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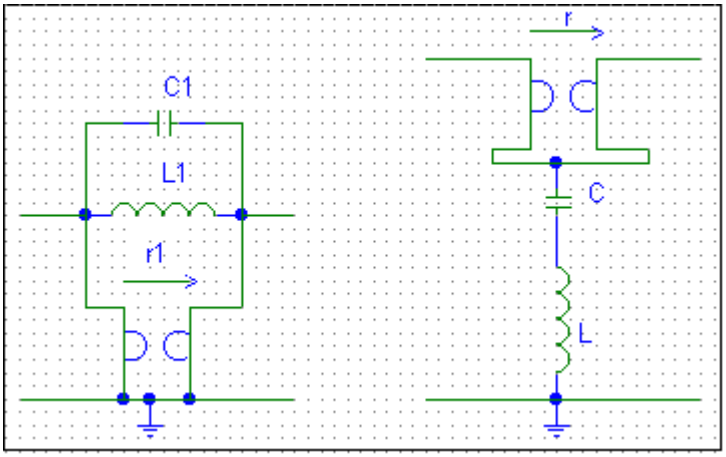
ENEE 610
Problems for grading, Set 2
Due at class M 09/22/03
Some 2-Port Theory and Synthesis

1. (25 points)

a) For the following 2-ports find the admittance/impedance matrix for the one on the left /right by the addition of two admittance/impedance matrices. Check by using $Z=Y^{-1}$.



b) Show that there are values of L1, C1, and r1 so that these two 2-ports have the same impedance matrix; give these values in terms of L, C and r.

2. (25 points).

a) For the 2-port on the right of problem 1, when loaded on its right port by the impedance z_L find the zeros of the even part of the input impedance z_{in} seen looking into the left port in terms of L, C, r and z_L. Relate these to the entries of the 2-port Z matrix.

b) Under the load conditions of part a) assume the circuit is fed by a voltage source on the left and the output is the voltage v2 on the right. Draw the schematic and find the transfer function v_2/v_1; give its zeros (= zeros of transmission).

3. (25 points)

Synthesize five different ways the driving point impedance

$$z_{in}(s)=\frac{5s(s^2+4)}{(s^2+2)(s^2+8)}$$