Lab 6 : Low Pass Filter

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1 Introduction

This lab was very difficult for me as i had no clue how to properly replicate the first unfiltered graph. No matter what I did I never got a square wave, and instead i kept getting spikes. Nonetheless, my filtered graph came out very nice despite not having a good reference.

2 Setup

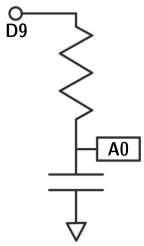

Figure 1: Circuit Diagram

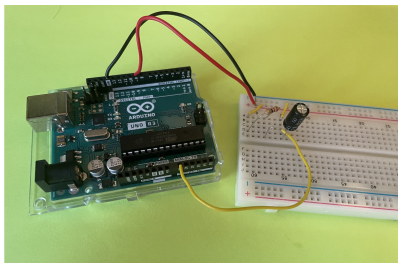

Figure 2: Photo of Breadboard

The breadboard was setup as a low pass filter. The signal coming from the d9 pin went throught a resistor and then through a capacitor then to ground. The A0 pin is connected in between the resistor and the capacitor and gives a filtered version of the original source.

3 Arduino Code

The Arduino code just generates a tone and records the time.
Link to the code: Link

4 Data

I ran the tone sequence without a filter and then with a filter. I then put both data points onto one graph where the raw signal is blue and the filtered signal is red. My biggest issue is that I couldn't figure out how to make the raw signal look good so instead it just looks like lines, apologies for that.

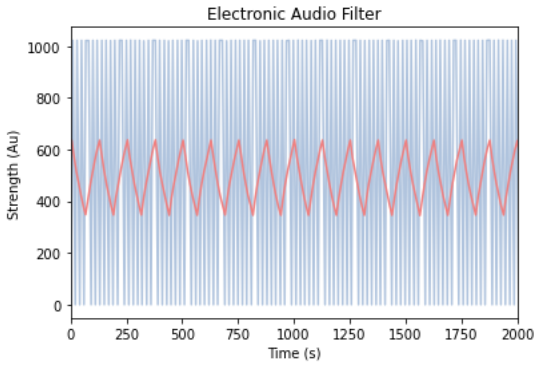

Figure 3: Raw and Filtered Signals

Link to python code Link

Link to raw data Link

Link to filtered data Link

The filter is working based on how the tone signal works. In the raw signal the value is either zero or the highest. However in a the filtered signal it lowers the peaks and raises the troughs. As well as the shape goes from a square wave (ideally) to a sort of sine wave.