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Preface

This volume contains the 26 contributed papers and the abstracts of the two invited lectures presented at the 8th IFIP Theoretical Computer Science (TCS-2014), held in Rome, during September 1–3, 2014. The two invited speakers were Giuseppe Italiano and Jane Hillston.

Previous TCS conferences took place in Amsterdam 2012, Brisbane 2010, Milan 2008, Santiago 2006, Tolouse 2004, Montreal 2002, and Sendai 2000.

TCS-2014 consisted of two tracks, with separate Program Committees, which dealt with:

- Track A: Algorithms, Complexity, and Models of Computation
- Track B: Logic, Semantics, Specification, and Verification

The Program Committees for track A and track B are listed in the next section.

Track A selected 12 out of 38 submissions and track B selected 14 out of 35 submissions.

IFIP TCS 2014 was co-located with CONCUR 2014. We would like to thank the general chairs of the whole event, Daniele Gorla and Rossella Petreschi, as well as the members of the TCS Steering Committee, Giorgio Ausiello, Jos Baeten, and Jacques Sakarovitch for their help and support.

July 2014

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Abstracts

Strong Bridges and Strong Articulation Points of Directed Graphs

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Abstract. Given a directed graph G, an edge is a strong bridge if its removal increases the number of strongly connected components of G. Similarly, a vertex is a strong articulation point if its removal increases the number of strongly connected components of G. Strong articulation points and strong bridges are related to the notion of 2-vertex and 2-edge connectivity of directed graphs, which surprisingly seems to have been overlooked in the past. In this talk, we survey some very recent work in this area, both from the theoretical and the practical viewpoint.

The Benefits of Sometimes Not Being Discrete

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Abstract. Discrete representations of systems are usual in theoretical computer science and they have many benefits. Unfortunately they also suffer from the problem of state space explosion, sometimes termed the *curse of dimensionality*. In the area of quantitative modelling, high-level formal modelling formalisms such as stochastic Petri nets and stochastic process algebras have eased the construction of underlying Markovian models. But the combination of improved model construction techniques and the increasing scale and complexity of the systems being developed have exacerbated the problem of state space explosion.

In recent years, research has shown that there are cases in which we can reap the benefits of discrete representation during system description but then gain from more efficient analysis by approximating the discrete system by a continuous one. When the system under consideration can be presented as a *population* model and the populations involved are known to be *large*, then a good approximation of the discrete behaviour can be achieved through a continuous or fluid approximation whereby the discrete Markov chain is replaced by a set of ordinary differential equations. Moreover, this model is scale-free in the sense that the computational effort to solve it remains the same even as the populations involved grow larger.

This paper will motivate this approach, explaining the theoretical foundations and their practical benefits.

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