Anderson, Christopher R.
A Rayleigh-Chebyshev procedure for finding the smallest eigenvalues and associated eigenvectors of large sparse Hermitian matrices. (English) Zbl 1197.65034

Summary: A procedure is presented for finding a number of the smallest eigenvalues and their associated eigenvectors of large sparse Hermitian matrices. The procedure, a modification of an inverse subspace iteration procedure, uses adaptively determined Chebyshev polynomials to approximate the required application of the inverse operator on the subspace. The method is robust, converges with acceptable rapidity, and can easily handle operators with eigenvalues of multiplicity greater than one. Numerical results are shown that demonstrate the utility of the procedure.

MSC:
65F15 Numerical computation of eigenvalues and eigenvectors of matrices

Keywords:
eigenvectors; Chebyshev polynomials; convergence; smallest eigenvalues; large sparse Hermitian matrices; inverse subspace iteration; numerical results

Software:
PETSc; TRLan; LAPACK

Full Text: DOI

References:

Edited by FIZ Karlsruhe, the European Mathematical Society and the Heidelberg Academy of Sciences and Humanities © 2021 FIZ Karlsruhe GmbH Page 1


This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.