

Preface

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Abstract: *We are pleased to present the special issue “New developments in scalable computing” of the scientific journal “Cybernetics and Information Technologies”. For this issue (Volume 20, No 6 – December 2020), we have selected 19 papers which have gone through peer review and represent novel results in the field of Scalable Computing using state-of-the-art high-performance computing infrastructures.*

Advances in information and communication technologies is one of the fundamental causes for the rapid development of applied sciences in recent decades. This is characterized by increasing demands for computing resources, coupled with increased energy costs. The topic of the special issue is of a key importance for development of advanced numerical methods, algorithms and applications for modeling, simulation and optimization in big data environment. Their scalability determines the efficiency of the implementation on constantly growing high-performance systems.

In the content of this special issue the papers are ordered thematically in two groups: (i) Scalable Methods and Algorithms (12 papers); (ii) Applications (7 papers). The results comprised in the first group present novel methods and include error estimates of the developed methods, theoretical analysis of computational complexity as well as experimental studies of sequential and parallel scalability of the algorithms. The second group of papers presents scalable applications in such priority topics as computer simulation of global climate changes impact, environmental modelling as well as advanced computing in drug design and bioinformatics.

Among the papers included in this issue, 14 papers present results achieved with the support by the Project BG05M2OP001-1.001-0003 Center of Excellence in Informatics and Information and Communication Technologies, funded through the Operational Program “Science and Education for Smart Growth” where 85% of the total amount of the grant is provided by the European Regional Development Fund and 15% are the national co-financing. The Center of Excellence is established by the following partners: Institute of Information and Communication Technologies –

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Guest Editors*