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Soggetti	Computer mathematics Numerical analysis Differential equations Applied mathematics Engineering mathematics Physics Computational Mathematics and Numerical Analysis Numerical Analysis Ordinary Differential Equations Applications of Mathematics Computational Science and Engineering Numerical and Computational Physics, Simulation
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Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	1 General Formulation of Spectral Approximation -- 2 Tau and Galerkin Methods for Fourth Order GEPs -- 3 The Chebyshev Collocation Method -- 4 The Laguerre Collocation Method -- 5 Conclusions and Further Developments -- Appendix: Algebraic Two-Parameter Eigenvalue Problems -- Index.
Sommario/riassunto	This book focuses on the constructive and practical aspects of spectral methods. It rigorously examines the most important qualities as well as drawbacks of spectral methods in the context of numerical methods devoted to solve non-standard eigenvalue problems. In addition, the

book also considers some nonlinear singularly perturbed boundary value problems along with eigenproblems obtained by their linearization around constant solutions. The book is mathematical, posing problems in their proper function spaces, but its emphasis is on algorithms and practical difficulties. The range of applications is quite large. High order eigenvalue problems are frequently beset with numerical ill conditioning problems. The book describes a wide variety of successful modifications to standard algorithms that greatly mitigate these problems. In addition, the book makes heavy use of the concept of pseudospectrum, which is highly relevant to understanding when disaster is imminent in solving eigenvalue problems. It also envisions two classes of applications, the stability of some elastic structures and the hydrodynamic stability of some parallel shear flows. This book is an ideal reference text for professionals (researchers) in applied mathematics, computational physics and engineering. It will be very useful to numerically sophisticated engineers, physicists and chemists. The book can also be used as a textbook in review courses such as numerical analysis, computational methods in various engineering branches or physics and computational methods in analysis.
