Ural-PDC 2016

Preface

This volume contains the papers presented at Ural-PDC 2016: 2nd Ural Workshop on Parallel, Distributed, and Cloud Computing for Young Scientists (http://ural-pdc.org/2016/) held on October 6, 2016 in Yekaterinburg, Russia.

Ural-PDC is jointly organized by the Krasovskii Institute of Mathematics and Mechanics and the Ural Federal University. The aim of the workshop is to build the community of young researchers who work on modern problems in parallel, distributed, cloud computing, and to provide an academic forum that fosters them to share their ideas and results.

The key topics of interest are high-performance computing, distributed computing, cloud computing, Big Data processing, parallel computing education, and various applications of parallel and distributed computing. We have received 18 submissions, each of which has been reviewed by at least three program committee members. The committee decided to accept 12 papers and 2 invited papers; only 10 of those papers have been included into the present proceedings volume.

Last but not least, we are grateful to our program and organizing committees, who made the workshop possible.

November, 2016 Yekaterinburg, Russia Andrey Sozykin Elena Akimova Dmitry Ustalov

Copyright © 2016 for the individual papers by the papers' authors. Copying permitted for private and academic purposes. This volume is published and copyrighted by its editors. The entire volume is available at http://ceur-ws.org/.

Table of Contents

Parallel Numerical Methods for Ordinary Differential Equations: a Survey Svyatoslav I. Solodushkin and Irina F. Iumanova	1
Post-Processing the Results of Metastable States Molecular Dynamics Simulation	11
Andrey Sozykin, Natalia Neustroeva, Vladimir Baidakov, Sergey Protsenko, Vasiliy Brukhanov, Konstantin Ushenin and Arsenii Krasnobaev	
CPU and GPU Parallel Kramers-Klein Calculations	17
Principles of Computing Resources Planning in Cloud-Based Problem Solving Environment	22
Parallel Left Ventricle Simulation Using the FEniCS Framework	29
Parallel Algorithms for Solving Linear Systems with Block-Fivediagonal Matrices on Multi-Core CPU	38
Automatic Launch and Tracking the Computational Simulations with LiFlow and Sumatra	49
Research of Student Prospects on Developing International PhD Programs in Software Engineering	56
Performance Evaluation of Space Fractional FitzHugh-Nagumo Model: an Implementation with PETSc Library	66
Parallel Algorithm for Natural Neighbor Interpolation	78

Program Committee

Elena Akimova Krasovskii Institute of Mathematics and Mechanics /

Ural Federal University

Vitalii Berdyshev Krasovskii Institute of Mathematics and Mechanics

Alexei Dukhanov ITMO University

Evgeny Ivanko Krasovskii Institute of Mathematics and Mechanics Iosif Meyerov Lobachevsky State University of Nizhni Novgorod

Sergey Pravdin Ghent University

Gleb Radchenko South Ural State University

Anastasia Shamakina High Performance Center Stuttgart

Oleg Shapovalov Singularis Lab, LLC

Vladislav Shchapov Institute of Continuous Media Mechanics

Svyatoslav Solodushkin Ural Federal University

Andrey Sozykin Krasovskii Institute of Mathematics and Mechanics /

Ural Federal University

Vladimir Titarev Dorodnicyn Computing Center

Vladimir Ustinov Ural Federal University
Vladimir Zverev Ural Federal University
Mikhail Zymbler South Ural State University

Invited Reviewers

Alexander Bocharov Ural Federal University Constantin Pan Postgres Professional

Organizing Committee

Andrey Sozykin Krasovskii Institute of Mathematics and Mechanics /

Ural Federal University

Alexander Bersenev Krasovskii Institute of Mathematics and Mechanics /

Ural Federal University

Mikhail Chernoskutov Krasovskii Institute of Mathematics and Mechanics /

Ural Federal University

Timofey Epanchintsev Krasovskii Institute of Mathematics and Mechanics /

Ural Federal University

Evgeniy Kuklin Krasovskii Institute of Mathematics and Mechanics /

Ural Federal University

Natalia Neustroeva Krasovskii Institute of Mathematics and Mechanics /

Ural Federal University

Dmitry Ustalov Krasovskii Institute of Mathematics and Mechanics /

Ural Federal University