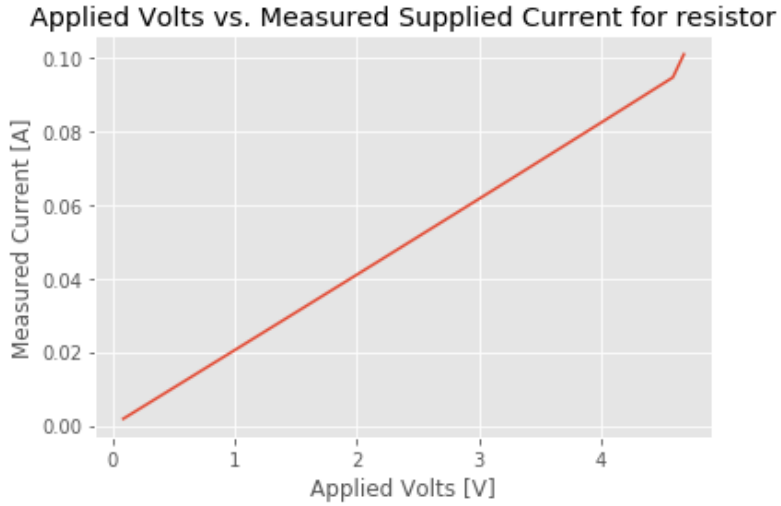
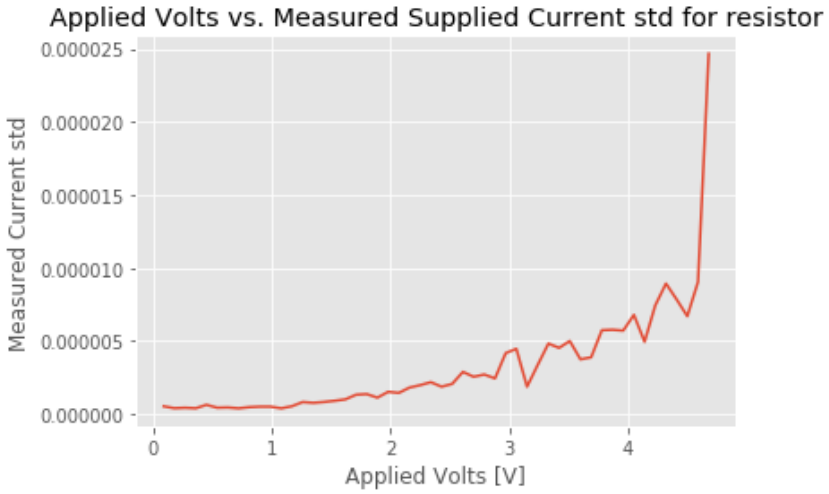
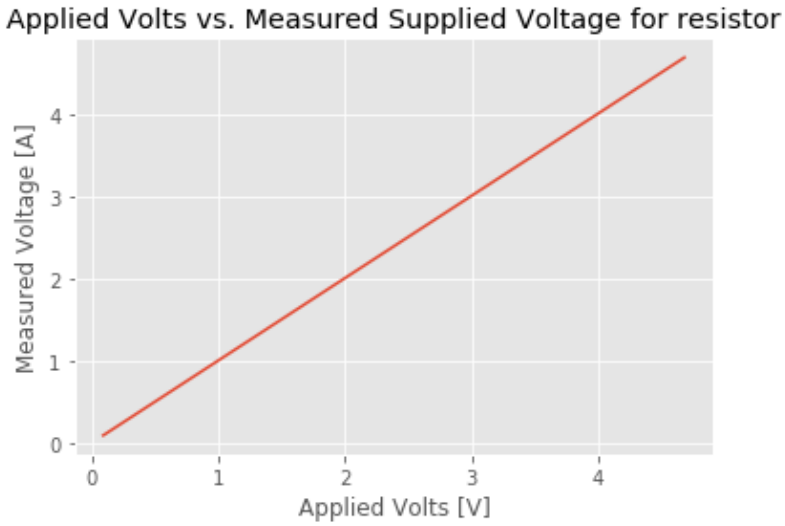
Name: Junzhe Wu Net id: Junzhew3

