Computer Lab 8 – Week 9

Plots & GUI : Part 1

Create a 2D graph by plotting multiple data series on the same axes, using a resolution of at least 0.1 between points. Choose your axis limits so that all three mathematical functions show at least 2 full iterations. Ensure axes are all labelled, and each data series has a different line style, marker and colour.

$$y = \sin(x)$$
$$y = \cos(x)$$
$$y = \tan(x)$$

Part 2

Using the surface plot approach for plotting functions in two variables (see **meshgrid** and **surf**), plot the following two functions, using a resolution of at least 0.1 between points, from 0 to 10. Plot both functions side-by-side, as subplots on the same figure. Ensure all axes are labelled. Use element wise operators (.* or .^) when multiplying and squaring vectors.

$$z = \sin(x) \cdot \cos(y)$$
$$z = \sin\left(3\sqrt{(x-5)^2 + (y-5)^2}\right)$$

Part 3

In this part, you are going to create a MATLAB Graphical User Interface (GUI) using App Designer. Before you start, read the following websites which give you all the information you need to finish this part.

- Create a Simple UI Using App Designer

https://www.mathworks.com/help/matlab/creating_guis/ways-to-build-matlab-guis.html

- App Designer Components

https://www.mathworks.com/help/matlab/creating_guis/choose-components-for-your-app-designer-app.html

- Callbacks for Specific Components

https://www.mathworks.com/help/matlab/creating_guis/write-callbacks-for-gui-in-app-designer.html

Part 4: Please read through lecture & tutorial notes Week 3, the Projectile problem. Work through textbook example 3.1.1 if required and then implement this code into App Designer. Pdf is on moodle.

Manually work on the code before writing it in MATLAB.

The GUI should use the function created for the projectile launched from a cannon above. The user should input various values for x_0, y_0, v_{0x}, v_{0y}, then when the user clicks 'redraw plot', the figure should update in the GUI. Your GUI should use the following UI components:

- Edit Text
- Static Text
- Axes
- Push Button

Here is an example of what your GUI might look like: