Numerical Methods Using Matlab (4th Edition)

By John H. Mathews, Kurtis K. Fink

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 This book provides a fundamental introduction to numerical analysis. This book covers numerous topics including Interpolation and Polynomial Approximation, Curve Fitting, Numerical Differentiation, Numerical Integration, and Numerical Optimization. For engineering and computer science fields.

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Editorial Review

From the Back Cover
This book provides a fundamental introduction to numerical analysis. This book covers numerous topics including Interpolation and Polynomial Approximation, Curve Fitting, Numerical Differentiation, Numerical Integration, and Numerical Optimization. For engineering and computer science fields.

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This book provides a fundamental introduction to numerical analysis suitable for undergraduate students in mathematics, computer science, physical sciences, and engineering. It is assumed that the reader is familiar with calculus and has taken a structured programming course. The text has enough material fitted modularly for either a single-term course or a year sequence. In short, the book contains enough material so that instructors will be able to select topics appropriate to their needs.

Students of various backgrounds should find numerical methods quite interesting and useful, and this is kept in mind throughout the book. Thus, there is a wide variety of examples and problems that help to sharpen one's skill in both the theory and practice of numerical analysis. Computer calculations are presented in the form of tables and graphs whenever possible so that the resulting numerical approximations are easier to visualize and interpret. MATLAB programs are the vehicle for presenting the underlying numerical algorithms.

Emphasis is placed on understanding why numerical methods work and their limitations. This is challenging and involves a balance between theory, error analysis, and readability. An error analysis for each method is presented in a fashion that is appropriate for the method at hand, yet does not turn off the reader. A mathematical derivation for each method is given that uses elementary results and builds the student's understanding of calculus. Computer assignments using MATLAB give students an opportunity to practice their skills at scientific programming.

Shorter numerical exercises can be carried out with a pocket calculator/computer, and the longer ones can be done using MATLAB subroutinie libraries. It is left for the instructor to guide the students regarding the pedagogical use of numerical computations. Each instructor can make assignments that are appropriate to the available computing resources. Experimentation with the MATLAB subroutine libraries is encouraged. These materials can be used to assist students in the completion of the numerical analysis component of computer laboratory exercises.

In this edition a section on Bezier curves has been added to the end of the chapter on curve fitting. Additionally, the chapter on numerical optimization has been expanded to include an introduction to both direct and derivative based methods for optimizing functions of one or more variables. A listing of the MATLAB programs in this textbook is available upon request from the authors (http://math.fullerton.edu/mathews/numerical.html). An instructor's solution manual for the exercise sets is available from the publisher.
Previously, we took the attitude that any software program that students mastered would work fine. However, many students entering this course have yet to master a programming language (computer science students excepted). MATLAB has become the tool of nearly all engineers and applied mathematicians, and its newest versions have improved the programming aspects. So we think that students will have an easier

and more productive time in this MATLAB version of our text.

Users Review

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