EECS 70A: Network Analysis

Homework #6

Due Friday, June 4, 2010.

Problem 1:
Time to frequency and back

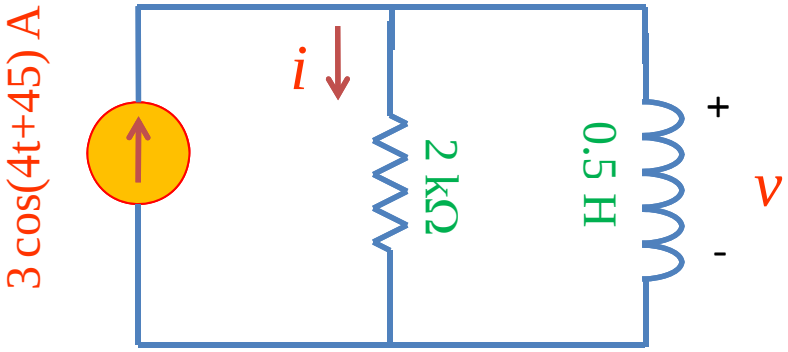
A) Given $v(t) = 4\cos(\omega t + \pi/4)$ find the phasor **V** that represents v(t). Express **V** as x+jy and as $re^{i\phi}$.

B) Given $i(t) = 4\sin(\omega t + \pi/2)$ find the phasor **I** that represents i(t). Express **I** as x+jy and as $re^{i\phi}$.

C) Given $\mathbf{V} = 3 + j4$ find v(t).

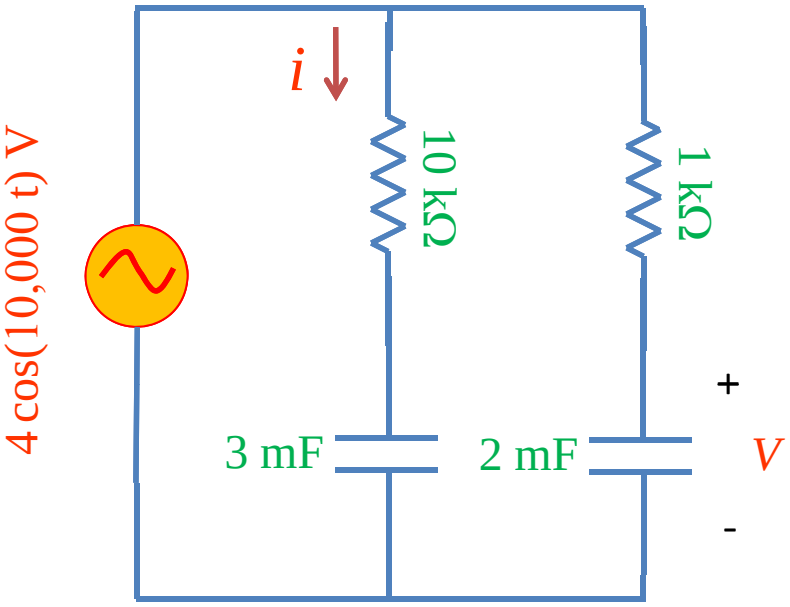
D) Given $\mathbf{I} = 1.5\, e^{i\pi/3}$ find i(t).

