Computational Physics / PHYS-UA 210 / Problem Set #3
Due September 20, 2019

You *must* label all axes of all plots, including giving the *units*!!

1. Exercise 4.3 of Newman.

2. Read Example 4.3 in Newman. Using successively larger matrices (10×10, 30×30, etc.) find empirically and plot how the matrix multiplication computation rises with matrix size. Does it rise as N^3 as predicted? Use both an explicit function (i.e. the one in the example) and use the `dot()` method. How do they differ?

3. Using the functions in the `numpy.random` module, generate an ensemble of 10,000 one-dimensional random walks, each of 1,000 steps, where each step is determined by the normal distribution (Gaussian with a standard deviation of unity). Show using plots how the mean and standard deviation of the distribution of walker positions grows with the number of steps. Can you explain the dependence of the standard deviation on the number of steps?