

Povzetek: Predstavljen je Jacobijevemu podoben algoritem za simultano diagonalizacijo para komutirajočih normalnih kompleksnih matrik. Algoritem uporablja zaporedje podobnostnih transformacij za zmanjševanje norme izvendiagonalnih elementov. Izkaže se, da ima kvadratičen red konvergence in je obratno numerično stabilen. Prirejen je tudi za uporabo na realnih ali kvaternionskih matrikah in na matrikah z dodatnimi simetričnimi strukturami. V grobem je opisana tudi simultana diagonalizacija več kot dveh komutirajočih matrik. Kot primer uporabe je opisano reševanje desno definitnega dvoparametričnega problema lastnih vrednosti. Predstavljeni so numerični rezultati, dobljeni v Matlabu, implementacija algoritma v Matlabu pa je v celoti zapisana v dodatku.

Ključne besede: simultana diagonalizacija, Jacobijeva iteracija, lastne vrednosti, lastni vektorji

Abstract: This work presents a Jacobi-like algorithm for simultaneous diagonalization of commuting pair of normal complex matrices. The algorithm uses a sequence of similarity transformations to reduce the norm of off-diagonal entries. It is shown, that its convergence rate is quadratic and it is backward numerically stable. It is also adjusted for use on real or quaternion matrices and on matrices with additional symmetry structures. A simultaneous diagonalization of more than two commuting matrices is also discussed. As an application of the algorithm a solution of the right definite two-parameter eigenvalue problem is described. Numerical results obtained in Matlab are given and an implementation of the algorithm in Matlab is presented in Appendix.

Key words: simultaneous diagonalization, Jacobi iteration, eigenvalues, eigenvectors

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