

Petri Nets 2007

Preface

In this special issue we are very happy to present a selection from the best papers of the 28th International Conference on Application and Theory of Petri Nets and Other Models of Concurrency (ICATPN 2007), held in Siedlce, Poland, 25-29th June 2007. The Petri Net conference has already a long history and is well known both amongst theoreticians and by people motivated by practical applications. More information about the Petri Net conferences and other activities related to Petri Nets can be found on the web site: <http://www.informatik.uni-hamburg.de/TGI/PetriNets/>

The Petri Net conference generally serves as an annual meeting place to discuss the progress in the field of Petri Nets and related models of concurrency. It provides a forum to present and discuss both applications and theoretical developments in this area. Novel tools and substantial enhancements to existing tools can also be presented. In addition, the conference always features invited talks that survey related domains, as well as satellite events such as tutorials and workshops. For example, the 2007 conference had five invited speakers, an introductory tutorial, two advanced tutorials, and five workshops. The conference received 70 submissions from authors from 29 different countries. After a thorough reviewing process the Program Committee selected 22 papers and 3 tool papers. The ICATPN 2007 conference was organized by the Institute of Computer Science at the University of Podlasie and the Institute of Computer Science of the Polish Academy of Sciences. Its remarkable organization was largely due to its General Chair Wojciech Penczek and his team. Detailed information about ICATPN 2007 can be found at <http://atpn2007.ap.siedlce.pl/>

We are very much honoured to introduce this issue of *Fundamenta Informaticae*, because it is a ‘double special’. For the first time in the history of the Petri Net conference, the best papers presented at the meeting have been invited for a special issue of a journal. The authors of the selected papers were invited to submit new versions of their papers, significantly enhanced from their conference counterparts. Each paper was reviewed according to the standards of *Fundamenta Informaticae* and subsequently revised by the authors.

The papers published in this issue cover a substantial area of interest in theory and applications of Petri Nets.

The first paper presents a systematic comparative analysis of the main classes of time Petri Nets for their expressive power. This comparison has a tremendous value not only theoretically but also from a practical viewpoint due to the high popularity of time Petri Nets. The second paper presents an extension of affine well-structured nets, namely an extension of Petri Nets with generalized transfer and reset arcs.

The new type of nets, called data nets, are thoroughly studied here with regards to the decidability of their coverability and termination. The third paper approaches the problem of automatic verification of Petri Nets by means of their analysis based on abstract interpretation. This approach helps to reduce the dimensionality of state spaces explored in the verification process. The fourth paper solves the new problem of synthesis of elementary net systems in which arcs are contextual (inhibitor and actuator) and events are constrained by the notion of localities. The co-located events are assumed to be executed synchronously. The initial specification is captured by step transition systems. The fifth paper considers the expressive power of two extensions to basic Petri Net systems, those with name creation and subnet replication, and proves that a Petri Net system with both such extensions is Turing complete. The sixth paper models a new transport protocol standard, Datagram Congestion Control Protocol, particularly focusing on the connection management and synchronization procedures captured in Coloured Petri Nets. It demonstrates the effectiveness of incremental enhancement and iterative modelling techniques. The seventh paper also has a strong application flavour, addressing issues relevant to workflow management systems. It considers process models and associated history dependent nets and shows how the latter can be automatically converted to classical Petri Nets for analysis purposes.

We would like to express our deep gratitude to the authors of these papers for all their hard work in producing the high quality editions included in this issue. We are also indebted to all the reviewers of these papers for their incredible helpfulness, tenacity and diligence they returned to us.

Special Issue Editors

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ICATPN'07 Program Co-Chairs

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