

<<求解代数特征值问题模板实用指南>>

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内容概要

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<<求解代数特征值问题模板实用指南>>

书籍目录

list of symbols and acronyms list of iterative algorithm templates list of direct algorithms list of figures list of tables 1
introduction 1.1 why eigenvalue templates? 1.2 intended readership 1.3 using the decision tree to choose a template
1.4 what is a template? 1.5 organization of the book 2 a brief tour of eigenproblems 2.1 introduction 2.1.1 numerical
stability and conditioning 2.2 hermitian eigenproblems j. demmel 2.2.1 eigenvalues and eigenvectors 2.2.2 invariant
subspaces 2.2.3 equivalences (similarities) 2.2.4 eigendecompositions 2.2.5 conditioning 2.2.6 specifying an
eigenproblem 2.2.7 related eigenproblems 2.2.8 example 2.3 generalized hermitian eigenproblems j. demmel 2.3.1
eigenvalues and eigenvectors 2.3.2 eigenspaces 2.3.3 equivalences (congruences) 2.3.4 eigendecompositions 2.3.5
conditioning 2.3.6 specifying an eigenproblem 2.3.7 related eigenproblems 2.3.8 example 2.4 singular value
decomposition j. demmel 2.4.1 singular values and singular vectors 2.4.2 singular subspaces 2.4.3 equivalences 2.4.4
decompositions 2.4.5 conditioning 2.4.6 specifying a singular value problem 2.4.7 related singular value problems
2.4.8 example 2.5 non-hermitian eigenproblems j. demmel 2.5.1 eigenvalues and eigenvectors 2.5.2 invariant
subspaces 2.5.3 equivalences (similarities) 2.5.4 eigendecompositions 2.5.5 conditioning 2.5.6 specifying an
eigenproblem 2.5.7 related eigenproblems 2.5.8 example 2.6 generalized non-hermitian eigenproblems j. demmel
2.6.1 eigenvalues and eigenvectors 2.6.2 deflating subspaces 2.6.3 equivalences 2.6.4 eigendecompositions 2.6.5
conditioning 2.6.6 specifying an eigenproblem 2.6.7 related eigenproblems 2.6.8 example 2.6.9 singular case 2.7
nonlinear eigenproblems j. demmel 3 an introduction to iterative projection methods 3.1 introduction 3.2 basic
ideas y. saad 3.3 spectral transformations r. lehoucq and d. sorensen 4 hermitian eigenvalue problems 4.1
introduction 4.2 direct methods 4.3 single- and multiple-vector iterations m. gu 4.3.1 power method 4.3.2 inverse
iteration 4.3.3 rayleigh quotient iteration 4.3.4 subspace iteration 4.3.5 software availability 4.4 lanczos method a.
ruhe 4.4.1 algorithm 4.4.2 convergence properties 4.4.3 spectral transformation 4.4.4 reorthogonalization 4.4.5
software availability 4.4.6 numerical examples 4.5 implicitly restarted lanczos method r. lehoucq, q and d. sorensen
4.5.1 implicit restart 4.5.2 shift selection 4.5.3 lanczos method in gemv form 4.5.4 convergence properties 4.5.5
