In-class test coming up today!

Test is on Week 1-4 content (matrices and eigenvalues):

- Find determinant, trace, eigenvalues, eigenvectors of a matrix
- Express determinant/trace in terms of eigenvalues
- Normalise eigenvectors and test for orthogonality
- Write down modal matrix and create diagonal matrix
- Express a quadratic curve as a matrix, classify the curve using its eigenvalues, and identify its principal axes
- Solve a coupled differential equation using matrix methods, given some initial values
- Express a higher-order differential equation in matrix form

Plan for Week 5 Computer Lab

- Please run through the "**MATLAB Lab 5**" document
- We'll use MATLAB to test the accuracy of **finite difference approximations** by comparing with the exact solutions
- We'll consider how the error in finite differences scales with **grid size**
- We'll use finite differences to **de-trend data**
- Note: next two items for the assessed MATLAB Project are due on **Friday Week 6**

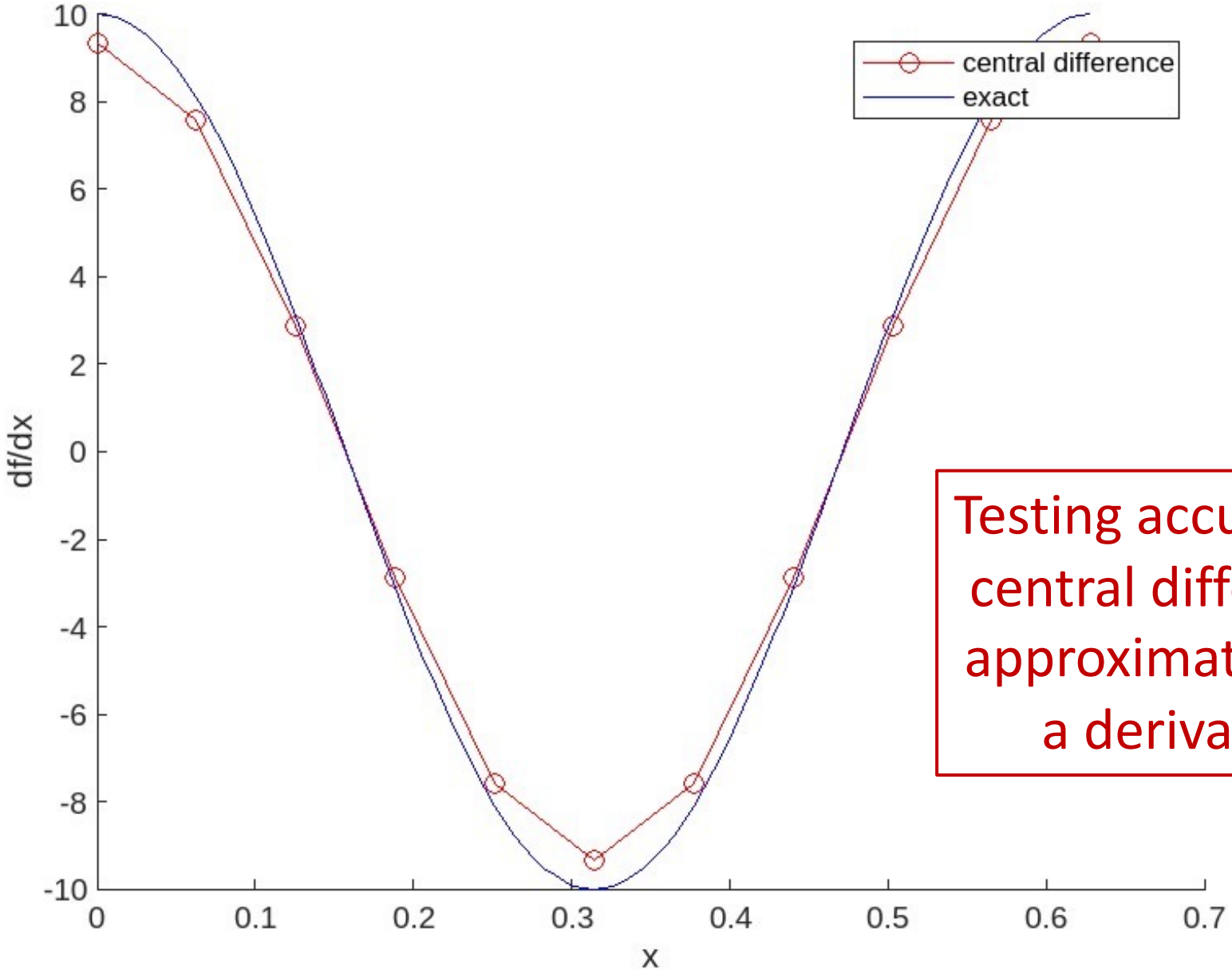
Lab 5 instructions

▾ Week 5

Test 1 is on Thur at 2.30PM, BA201 (usual lecture theatre)

