SDSU COMP521
Fall 2023

Homework 02 - Due Date: 09/21/2023

August 16, 2023

Problem

Calculate the centered finite difference approximation of $f''(x)$ for the following functions on the interval $x \in [-1, 1]$. Show the numerical and the analytical results in the same plot using a grid size $h = 0.02$. Show the *loglog* plots of the errors versus grid sizes. Use at least 4 grid sizes for the error plot.

(a) $f(x) = e^x sin(\frac{\pi x}{2})$

(b) $f(x) = 2cos^2(\pi x) - 1$

Deliverable: Submit your code (please use MATLAB), plots and additional information in a single .PDF file through our Canvas class site. You should include an explanation of what your plot is showing, and why it is important. Why did you compare a numerical and analytic solution? What does the error plot mean beyond the fact there is an error? Can the numerical approximation be better? How?