computational costs and tradeoffs 4.5.6 deflation and stopping rules 4.5.7 orthogonal deflating transformation 4.5.8
implementation of locking and purging 4.5.9 software availability 4.6 band lanczos method r. freund 4.6.1 the need
for deflation 4.6.2 basic properties 4.6.3 algorithm 4.6.4 variants 4.7 jacobi-davidson methods g. sleijpen and h. van
der vorst 4.7.1 basic theory 4.7.2 basic algorithm 4.7.3 restart and deflation 4.7.4 computing interior eigenvalues
4.7.5 software availability 4.7.6 numerical example 4.8 stability and accuracy assessments z. bai and r. li 5
generalized hermitian eigenvalue problems 5.1 introduction 5.2 transformation to standard problem 5.3 direct
methods 5.4 single- and multiple-vector iterations m. gu 5.5 lanczos methods a. Ruhe 5.6 jacobi-davidson methods
g. sleijpen and h. van der vorst 5.7 stability and accuracy assessments z. bai and r. li 5.7.1 positive definite b 5.7.2
some combination of a and b is positive definite 6 singular value decomposition 6.1 introduction 6.2 direct
methods 6.3 iterative algorithms j. demmel 6.3.1 what operations can one afford to perform? 6.3.2 which singular
values and vectors are desired? 6.3.3 golub-kahan-lanczos method 6.3.4 software availability 6.3.5 numerical
example 6.4 related problems j. demmel 7 non-hermitian eigenvalue problems 7.1 introduction 7.2 balancing
matrices t. chen and j. demmel 7.2.1 direct balancing 7.2.2 krylov balancing algorithms 7.2.3 accuracy of
eigenvalues computed after balancing 7.3 direct methods 7.4 single- and multiple-vector iterations m. gu 7.4.1
power method 7.4.2 inverse iteration 7.4.3 subspace iteration 7.4.4 software availability 7.5 arnoldi method y. saad
7.5.1 basic algorithm 7.5.2 variants 7.5.3 explicit restarts 7.5.4 deflation 7.6 implicitly restarted arnoldi method r.
lehoucq and d. sorensen 7.6.1 arnoldi procedure in gemv form 7.6.2 implicit restart 7.6.3 convergence properties
7.6.4 numerical stability 7.6.5 computational costs and tradeoffs 7.6.6 deflation and stopping rules 7.6.7 orthogonal
deflating transformation 7.6.8 eigenvector computation with spectral transformation 7.6.9 software availability 7.7
block arnoldi method r. lehoucq and k. maschhoff 7.7.1 block arnoldi reductions 7.7.2 practical algorithm 7.8
lanczos method z. bai and d. day 7.8.1 algorithm 7.8.2 convergence properties 7.8.3 software availability 7.8.4 notes
and references 7.9 block lanczos methods z. bai and d. day 7.9.1 basic algorithm 7.9.2 an adaptively blocked
lanczos method 7.9.3 software availability 7.9.4 notes and references 7.10 band lanczos method r. freund 7.10.1

