School of Mathematics

Course 342 — Practical computational simulations. 2002-03
(JS Theoretical Physics, JS Mathematics, JS Computational Science.)

Lecturer: Dr. Mike Peardon

Requirements/prerequisites: Some knowledge of C programming.

Duration: Michaelmas term.

Number of lectures per week: 1 lecture per week, with a 1 hour lab class.

Assessment: Assessment is through lab attendance and assignments and a project.

End-of-year Examination: None.

Description:

The course provides a practical introduction to some numerical techniques for simulating physical systems.

- The C compiler: Using the C compiler, command line arguments, file input/output, structures, linking to libraries.
- Matrix methods: inversion, eigenvalues and eigenvectors.
- Finite difference methods: solving ODEs and PDEs.

Textbooks:

- **UNIX in a Nutshell**, Robbins. O'Reilly Publishing. ISBN: 1-56592-427-4.
- **Practical C Programming, 3rd Edition**, Oualline. O'Reilly Publishing. ISBN: 1-56592-306-5.
- **Numerical Recipes in C**, Press, Teukolsky, Vetterling and Flannery. Cambridge. ISBN: 0-521-43108-5. Online: `http://www.nr.com/`

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