Course structure and other information

Coursework

- This will require some coding, in a language of your choice.
- The coding will require you to define functions, use loops, and plotting.
- The coursework will be set on 27th Feb, due 17th March.
- Worth 10%

Exam

- The exam will account for the remaining 90%.
- There will be an additional *mastery* question, requiring a deeper level of understanding.

Online resources

- Chapters will be uploaded to blackboard just as we are about to cover them in class.
- Notebook coding demos will appear in the lecture notes, these can be run through MyBinder.
- I will check Ed roughly once per week.

Office hour

- My office: Huxley 758
- Office hour: Immediately after Tuesday's lecture, 1pm, in my office.

Planned course structure:

Here's what you can expect from each stage in the course - note that this may be subject to change!

- Summary of Complex Analysis
  - We will collect and review the tools and theorems needed for applications
- Approximation of closed and unbounded contours
  - We will investigate the unexpectedly rapid convergence of the trapezium rule for closed and unbounded contours
  - We will review applications of this, such as root-finding and approximation of high-order derivatives
  - We will investigate techniques for further improving the accuracy
- Polynomial approximation
  - We make connections between Fourier series, Lauranet polynomials and Chebyshev polynomials
  - We investiage the role that the complex plane plays when approximating functions on the real line

  - We will learn about other orthoganol polynomials, and review classical Gaussian quadrature for analytic functions
- Special functions
  - We will investigate a few special functions relevant to applications
  - Fresnel integrals
  - Airy functions
  - Gamma functions
- Steepest descent methods
  - We investigate evaluation of integrals via steepest descent deformation
  - Asymptotic approaches
  - Numerical approaches
- Singular integral equations
  - We review Cauchy and Hilbert transforms
  - We derive integral equation methods for solving Laplace problems