Problem 2



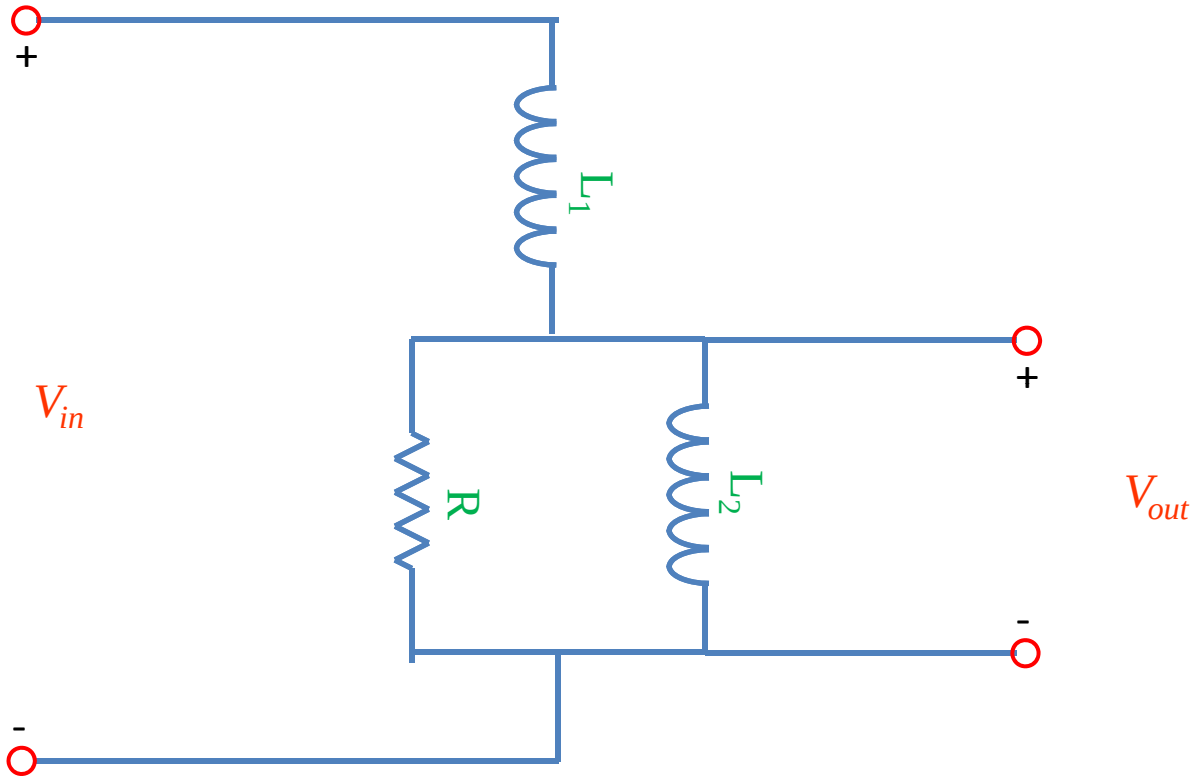
Find i(t) and v(t). Hint: convert the current source into a phasor, then find the current and voltage phasors for the whole circuit, then convert back to the time dependent i(t), v(t).

