Topic 10: Parallel Numerical Algorithms

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Topic Committee

The solution of large-scale problems in Computational Science and Engineering relies on the availability of accurate, robust and efficient numerical algorithms and software that are able to exploit the power offered by modern computer architectures. Such algorithms and software provide building blocks for prototyping and developing novel applications, and for improving existing ones, by relieving the developers from details concerning numerical methods as well as their implementation in new computing environments.

From the papers submitted to this year's Europar, the topic of Parallel Numerical Algorithms involving these themes attracted submissions from Europe, Asia and the Africa. Each paper received at least four reviews and finally three were selected for presentation following extensive discussions between members of EUROPAR's Program Committee.

Donfack, Grigori and Khabou present an algorithm for dense LU factorization that is suitable for machines with multiple levels of parallelism and describe its implementation on a cluster of multicore processors based on MPI and Pthreads. Korch describes data-parallel implementations of ODE solvers, specifically explicit Adams-Bashforth methods. He examines locality and scalabiity and shows how the careful use of pipelining can improve the locality of memory references. Cotronis, Konstantinidis, Louka and Missirlis describe special local SOR methods optimized for GPUs.

Based on these interesting papers, this session provides a forum for the discussion of recent developments in the design and implementation of numerical methods on modern parallel architectures such as multicores and GPU systems.

It is appropriate, at this time, to thank the authors who submitted papers to the session and congratulate those whose papers were accepted. We are especially grateful to the referees who provided us with carefully written and informative reviews. Finally, we thank the Conference Organizers for providing the opportunity to the participants to present and discuss the state-of-the-art in Parallel Processing on the beautiful island of Rhodes. In this Olympic year, our authors took "hic Rhodus, hic salta" to heart as all papers demonstrate implementations of numerical algorithms on advanced computer systems.

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