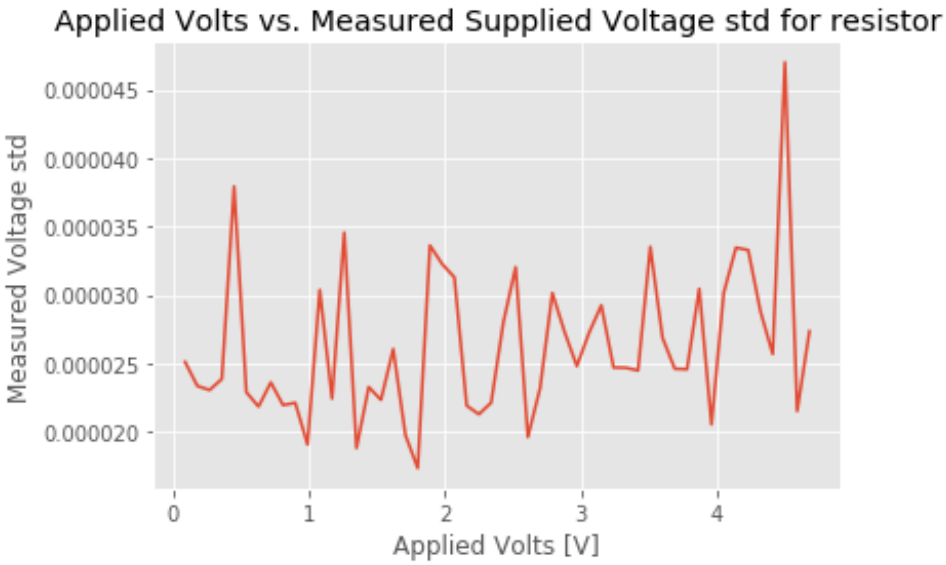
1. The maximum voltage I plan to apply to the resistor is 4.7V.
2. Current:



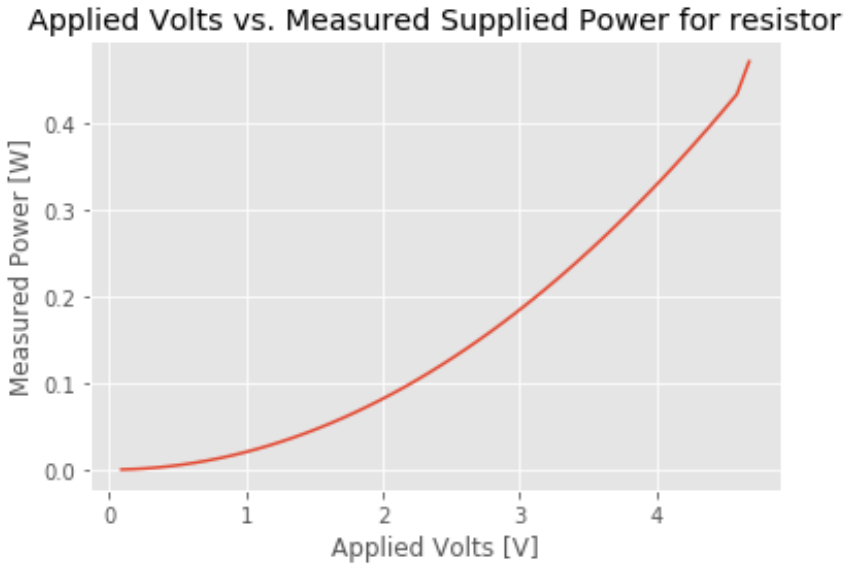


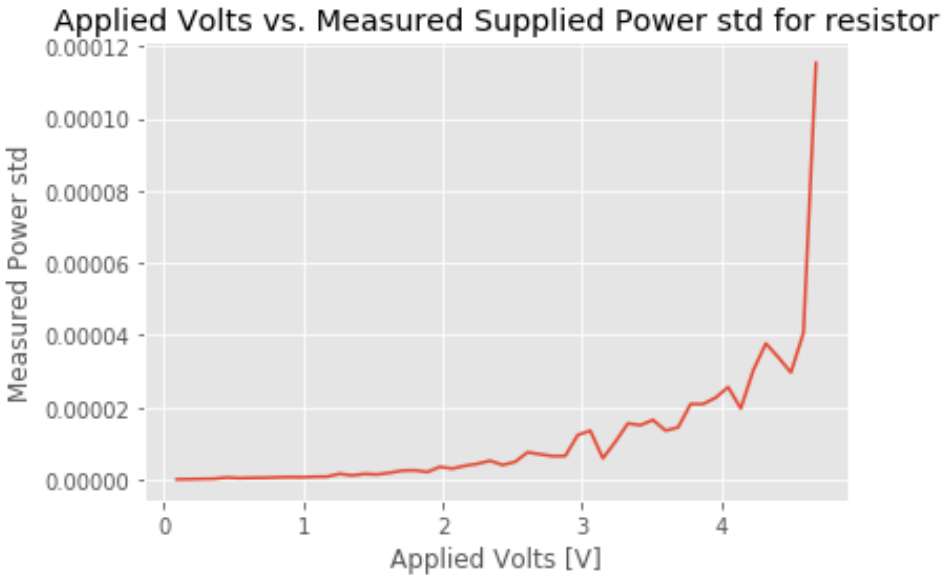
Voltage:




