PHYS 50733 - Computational Physics
Homework 1

Homework 1 is due at **midnight** on **Wednesday 6 February 2019**. Along with your jupyter notebook you should include copies of any plots generated and any analytical derivations or calculations required in a folder labeled Homework_1 in your github repository. Remember to comment your code. You will be graded on whether your notebook runs on my computer and produces the correct results as well as your use of functions when possible.

Problem 1

Write a program which calculates the distance a projectile of a mass, m will travel when shot out of a cannon at an angle θ from the ground with an initial speed v. Plot the dependence of the distance on m, θ and v for the following cases. Your values of m should be between 0.1 and 10 kg, θ from 0 to 90 degrees and v should span at least two orders of magnitude, however the exact values are yours to determine.

a) Earth
b) Mars
c) Titan
d) Ceres

Problem 2

Write a program which calculates e^{-x} using the three algorithms giving in lectures on 29 January 2019. Plot e^{-x} for each algorithm and using numpy as well as the difference between each algorithm and the numpy values as a function of x. Discuss the dependency of your answer on your choice of n_{max}.