Name: _____ Section: _____

Practice for Exam1. – SUBMIT the script by the end of the hour.

NO QUESTIONS WILL BE ANSWERED IF THEY PERTAIN TO WHY THE CODE DOES NOT WORK. NO QUESTIONS WILL BE ANSWERED REGARDING THE COVER SHEET EITHER. EVERYTHING IS WRITTEN HERE. **READ FULLY FIRST**. REFRAIN FROM RAISING YOUR HAND.

HOWEVER, PLEASE ASK FOR HELP IMMEDIATELY IF YOUR PC STARTS ACTING WEIRD!!!
SAVE OFTEN TO YOUR P:// DRIVE OR FLASHDRIVE!

A charged particle is being manipulated by electric fields, so it follows a specific path. The manipulation forces it to 'peak' (see figure below) multiple times. A laser is set up, to automatically count how often the particle crossed a specific height. Graphically count how many times the particle crosses the laser!

Height (meters)

Particle path

y_G
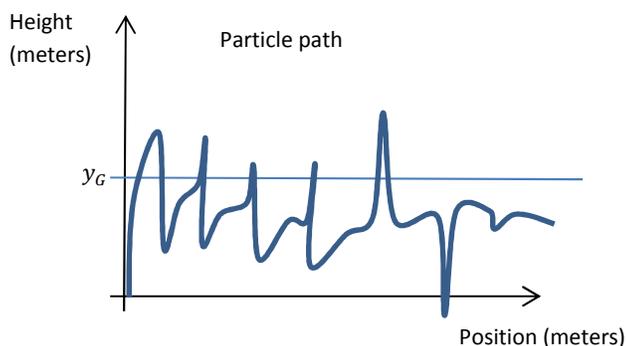
Position (meters)

The path of the particle is given by the following equation:

$$y(x) = e^{-x} * \frac{\cos(2\pi x)}{\sin(2\pi x - k)}$$

x and y are the positions, in meters, of the particle at a given moment. k is a known constant (no units) that dictates how well the particle flows.

At a given height y_G (meters), a laser is set up. This laser is represented by a horizontal line that will intersect with the path of the particle.

Create a program that will plot the path of the particle and the horizontal line, so we can visually count how many time the particle crossed the laser. (One up and down is equal to 2. For example, the figure above shows 10 passes in front of the laser.) For the particle curve, use 100 data points, from x=0 to 5 meters.

Step1 (**5pts**):

Step2: Shown above.   Step3: Equation also given above.

Step4: Assume $k = 3$, and $y_G = 3.2m$ (Test case #1)

Step5/Step6: Solve graphically. NO MATH.

Step7a and 7b: place directly on the script file. There are no step 7c to show.

   Requirements for the program itself:

   (**12pts**) Hardcode a variable for each given.

   (**20pts**) Define all vectors necessary to plot the path and the horizontal line (**4** vectors)

   (**10pts**) Plot correctly, using colors, markers and line specifications AS SHOWN in the videos.

   (**15pts**) Title, label and legend the plot properly and fully

   (**7pts**) – other random errors!

(5pts) – Fill in the table

Test case	Laser position (y_G) meters	Flow Coefficient (k)	How many times particle crosses path of laser?
#1	3.2	3	
#2	10	4	
#3	1	0.2	

Within script:

name/section/purpose of code (**3pts**)

commands to clean up previous execution of MATLAB codes (**3pts**)

comments (which is considered the algorithm 7a) (**5pts**)

spacing of code (**5pts**)

appropriate variable names (no single letters) (**5pts**)

semi-colon hiding intermediate calculations (**5pts**)