UNIVERSITY OF ALASKA FAIRBANKS

COLLEGE OF ENGINEERING AND MINES

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

COURSE CODE	EE F102 F01 (CRN: 32862)		
COURSE NAME	INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING		
SEMESTER	SPRING	**YEAR**	2023
LABORATORY LOCATION	JUB 331 (ELECTRONICS LAB)		
LAB SESSION DATE AND TIME	MONDAY 30 JAN 2023		
TYPE OF SUBMISSION	LABORATORY REPORT	**NUMBER**	2
TITLE OF SUBMISSION	MEASURING VOLTAGE AND CURRENT		
METHOD OF SUBMISSION	ONLINE VIA CANVAS		
DUE DATE OF SUBMISSION	MONDAY 06 FEB 2023	**DUE TIME OF SUBMISSION**	23:59

STUDENT NAME	

MAKE THIS FORM A "COVER PAGE" FOR YOUR REPORT SUBMISSION.

FOR THE TA USE ONLY

REMARKS:

Objective:

We will learn how to measure voltage and current using a multimeter and power supply. We will learn the difference between node voltage and differential voltage. We will characterize the output voltage regulator versus the input voltage and compare those mesurements to a simulation.

Circuits Diagram, Observations and Data Used in Lab:

Figure 1 shows the simulated voltage regulator circuit used in the lab. Figure 1 displays the voltage regulator, power supply, and 1 kΩ resistor. This simulated version of the circuit was used to learn how the voltage regulator works when given different voltage levels.

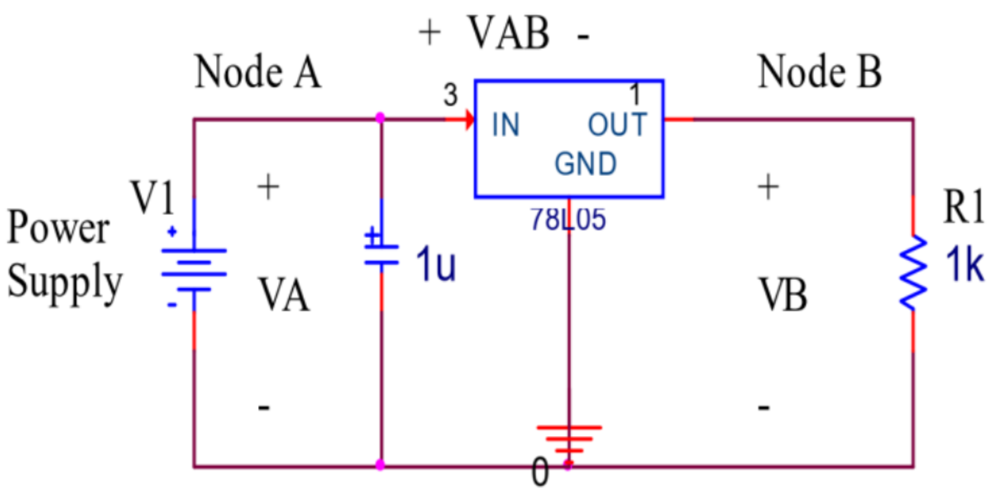

Figure 1: Voltage Regulator

Table 1 shows the voltage that was input from Node A and the Voltage output through Node B with the measured Differemtial Voltage and Current Measured. With the values that are here we can calculate the theoretical differential voltage along with the theoretical resistance.

