13.12.2018

Due to:28.12.2018

MAT 116E

HOMEWORK-3

This homework is designed to give you practice with writing functions and visualizing data. When you produce your figure, **do not use Matlab's graphic editor. You have to use appropriate graphic options in command form. Otherwise, you will get lower grade.**

Homework must be submitted on the ninova system.

What to turn in: Copy the text from your scripts and paste it into a document. If a question asks you to plot or display something to the screen, also include the plot and screen output your code generates. Submit either a *.doc or *.pdf file.

Keep all your code in scripts. If a specific name is not mentioned in the problem statement, you can choose your own script names.

Q1. Use MATLAB to find the coefficients of the quadratic polynomial $y = ax^2 + bx + c$ that passes through the three points (x, y) = (−16, 38), (5, 9), and (25, 32). Plot the resulting polynomial and the three given points to show that the solution is correct.

Q2. Create a MATLAB script file to calculate and plot the derivative of the function y=cos(x) from $0 \le x \le \pi$ using the Central Difference Method described in class (shown below). Make sure to use enough points to provide a good approximation of the derivative plot. You must use a for loop with a sufficient number of terms to solve this problem. Provide a plot title and labels for the axes.

Q3.

Linear system of equations. Solve the following system of equations using ****. Compute and display the error vector

$$\begin{aligned} 3a+6b+4c &= 1 \\ a+5b &= 2 \\ 7b+7c &= 3 \end{aligned}$$

Q4.

Numerical integration. What is the value of: $\int_0^5 xe^{-x/3}dx$? Use **trapz** or **quad**. Compute and display the difference between your numerical answer and the analytical answer: $-24e^{-5/3}+9$.

Q5.

Computing the inverse. Calculate the inverse of $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and verify that when you multiply the original matrix by the inverse, you get the identity matrix (**inv**). Display the inverse matrix as well as the result of the multiplication of the original matrix by its inverse.