

Lab 2: Analog Circuits

Ruben Gonzalez
Joshua Lozada
ECE 5 - UC San Diego

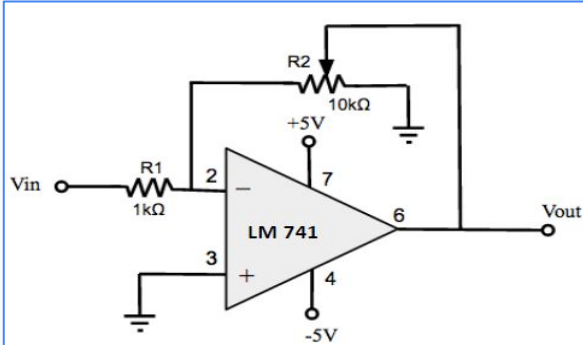
Part 1: Amplifier + Low Pass Filter

Objective

What is the objective of this lab (in your own words)?

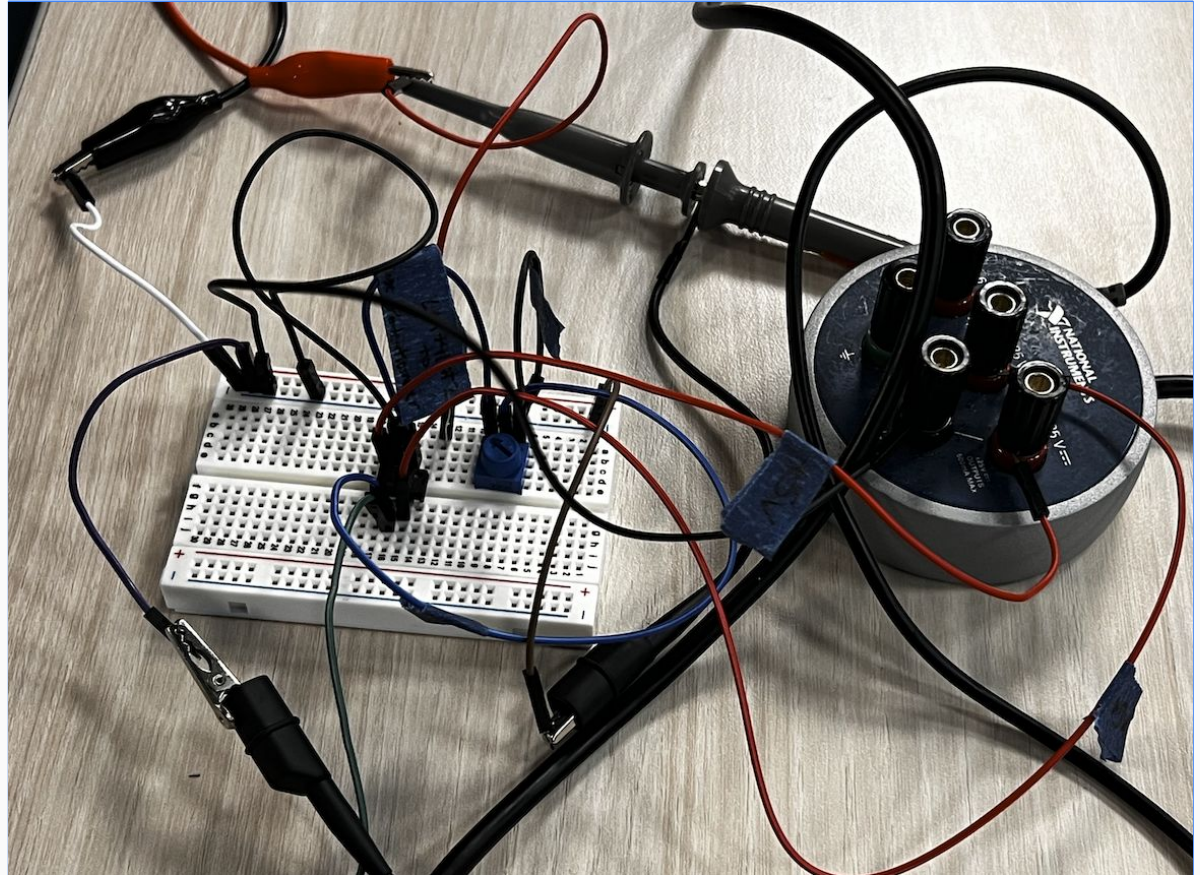
The objective of this assignment is to give us hands on experience in using the Function Generator oscilloscope, and test the frequency/gain of our amplifier and low pass filter breadboards.

