Introduction

Martin Berzins, Daniela di Serafino, Martin Gander, and Luc Giraud

Topic chairs

The solution of Computational Science problems relies on the availability of accurate and efficient numerical algorithms and software capable of harnessing the processing power of modern parallel and distributed computers. Such algorithms and software allow to prototype and develop new large-scale applications, as well as to improve existing ones, by including up-to-date numerical methods, or well-assessed ones re-designed in the light of the new architectures.

This conference topic is aimed at discussing new developments in the design and implementation of numerical algorithms for modern parallel architectures, including multi-core systems, multi-GPU based computers, clusters and the Grid. Different aspects, ranging from fundamental algorithmic concepts to software design techniques and performance analysis, are considered.

The papers submitted to this topic came from Austria, Australia, the Czech Republic, France, India, Italy, Japan, the Netherlands, Russia, Spain, and the USA. Each paper received at least three reviews and, finally, we selected three regular papers, all related to numerical linear algebra. E. Solomonik and J. Demmel describe and analyze a class of 2.5D linear algebra algorithms for matrix-matrix multiplication and LU factorization, that use extra memory to reduce bandwidth and latency costs. X. Dong and G. Cooperman present a parallel version of the ILU(k) preconditioner, that preserves stability properties. L. Bergamaschi and A. Martinez describe a parallel implementation of an inexact constraint preconditioner, based on sparse approximate inverse, for generalized saddle-point linear systems. We think that these papers provide a significant contribution to the scientific programme of Euro-Par 2011 and will contribute to the success of the conference.

Finally, we would like to thank all the authors for their submissions, the referees for helping us to select high-quality papers, and the Euro-Par Organizing Committee for the coordination of all the conference topics.