MATLAB HW1

ESC 202, Spring '25

Due on Blackboard by 11:59 pm on Feb. 3

Upload your solutions to Blackboard by 11:59pm on Feb. 3. Upload your Matlab code along with the .m (Matlab file). You will create a file called "YOURLASTNAMEmh1.m" and submit that file on Blackboard. Your file will do everything described in the problem statements on this page, and may do more. Do not submit any other .m files. There is a general pre-formated .m file on Blackboard that may be a useful start.

1   Hey, they really are derivatives of each other!

The position of a particle along a straight line is given by $s = (t^3 - 9t^2 + 15t)$ feet, where t is in seconds. Plot the position, velocity, and acceleration of the particle from t = 0s – 10s. Use the "subplot" function to make a single figure with 3 subplots. Be sure to label plots appropriately, including units on axes.

2   Projectile Path

Plot the path of a soccer ball that is kicked such that it has a velocity of 10 m/s at 39°. Assume it is kicked from and lands on the ground.

3   Show 45° gives the farthest distance for an arbitrary velocity

Choose an initial velocity. Plot the path of a projectile launched with that initial velocity for a launch angle $\theta = [5^o, 15^o, 25^o, 35^o, 45^o, 55^o, 65^o, 75^o, 85^o]$. Put all paths on the same figure, and use a legend to label each trajectory appropriately. Remember to label axes with units.

4   Challenge: Animating

Use the "drawnow" function to animate the soccer ball from problem 2 as it flies through the air. Hint: loops are how you do something repeatedly. An animation is just a series of pictures.