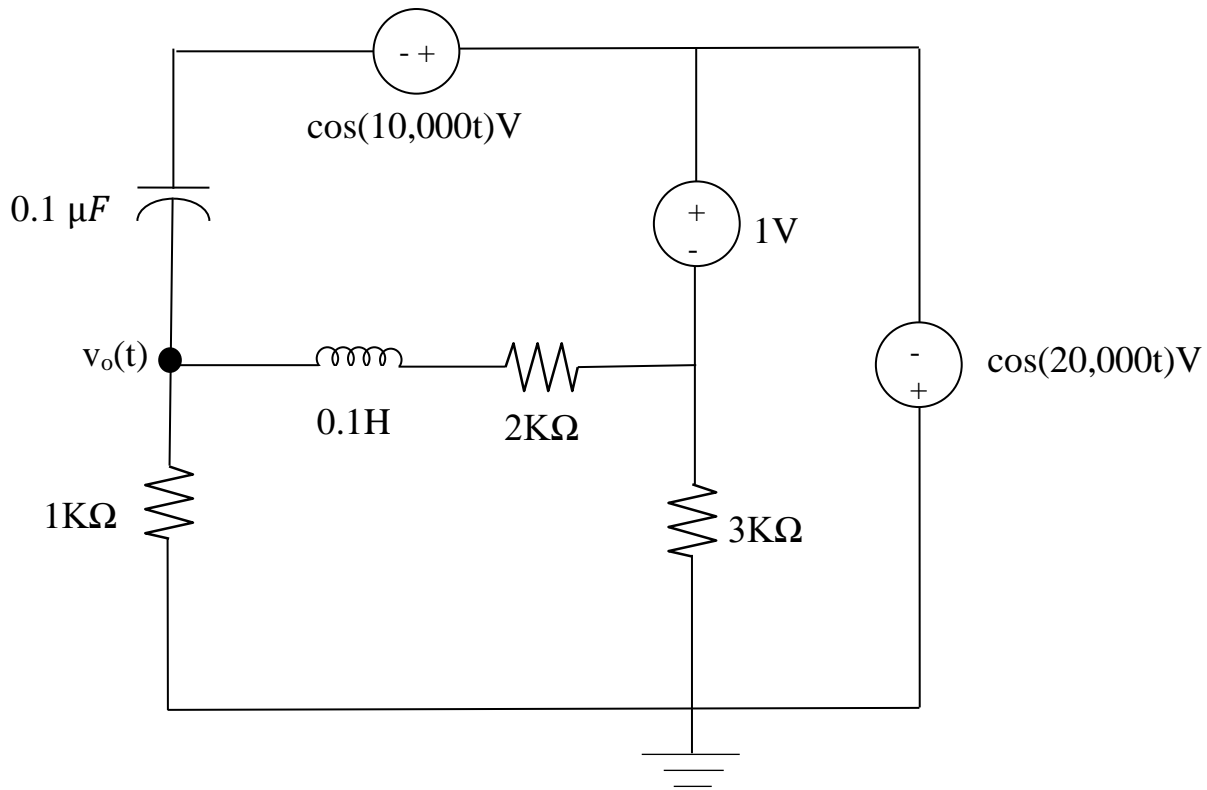
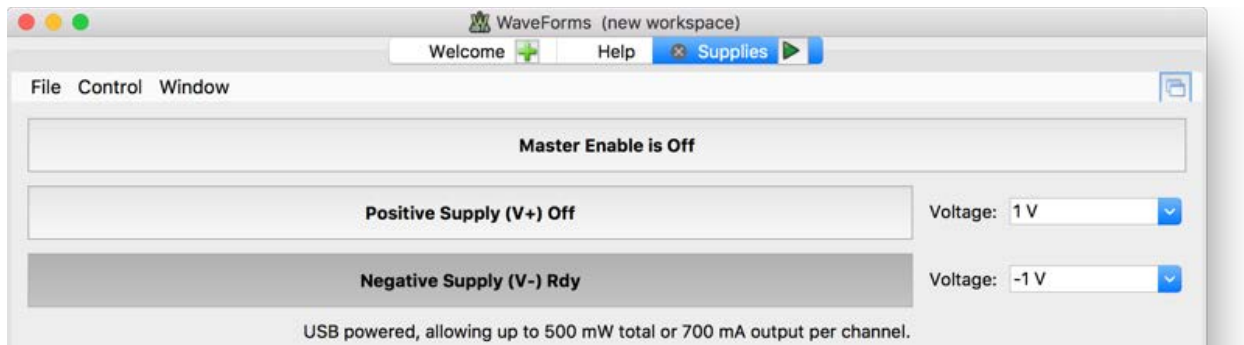


