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MINISYMPOSIUM TITLE

ADVANCES ON SOFTWARE FITTING HPC HARDWARE

TRACK NUMBER (1400 - SOFTWARE, HIGH PERFORMANCE COMPUTING)

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ABSTRACT

Very significant advances in HPC hardware is taking place nowadays. However, in order to profit from them it is frequently necessary to complement such developments with special software adequate to the novel features of the new equipment. Study, research and development on this general problem is the topic of this MS.
Much of the progress, of today and the future, in pure and applied science depends on the capacity of incorporating the new computational tools in the different disciplines. This in turn, essentially depends on advancing the specialized software we are here referring to. With respect to applied science, energy industry is outstanding among the main beneficiaries of HPC numerical simulations at the Exascale level.
Transversal activities focused on general developments and techniques that can be used in a great diversity of applications are especially welcome in this mini-symposium.

New architectures need codes that improve critical points, while decreasing the cost of simulations accuracy.

One of the main objectives of the specialized codes is to improve performance efficiency. Hence, when comparing different HPC codes it is important to have accurate evaluations of their performance efficiencies. In the case of parallel computation, traditionally the measure of performance efficiency has been based on the notion that in parallel computation, the maximum achievable speedup is equal to number of processors. However, the speedup sometimes can reach far beyond the limited linear speedup. Superlinear speedup means that the speedup is greater than the number of processors that are used [1]. When the superlinear behavior takes place, the traditional measure of efficiency is not adequate. Recently, a superlinear domain decomposition method (ddm) was introduced [2,3]. This innovation, besides other important implications, means that in this field new and more effective measures need to be developed.

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Other objectives drive activities on computer science HPC-related topics, such as load balancing, energy efficiency, leveraging I/O parallelism and fault-tolerance, performance scalability, and resiliency. Also, enhancing the computational and energy efficiency, as well as improving the scalability by identifying bottlenecks affecting proposed codes for each problem. The above discussion and comments indicate that the scope of our mini-symposium is quite wide and of great interest currently. All scholars and professionals are invited to participate.

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