

Project 3: Analysis and Plotting of Experimental Data

Introduction

Experimental data has been collected and provided from a research trailer in the Jemez Mountains. The data contains a variety of measurements for water in a stream, temperatures, and diagnostics such as voltages of batteries that power the systems.

Problem Statement

The goal of the project is to write a Matlab program that reads in data files of the format provided and does some basic analysis and visualization. Specifically, the Matlab program should

1. read in a set of data files with a fixed format as given in the two examples (`Trailer-Data_14-02-02_0001.txt`, `Trailer-Data_14-02-03_0000.txt`), and treats the multiple sets of data as one continuous set;
2. plots (clearly labeled) the raw values of three measured quantities (each in its own figure) versus the date and time the measurement was taken: *Outdoor Temp* in degrees Celsius, C; *Pump and Heater Battery Voltage* in Volts, V; and *Instrument Battery Voltage* in Volts, V;
3. reports how many of the measured, raw voltages are above 14 V or below 12.5 V;
4. interpolates the raw data for all three quantities such that the resulting, interpolated values are at intervals of exactly one minute (zero seconds);
5. calculates a 60 minute moving average of the three interpolated quantities;
6. plots (clearly labeled) the interpolated data and moving average on the same plot (one plot for each quantity);
7. be easily modified for any number of other data files of the same format; and
8. be neatly coded and easy to understand, i.e., has appropriate variable names, nice formatting and comments.

Items to Turn In

- Hand in a printed document that includes memo, Matlab program, results and plots.
- Email Matlab program to instructor such that program can be readily ran with alternate data files of the same format. Put “EE 251 Project 3” in the subject line of the email.