Table 1: Voltage Regulator Voltages and Current Measurements

Node Voltage Measured		**Differential Voltage Measured**	**Differential Voltage Calculated**	**Current Measured Through 1 kΩ**	**Calculated Resistance 1 kΩ**
V_A [V]	V_B [V]	V_{AB} [V]	V_{AB} [V]	I_o [mA]	R_1 [Ω]
0.500	0.000	0.500	0.500	0.000	1000.000
1.000	0.000	1.000	1.000	0.000	1000.000
1.499	0.019	1.480	1.480	0.018	1038.889
1.998	0.684	1.314	1.314	0.686	997.085
2.496	1.149	1.347	1.347	1.152	997.396
2.995	1.625	1.370	1.370	1.628	998.157
3.494	2.108	1.386	1.386	2.114	997.162
3.993	2.595	1.398	1.398	2.602	997.310
4.493	3.085	1.408	1.408	3.093	997.414
4.993	3.575	1.418	1.418	3.585	997.211
5.492	4.064	1.428	1.428	4.077	996.811
5.992	4.533	1.459	1.459	4.548	996.702
6.491	4.920	1.571	1.571	4.937	996.557
6.991	5.018	1.973	1.973	5.037	996.228
7.491	5.019	2.472	2.472	5.039	996.031
7.990	5.021	2.969	2.969	5.040	996.230
8.489	5.022	3.467	3.467	5.041	996.231
8.989	5.023	3.966	3.966	5.043	996.034

