

MUMPS on thousands of cores: feedback on the use of direct solvers in domain decomposition methods

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Abstract

This presentation deals with the use of MUMPS as a stepping stone for the design of highly scalable domain decomposition methods. Such methods typically require three important tools: a global iterative method, local direct solvers, and a coarse grid operator. MUMPS has been used for the latter two components in the context of HPDDM (<https://github.com/hpddm/hpddm>), a library for domain decomposition methods. In this context, we have solved various problems arising from Poisson/Stokes/Helmholtz/Maxwell equations, with billions of unknowns, and we can thus benchmark MUMPS against other state of the art direct solvers like PARDISO and PaStiX. Emphasis will be put in this talk on systems with multiple right-hand sides, and on performance of the Block Low-Rank features of MUMPS.