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ENEE 610
Homework Problems for Grading, Set 3 (60 points)
Due at class M 10/11/04
Sensitivity, state, input y(s)

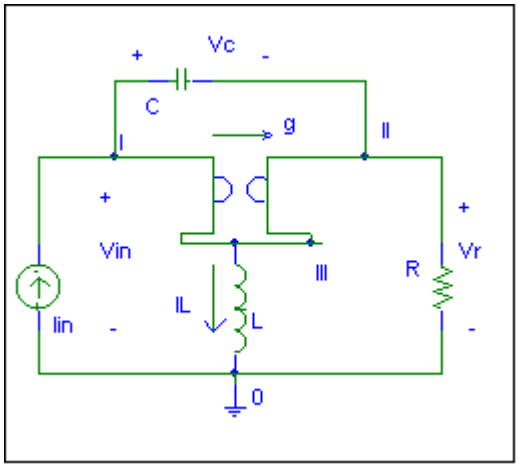
1.(20 points)

For the following circuit

a) draw the adjoint as needed for the sensitivity of the input admittance, yin(s)=Iin(s)/Vin(s) seen by the current source, to C, to L, and to R.

b) use the adjoint to calculate the sensitivities listed in part a).

c) check by straight differentiation.



2. (20) points

For the same circuit as in problem 1 above, give state variable equations using the state as $x=[v_c, i_L]^T$, input u=Iin, and output $y=[Vin, V_r]^T$

3. (20) points

For the same circuit as in problem 1 above,

a) find the 2-port Y(s) matrix for the 2-port formed by L, C, and the gyrator (that is, the 2-port seen by the external Iin and R).

b) replace R by a load $y_L(s)$ and calculate yin(s) versus $y_L(s)$ and L, C, and g using the Y(s) found in a)

c) from the result of b) find $y_L(s)$ in terms of yin(s), L, C, and g.