Robust memory-aware mappings for parallel multifrontal factorizations

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Abstract

We focus on memory scalability issues in multifrontal solvers like MUMPS. We illustrate why commonly used mapping strategies (e.g., a proportional mapping) cannot achieve a high memory efficiency. We propose a class of "memory-aware" algorithms that aim at maximizing performance under memory constraints. These algorithms provide both accurate memory predictions and a robust solver. We illustrate our approach with experiments performed on large matrices using MUMPS.