

# New results on subdirect sums of $\mathcal{S}$ -strictly diagonally dominant matrices

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## Abstract

The question when subdirect sum of two  $H$ -matrices is an  $H$ -matrix for the case of  $\mathcal{S}$ -SDD matrices was treated in the paper by Bru et al. (2006), where some sufficient conditions were given. Motivated by the same question, using a different technique, we are going to give a simplified proof of the main theorem from the paper above followed by its generalization. As the main result, for the class of  $\mathcal{S}$ -SDD, defined as a subclass of  $H$ -matrices which is a kind of broader concept of  $\mathcal{S}$ -SDD matrices, we are going to give the exact answer to the question when the subdirect sum of two  $\mathcal{S}$ -SDD matrices is an  $\mathcal{S}$ -SDD matrix.

## Keywords

Subdirect sum,  $H$ -matrices, Overlapping blocks.

## References:

- Bru, R., F. Pedroche and D. B. Szyld. (2006) Subdirect sums of  $\mathcal{S}$ -Strictly Diagonally Dominant matrices. *Electron. J. Linear Algebra* 15, 201–209.
- Bru, R., F. Pedroche and D. B. Szyld. (2005) Subdirect sums of nonsingular  $M$ -matrices and of their inverses. *Electron. J. Linear Algebra* 13, 162–174.
- Cvetković, L. (2006).  $H$ -matrix theory vs. eigenvalue localization. *Numerical Alg.* 42, 229–245.
- Cvetković, L. and V. Kostić (2006). Between Geršgorin and minimal Geršgorin set. *J. Comput. Appl. Math.* 196, 452–458.
- Cvetković, L., V. Kostić and R. S. Varga (2004). A new Geršgorin-type eigenvalue inclusion set. *Electron. Trans. Numer. Anal.* 18, 73–80.
- Fallat, S.M. and C.R. Johnson (1999). Sub-direct sums and positivity classes of matrices. *Linear Algebra Appl.* 288, 149–173.