Challenge #1 - Amplifier

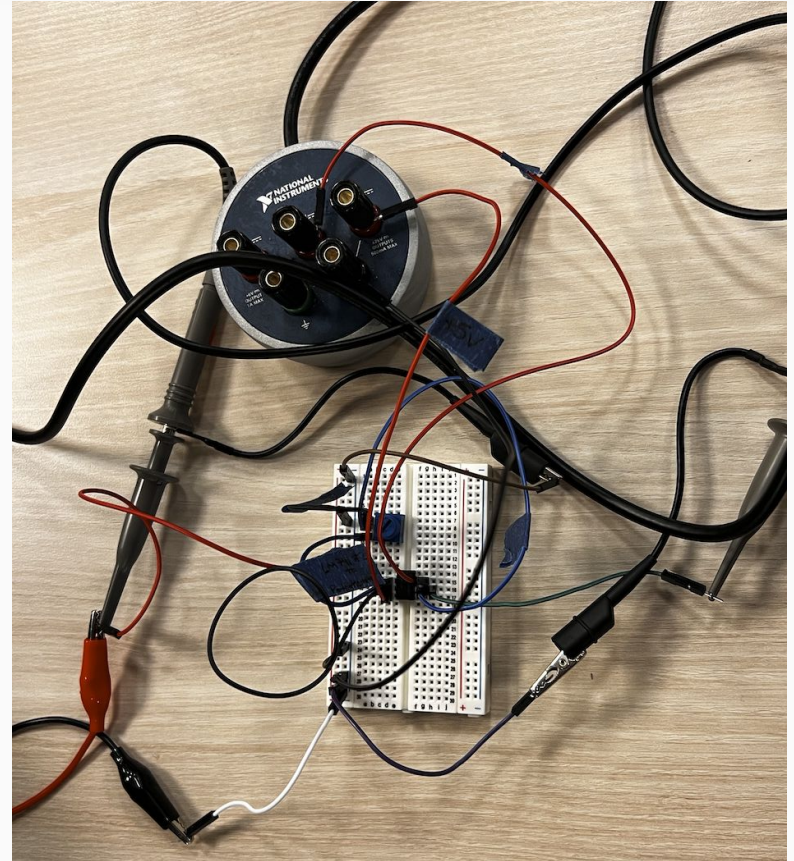
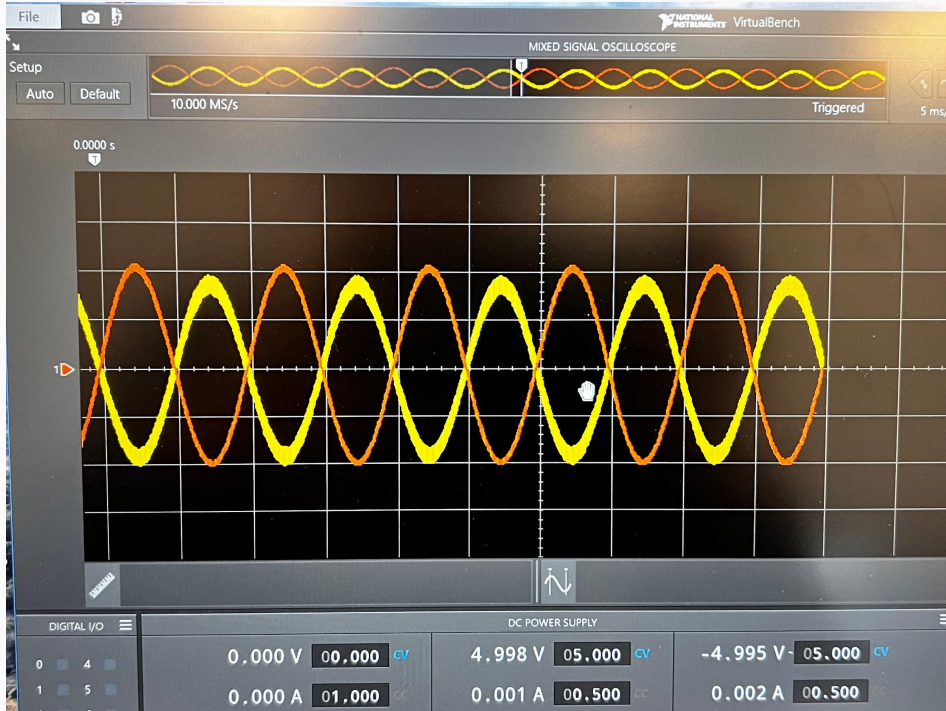


