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IJCCBS covers all the topics related to the engineering (including development and evaluation) of computer-based systems (CBS) employed in mission and safety critical applications. CBS feature increasingly large, distributed and heterogeneous architectures, which complicate their design and analysis. CBS are not simply isolated computer systems: context awareness, environmental factors and the interaction with systems of different nature have become very important aspects. Furthermore, dependability, resiliency, trustworthiness, survivability and performability are some of the many essential and non-elementary properties which often need to be predicted and demonstrated for such systems.

The objective of *IJCCBS* is to provide insights, methods and tools to support the design and analysis of complex critical CBS. It also aims at disseminating new standards, processes and technologies together with development and verification approaches supported by sound case-study applications and success stories. Issues related to methodological and technological transfers from/to other research fields are addressed as well. Due to the interdisciplinary nature of some topics, *IJCCBS* seeks self-contained and well-focused papers even on subjects which are not strictly related to computer science.

Subject coverage

Suitable topics include, but are not limited to:

- Engineering methods for high-assurance systems in real-time control applications
- Performance, dependability and security evaluation using analytical models, simulation or empirical approaches
- Management of complexity in large, distributed and heterogeneous CBS, including compositional and hierarchical approaches
- Verification and validation, including model-based software testing and formal methods (model-checking, theorem proving)
- Fault-tolerant, resilient, reactive and reconfigurable architectures
- Multi-formalism and multi-paradigm approaches, including UML-based methods
- Novel approaches to safety assessment, hazard analysis and failure mode and effect analysis (FMEA), with special emphasis on immature domains
- Business continuity management: backup strategies and disaster recovery procedures
- Maintainability and human factors in CBS

- Model-based security engineering and design for security
- Cost-benefit optimisation of design parameters, including genetic approaches
- Measured data management, integration, fusion, correlation and reasoning for on-line diagnostics and prognostics of CBS
- Statistical approaches for field data retrieval, filtering and analysis in the operational phase
- Innovative applications, case-studies and industrial experience reports (process control, biomedicine, X-by-wire, e-commerce, etc.)

Submission of papers

Papers, case studies, etc. in the areas covered by *IJCCBS* are invited for submission. Authors may wish to send an abstract of proposed papers in advance. Notes for intending authors can be found at: <https://www.inderscience.com/papers>

All papers must be submitted online.

Authors of accepted papers will receive a PDF file of their published paper. Hard copies of journal issues may be purchased at a special price for authors from subs@inderscience.com

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VERIFICATION, CONTROL AND PERFORMANCE ANALYSIS: PART II

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Editorial

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Biographical notes: Djamil Aissani received his PhD in 1983 from the Kiev State University (Soviet Union). He joined the University of Bejaia since its opened in 1983/1984. He is the Director of Research, First Head of the Faculty of Science and Engineering Science (1999–2000), Director of the Research Unit LAMOS (<http://www.lamos.org>), Scientific Head of the Doctoral Computer School (2004–2011), he has taught in many universities. He has published many papers on Markov chains, queueing systems, reliability theory, performance evaluation and their applications in such industrial areas as electrical networks and computer systems. He was the President of the National Mathematical Committee (Algerian Ministry of Higher Education and Scientific Research, 1995–2005).

Francesco Flammini obtained his PhD in Computer Engineering from the University of Naples Federico II, Italy. From 2003 to 2016, he has worked in Ansaldo STS on the reliability, safety and security of rail transit systems. He has been involved in large international research, innovation and engineering projects. He has authored more than 70 publications on international journals, books and conference proceedings. He has served as the chairman, editor and program committee member in several books, journals and symposia. He is an Adjunct Professor of Cyber-Security at the University of Maryland (UMUC Europe) and an Information Security Compliance Manager at the IPZS (Italian State Mint and Polygraphic Institute). He is an IEEE senior member and the Chairman of the IEEE SMC Technical Committee on Homeland Security.

This issue entitled ‘Verification, control and performance analysis’ is devoted to extended versions of selected contributions from the technical sessions of the two editions of *International Workshop on Verification and Evaluation of Computer and Communication Systems* (VECoS) held in 2013 in Florence, and 2014 in Bejaia.

The aim of the VECoS Workshop is to bring together researchers and practitioners, in the areas of verification, control, performance, quality of service, dependability evaluation, in order to discuss the state-of-the-art and the challenges in modern computer and communication systems in which functional and extra-functional properties are

strongly interrelated. Thus, the main motivation for VECoS is to encourage the cross-fertilisation between the various formal verification and evaluation approaches, methods and techniques, and especially those developed for concurrent and distributed hardware/software systems. Beyond its technical and scientific goals, another main purpose of VECoS is to promote collaboration between participants in research and education in the area of computer science and engineering.

