

The Kogbetliantz Method is Accurate

(Talk)

Josip Matejaš

Faculty of Economics, University of Zagreb

`jmatejas@efzg.hr`

(joint work with Vjeran Hari, Department of Mathematics,
University of Zagreb)

The high relative accuracy of the Kogbetliantz method for computing the singular value decomposition (SVD) of triangular matrices is proven. The method belongs to a class of two-sided Jacobi algorithms for computing the SVD of a square matrix. Applied to triangular matrices, the method simplifies and becomes quadratically convergent under the serial strategies. The standard Voevodin formulas for computing the SVD of 2×2 triangular matrices have been modified to obtain a relatively accurate algorithm. Using a subtle error analysis, sharp error bounds are derived, which compare favorably to the bounds, obtained by the same analysis, for the existing *LAEV2 routine from LAPACK. Using these two algorithms as core algorithms in the Kogbetliantz method for n by n triangular matrices, sharp relative error bounds for the singular values are derived. The error bounds coming from a single step and from the whole sweep are obtained. The error analysis is made separately for the class of scaled diagonally dominant triangular matrices and for general triangular matrices. Numerical examples which illustrate and confirm the obtained results are provided.

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