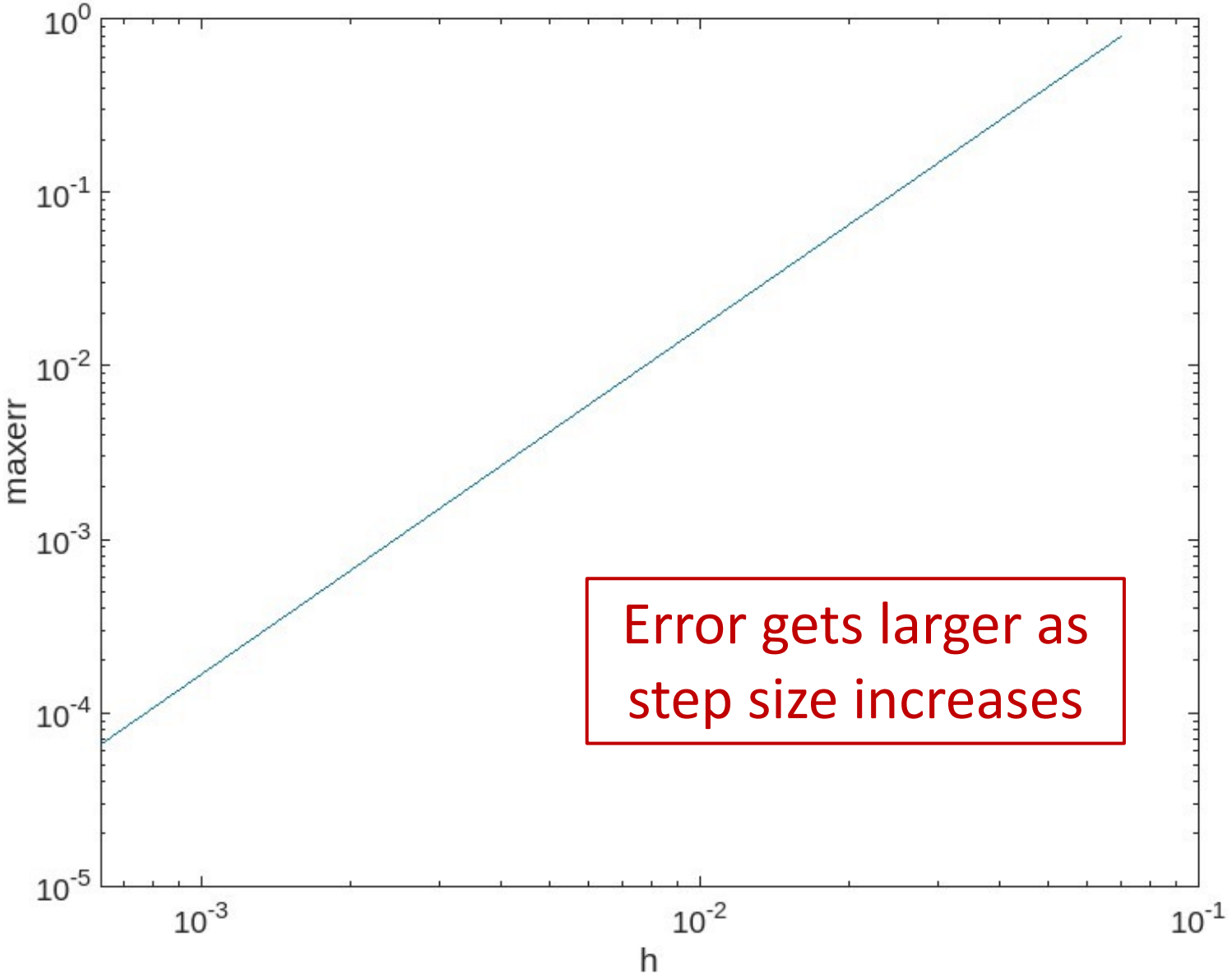
- Additional Practice test 1
- Additional Practice Test 1 Solutions
- Week 5 (September 1-7)
- Tutorial 5
- Matlab laboratory 5
- Lab5Data.dat

