MA 5628-01: Numerical Ordinary Differential Equations Fall 2004

Class: MWF 15:05 - 15:55, 327B Fisher Hall
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Office Hours: MWF 4 - 5 pm, and by appointment

Prerequisites: Introduction of ODE, basic linear algebra, or consent of instructor


Additional References: 1. Computational Methods in Ordinary Differential Equations
2. Numerical Solution of Ordinary Differential Equations

Contents: This course discusses the principles and applications of numerical methods to solve ordinary differential equations. Topics to be covered include:

- Solution methods for initial value problems (IVP):
  - Basic implicit and explicit solution methods (e.g. Euler, trapezoid)
  - One-step methods (e.g. Taylor series methods, Runge-Kutta methods)
  - Linear multistep methods (Adams methods, predictor-corrector methods)

- Solution methods for boundary value problems (BVP):
  - Shooting methods
  - Finite difference methods

- Stability, convergence, accuracy and consistency of these methods

- Stiffness of IVP and BVP

Homework: Homework and computer projects will be assigned and collected. (60% of grade)

Final Exam: There will be a final exam. (40% of grade)

Class Policies: - Attendance in class is mandatory.
  - Students are expected to hand in homework assignments and computer projects on time.

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