

The matrix eigenvalue problem: GR and Krylov subspace methods

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Abstrak

This book presents the first in-depth, complete, and unified theoretical discussion of the two most important classes of algorithms for solving matrix eigenvalue problems: QR-like algorithms for dense problems and Krylov subspace methods for sparse problems. The author discusses the theory of the generic GR algorithm, including special cases (for example, QR, SR, HR), and the development of Krylov subspace methods. Also addressed are a generic Krylov process and the Arnoldi and various Lanczos algorithms, which are obtained as special cases. The chapter on product eigenvalue problems provides further unification, showing that the generalized eigenvalue problem, the singular value decomposition problem, and other product eigenvalue problems can all be viewed as standard eigenvalue problems.