

**PHZ4151C, Fall 2019**  
**Homework 8**  
**Due Tuesday Dec 10th, 11.59PM**

**Instructions:** Solve all five problems. Every problem is worth 10 points. Write your codes following the strategy discussed in the “Structure of the program and program design” video and the format used in the sample programs discussed in the class and lecture videos. Make sure that your code is clear, readable for users other than yourself, and properly commented. Once finished, include all your program files and figures into a zip file named after your last name and homework number (e.g. “Ullah\_HW8.zip”) and submit it through canvas. Submitting individual files for each problem or part of the problem will not be accepted and disregarded. There is no need to include big data files generated by your programs unless the data files are read by your programs (that is the program reads data from the file and uses that data). Email me any questions or concerns about the homework either through canvas or directly my email address.

**Note:** You are allowed to submit incomplete codes for partial credit.

**Problem 1:** Write a program for the radioactive decay problem discussed in the class for different  $N_0$  values of 1000, 100000, and 1000000. Plot  $\log(N)$  as a function of time for each  $N_0$  value on the same window.

**Problem 2:** Evaluate the following integral

$$\int_0^2 \int_{-1}^5 \int_1^4 \int_2^3 \int_{-5}^4 \int_{-1}^1 u^6 v^3 w^3 x^3 y z^2 du dv dw dx dy dz \quad (1)$$

**Problem 3:** Identify and fit the model to data given in HW83.dat using least squared method. The 1<sup>st</sup> and 2<sup>nd</sup> columns contain x and y data respectively.

**Problem 4:** Identify and fit the model to the data given in HW84.dat by finding the minimum of chi-squared. The 1<sup>st</sup> and 2<sup>nd</sup> columns contain x and y data respectively.