

A shift strategy for superquadratic convergence of the dqds algorithm for computing singular values

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Matrix singular values play an important role in many applications. In 1994, the dqds algorithm was proposed by Fernando and Parlett [1] to compute the singular values of bidiagonal matrices to high relative accuracy. The dqds algorithm is currently implemented in LAPACK as DLASQ routine [2] which has a complicated but sophisticated shift strategy evolved in order to achieve high efficiency. Recently, based on a global convergence theorem of the dqds algorithm by the authors [3], superquadratic convergence of the DLASQ routine has been established [4].

The objective of this talk is to present another simple shift strategy enjoying superquadratic convergence. Our shift strategy is designed primarily to achieve superquadratic convergence. A numerical result is also shown to illustrate the superquadratic convergence. In addition, a practical implementation is presented, of the dqds algorithm with our shift strategy, which is comparable to the DLASQ routine.

References

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