

Tensor approximation and inversion of structured matrices

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A general technique is presented for development of fast algorithms for multilevel structured matrices. It includes three basic components: tensor approximations, wavelet sparsification, and Newton iteration in a modified form. It is based on investigation of the tensor properties of multilevel matrices (developing the idea recently introduced by J. Kamm and J. G. Nagy in the block Toeplitz case) and extends the results of V.Pan-Rami and D.Bini-B.Meini using the Newton iteration for the inversion of matrices of low displacement rank.