Math 164 - Scientific Computing: Spring 2003

Professor: L.G. de Pillis
TTh 1:15 - 2:30 p.m.
Olin 145

• Topics:
Computational techniques applied to problems in science and engineering. Modeling of physical problems, computer implementation, analysis of results; use of mathematical software; numerical methods.

• Recommended Texts:
None of the texts listed is required for the course. All the texts listed are on four-hour reserve at Sprague Library.


• Prerequisites:
One semester linear algebra, one semester ordinary differential equations, CS 60 or programming experience, and a broad science background.

• Course Outline:
1. Introduction and course goals
2. Mathematical modeling and Matlab
3. Modeling with ordinary differential equations for multiple applications
4. Error analysis for differential equations
5. Modeling with linear systems for economics
6. Analysis for solving linear systems and eigenvalue problems
7. Fourier Transforms and FFT
8. Parallel computing with MPI
9. Modeling with partial differential equations for multiple applications

• Homework and Grading:
Grading will be based entirely on several assigned modeling, programming and writing projects, in-class presentations, and a larger final project. Detailed requirements of these projects will be discussed in class. Most work will be done in teams, some work is to be done individually.

Attendance at and participation in regular lectures is not required, but is strongly encouraged, and will be a deciding factor in borderline grades.