EE213 Spring 1999  
Problem Set 6  
due 3/8

1)  
a) Refer to Fig. P8.30. At time 0 find the current through the inductor and the voltage across the capacitor. Use Laplace transforms to solve for the current through the inductor $i_L(t)$ for $t \geq 0$.  
b) Repeat a) for Fig. P8.32.  

2) Refer to HW #4 problem 2) and let $C_1 = C_2$. Let $v_i(t) = 1V$ and assume that one volt has been applied to the circuit for a long time. Then after this long period of time (at time 0), the voltage source $v_i(t)$ is turned off. Calculate at time 0 the voltage at the output $v_o$ and also the voltage across each capacitor. Find $v_o(t)$ for $t \geq 0$.  

3) For the following circuits write the state equations. Compute the Laplace Transform of the state transition matrix, $(sI - A)^{-1}$ and find all the natural frequencies. Use matlab to confirm calculations.  

4) For problem 1), find the state space representation for parts a) and b) (find $A$, $b$, and $c$). Use matlab to find the transfer function and to solve for $i_L(t)$ using the state space approach.