Introduction

M.Sc. in Mathematical Modelling & Scientific Computing, Practical Numerical Analysis

Michaelmas Term 2026

Introduction to Practical Numerical Analysis

- Lectures: 4pm on Mondays in weeks 1–3, 10am on Fridays in weeks 1 & 2, and 9am on Friday in week 3, all in L2.
- There will be two problem sheets to be submitted on Thursdays by 9am in weeks 2 and 4.
- Idea is to learn to programme algorithms by a set of examples from Numerical Analysis.
- Our TAs will be Ben Ballyk and Joe Webb.
- Course materials, including lecture recordings, slides and problem sheets, will be available from https://courses.maths.ox.ac.uk/course/view.php?id=6773.

Content

Topics we will look at are

- Rootfinding
- Quadrature
- Elliptic PDEs
- ODEs (initial value problems)
  - Simple Euler schemes
  - Runge Kutta schemes
- Parabolic PDEs — the heat equation

Lectures

The idea of the lectures is to summarise the ideas for a topic. While there may be theorems stated, there will not be many proofs — this is meant to be a practical course.

Problem Sheets

Submissions: you will submit solutions to Section B problems for both problem sheets for marking by a TA.

All solutions should contain code and results as well as an explanation or interpretation of results. (Do your results match with theory, if not why not etc.)

A Jupyter notebook is recommended for your solutions, but then export as a pdf for submission.

If you prefer to write a .py file to execute all your code at once then use the publish.py code on the course webpage to convert your code to html and then save that as pdf.

In either case, please ensure the pdf contains a listing of all functions you use.