

# Physics 524 Week 6 Homework Exercises

Due: Tuesday 10/3/2023 at 10am

## **Due date reminder, etc.**

Please email your completed assignment to the course TA by Tuesday, 10 am of next week. Assignments that are late by at most one week will receive at most 50% of full credit. We will not grade anything submitted more than one week late.

Your homework submissions—code, cell phone photos, etc. must include enough identifying information for us to tell who you are!

### 1. *Temperature Measurements*

Write a python program that will read a data file and generate graphs of the values of  $T_{I2C}$ ,  $T_{SPI}$ , and  $T_{I2C} - T_{SPI}$  as functions of sample number. Also have your program generate histograms of the values of these three quantities for the data file. Do this for several different files you've stored.

### 2. *ADC algorithm*

Pretend that the Adalogger uses its ADC inputs primarily to decide whether or not the DAC voltage is greater than the voltage on the trimpot's center pin, but not for much of anything else. Code up a 12-bit successive approximation ADC algorithm by defining a 12 bit SAR, as described in the notes, and setting or clearing various bits as you hunt for the DAC voltage that's closest to the voltage on the trimpot center pin.