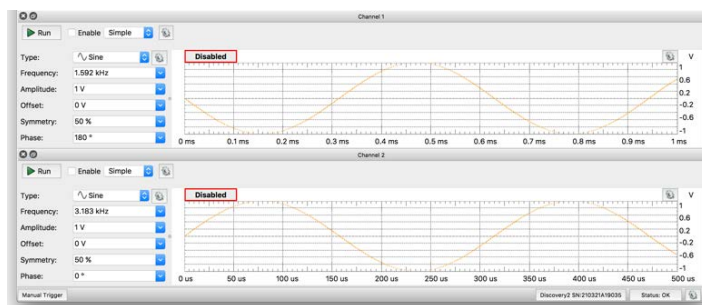
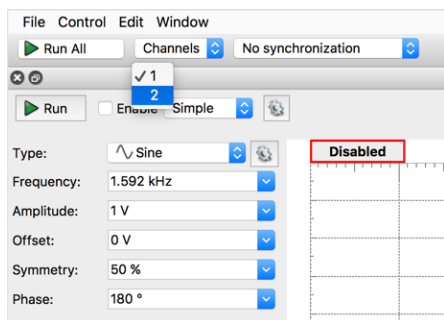
# ECE 211 Analog Discovery Lab – Understanding Superposition using the Spectrum Analyzer



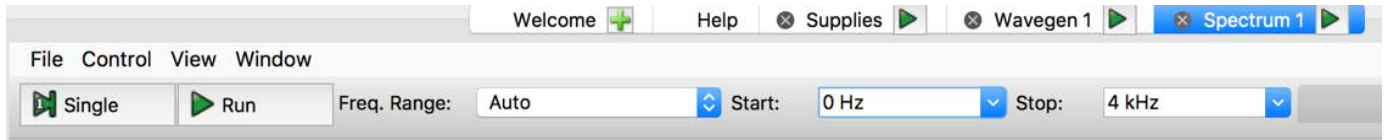
1. Build the circuit from the diagram. You will need to use the negative voltage output and change the phase of one of the sinusoids. The ground labelled on the circuit diagram will not be the same as the ground line from the Analog Discovery.
2. Open the supplies tab in Waveforms. Deactivate the positive supply, and make sure the negative supply is set to -1V and is ready.



3. Open the waven tab in Waveforms. Use the “Channels” pulldown menu and select “2” to access the second waveform generator channel. Set the wavegens to the frequencies from the diagram. The  $\omega=10,000$  supply will need a phase of  $180^\circ$ .



4. Open the Spectrum Analyzer and set the start and stop frequencies to 0Hz and 4KHz.



5. Turn off all but one source. Use the spectrum analyzer and note the amplitudes of the signal. Repeat for the other two sources. (To turn off the sinusoids, you can set the waveform to a DC signal with an offset of 0 Volts. To shut off the DC source, you will need to both turn off the negative voltage supply and replace the connector for it with one to the analog discovery's internal ground.)
6. Turn on all three sources at once and look at the spectrum analyzer. Verify this is the sum of the three partial outputs.
7. Analytically solve for the node voltage,  $v_o(t)$ . Determine the % error between the analytical results and Results measured in step #5.