

1. Record Nr.	UNINA9910824482203321
Autore	Epperson James F
Titolo	An Introduction to Numerical Methods and Analysis, Second Edition
Pubbl/distr/stampa	Hoboken, : Wiley, 2013
ISBN	1-118-73097-6 1-118-40746-6
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (1171 p.)
Disciplina	535.278
Soggetti	Lagrange equations Mathematics Numerical analysis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Cover; Half Title page; Title page; Copyright page; Dedication; Preface; Chapter 1: Introductory Concepts and Calculus Review; 1.1 Basic Tools of Calculus; 1.2 Error, Approximate Equality, and Asymptotic Order Notation; 1.3 A Primer on Computer Arithmetic; 1.4 A Word on Computer Languages and Software; 1.5 Simple Approximations; 1.6 Application: Approximating the Natural Logarithm; 1.7 A Brief History of Computing; 1.8 Literature Review; References; Chapter 2: A Survey of Simple Methods and Tools; 2.1 Horner's Rule and Nested Multiplication; 2.2 Difference Approximations to the Derivative 2.3 Application: Euler's Method for Initial Value Problems 2.4 Linear Interpolation; 2.5 Application-The Trapezoid Rule; 2.6 Solution of Tridiagonal Linear Systems; 2.7 Application: Simple Two-Point Boundary Value Problems; Chapter 3: Root-Finding; 3.1 The Bisection Method; 3.2 Newton's Method: Derivation and Examples; 3.3 How to Stop Newton's Method; 3.4 Application: Division Using Newton's Method; 3.5 The Newton Error Formula; 3.6 Newton's Method: Theory and Convergence; 3.7 Application: Computation of the Square Root; 3.8 The Secant Method: Derivation and Examples; 3.9 Fixed-Point Iteration 3.10 Roots of Polynomials, Part 13.11 Special Topics in Root-Finding Methods; 3.12 Very High-Order Methods and the Efficiency Index; 3.13 Literature and Software Discussion; References; Chapter 4:

Interpolation and Approximation; 4.1 Lagrange Interpolation; 4.2 Newton Interpolation and Divided Differences; 4.3 Interpolation Error; 4.4 Application: Muller's Method and Inverse Quadratic Interpolation; 4.5 Application: More Approximations to the Derivative; 4.6 Hermite Interpolation; 4.7 Piecewise Polynomial Interpolation; 4.8 An Introduction to Splines  
4.9 Application: Solution of Boundary Value Problems  
4.10 Tension Splines; 4.11 Least Squares Concepts in Approximation; 4.12 Advanced Topics in Interpolation Error; 4.13 Literature and Software Discussion; References; Chapter 5: Numerical Integration; 5.1 A Review of the Definite Integral; 5.2 Improving the Trapezoid Rule; 5.3 Simpson's Rule and Degree of Precision; 5.4 The Midpoint Rule; 5.5 Application: Stirling's Formula; 5.6 Gaussian Quadrature; 5.7 Extrapolation Methods; 5.8 Special Topics in Numerical Integration; 5.9 Literature and Software Discussion; References  
Chapter 6: Numerical Methods for Ordinary Differential Equations  
6.1 The Initial Value Problem: Background; 6.2 Euler's Method; 6.3 Analysis of Euler's Method; 6.4 Variants of Euler's Method; 6.5 Single-Step Methods: Runge-Kutta; 6.6 Multistep Methods; 6.7 Stability Issues; 6.8 Application to Systems of Equations; 6.9 Adaptive Solvers; 6.10 Boundary Value Problems; 6.11 Literature and Software Discussion; References; Chapter 7: Numerical Methods for the Solution of Systems of Equations; 7.1 Linear Algebra Review; 7.2 Linear Systems and Gaussian Elimination; 7.3 Operation Counts  
7.4 The LU Factorization

---

Sommario/riassunto

Praise for the First Edition "" . . . outstandingly appealing with regard to its style, contents, considerations of requirements of practice, choice of examples, and exercises.""-Zentralblatt MATH "" . . . carefully structured with many detailed worked examples.""-The Mathematical Gazette The Second Edition of the highly regarded An Introduction to Numerical Methods and Analysis provides a fully revised guide to numerical approximation. The book continues to be accessible and expertly guides readers through the many available t

---