A 2D Task-based Fan-both Factorization Algorithm for Sparse Symmetric Matrices

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Abstract

In this work, we present a new 2D data distribution of a sparse symmetric matrix, which balances the workload and the number of nonzero entries explicitly. We have incorporated low-overhead task-based Cholesky and LDLt algorithms in the symPACK solver using this new distribution, implemented using a custom runtime environment based on the UPC++ communication framework. We analyze the performance achieved during the numerical factorization as well as that of the solution phase.

Keywords: factorization, sparse matrix, symmetric matrix, scheduling, cholesky, ldlt

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