EE230: Homework 2
Plotting and Data Representation

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1 Overview of the experiment

1.1 Aim of the experiment

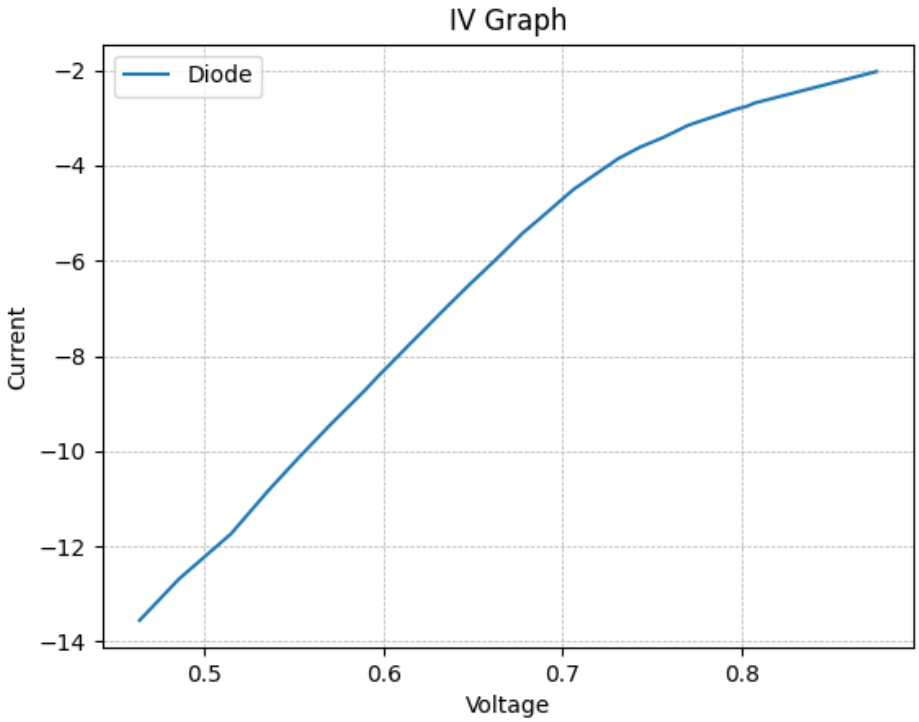
Creating an IV characteristics graph for a diode and devising a method to obtain the Ideality Factor by visual inspection of the semilog graph.

1.2 Method

The readings for the Current and Voltage were already provided in the lab handout. These were then plotted using Matplotlib and then **n** was approximated using the method devised.

V (V)	I (A)
0.464	1.30E-06
0.486	3.10E-06
0.515	8.00E-06
0.536	2.00E-05
0.553	4.00E-05
0.571	8.10E-05
0.59	1.65E-04
0.597	2.19E-04
0.604	2.85E-04
0.615	4.35E-04
0.632	8.30E-04
0.647	0.00145
0.663	0.00257
0.678	0.00448
0.687	0.00596
0.706	0.0111
0.731	0.0212
0.743	0.0269
0.756	0.033
0.77	0.0427
0.796	0.0594
0.803	0.0638
0.807	0.0681
0.875	0.132

2 Simulation results



3 Experimental results

The Current and Voltage for a diode are related by the following equation:

$$I = I_0(e^{qV/nkT} - 1) \tag{1}$$

Ignoring the 1 and taking $\log_e$ on both sides,

$$\log_e I = \frac{qV}{nkT} + \log_e I_0 \tag{2}$$

Here, we can observe that the graph obtained above is linear for Voltage between 0.5-0.7. The slope of $\log_e I$ vs V graph is given by $\frac{q}{nkT}$. Using this formula, we get **n=1.06**