

HPC TECHNIQUES IN COMPUTATIONAL MECHANICS

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ABSTRACT

Parallel computers are nowadays pervasive. From cell phones up to supercomputers, from shared memory to distributed memory, from multicores to accelerators, almost every FLOP operation is done in parallel hardware. This fact blatantly exposes the need for simulation software that can profit parallelism. This MS addresses all issues about the use of HPC-techniques in simulation software, with special attention in massively parallel cases, capable of using efficiently thousands of cores. Among the topics are mesh issues, algebraic solvers and preconditioners or parallel post-process, using parallelization paradigms such as OpenMP threads, MPI or CUDA programming. Usually, large-scale simulations are a must in complex scientific or industrial environments, so examples of these applications are very welcome. Because of the added complexity of solving several problems at the same time, examples of multi-physics parallel simulations are particularly welcome.

Presenters in this MS should explain numerical, algorithmic or programming issues observed in Computational Mechanics parallel programming and the solutions they proposed and assess their behaviour through complex numerical examples.