

## Programming Assignment 06

**Due:** Tuesday , February 17

**Problem:** A common engineering activity is to perform functional analysis on an equation that is used for design purposes.

**Your task:** Design, code, and debug a MATLAB script that

- (1) Asks the user what kind of function (string, in-line, or m-file) will be used. If a string or inline, have the user enter the function, if an m-file, enter the file name;
- (2) Request the user to enter the domain of interest, and produce an annotated plot of the function in the desired domain using fplot (use a **function call**);
- (3) Displays a menu asking what type of analysis: zeros, minima, maxima, area under the curve;
- (4) Uses a switch-case structure with the menu response to
  - (a) Locate as many zeros as desired, report the location of each zero found in the command window, and compile and return a vector with the zero locations (use a **function call**)
  - (b) Locate as many minima as desired, report the location and value of each minimum found in the command window, and compile and return two vectors with the location of minima and the values (use a **function call**)
  - (c) Locate as many maxima as desired, report the location and value of each maximum found in the command window, and compile and return two vectors with location of the maxima and the values (use a **function call**)
  - (d) Find the area under the curve between 2 points entered by the user. Give the user the option of using the trapz or quadl method.
- (5) After finding as many of desired option, returns to step 3.
- (6) After working with the current function, have the script ask whether the analysis of another function is desired, and if so, return to step 1.

Use the function  $y = 3x \cos(2x) e^{0.1x}$  in the domain  $[-2\pi \ 2\pi]$

To test your script.

**Turn in:**

1. Folder with various m-files