
Hybrid Solver for Quasi Block Diagonal Linear Systems

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We present a solver for a class of sparse linear systems that we call quasi block diagonal. The solver combines multi-processors and multi-threaded parallelisms using MPI and OpenMP to implement preconditioned Jacobi. Specific formats for sparse matrices are exploited in order to reduce memory storage requirements. Our experiments show that communication costs are negligible, so as that speed-up and efficiency with respect to the sequential implementation are very high. Our hybrid implementation is tested on a cluster and compared to ScaLapack and Pardiso distributed-memory oriented linear solvers.

Keywords: Sparse matrices, Linear Systems, Preconditioned Jacobi, MPI, OpenMP.