Agent-Based Simulations, Adaptive Algorithms and Solvers: Preface

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Abstract. The aim of this workshop is to integrate results of different domains of computer science, computational science, and mathematics. We invite papers oriented toward simulations, either hard simulations by means of finite element or finite difference methods, or soft simulations by means of evolutionary computations, particle swarm optimization, and other. The workshop is most interested in simulations performed by using agent-oriented systems or by utilizing adaptive algorithms, but simulations performed by other kind of systems are also welcome. Agent-oriented system seems to be the attractive tool useful for numerous domains of applications. Adaptive algorithms allow significant decrease of the computational cost by utilizing computational resources on most important aspect of the problem. ¹

Keywords: Agent-based simulations, Adaptive-algorithms, Solvers

1 Introduction

This is the fourteen workshop on "Agent-Based Simulations, Adaptive Algorithms and Solvers" (ABS-AAS) organized in the frame of the International Conference on Computational Science (ICCS). The workshop at Wuxi follows meetings hold in Krakow 2004, Atlanta 2005, Reading 2006, Beijing 2007, Krakow 2008, Baton Rouge 2009, Amsterdam 2010, Singapore 2011, Omaha 2012, Barcelona 2013, Cairns 2014, Reykjavik 2015, San Diego 2016 and Zurich 2017 in frame on ICCS series of conferences. The history of previous ABS-AAS workshops is illustrated in Figure 1.

The co-chairmen of the workshop currently involve prof. Robert Schaefer from AGH University, Kraków, Poland, prof. David Pardo from the University of the Basque Country UPV/EHU, Bilbao, Spain, and prof. Victor Manuel Calo from Curtin University, Perth, Western Australia.

We have a scientific committee with researchers from several countries, including Poland, Spain, Australia, United States, Brasil, Saudi Arabia, Ireland, Chile. These locations are illustrated in Figure 2.

The papers submitted to the workshop falls into either theoretical brand, like:

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Fig. 1. Past locations of the Workshop.



Fig. 2. Scientiffic committee from different countries.

- multi-agent systems in high-performance computing,
- efficient adaptive algorithms for big problems,
- low computational cost adaptive solvers,
- fast solvers for isogeometric finite element method,
- agent-oriented approach to adaptive algorithms,
- model reduction techniques for large problems,
- mathematical modeling and asymptotic analysis of large problems,
- finite element or finite difference methods for three dimensional or nonstationary problems, and
- mathematical modeling and asymptotic analysis.

or the application sphere, like:

- agents based algorithms,
- application of adaptive algorithms in large simulations,
- simulation and large multi-agent systems,
- applications of isogeometric finite element method,
- application of adaptive algorithms in three dimensional finite element and finite difference simulations,
- application of multi-agent systems in computational modeling, and
- multi-agent systems in integration of different approaches.

There are three types of possible submissions, the full paper submission, the poster submission and the presentation only submission. For the full paper and poster submission, the whole paper is reviewed by the scientific committee. This year we had 11 full paper submissions, and we rejected 5 submissions to keep the high level of the workshop. On top of that, there are abstract only submissions which do not require a full paper review. Usually, authors of these submissions prefer to submit the full paper to some high impact factor journal after the conference. Thus, these submissions are usually of high quality, and this year we had 5 presentation-only submissions, and all of them have been accepted. Summing up, this year we had 14 submissions, with 6 full papers accepted [7–9, 11, 10, 6], 5 presentation only [1–5], and 5 rejected.

The topics of the papers fall into two categories. The first one includes theoretical analysis and implementation aspects of the finite element method simulations, from adaptive finite element method in 1.5 dimensions to space-time formulations [1, 3], through isogeometric finite element method simulations [2, 4] finishing with different aspects of large-scale parallel simulations [5, 6]. The second one include agent-based simulations of swarm computations [7], pedestrian modeling [8], behavioral modeling [9], through image coding [10] finishing with sociological simulations [11].

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4