

Schur complements in H-matrices classes

Rafael Bru, Cristina Corral, Isabel Gimenez,
and José Mas

Universidad Politécnica de Valencia, Spain

Abstract

Schur complements and (block) LU factorizations of different classes of matrices have been studied through the literature ([2,3,4,5,6]). A partition of the set of H -matrices in three classes, Invertible, Singular and Mixed class, was obtained in [1] following the singularity or not of the matrices of the equimodular set. It is well-known that the set of nonsingular M -matrices is closed under the Schur complement. Similar results for H -matrices are collected and extended when it is possible. In particular it is proved that the Schur complement of an H -matrix, if it exists, is an H -matrix and it is analyzed to which class belongs to.

Keywords

M -matrix, H -matrices classes, Schur complement, LU factorization.

References

- [1] Bru, R., Corral, C., Gimenez, I. and Mas, J. (2008). Classes of general H -matrices. *Linear Algebra Appl.* 1429, 2358–2366.
- [2] Crabtree, D.E. (1966). Applications of M -matrices to non-negative matrices. *Duke Math. J.* 33, 179–208.
- [3] Fan, K. (1960). Note on M -matrices. *Quart. J. Math. (2)* 11, 43–49.
- [4] Polman, B. (1987). Incomplete Blockwise Factorizations of (Block) H -matrices. *Linear Algebra Appl.* 90, 119–132.
- [5] Smith, R.L. (1988). Some Notes on Z -matrices. *Linear Algebra Appl.* 106, 219–231.
- [6] Varga, R.S. and Cai, Y.(1981). On the LU factorization of M -matrices. *Numer. Math.* 38, 193–208.