

# EECS 70A: Network Analysis

## Homework #4

The homework is due Tuesday 5/26/2015 at 6.30pm.

You can choose either way to turn in your homework

1) Turn it in during discussions (Highly recommended)

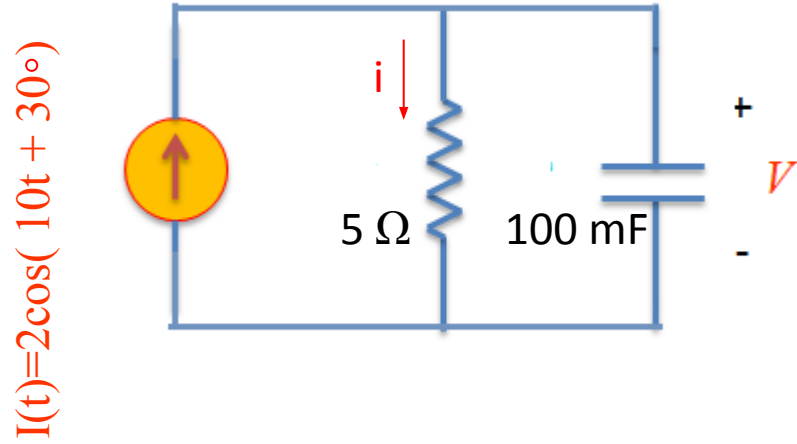
2) Turn it in during TA office hour

3) EEE Dropbox

1. a) Given  $v(t) = 2 \cos(\omega t + \pi/12)$ . Find the phasor  $\mathbf{V}$  that represents  $v(t)$ . Express  $\mathbf{V}$  as  $x + jy$  and as  $re^{j\theta}$ .
- b) Given  $i(t) = 4 \sin(\omega t + \pi/8)$ . Find the phasor  $\mathbf{I}$  that represents  $i(t)$ . Express  $\mathbf{I}$  as  $x + jy$  and as  $re^{j\theta}$ .
- c) Given  $\mathbf{V} = 2 + j1$ , find  $v(t)$ .
- d) Given  $\mathbf{I} = 4 + 2j$ , find  $i(t)$ .

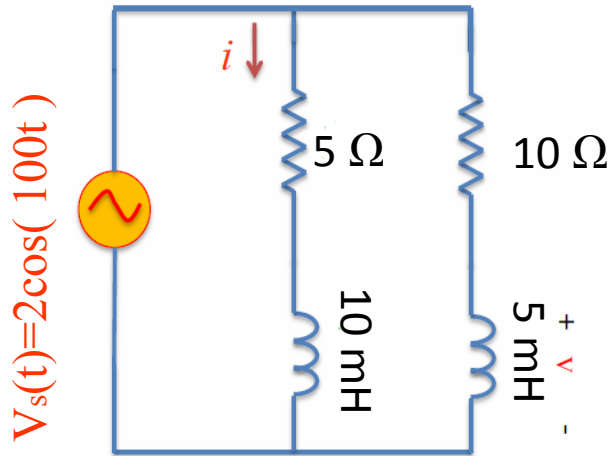
Problem 2 .

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  $i(t)$ ,  $v(t)$ .



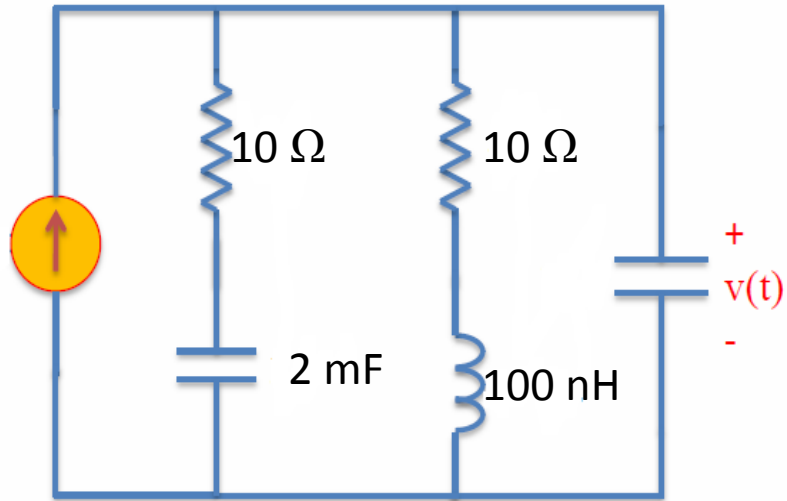
Problem 3 .

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  $i(t)$ ,  $v(t)$ .

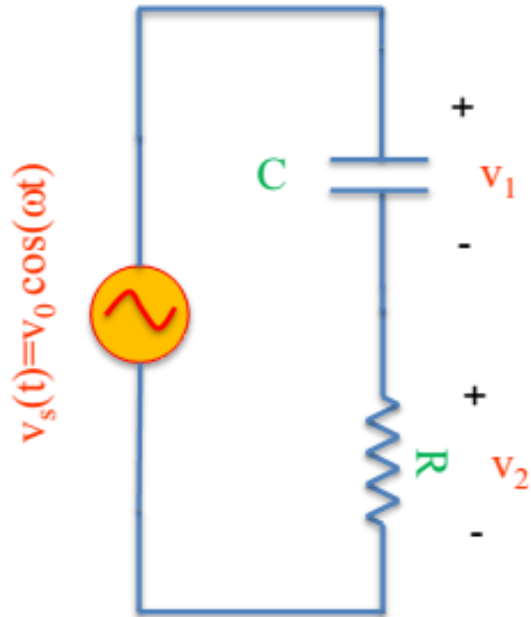


Problem 4: Find  $v(t)$ .

$$I_s(t) = 10 \cos(10^6 t)$$



Problem 5: Suppose the following circuit has been run for enough long time.(Initial conditions are ignored)  
Find  $i(t)$ ,  $V_1(t)$ ,  $V_2(t)$  for this circuit. In class, we used phasors. For the HW, I want you to do it WITHOUT phasors!



Problem 6. Design a 4 - bit ( 4 input) D/A converter using an op-amp and 9 resistors. Let  $R_f = 10 \text{ k}\Omega$  and  $R = 5\text{k}\Omega$ . Find the output voltage for the input  $V_i = [1 \ 0 \ 0 \ 1]$ .



Problem 7. Find  $v(t)$  for  $t > 0$  in the circuit given. Assume the switch has been open for long time and is closed at  $t = 0$ . Calculate  $v(t)$  at  $t = 0.5$ .

