ELEC 240
Lab 4 - Signal Processing II: Active Circuits

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1 Objective

Your text here

2 Materials

Your text here

3 Test Description

Your text here

3.1 Pre-Lab Calculations and Schematics

Your text here

4 Results and Discussion

After setting up the Op-Amp into an open-loop response configuration in Part A for Experiment 4.1, we produced a 2 V_{pp}, 20 Hz sine wave. We measured the voltage output from the Op-Amp and observed a max voltage of 14.4 V and a minimum voltage of -13.6 V. We then connected a 100 Ω resistor between v_{OUT} and ground. This caused the voltage to drop dramatically because the resistor itself has a significant voltage drop. We now observed a max voltage of 3.12 V and a minimum voltage of -1.64 V. After removing the 100 Ω resistor, we set the function generator to produce a square wave of the same frequency. We observed that v_{OUT} becomes a square wave as well. We also noted some slew-rate limiting, where the slope of v_{OUT} does not change as quickly as v_{IN} when switching between high and low voltages. Furthermore, we noticed that v_{OUT} exhibited 0.79V of DC offset despite the fact that the function generator was set to 0 DC offset. We hypothesized that this DC offset arises from the Op-Amp affecting the input voltage so that it is not perfectly magnified, thus yielding a nonzero DC offset.

Overall, using an open-loop response configuration is not ideal due to the fact that distortions in the circuit are highly magnified. For example, the small DC offset in the Op-Amp was magnified to nearly a full volt, which caused clipping in the output signal (where the larger amplitude portions of the signal are cut off due to the limitations of the Op-Amp's power supply.)

We then built an inverting amplifier in Part A of Experiment 4.2. We then set the function generator to produce a 1 V_{pp}, 100 Hz sine wave.
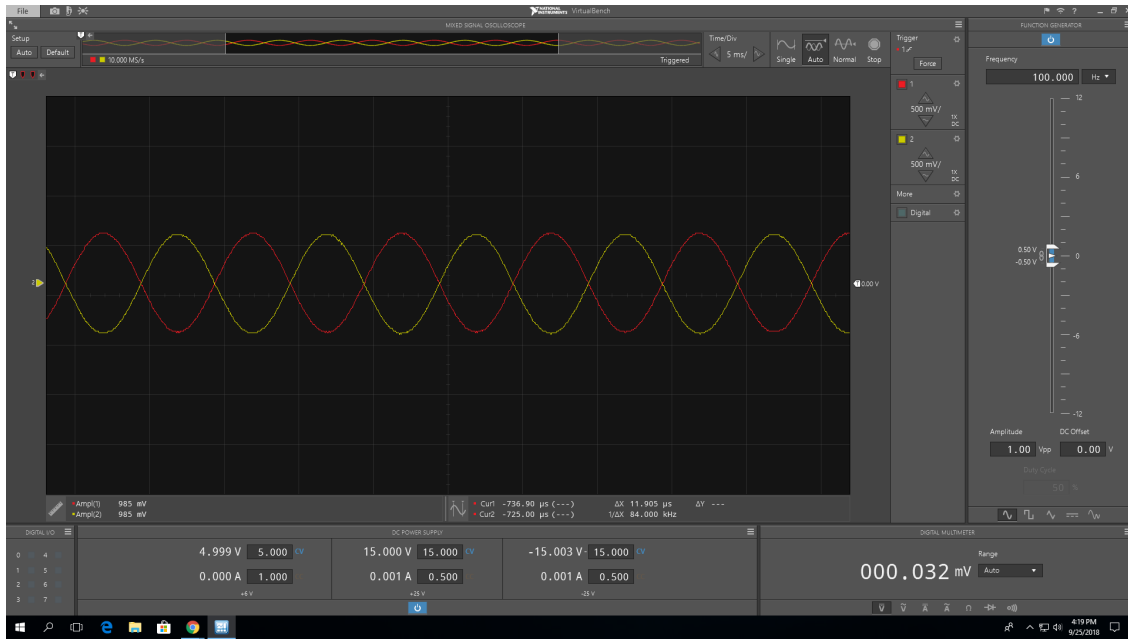
Figure 1: OpAmp Output in Response to 1 V_{pp}, 100 Hz sine wave

5   References

Your text here

Note (To be deleted): List any datasheets, websites, lab procedure, etc. used during the lab.

6   Conclusion

Your text here

Note (To be deleted): While the "Results and Discussion" section focused on the test results individually, the "Conclusion" discusses the results in the context of the entire experiment. Usually, the objectives given in the "Introduction" are reviewed to determine whether the experiment succeeded. If the objectives were not met, you should analyze why the results were not as predicted.

7   Errors

Your text here

Note (To be deleted): Briefly list sources of error and discuss how to eliminate or deal with them