

Feedback on the use of MUMPS in Safran Tech's applications: a multithread performance evaluation of MUMPS

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The emergence of a new generation of architected materials opens up vast opportunities in the design of products, enabling to design the underlying microstructure to fulfill mechanical requirements. Reaching the full benefit of this potential requires massive adoption of virtual testing, which, in turn, relies on large-scale finite element problems that need robust and efficient HPC solvers. In this context, Safran Tech uses MUMPS as a direct solver for various applications such as finite element solvers, non-overlapping domain decomposition (FETI, BDD and their derivatives, topology optimization (multiple right-hand sides), rank-deficiency improved detection, *etc.*

In this talk, we present the practical use of MUMPS in some of Safran Tech's applications and, in particular, its use in the framework of the development of a finite element solver. A focus on the evaluation of MUMPS' performance in a multithreaded environment is presented.