

Math 391. Assignment 1 Instructions

Due: Thursday, October 10

How to submit:

For the assignment, you should submit a hard copy in the lecture that contains your answers to all the questions. Each answer should explain what is being answered and what the relevant figures or plots show (*i.e.*, for question 2. *Please state what the figures are showing, don't just attach four unlabeled figures.*)

For any question that requires you to write a MatLab function, the hard copy should contain the code and the result from the code, and it should be clear to the reader what question this is for. (see Matlab Publish).

Submit a copy of your MatLab code on D2L via the dropbox.

Note on marking:

There is no standard requirement for the format of your assignment. The assignment you submit should be easy to follow and read.

(Optional) Typed up answers are often easier to read and mark. Creating a typed up document can be done by utilizing Matlab Publish and/or LaTeX. These should still be submitted on paper in lecture on Oct 10.

(*overleaf.com is my LaTeX editor*)

Office Hours Update

Mondays office hours are the same time, but now in this lab room.

Worksheet 3

01.

Using the formula from the question. Calculate the two values.

$$f'(1.3) \approx ? \quad (h = 0.1)$$

$$f'(1.3) \approx ? \quad (h = 0.2)$$

Compare to $f'(x) = (3xe^x - \cos(x))'$ at 1.3 to determine the error.

$$f'(1.3) = 26.2817$$

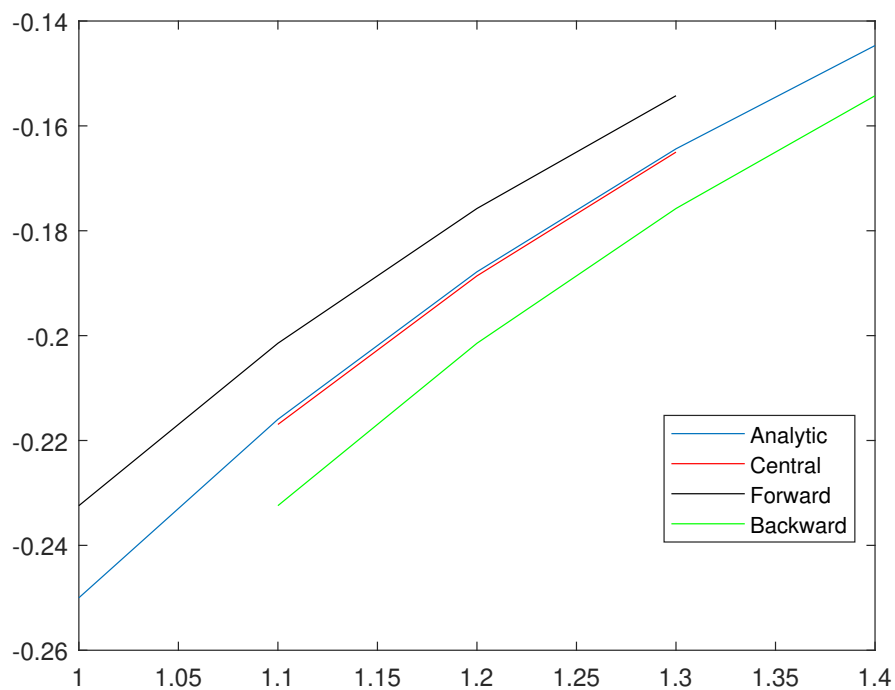
$$f'(1.3) \text{ is approx. } 26.3590 \text{ (h=0.1)}$$

Which has an error of: 0.0773

$$f'(1.3) \text{ is approx. } 26.2825 \text{ (h=0.01)}$$

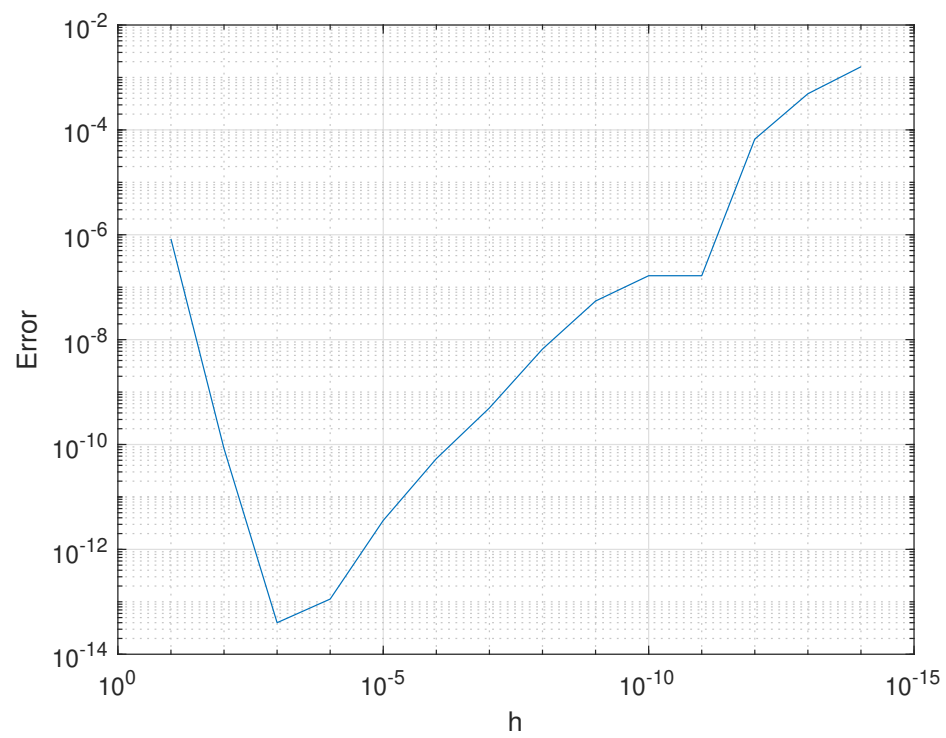
Which has an error of: 7.7285e-04

02.



| | | | | | |
|-----------------|----------|------------|------------|------------|-----------|
| x | 1.0000 | 1.1000 | 1.2000 | 1.3000 | 1.4000 |
| $f(x)$ | 0.25 | 0.2267574 | 0.2066116 | 0.1890359 | 0.17361 |
| $f'(x)$ | -0.25 | -0.2159594 | -0.1878287 | -0.164379 | 0.144676 |
| <i>forward</i> | -0.23242 | -0.2014579 | -0.1757565 | -0.154248 | |
| <i>backward</i> | | -0.2324263 | -0.2014580 | -0.1757565 | -0.154248 |
| <i>central</i> | | -0.2169421 | -0.1886072 | -0.1650022 | |

03.



04.

05.