Solving Ordinary Differential Equations I

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This book deals with methods for solving nonstiff ordinary differential equations. The first chapter describes the historical development of the classical theory from Newton, Leibniz, Euler, and Hamilton to limit cycles and strange attractors. In a second chapter a modern treatment of Runge-Kutta and extrapolation methods is given. Also included are continuous methods for dense output, parallel Runge-Kutta methods, special methods for Hamiltonian systems, second order differential equations and delay equations. The third chapter begins with the classical theory of multistep methods, and concludes with the theory of general linear methods. Many applications from physics, chemistry, biology, and astronomy together with computer programs and numerical comparisons are presented. This new edition has been rewritten, errors have been eliminated and new material has been included. The book will be immensely useful to graduate students and researchers in numerical analysis and scientific computing, and to scientists in the fields mentioned above.

作者介绍:

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