

Overview



Pod Choices:

**A1-01**

**A1-04**

**A1-07**

Wire Connections:

Thermistor Wire      Pod's Pin 3 (+5V Source)

Thermistor Wire      Pod's Pin 2 (0-5V Input)

Sensor Details:

A 100K ohm @25°C thermistor was used in this example. The resistance device provides a maximum measurement resolution of less than 0.2°C/bit.

i := 0 .. 70      Temperature Range

The following coefficient derivation will provide for the linearization of the sensor from 0C to 70C.

$$v\_adc(R_{therm}) := 5 \cdot \frac{30 \cdot k}{30 \cdot k + 30 \cdot k + R_{therm}}$$

display<sub>i</sub> := i

Displayed reading: Temperature

$$value_i := \frac{v\_adc(R_{\tau 100k_i})}{2.5} \cdot 1024$$

R<sub>τ100k</sub> is a table of resistance values versus temperature

regression analysis to the nth order:      n := 3

cc := regress (value, display, n)

coeff\_1 := cc<sub>3</sub>

coeff\_1 = -25.73

coeff\_2 := cc<sub>4</sub>

coeff\_2 = 0.19

coeff\_3 := cc<sub>5</sub>

coeff\_3 =  $-2.28 \times 10^{-4}$

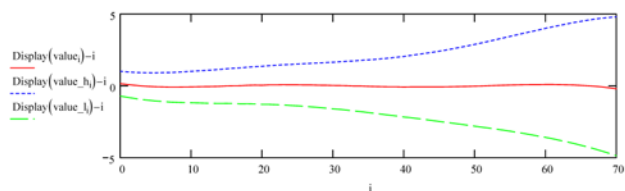
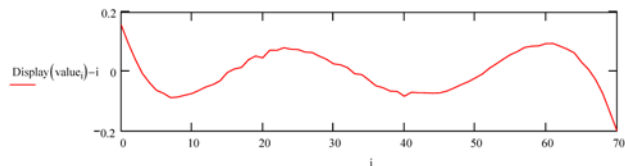
coeff\_4 := cc<sub>6</sub>

coeff\_4 =  $1.69 \times 10^{-7}$

Sample Coefficients

The 5VDC source output is not a precision source. It has a tolerance of ±4%. Typically, the device never reaches these extremes. The following curves indicate the error band for that range.

Error Curve



$$v\_adc\_h(R_{therm}) := 5.2 \cdot \frac{30 \cdot k}{30 \cdot k + 30 \cdot k + R_{therm}}$$

$$v\_adc\_l(R_{therm}) := 4.8 \cdot \frac{30 \cdot k}{30 \cdot k + 30 \cdot k + R_{therm}}$$

$$value_i := \frac{v\_adc(R_{\tau 100k_i})}{2.5} \cdot 1024$$

$$value\_h_i := \frac{v\_adc\_h(R_{\tau 100k_i})}{2.5} \cdot 1024$$

$$value\_l_i := \frac{v\_adc\_l(R_{\tau 100k_i})}{2.5} \cdot 1024$$