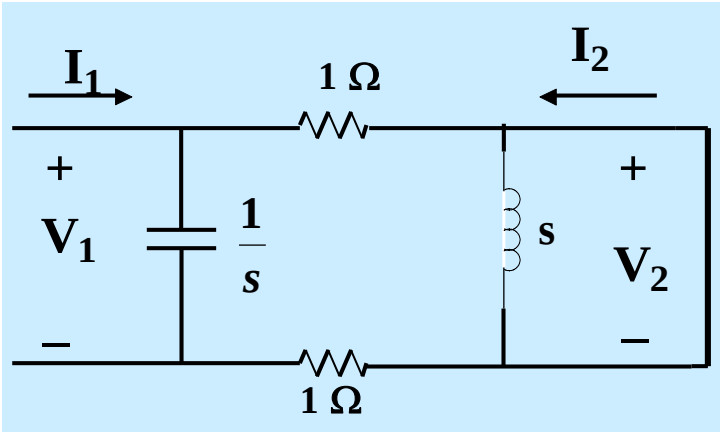
$$V_1 = I_1\left(\frac{2/s}{2+1/s}\right) = I_1\left[\frac{2}{2s+1}\right]$$

so $y_{11} = \frac{I_1}{V_1}\Big|_{V_2=0}$ = s + 0.5

Two Port Networks

Y Parameter Example

$$y_{21} = \frac{I_2}{V_1} \Big|_{V_2 = 0}$$



We see

$$V_1 = -2I_2$$

$$y_{21} = \frac{I_2}{V_1} = 0.5 \text{ S}$$

THANKS….

Queries Please…