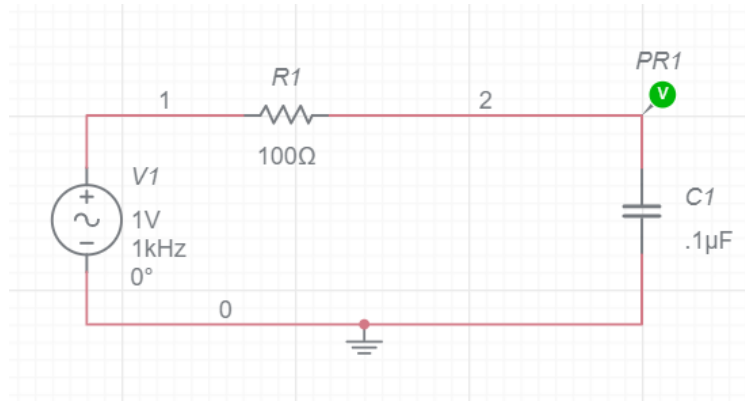ELCT 221 Project 2

Transfer Functions
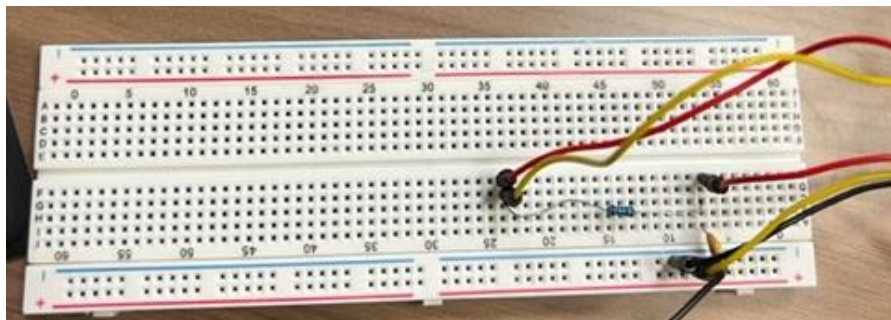
Will Rashley and Carson Murray

# Experiment 1: Low-Pass Filter
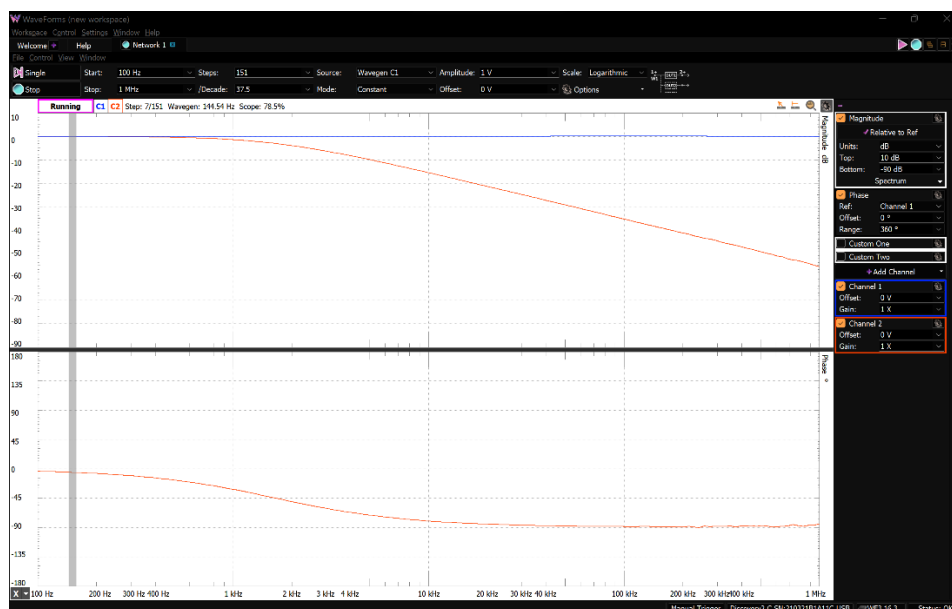
Schematic Picture:
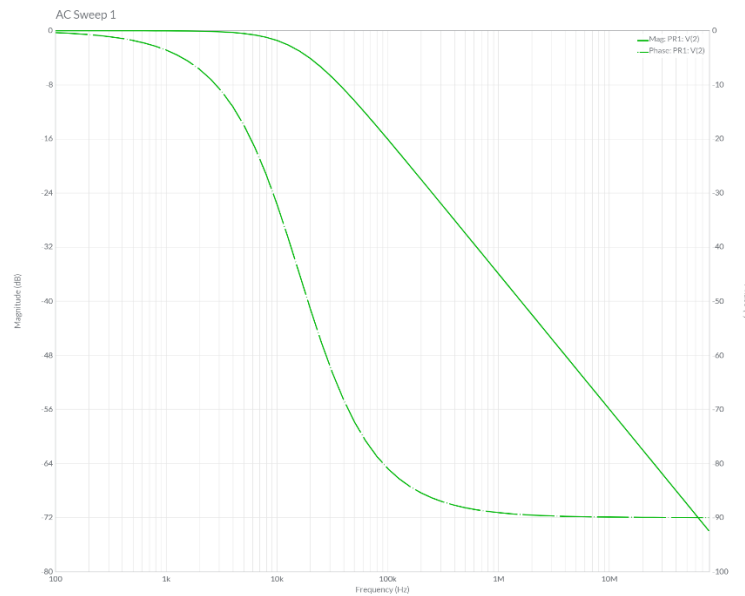