Schematic of Amplifying Circuit

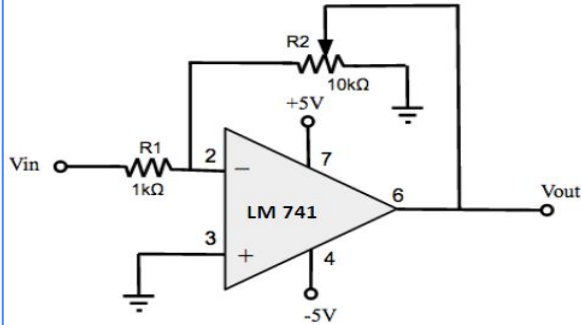
Our amplifying circuit connects jumper wires from our breadboard to the Function Generator. We clip the CH1/CH2 oscilloscope ground clip onto our jumper ground wire. We then plug in the -25V wire to our bread board V_{out} and a +25V connection to V_{in} .



Additional Amplifier Pictures



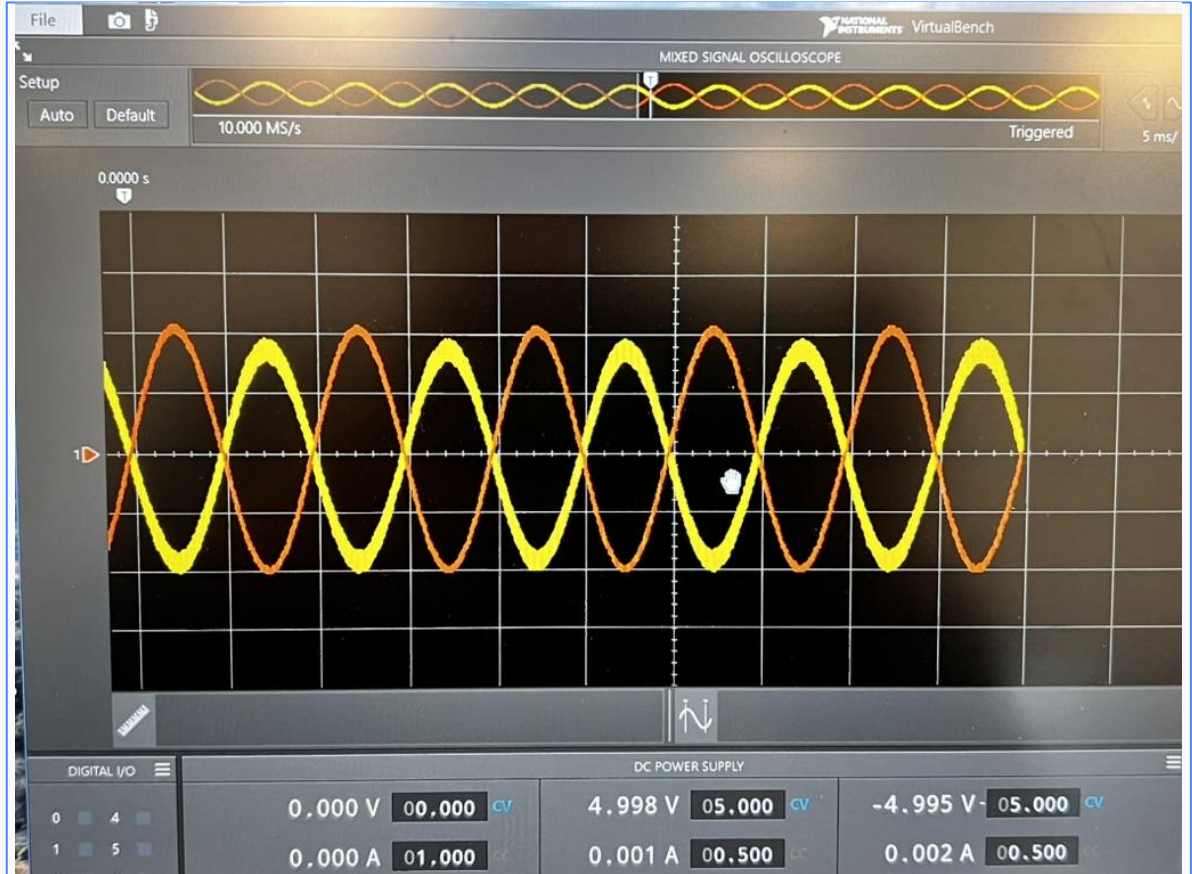
Challenge #1 - Amplifier



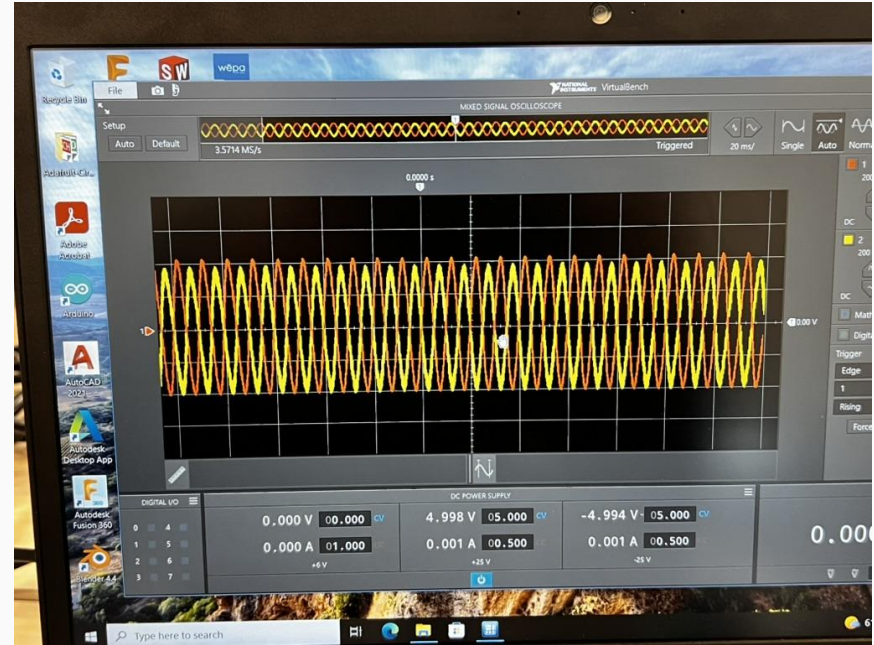
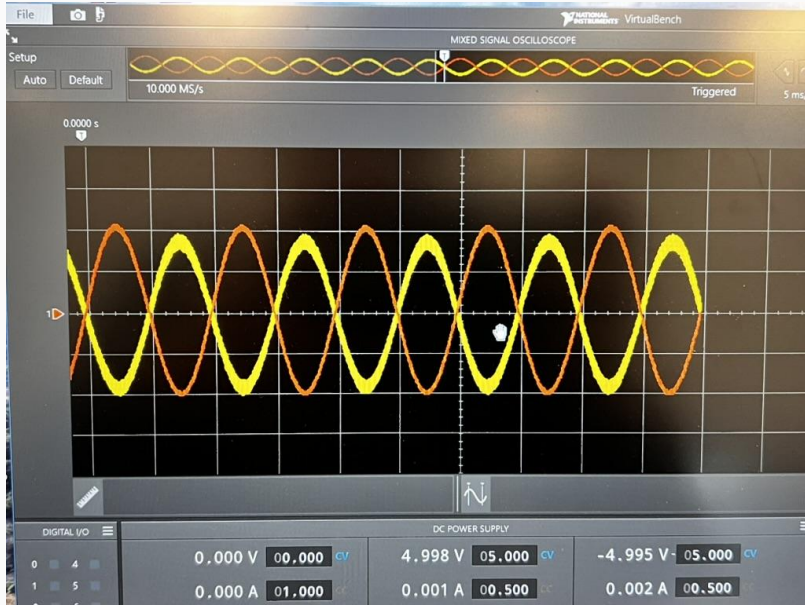
Schematic of Amplifying Circuit

