

Numerical matrix inversion

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Abstract

As it is mentioned by Higham in his book *Accuracy and Stability of Numerical Algorithms*, Forsythe, Malcolm and Moler say in 1977: *In the vast majority of practical computational problems, it is unnecessary and inadvisable to actually compute A^{-1} .* However, there exist problems in which the matrix inverse must be computed explicitly. Such a situation is in the Higham scaled method for the polar decomposition of a nonsingular matrix. We concentrate on the most important problem of the quality of inverses in the method of Higham. We discuss the properties of the computed inverses not impeding the good numerical behaviour of the Higham method and those properties which can seriously spoil the quality of the computed unitary polar factor.

Our numerical experiments with the Higham scaled method for the polar decomposition seem to justify some conjecture on the quality of the matrix inversion by Gauss elimination with partial pivoting.

Keywords

Matrix inversion, Polar decomposition, Higham's scaled method.

References

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