Breadboard Connections:



Measured Transfer Functions:

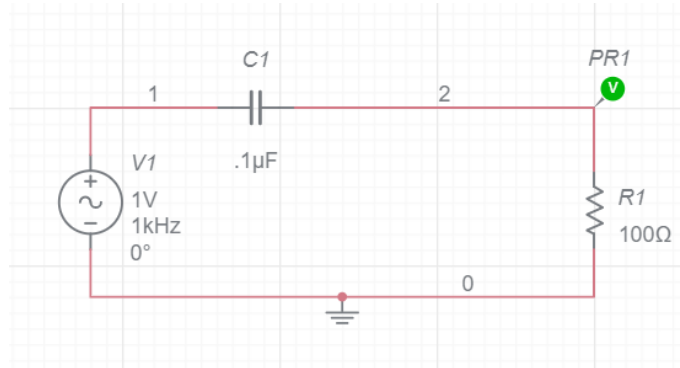Spice Simulation Transfer Functions:



Estimation of Corner Frequency:

$$\omega_c = \frac{1}{RC} = \frac{1}{100 \ \Omega * 0.1 \ \mu F} = 100 \ kHz$$
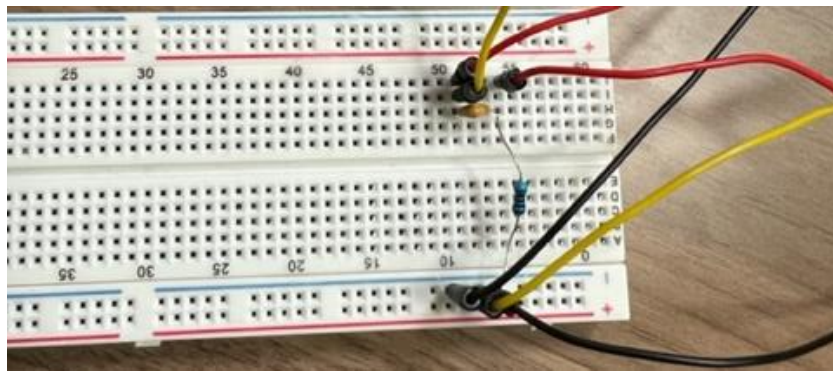
Comments:

