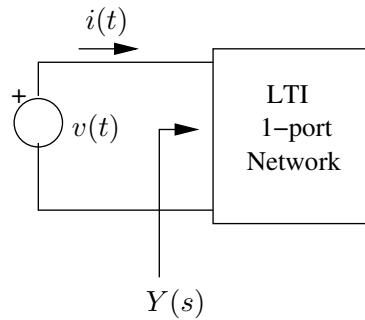# EC204: Networks & Systems
Problem Set 8

1. The admittance function $Y(s)$ has poles at $s = -1 \pm j1$ and two zeros.
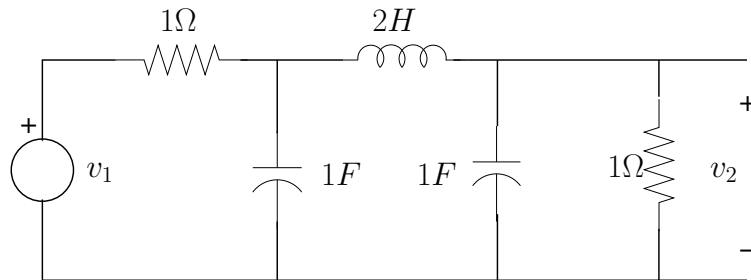

The steady state current to a 6V dc input and a sinusoidal input $\sin t$ is given below.

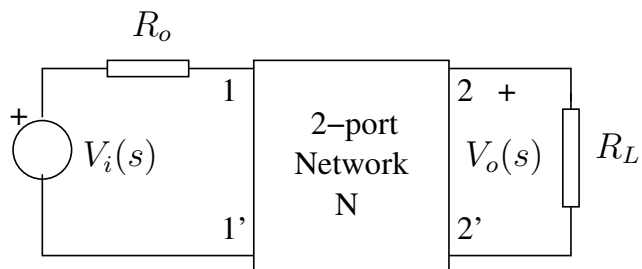| $v(t)$	Steady state component of $i(t)$
6V dc	0 A
$\sin t$ V	$0.6 \sin t + 0.8 \cos t$

Determine the steady state current for the input voltage $\sin 2t$ V.

2. Consider the network shown below.
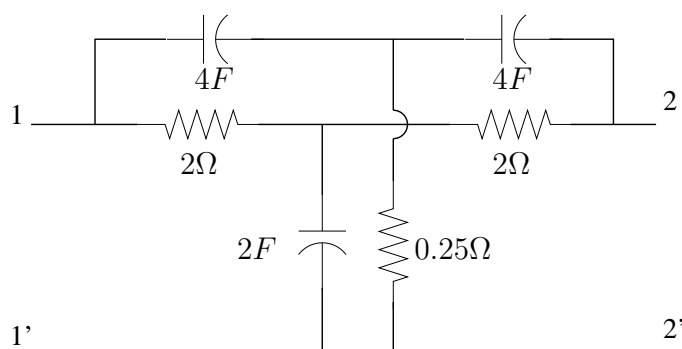

   (a) Find the transfer function $H(s) = V_2(s)/V_1(s)$.
   (b) Sketch the magnitude of the frequency response function $H(s)|_{s=j\omega}$ as a function of ω.

3. Find $V_o(s)/V_i(s)$ of the terminated 2-port network N in terms of R_o, R_L, and the $z-$parameters of N.
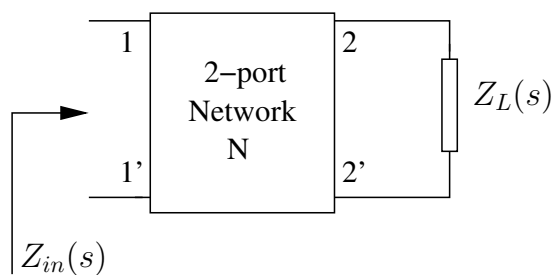

4. Find the $y-$parameters of the overall 2-port shown below, viewing it as the parallel interconnection of two 2-port T-networks.

5. Let the open circuit impedance matrix of network N be

$$\begin{bmatrix} 0 & -r \\ r & 0 \end{bmatrix}.$$

Find $Z_{in}(s)$ in terms of r and $Z_L(s)$. If $Z_L(s)$ is $1/Cs$, show that the network behaves like an inductor at the input terminals.