Problem 3



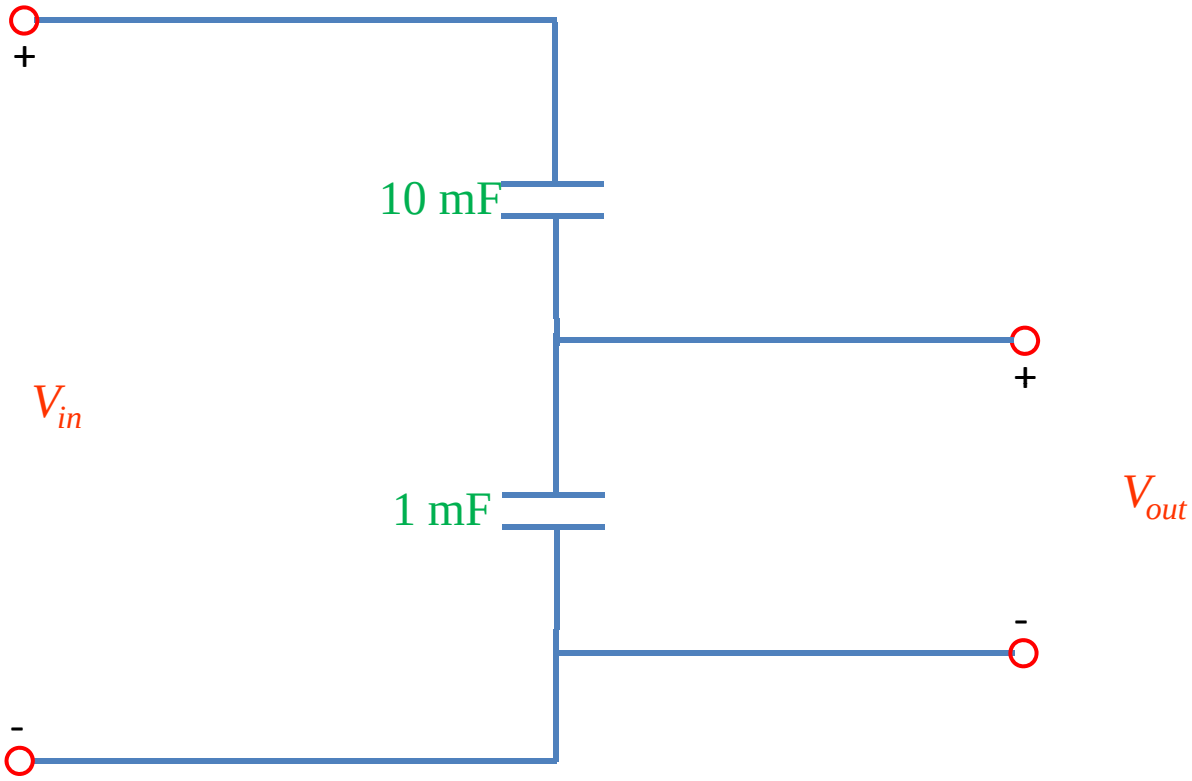
Find i(t) and v(t). Hint: convert the voltage source into a phasor, then find the current and voltage phasors for the whole circuit, then convert back to the time dependent i(t), v(t).

Problem 4: Transfer function



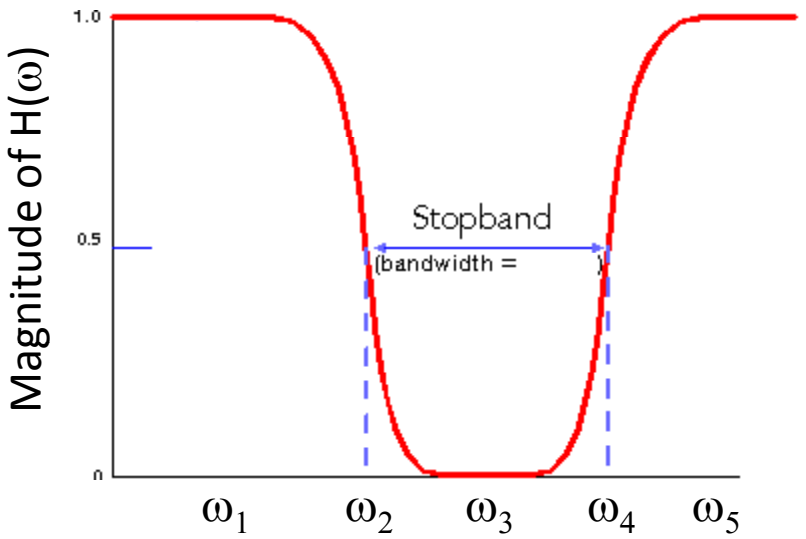
Calculate H(ω) for this circuit. Sketch the magnitude of H(ω) vs. ω.

Problem 5: Transfer function



Calculate H(ω) for this circuit. Sketch the magnitude of H(ω) vs. ω.

Problem 6: Band stop filter



A) Given $v(t) = 4\cos(\omega_1 t + \pi/4)$ find $v_{out}(t)$.
B) Given $v(t) = 3\cos(\omega_2 t + \pi/2)$ find $v_{out}(t)$.
C) Given $v(t) = 2\cos(\omega_3 t + \pi/3)$ find $v_{out}(t)$.
D) Given $v(t) = 2\cos(\omega_4 t + \pi/2)$ find $v_{out}(t)$.
E) Given $v(t) = 2\cos(\omega_5 t + \pi/4)$ find $v_{out}(t)$.

Note: You cannot determine the phase of $v_{out}(t)$ so leave that as unknown in your answer.