Applied Volts vs. Measured Supplied Voltage std for resistor
Measured Voltage std
0.000045
0.000040
0.000035
0.000030
0.000025
0.000020
0
1
2
3
4
Applied Volts [V]

Power:


Applied Volts vs. Measured Supplied Power for resistor
Measured Power [W]
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
Applied Volts [V]


Applied Volts vs. Measured Supplied Power std for resistor
Measured Power std
0.00012
0.00010
0.00008
0.00006
0.00004
0.00002
0.00000
0
1
2
3
4
Applied Volts [V]

3. The mean plots of current and voltage are straight line and the mean plot of power is quadratic curve. Because:

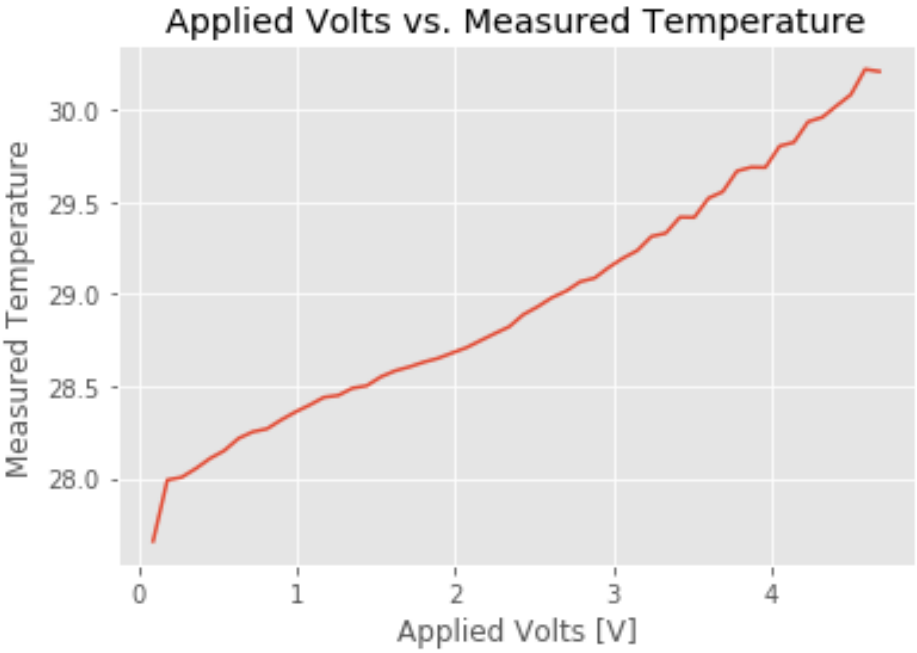
$$U_{measure} = U_{applied}$$

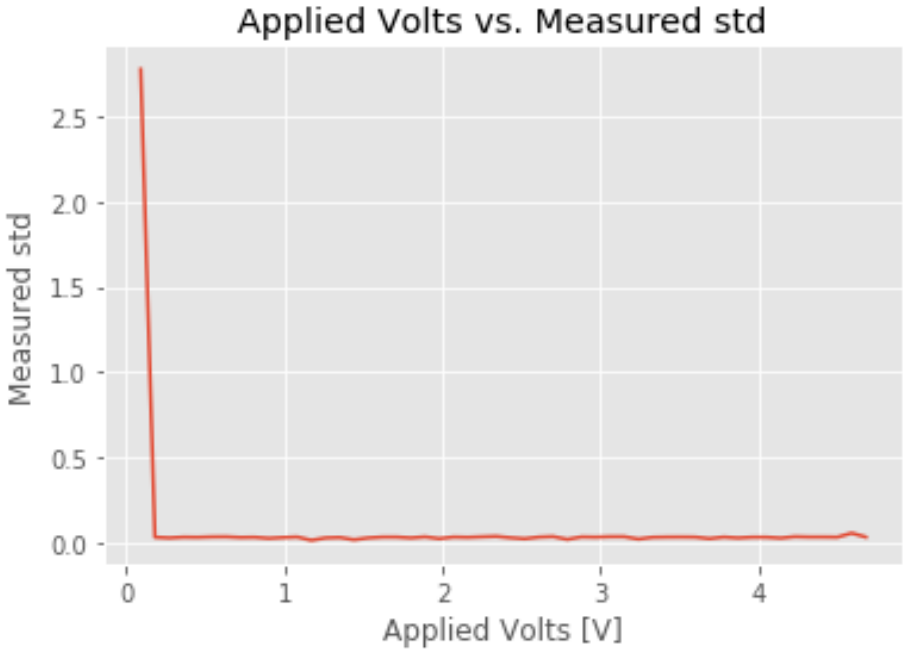
$$I_{measure} = \frac{U_{applied}}{R}$$

$$P_{measure} = U_{measure} I_{measure} = \frac{(U_{applied})^2}{R}$$