<<求解代数特征值问题模板实用指南>>

deflation 7.10.2 basic properties 7.10.3 algorithm 7.10.4 application to reduced-order modeling 7.10.5 variants 7.11 lanczos method for complex symmetric eigenproblems r. freund 7.11.1 properties of complex symmetric matrices 7.11.2 properties of the algorithm 7.11.3 algorithm 7.11.4 solving the reduced eigenvalue problems 7.11.5 software availability 7.11.6 notes and references 7.12 jacobi-davidson methods g. sleijpen and ii. van der vorst 7.12.1 generalization of hermitian case 7.12.2 schur form and restart 7.12.3 computing interior eigenvalues 7.12.4 software availability 7.12.5 numerical example 7.13 stability and' accuracy assessments z. bai and r. li 8 generalized non-hermitian eigenvalue problems 8.1 introduction 8.2 direct methods 8.3 transformation to standard problems 8.4 jacobi-davidson method g. sleijpen and h. van der vorst 8.4.1 basic theory 8.4.2 deflation and restart 8.4.3 algorithm 8.4.4 software availability 8.4.5 numerical example 8.5 rational krylov subspace method a. ruhe 8.6 symmetric indefinite lanczos method z. bai, t. ericsson, and t. kowalski 8.6.1 some properties of symmetric indefinite matrix pairs 8.6.2 algorithm 8.6.3 stopping criteria and accuracy assessment 8.6.4 singular b 8.6.5 software availability 8.6.6 numerical examples 8.7 singular matrix pencils b. kagstrom 8.7.1 regular versus singular problems 8.7.2 kronecker canonical form 8.7.3 generic and nongeneric kronecker structures 8.7.4 ill-conditioning 8.7.5 generalized schur-staircase form 8.7.6 guptri algorithm 8.7.7 software availability 8.7.8 more on guptri and numerical examples 8.7.9 notes and references 8.8 stability and accuracy assessments z. bai and r. li 9 nonlinear eigenvalue problems 9.1 introduction 9.2 quadratic eigenvalue problems z. bai, g. sleijpen, and ii. van der vorst 9.2.1 introduction 9.2.2 transformation to linear form 9.2.3 spectral transformations for qep 9.2.4 numerical methods for solving linearized problems 9.2.5 jacobi-davidson method 9.2.6 notes and references 9.3 higher order polynomial eigenvalue problems 9.4 nonlinear eigenvalue problems with orthogonality constraints r. lippert and a. edelman 9.4.1 introduction 9.4.2 matlab templates 9.4.3 sample problems and their differentials 9.4.4 numerical examples 9.4.5 modifying the templates 9.4.6 geometric technicalities 10 common issues 10.1 sparse matrix storage formats j. dongarra 10.1.1 compressed row storage 10.1.2 compressed column storage 10.1.3 block compressed row storage 10.1.4 compressed diagonal storage 10.1.5 jagged diagonal storage 10.1.6 skyline storage 10.2 matrix-vector and matrix-matrix multiplications j. dongarra, p. koev, and x. li 10.2.1 blas 10.2.2 sparse blas 10.2.3 fast matrix-vector multiplication for structured matrices 10.3 a brief survey of direct linear solvers j. demmel, p. koev, and x. li 10.3.1 direct solvers for dense matrices 10.3.2 direct solvers for band matrices 10.3.3 direct solvers for sparse matrices 10.3.4 direct solvers for structured matrices 10.4 a brief survey of iterative linear solvers h. van der vorst 10.5 parallelism j. dongarra and x. li 11 preconditioning techniques 11.1 introduction 11.2 inexact methods k. meerbergen and r. morgan 11.2.1 matrix transformations 11.2.2 inexact matrix transformations 11.2.3 arnoldi method with inexact cayley transform 11.2.4 davidson method 11.2.5 jacobi-davidson method with cayley transform 11.2.6 preconditioned lanczos method 11.2.7 inexact rational krylov method 11.2.8 inexact shift-and-invert 11.3 preconditioned eigensolvers a. knyazev 11.3.1 introduction 11.3.2 general framework of preconditioning 11.3.3 preconditioned shifted power method 11.3.4 preconditioned steepest ascent/descent methods 11.3.5 preconditioned lanczos methods 11.3.6 davidson method 11.3.7 methods with preconditioned inner iterations 11.3.8 preconditioned conjugate gradient methods 11.3.9 preconditioned simultaneous iterations 11.3.10 software availability appendix. of things not treated bibliography index

章节摘录

版权页：插图：In many large scale scientific or engineering computations, ranging from computing the frequency response of a circuit to the earthquake response of a building to the energy levels of a molecule, one needs to find eigenvalues and eigenvectors of a matrix. There are many mathematical ways to formulate eigenvalue problems, and even more ways have been proposed to solve them numerically. This book is intended to be a guide to finding the best numerical method for an eigenvalue problem. The current state of the art is such that excellent methods exist for many eigenproblems, especially for small- to medium-sized dense matrices. These algorithms have been made available in programming environments like MATLAB, libraries like LAPACK [12], and many other commercial and public packages. But for very large and (typically) sparse eigenvalue problems no single best method exists. The sheer number of methods and the complicated ways they depend on mathematical properties of the matrix and trade off efficiency and accuracy make it difficult for experts, let alone general users, to find the best method for a given problem. Good online search facilities and software repositories exist, notably GAMS (Guide to Available Mathematical Software)² and NETLIB.³ These facilities permit searches based on library names, subroutines names, key words, and a taxonomy of topics in numerical computing. But they will not give advice as to which method is best to use for a particular problem. As a result, the authors of this book and other experts are frequently asked for advice in choosing an algorithm. This situation has motivated us to distill our knowledge into this book to make it as widely available as possible.

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