The low-pass filter transfer functions for both the simulated and measured graphs were both a success in capturing the correct shape for a low-pass filter. Although, the measured transfer functions appear to be shifted a to the left as they should be closer to the corner frequency of 100 kHz.
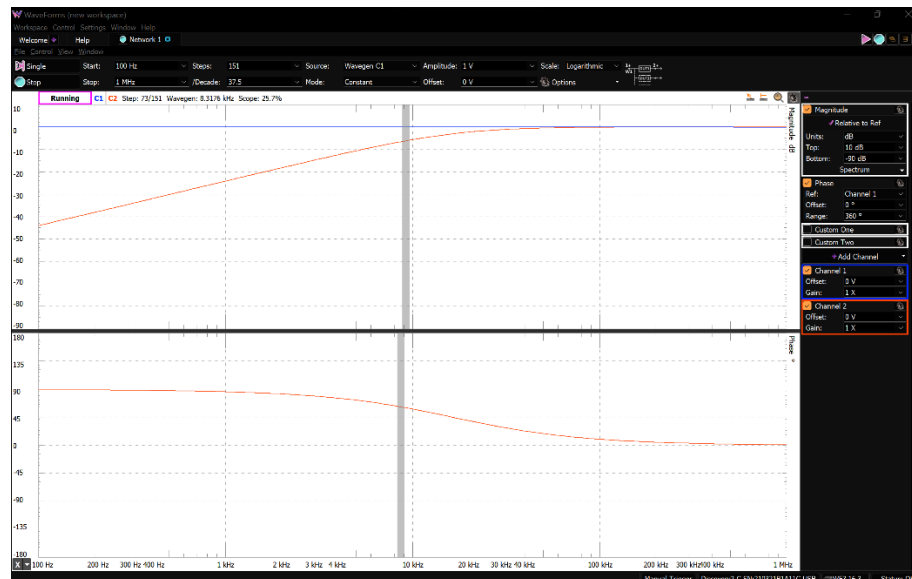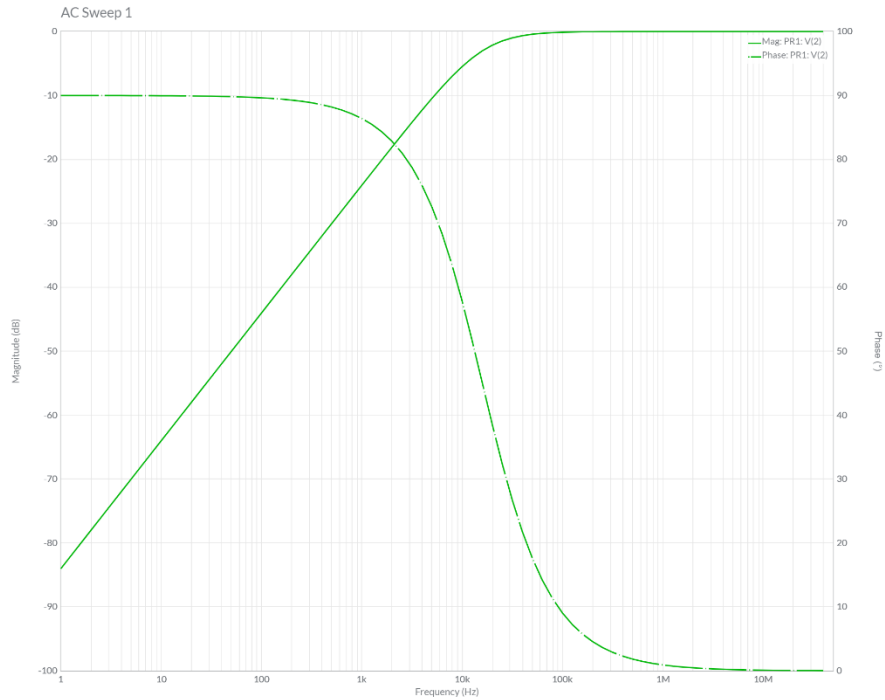
# Experiment 2: High-Pass Filter

Schematic Picture:



Breadboard Connection:



Measured Transfer Functions:

Spice Simulation Transfer Functions:



Estimation of Corner Frequency:
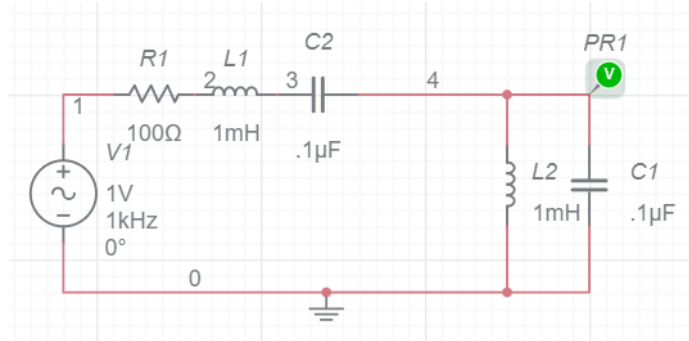
$$\omega_c = \frac{1}{RC} = \frac{1}{100\,\Omega * 0.1\,\mu F} = 100\,kHz$$
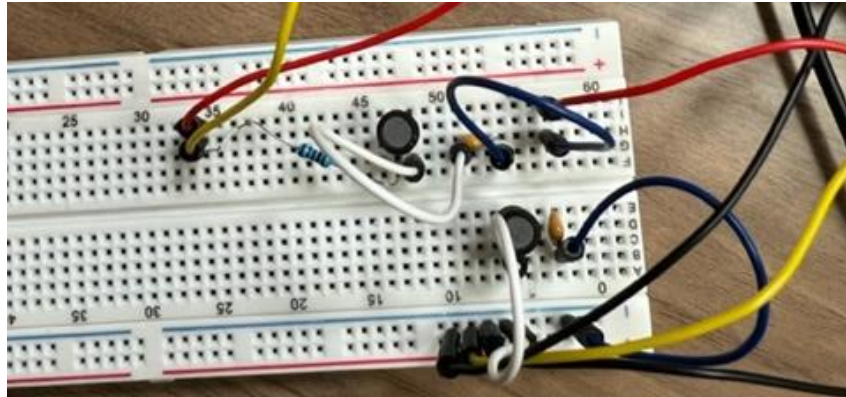
Comments:

