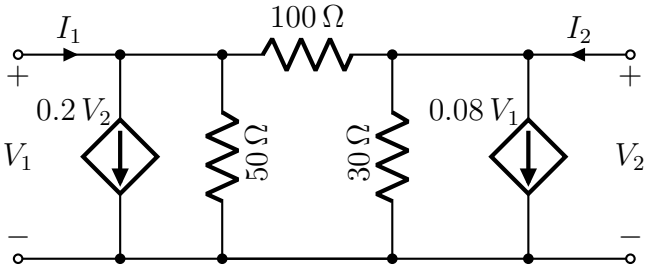
EE2015: Electric Circuits and Networks

Tutorial 4

(September 6, 2024)

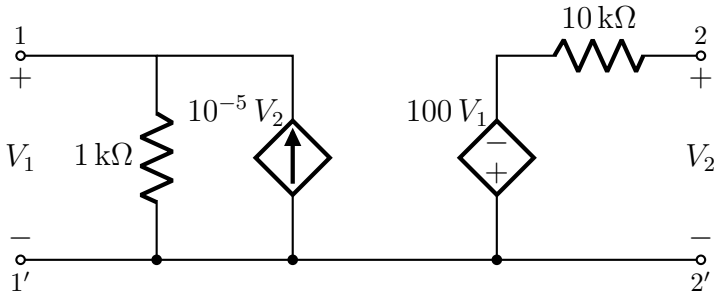
1.



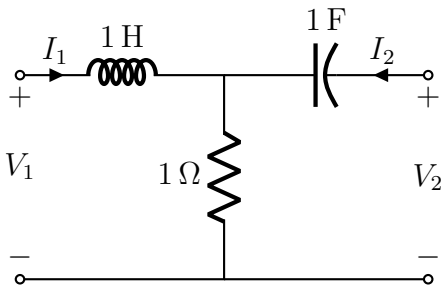
Obtain the impedance and admittance parameters for the two-port network shown on the left.

2. (a) Find the h-parameters of the two-port network shown below.

   (b) Find $\mathbf{Z}_{\text{out}}$ if an input $\mathbf{V}_s$ having source resistance of $R_s = 200\,\Omega$ is connected at $11'$.



3.



Consider the two-port network shown on the left. Find its g-parameters.

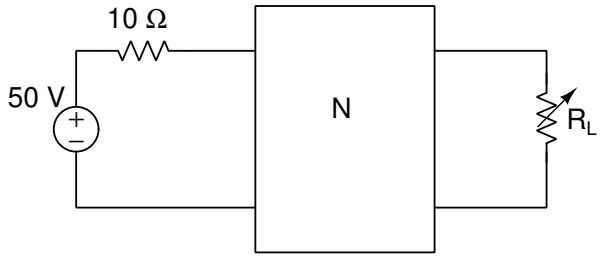
4. Find the z and g parameters of a network if the T parameters are

$$T = \begin{bmatrix} 10 & 1.5\Omega \\ 2S & 4 \end{bmatrix}$$

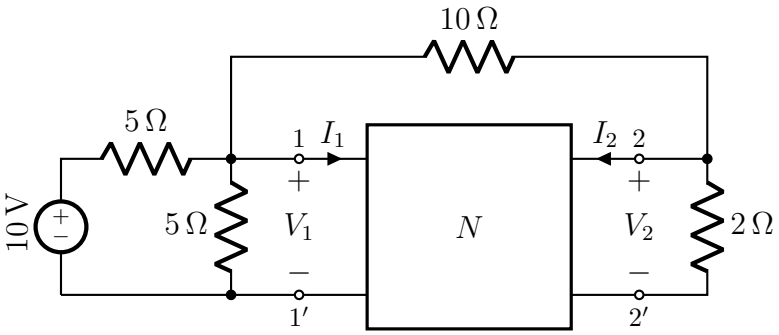
5. The T parameters of the network N in the figure below are

$$T = \begin{bmatrix} 10 & 1.5\Omega \\ 2S & 4 \end{bmatrix}$$

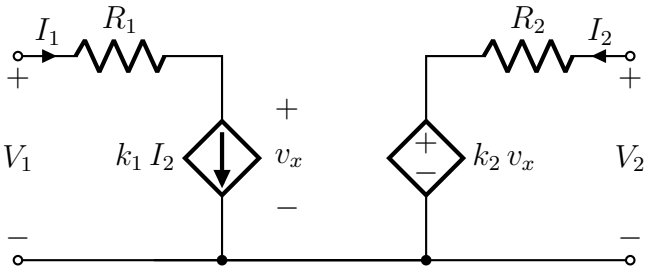
The output port is connected to a variable load resistor R_L. Find R_L for maximum power transfer. What is the maximum power transferred?



6. A resistive symmetric two-port network N is shown on the right. It was observed that $y_{11} = 0.2\,\text{S}$ and $y_{12} = -0.05\,\text{S}$. Find the port voltages.



7.



Consider the two-port network shown on the left. Find the condition that k_1, k_2, R_1, and R_2 should satisfy for the network to be reciprocal.

8. Consider the resistive two-port network N shown below on the left. When an independent source of 10 V was connected as shown, the measured voltage at port 2 was 2 V. The same network N is now connected in the configuration shown on the right. Find the power dissipated in R_x in this configuration.