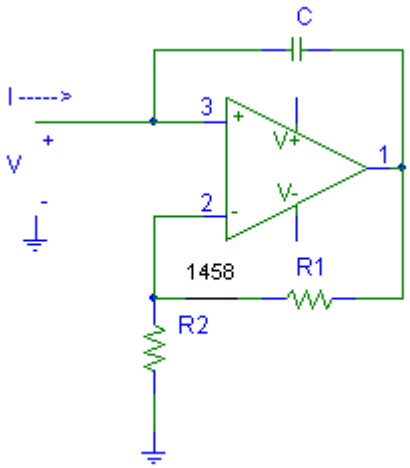
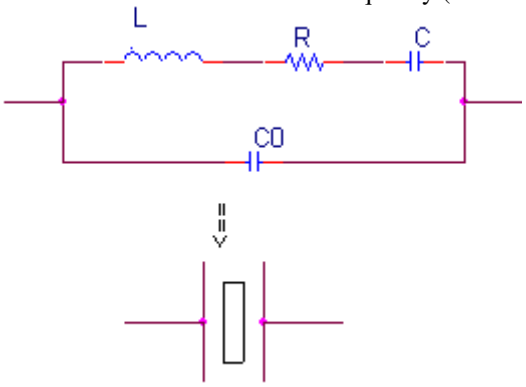
ENEE 417 -Spring 2012
Week #7 starting M 03/12/12
Negative Y & Crystal equivalent circuit, Oscillator Designs; VLSI & Spice Extraction

1. Construct the following circuit to make a negative capacitor (first replace the capacitor by a resistor and check if you see a negative resistor at the input). Note that I=-(R1/R2)y(s).V where y(s0 is the admittance of a two-terminal device placed where the capacitor is; y(s)=sC for the capacitor.



2. Use the S663 quartz crystal (ECS inc. part ECS-3X8X) **[note that the crystal will shatter when too high a voltage is applied]**

a) Find the values of the components in its following equivalent circuit. For that use the circuit of part 1 above to cancel out the parallel C0 (of C0=1.6pFd given in the ECS data sheet) and then check the resonant frequency (fo = 32.768KHz of the ECS data sheet).



b) Construct the Recommended Oscillation Circuit of the ECS data sheet and check its oscillation.