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CROUT VERSIONS OF ILU FACTORIZATION WITH PIVOTING FOR SPARSE SYMMETRIC MATRICES *

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Abstract. The Crout variant of ILU preconditioner (ILUC) developed recently has been shown to be generally advantageous over ILU with Threshold (ILUT), a conventional row-based ILU preconditioner. This paper explores pivoting strategies for sparse symmetric matrices to improve the robustness of ILUC. We integrate two symmetry-preserving pivoting strategies, the diagonal pivoting and the Bunch-Kaufman pivoting, into ILUC without significant overheads. The performances of the pivoting methods are compared with ILUC and ILUTP ([20]) on a set of problems, including a few arising from saddle-point (KKT) problems.

Key words. incomplete LU factorization, ILU, ILUC, sparse Gaussian elimination, crout factorization, preconditioning, diagonal pivoting, Bunch-Kaufman pivoting, ILU with threshold, iterative methods, sparse symmetric matrices

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