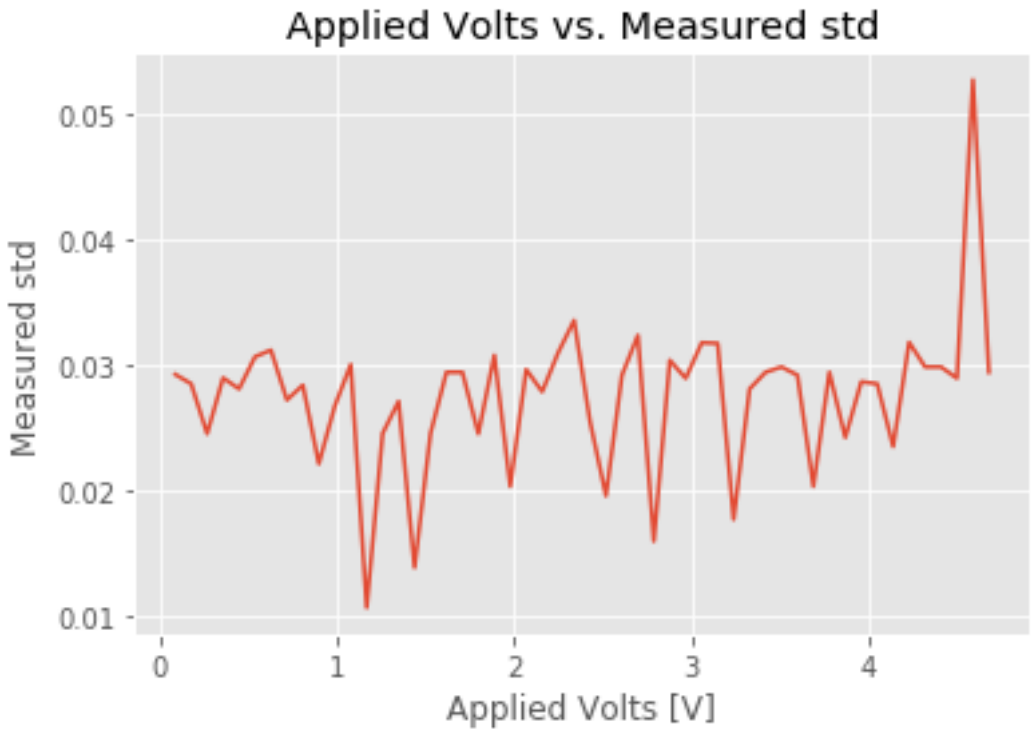
These measurements do follow the theoretical model.

4. The mean and standard deviation of the temperature for the different voltages applied on the power resistor.





The first value of temperature std is too large to see the change of rest values of temperature std. That is why I delete the first value and plot the temperature std again.



5. The standard deviation is different for different temperatures. Since when temperature goes up, the working condition for sensor and board will change, and the error will also change.

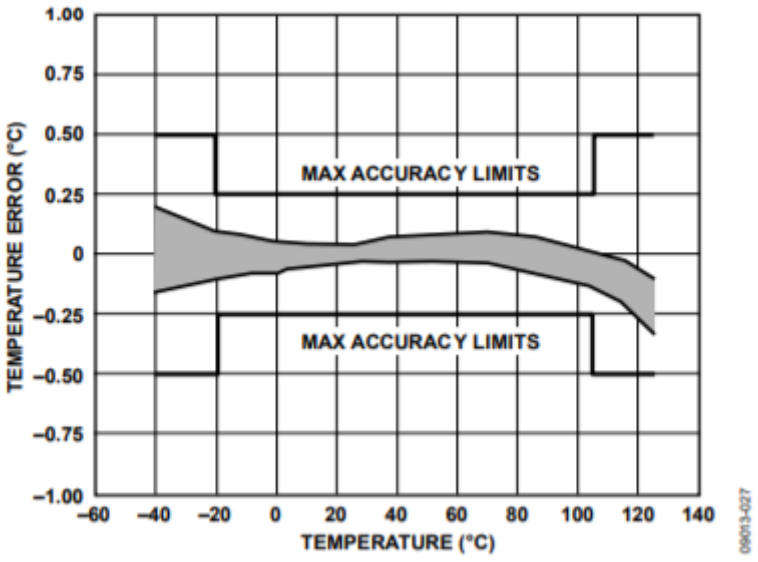


Figure 4. Temperature Accuracy at 3 V

Similarity: The std and error both change when the temperature changes. And the changes are all small when temperature rise from 27 to 31.