

Math 578 - Numerical Analysis 1

September 1, 2011

Lectures

Location: Burnside Hall 1205

Time: Tuesday and Thursday - 13:05 - 14:25

Instructor: Jean-Christophe Nave

office: Burnside hall 1121 - Thursday - 14:30 - 16:00 (or by appointment)

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Catalog Description

Development, analysis and effective use of numerical methods to solve problems arising in applications. Topics include direct and iterative methods for the solution of linear equations (including preconditioning), eigenvalue problems, interpolation, approximation, quadrature, solution of nonlinear systems.

Topics Covered

- Computer arithmetics
- Interpolation
- Direct methods for linear systems
- Iterative methods for linear systems
- Nonlinear solutions and basic optimization methods
- Numerical integration
- Numerical differentiation
- Solutions of ordinary differential equations
- Eigenvalue problems

Prerequisites

MATH 247 or MATH 251; and MATH 387; or permission of the instructor.

Textbook (not mandatory)

Author: Robert Plato

Title: Concise numerical mathematics, Graduate Studies in Mathematics
57, AMS.

Recommended Reading

- Quarteroni, Sacco, and Saleri, Numerical mathematics, TAM 37
- Trefethen and Bau III. Numerical linear algebra. SIAM
- Dahlquist and Bjorck. Numerical methods. Dover
- Atkinson and Han. Theoretical numerical analysis. TAM 39. Springer
- Isaacson and Keller. Analysis of numerical methods. Dover

Software and Programming

I expect students enrolled in the class to learn and use Matlab. For projects and homework I will accept also C/C++, FORTRAN,...

Evaluation Scheme

Homework 50% (4 problem sets worth 5% each)

Project 50% (oral presentation 20% - written report 30%)