ADVANCES ON HIGH PERFORMANCE COMPUTING FOR COMPUTATIONAL MECHANICS

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ABSTRACT

In the last decades, the complexity of scientific and engineering problems has largely increased. In many areas of engineering and science High-Performance Computing (HPC) has become determinant for industrial competitiveness and advanced research. Advances in HPC architectures and software capabilities are leading to a new era of HPC for Computational Mechanics, with new challenges both in computing and system modelling. This is especially critical considering that HPC systems continue to scale up in terms of nodes and cores. Not to mention that serial computing has today reached its zenith in performance, and future performance improvements must largely come from increasing the number of processors (multi-core architectures) rather than making faster cores. The Mini-symposium is dedicated to HPC for Computational Mechanics, and aims to cover theory, algorithms, implementations and applications to engineering problems. This session seeks submissions from academia, industry and research institutions presenting novel research on all theoretical and practical aspects of high performance and large scale computing systems, their use in modelling and simulation, their design and use, and their impact. Special reference will be given to parallel, distributed and grid computing and how serial or sequential algorithms for engineering problems may be parallelized for the efficient solution of large scale problems in engineering, simulation and design. The scope is multidisciplinary, including but not limited to topics in the following major areas of interest:

- General-Purpose computation on Graphics Processing Units (GPGPU) in Computational Mechanics
- Domain Decomposition Methods and Scalable Computing in Computational Mechanics
- Large Scale Scientific Computing
- Multi-Core and Many-Core Architectures in Computational Mechanics
- Reliable Parallel and Distributed Algorithms in Computational Mechanics
- Computational Mechanics Applications using HPC