

MATH/CSCI 3300/8305: Numerical Methods

TR 1:00 PM – 2:15 PM | Remote Learning | Dr. Baccouch

Overview: Numerical methods are mathematical techniques for generating approximate solutions to mathematical problems of various types. The purpose of this course is to

1. introduce/analyze numerical methods for approximating solutions to ordinary differential equations (ODEs) and partial differential equations (PDEs),
2. explain how, why, and when they can be expected to work.

Description: This course involves solving equations in one variable, linear systems of equations, interpolation, numerical differentiation and integration, numerical solutions to ordinary differential equations, numerical calculations of eigenvalues and eigenvectors, analysis of algorithms and errors, and computational efficiency.

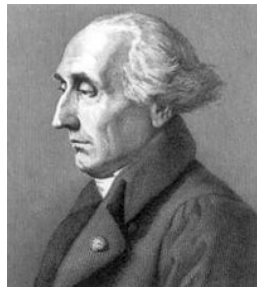
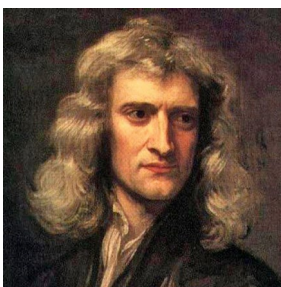
The main topics covered are: Analysis of algorithms and errors, Solution of equations in one variable; Polynomial interpolation and approximation; Numerical differentiation and integration; Initial-value problems for ordinary differential equations; Numerical methods for solving linear systems.

Objectives: This course will emphasize the development of numerical methods to provide solutions to common problems formulated in science and engineering. Students will be able to apply numerical methods to the problems that do not have analytic solutions and become familiar with techniques for solving numerically large problems. In particular, he/she should become familiar with Numerical techniques for solving nonlinear equations, interpolation, numerical differentiation and integration.

Textbook: Numerical Methods, 4th Edition, by Faires and Burden, Brooks/Cole, 2013

For Whom Intended: Undergraduates and first year graduates (majors in mathematics, engineering, or computer science) needing a basic familiarity with numerical methods. Graduate students can take this class as a graduate level class (Math/CSCI 8305).

Prerequisites: Math 1960 and some basic programming skills. It is recommended, but not required, that students take Math 2050 (Applied Linear Algebra) Math 2350 (Differential equations) before taking this course.

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