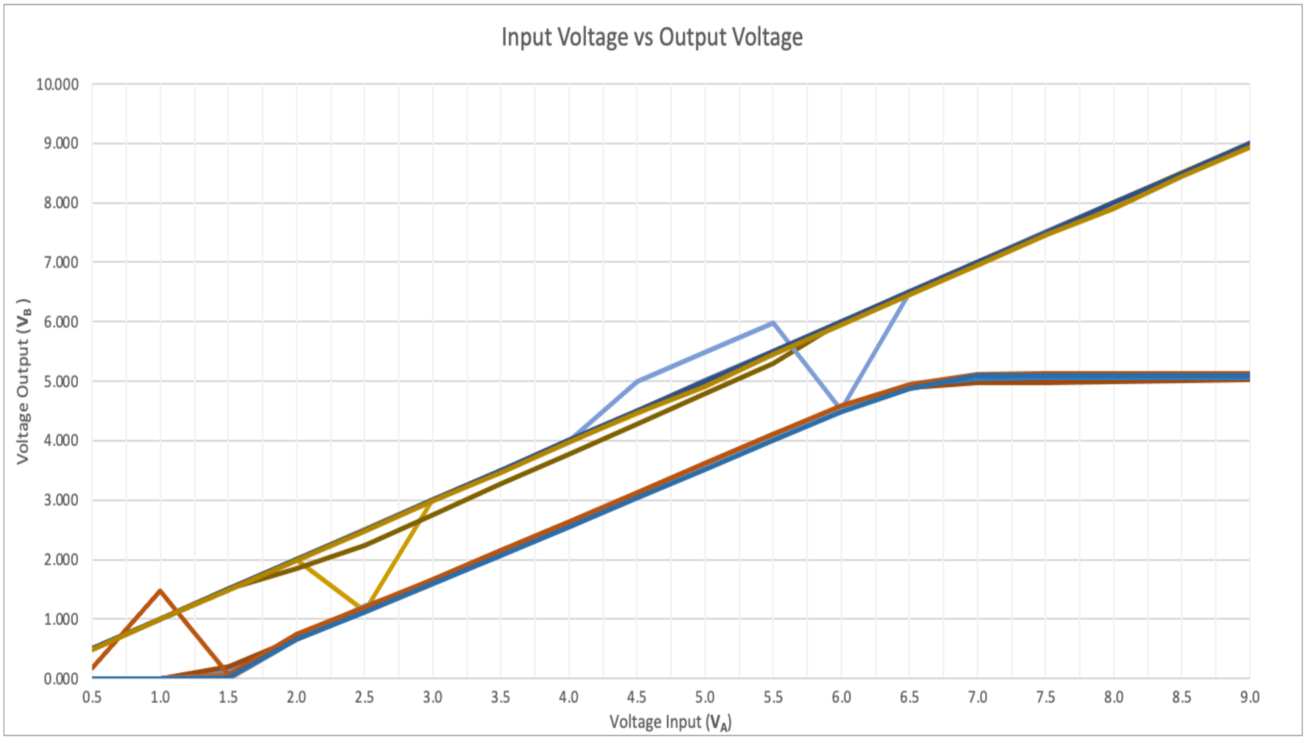

Figure 2: Input Voltage vs Output Voltage of the class

Figure 2 shows how the voltage regulator effects the voltage output. As seen the voltage regulator keeps the output voltage to about 5V while the Input voltage may be higher the regulator will keep the voltage output to about 5 V regardless of this. The darker blue line is the measurements I took while all other lines are my classmates.

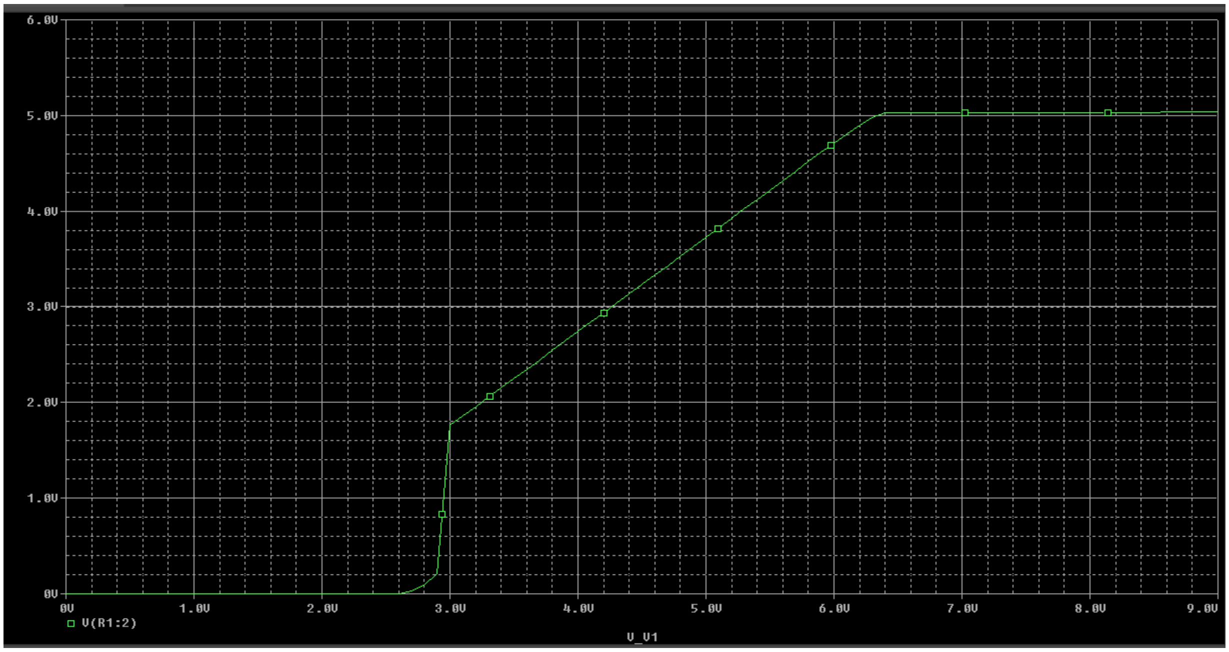

Figure 3: Simulation Input vs Output

Figure 3 displays the Input vs the Output with the axis the same as that of Figure 2. Figure 3 is the simulated version of the circuit compared. The graph is shows evidence of a more perfect environment compared to Figure 2 which shows imperfect values.

Conclusion:

As seen in Figure 2 and evidenced by the Table 1 the input voltage is much more linear than the output voltage due to the fact that the voltage regulator would keep the voltage output to a plateau at 5V. The simulation shown at Figure 3 shows this plateau clearly as there is no interference compared to the real world values of Figure 2.