Treatment of Block-Based Sparse Matrices in Domain Decomposition Method

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***Abstract*— The domain decomposition method involves the finite element solution of problems in the parallel computer. The finite element discretization leads to the solution of large systems of linear equation whose matrix is naturally sparse. The use of proper storing techniques for sparse matrix is fundamental especially when dealing with large scale problems typical of industrial applications. The aim of this research is to review the sparsity pattern of the matrices originating from the discretization of the elasto-plastic and thermal-convection problems. Some practical strategies dealing with sparsity pattern in the finite element code of adventure system are recalled. Several efficient storage schemes to store the matrix originating from elasto-plastic and thermal-convection problems have been proposed. In the proposed technique, inherent block pattern of the matrix is exploited to locate the matrix element. The computation in the high performance computer shows better performance compared to the conventional skyline storage method used by the most of the researchers.**

Keywords: sparse matrix, compressed sparse, block size, domain decompose, adventure system;

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