Problem Set 6
Due Wednesday (5pm), March 21, 2012

1. (a) Find an expression for the complex transfer function \(H(\omega) = \frac{V_o}{V_i}\).

(b) What are the magnitude \(|H(\omega)|\) and phase \(\angle H(\omega)\) of the transfer function?

(c) Suppose that the input voltage is \(v_i(t) = 5 \cos(100t + \frac{\pi}{4})\). What is the phasor representation of this signal in the complex domain?

(d) For the given input and the transfer function characteristics, find the output voltage signal, both its phasor representation and its time domain representation.

2. Use superposition to solve for \(V_1\). Note that the impedances are provided and that sources are given in phasor form.

3. Find the Thévenin and Norton equivalents of the circuit at the indicated terminals.
4. Derive the transfer function \( H(\omega) = \frac{V_o}{V_i} \) for the following circuit. Does it behave as a low-pass filter or high-pass filter? Explain your answer.

![Circuit Diagram]

\[ V_i \quad C \quad R \quad - \quad + \quad V_o \]