Plots for Lab 5

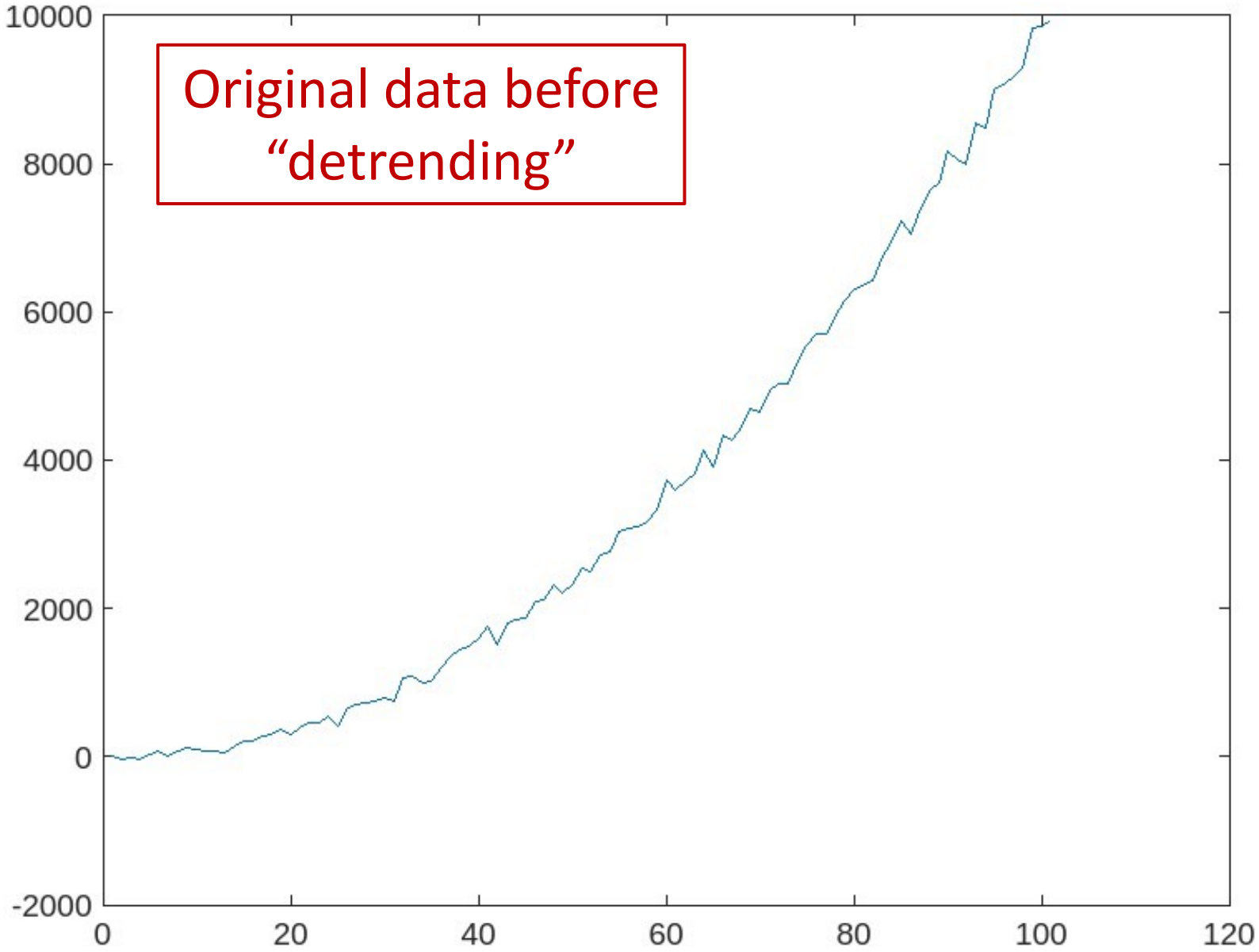


Testing accuracy of central difference approximation for a derivative

Plots for Lab 5



Plots for Lab 5



Plots for Lab 5

After trend is removed:

$$y(x) = a + bx + cx^2 + \varepsilon(x)$$

$$y''(x) = 2c + \varepsilon''(x)$$