The programme committees included researchers from 16 countries and more than 40 laboratories. Each of the 57 submitted papers was evaluated by at least three reviewers. Afterwards, reports were returned to the programme committee for discussion and resolution of conflicts. Based on their recommendations, we selected 21 papers. The proceedings including these accepted papers were published online at CEUR-WS.org.

After VECoS'2014, we invited 15 authors to submit extended versions of their papers. After additional refereeing and further revisions, we were able to accept 12 papers for inclusion in this special issue divided in two parts.

Part 2 comprises the following six papers:

- ‘Modelling and analysis data fragmentation in IEEE 802.15.4 slotted CSMA/CA protocol without ACK mode’

Mouloud Atmani, Djamil Aïssani and Yassine Hadjadj-Aoul improve bandwidth utilisation and reduce the overhead in IEEE 802.15.4 networks and introduce the data fragmentation mechanism into slotted CSMA/CA. The novelty proposed in this paper consists into the adaptation of the fragmentation mechanism providing a success transmission without use the acknowledgement frame.

- ‘Analysing reward measures of LARES performability models by discontinuous Markov chains’

Alexander Gouberman, Martin Riedl and Markus Siegle present a new type of Markovian performability models, which features both delayed and immediate transitions, as well as rate and impulse rewards. The high-level model is transformed into a CTMC with fast transitions which in the limit is interpreted as a CTMC with stochastic discontinuities.

- ‘On the dependability evaluation of a virtual multiple input multiple output link’

Mohamed Escheikh and Kamel Barkaoui present a model-based probabilistic approach for dependability assessment of a VMIMO link. They show how node and link failures and related repair rates affect VMIMO link dependability metrics such as availability, reliability and survivability.

- ‘Modelling and performance analysis of video and voice streams in the IEEE 802.11e-EDCA WLANs with TXOP bursting under fading channel’

Mohand Yazid, Louiza Bouallouche-Medjkoune and Djamil Aïssani propose a new Markov chain model of the IEEE 802.11e network including the transmission opportunity limit (TXOPLimit) and the packet error rate (PER). Indeed, the TXOPLimit has been proven efficient for achieving differentiated quality of service (QoS) and improving the wireless bandwidth utilisation. However, most existing analytical models have been developed under unrealistic assumption that the wireless channel is error-free.

- ‘Failure detector-Ring Paxos-based atomic broadcast algorithm’

Nadjette Rebouh, Ifeticene Ryma Asma, Aidoun Naoual and Louiza Bouallouche-Medjkoune present a new solution to the atomic broadcast problem in a distributed asynchronous system. This solution relies on the use of a rotating coordinator and $\diamond S$ failure detectors for fault tolerance. Simulation results show that our proposal performs better than the Ring-Paxos protocol in some situations and is recommended in applications with low latencies.

- ‘Formal approach based on petri nets using agent paradigm for m-maintenance’

Khadidja Abid, L.H. Mouss; Okba Kazar and Laid Kahloul present a new approach which is based on mobile multi-agent architecture for m-maintenance in manufacturing systems. Using high level Petri nets, the authors make the specification, simulation and verification of the proposed architecture.

The six papers presented in part 1 are:

- 1 ‘Debugging of probabilistic systems using structural equation modelling’ by Hichem Debbi, Aimad Debbi and Mustapha Bourahla.
- 2 ‘A μ -calculus formulation of the diagnosability of discrete event systems’ by Florent Peres and Mohamed Ghazel.
- 3 ‘A CTL-based OCL extension using CPN ML for UML validation’ by Miloud Bennama and Thouraya Bouabana-Tebibel.
- 4 ‘A bigraph-based framework for specification and analysis of context-aware systems’ by Taha Abdelmoutaleb Cherfia, Faïza Belala and Kamel Barkaoui.
- 5 ‘Hierarchical timed abstract state machines for WCET estimation’ by Vladimir-Alexandru Paun, Bruno Monsuez and Philippe Baufreton.
- 6 ‘Formal verification of cloud systems elasticity’ by Hamza Sahli, Faïza Belala and Chafia Bouanaka.

We are grateful to all members of the program and organising committees and to all referees of this special issue for their hard work. The support and encouragement of the steering committee were invaluable assets. Finally, we would like to thank all the authors of the invited and submitted papers and all the participants of the workshop.