

# The Algebraic Eigenvalue Problem

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Templates for the Solution of Algebraic Eigenvalue Problems  
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An Oscillation Theorem for Algebraic Eigenvalue Problems and its Applications  
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An Introduction to Inverse Algebraic Eigenvalue Problems  
The Algebraic Eigenvalue Problem  
The Algebraic Eigenvalue Problem, By J.H. Wilkinson  
Some Topics in the Numerical Solution of the Algebraic Eigenvalue Problem  
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Numerical Methods for Large Eigenvalue Problems  
The Matrix Eigenvalue Problem  
ARPACK Users' Guide  
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The General Formulation for Inverse Algebraic Eigenvalue Problem  
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Zhaojun Bai  
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James H. Wilkinson  
Frank William Sinden  
Zhaojun Bai  
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*Richard B. Lehoucq Steffen Börm Chun-Chin Sy Xu Shu-Fang*

large scale problems of engineering and scientific computing often require solutions of eigenvalue and related problems this book gives a unified overview of theory algorithms and practical software for eigenvalue problems it organizes this large body of material to make it accessible for the first time to the many nonexpert users who need to choose the best state of the art algorithms and software for their problems using an informal decision tree just enough theory is introduced to identify the relevant mathematical structure that determines the best algorithm for each problem

mathematics of computing numerical analysis

algebraische inverse eigenwertprobleme behandeln die frage wie man die elemente einer matrix aus den spektralwerten bestimmen kann dies ist ein zentrales thema in vielen problemkreisen z b kontrolltheorie molekularspektroskopie geologie

this revised edition discusses numerical methods for computing the eigenvalues and eigenvectors of large sparse matrices it provides an in depth view of the numerical methods that are applicable for solving matrix eigenvalue problems that arise in various engineering and scientific applications each chapter was updated by shortening or deleting outdated topics adding topics of more recent interest and adapting the notes and references section significant changes have been made to chapters 6 through 8 which describe algorithms and their implementations and now include topics such as the implicit restart techniques the jacobi davidson method and automatic multilevel substructuring

an in depth theoretical discussion of the two most important classes of algorithms for solving matrix eigenvalue problems

this book is a guide to understanding and using the software package arpack to solve large algebraic eigenvalue problems the software described is based on the implicitly restarted arnoldi method which has been heralded as one of the three most important advances in large scale eigenanalysis in the past ten years the book explains the acquisition installation capabilities and detailed use of the software for computing a desired subset of the eigenvalues and eigenvectors of large sparse standard or generalized eigenproblems it also discusses the underlying theory and algorithmic background at a level that is accessible to the general practitioner

eigenvalues and eigenvectors of matrices and linear operators play an important role when solving problems from structural mechanics and electrodynamics e g by describing the resonance frequencies of systems when investigating the long term behavior of stochastic processes e g by describing invariant probability measures and as a tool for solving more general mathematical problems e g by diagonalizing ordinary differential equations or systems from control theory this textbook presents a number of the most important numerical methods for finding eigenvalues and eigenvectors of matrices the authors discuss the central ideas underlying the different algorithms and introduce the theoretical concepts required to analyze their behavior with the goal to present an easily accessible introduction to the field including rigorous proofs of all important results but not a complete overview of the vast body of research several programming examples allow the reader to experience the behavior of the different algorithms first hand the book addresses students and lecturers of mathematics physics and engineering who are interested in the fundamental ideas of modern numerical methods and want to learn how to apply and extend these ideas to solve new problems

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