

Lab 04 - Humidity

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1 Introduction

The goal of this lab was to understand the relation between humidity and capacitance.

2 Calibration Curve

In order to measure the humidity outside, a calibration curve was created by measuring the voltage across the resistor with changing capacitance. To best respond to the manufacturer's reference curve, the V_{input} was set to a 1V square wave at $10kHz$. This is shown in the figure 1:

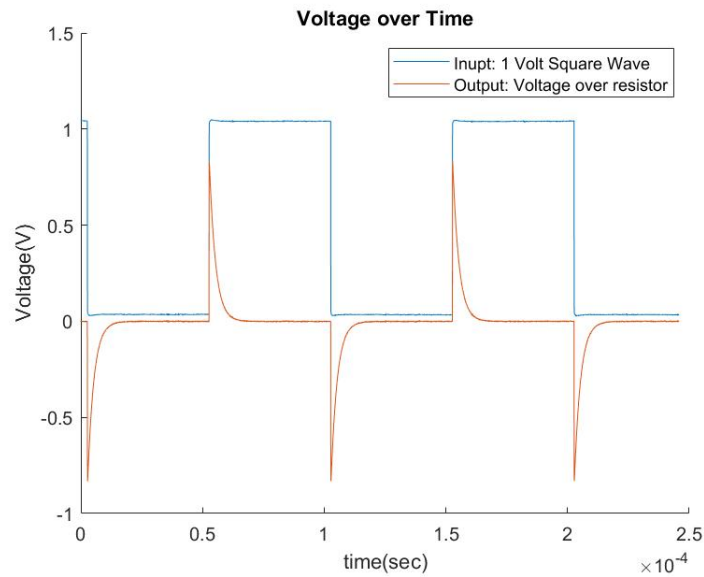


Figure 1: Voltage over Time

The main difference between this circuit and the one from glass is noticeably the changed positions of the Capacitor and Resistor. The quantitative difference is that of the time constant RC . The other difference is what is being measured with V_{out} . In this circuit, the V_{out} measures the decreasing voltage across the resistor, while in yesterday's lab the V_{out} measured the increasing voltage across the capacitor.

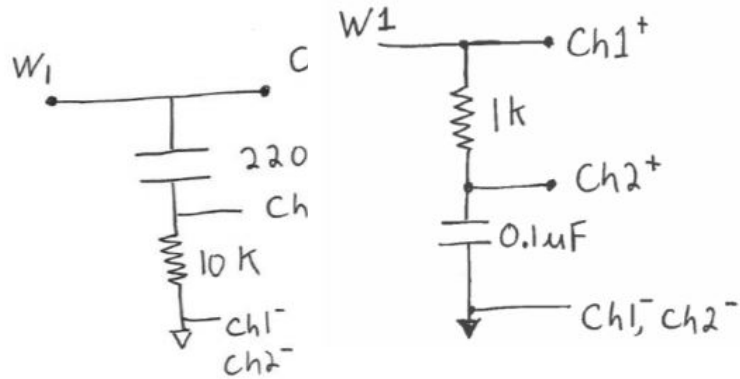


Figure 2: Circuit

The calibration curve data is plotted below in Figure 2.

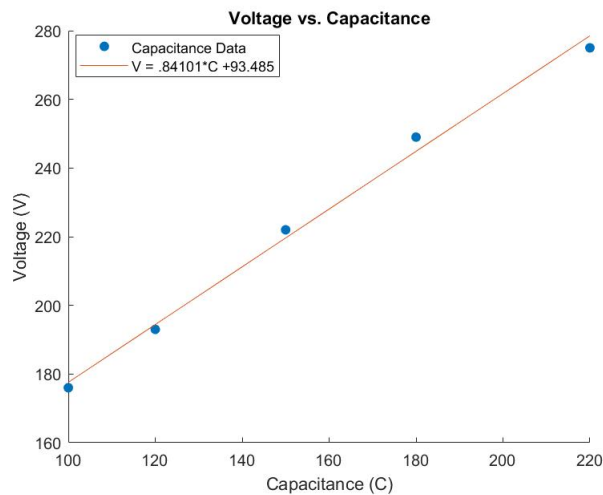


Figure 3: Calibration Curve

3 Conclusion

The equation of the line of best fit $V = .84101C + 93.485$ The voltage reading across the resistor was found to $244V$ inside and $245.2V$ outside. This translates to $178C$ and $182C$, respectively. Using the manufacturer's reference curve, it can be found that the humidity inside the room as approximately 50% and the outside humidity as approximately 65%. This somewhat disagrees with the actual humidity of the day was nearly 95%.