

Treating breakdowns and near breakdowns in JHES algorithm for a reducing a matrix to upper J -Hessenberg form

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Abstract

The reduction of a matrix to an upper J -Hessenberg is usually performed via the algorithm JHES (or via the recent algorithm JHMSH and its variants). This reduction is a crucial step in the SR -algorithm (which is a QR -like algorithm), structure-preserving, for computing eigenvalues and vectors, for a class of structured matrices. Unlike its equivalent in the Euclidean case, the JHES algorithm may meet a fatal breakdown, causing a brutal stop of the computations or encounter near-breakdowns, which are source of serious numerical instability.

In this talk, we present efficient strategies for curing fatal breakdowns and also for treating near breakdowns. The effectiveness of such strategies are illustrated by numerical experiments.

References

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