

1. Record Nr.	UNINA9910254074803321
Autore	Hermann Martin
Titolo	Nonlinear Ordinary Differential Equations [[electronic resource] ] : Analytical Approximation and Numerical Methods / / by Martin Hermann, Masoud Saravi
Pubbl/distr/stampa	New Delhi : , : Springer India : , : Imprint : Springer, , 2016
ISBN	81-322-2812-X
Edizione	[1st ed. 2016.]
Descrizione fisica	1 online resource (XVI, 310 p. 53 illus.)
Disciplina	515.352
Soggetti	Differential equations Numerical analysis Mathematical physics Ordinary Differential Equations Numerical Analysis Mathematical Physics Mathematical Applications in the Physical Sciences
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	A Brief Review of Elementary Analytical Methods for Solving Nonlinear ODEs -- Analytical Approximation Methods -- Further Analytical Approximation Methods and Some Applications -- Nonlinear Two-Point Boundary Value Problems -- Numerical Treatment of Parameterized Two-Point Boundary Value Problems.
Sommario/riassunto	The book discusses the solutions to nonlinear ordinary differential equations (ODEs) using analytical and numerical approximation methods. Recently, analytical approximation methods have been largely used in solving linear and nonlinear lower-order ODEs. It also discusses using these methods to solve some strong nonlinear ODEs. There are two chapters devoted to solving nonlinear ODEs using numerical methods, as in practice high-dimensional systems of nonlinear ODEs that cannot be solved by analytical approximate methods are common. Moreover, it studies analytical and numerical techniques for the treatment of parameter-dependent ODEs. The book explains various methods for solving nonlinear-oscillator and structural-system

problems, including the energy balance method, harmonic balance method, amplitude frequency formulation, variational iteration method, homotopy perturbation method, iteration perturbation method, homotopy analysis method, simple and multiple shooting method, and the nonlinear stabilized march method. This book comprehensively investigates various new analytical and numerical approximation techniques that are used in solving nonlinear-oscillator and structural-system problems. Students often rely on the finite element method to such an extent that on graduation they have little or no knowledge of alternative methods of solving problems. To rectify this, the book introduces several new approximation techniques.

---