Lab 6: Building circuits from scratch

Part One

Build a low pass filter with a characteristic (cut-off) frequency of 1400 Hz. Demonstrate that your circuit works.

In your lab report, include a photo of your circuit, a schematic/drawing of your circuit, and a plot that demonstrates that your circuit works. Briefly explain your circuit and calculations.

Part Two

Build a circuit that generates the signal in blue when the input is the signal in red (Figure 1).

In your lab report, include a photo of your circuit, a schematic/drawing of your circuit, and a plot of the actual input and output signal. Briefly explain your circuit and calculations.

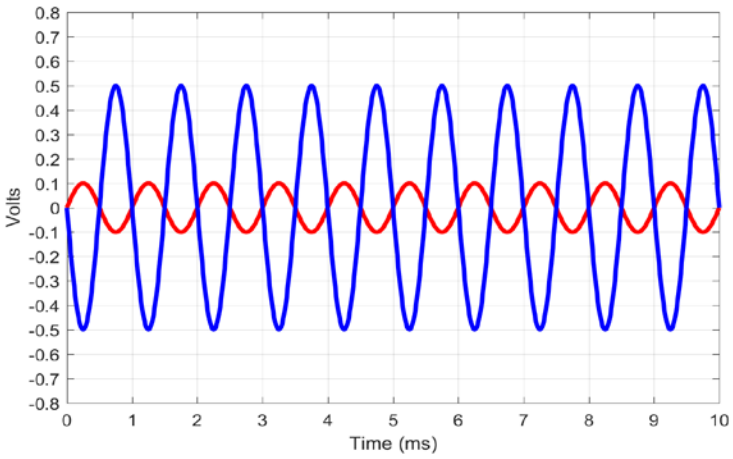

Figure 1: Input (red) and output (blue) signal.

Part Three

Build a band pass filter with a low cut-off frequency of around 700 Hz and a high cut-off frequency of around 3200 Hz that includes an op amp.

In your lab report, include a photo of your circuit, a schematic/drawing of your circuit, plot(s) that demonstrate that your circuit works. Briefly explain your circuit and calculations.

Optional Challenge:

Build a filter that allows (nearly) all frequencies, except 60 Hz, to pass through. You can test your circuit by using yourself grabbing a bare wire as the input signal in addition to using the waveform input on the analog discovery. Note that you will find a lot of examples of how to build this circuit online. If you want to try an online circuit, see if you can figure out how it works (though it likely will be difficult for you to analyze in detail), rather than simply just building it. You can also try to construct the circuit using ideas that we have taught you.

In your lab report, include a photo of your circuit, a schematic/drawing of your circuit, and a plot(s) that demonstrates that your circuit works. Briefly explain your circuit and calculations.