ECE 476/676 - Homework #8

Text Files, Temperature Sensors - Due Monday, March 24th

Temperature Sensor: Thermal Time Constant

- 1) Write a Python program which
 - Records the temperature of a DS18B20 sensor every 1.0 seconds
 - Displays the data on the LCD display, and
 - Saves the data to a text file
- 2) Using this program, record
 - Pick something that gets hot or cold (cup of tea, light bulb when turned on, motor, etc)
 - Record the temperature of this object for 1 minute or more
- 3) Modify this program to
 - Compute the thermal time constant (1/a) using recursive least squares and
 - Display the temperature and thermal time constant on the LCD display

$$T = b \cdot \exp(-at) + T_{amb} \qquad \qquad \ln(T - T_{amb}) = \ln(b) - at$$

- 4) Collect three sets of data (three different measurements of the thermal time constant)
- 5) From your data, determine the 90% confidence interval for the thermal time constant (1/a)