Briefly describe your picture to the right. For the specified settings what is your gain. What is the relationship between gain and the two resistors, R_2 and R_1 ?

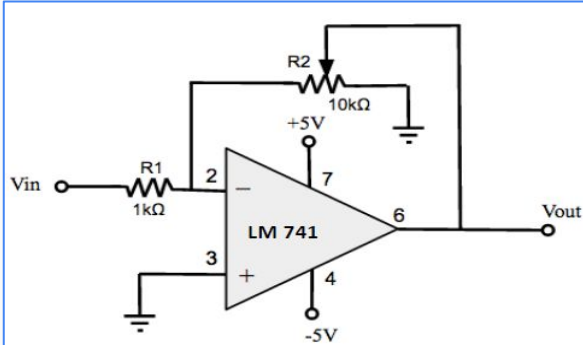
For this setting our gain is set to around 5.5db. The relationship between gain and the two resistors is that the amplification is changed by applying a higher/lower resistor.



Additional Images

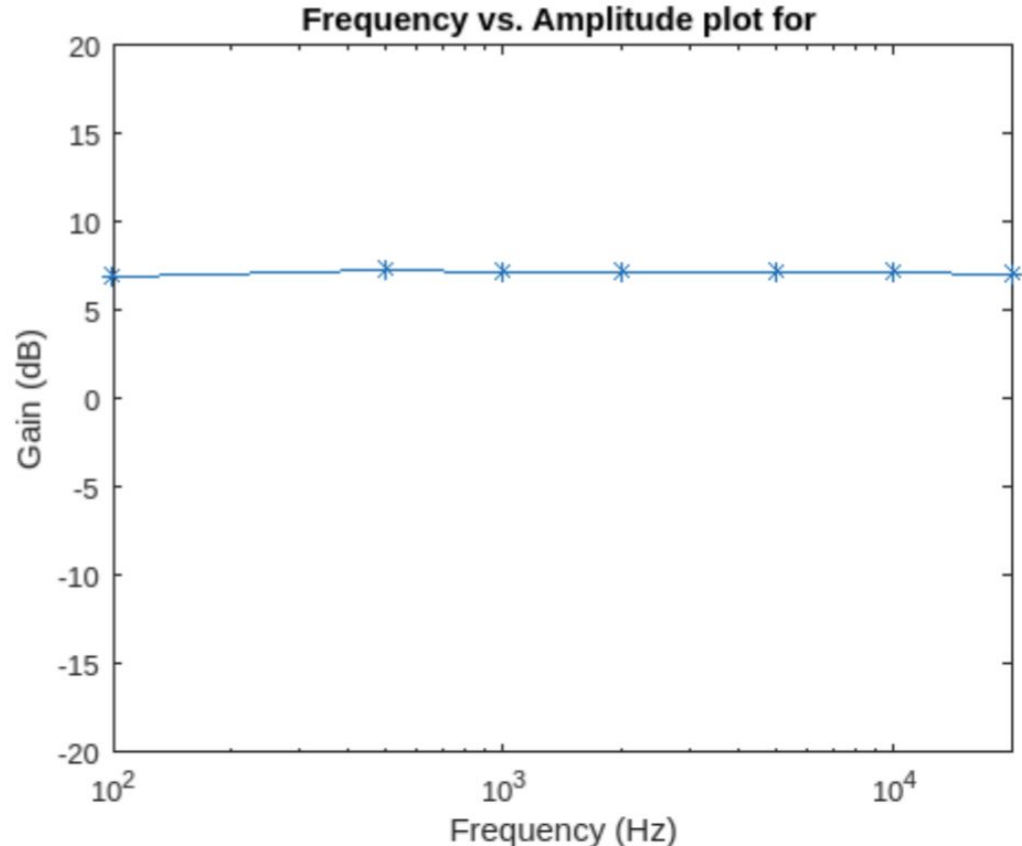


Challenge #1 - Amplifier

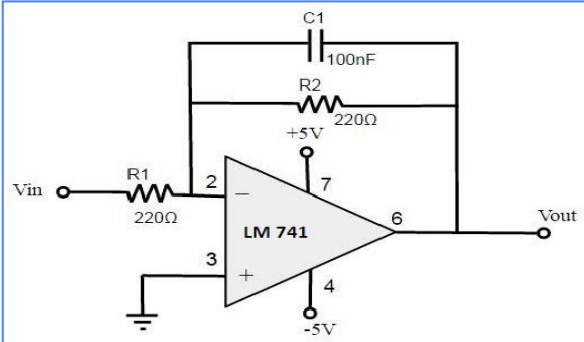


Schematic of Amplifying Circuit

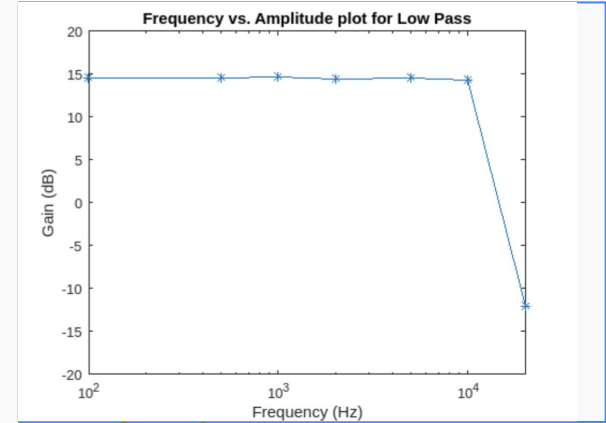
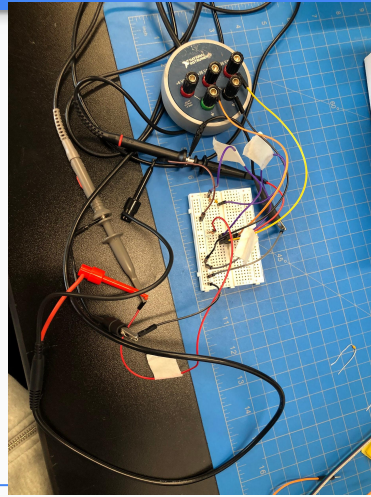
After creating our plot, we noticed that frequency does not make much of an impact on the gain levels. (almost no difference at all). From this we can conclude that gain is not dependent on frequency.



Challenge #2 - Low Pass Filter



Schematic of Low-Pass Filter



Our Low pass filter is connected in a series of jumper wires, including a resistor and a capacitor. The V_{in} and V_{out} are connected to CH1 and CH2. Which is then connected to the Function Generator, letting us manipulate the frequency of the signal.

Explain your plot. Estimate the cutoff frequency of this filter. Why is this called a "low-pass" filter?

From looking at the plot we can see that the cutoff frequency would be around 10kHz range. (10^4 , 15). The reason for the name "low-pass filter" is because of the way we pass a filter which signals out unwanted frequencies/noise. In this case it's allowing for low frequencies to pass through. (cut out frequency)

Additional Low Pass Filter Pictures