The measured high-pass transfer function and simulated high-pass transfer function both appear to capture the correct shape and correct corner frequencies.
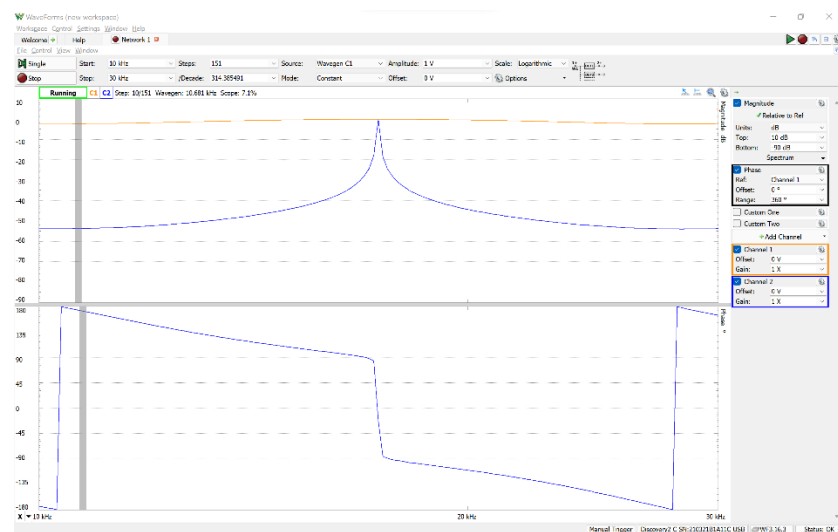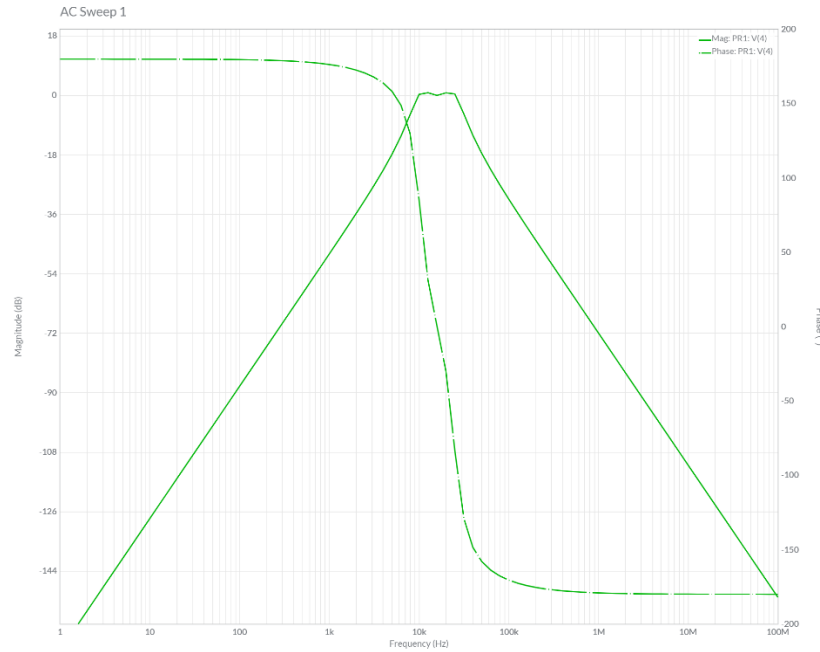
# Experiment 3: LC Band-Pass Filter

Schematic Picture:



Breadboard Connection:



Measured Transfer Functions:

Spice Simulation Transfer Functions:



Estimation of Resonance Frequency:

$$\omega_r = \frac{1}{2 * \pi * \sqrt{L * C}} = \frac{1}{2 * \pi * \sqrt{1\, mH * \ 0.1\, \mu F}} \approx 15.9\, kHz$$

Comments:

Both Simulated and measured graphs appear to be very similar in shape and scale. The only differences being that the measured aplitude appears to only touch 0 once (unlike the simulated which stays at zero for a couple thousand Hz) and the phase graph appears to be slightly wild towards the beginning and end of the graph.