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Foreword

ETAPS 2002 is the fifth instance of the European Joint Conferences on Theory and Practice of Software. ETAPS is an annual federated conference that was established in 1998 by combining a number of existing and new conferences. This year it comprises five conferences (FOSSACS, FASE, ESOP, CC, TACAS), thirteen satellite workshops (ACL2, AGT, CMCS, COCV, DCC, INT, LDTA, SC, SFEDL, SLAP, SPIN, TPTS and VISS), eight invited lectures (not including those that are specific to the satellite events), and several tutorials.

The events that comprise ETAPS address various aspects of the system development process, including specification, design, implementation, analysis and improvement. The languages, methodologies and tools which support these activities are all well within its scope. Different blends of theory and practice are represented, with an inclination towards theory with a practical motivation on one hand and soundly-based practice on the other. Many of the issues involved in software design apply to systems in general, including hardware systems, and the emphasis on software is not intended to be exclusive.

ETAPS is a loose confederation in which each event retains its own identity, with a separate programme committee and independent proceedings. Its format is open-ended, allowing it to grow and evolve as time goes by. Contributed talks and system demonstrations are in synchronized parallel sessions, with invited lectures in plenary sessions. Two of the invited lectures are reserved for "unifying" talks on topics of interest to the whole range of ETAPS attendees. The aim of cramming all this activity into a single one-week meeting is to create a strong magnet for academic and industrial researchers working on topics within its scope, giving them the opportunity to learn about research in related areas, and thereby to foster new and existing links between work in areas that were formerly addressed in separate meetings.

ETAPS 2002 is organized by Laboratoire Verimag in cooperation with

Centre National de la Recherche Scientifique (CNRS)
Institut de Mathématiques Appliquées de Grenoble (IMAG)
Institut National Polytechnique de Grenoble (INPG)
Université Joseph Fourier (UJF)
European Association for Theoretical Computer Science (EATCS)
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European Association of Software Science and Technology (EASST)
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Overall planning for ETAPS conferences is the responsibility of its Steering Committee, whose current membership is:

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I would like to express my sincere gratitude to all of these people and organizations, the programme committee chairs and PC members of the ETAPS conferences, the organizers of the satellite events, the speakers themselves, and finally Springer-Verlag for agreeing to publish the ETAPS proceedings. As organiser of ETAPS'98, I know that there is one person that deserves a special applause: Susanne Graf. Her energy and organizational skills have more than compensated for my slow start in stepping into Don Sannella's enormous shoes as ETAPS Steering Committee chairman. Yes, it is now a year since I took over the role, and I would like my final words to transmit to Don all the gratitude and admiration that is felt by all of us who enjoy coming to ETAPS year after year knowing that we will meet old friends, make new ones, plan new projects and be challenged by a new culture! Thank you Don!

Lisbon, January 2002

José Luiz Fiadeiro
Steering Committee Chairman
ETAPS 2002

Preface

The present volume contains the proceedings of the international conference *Foundations of Software Science and Computation Structures (FOSSACS) 2002*, held in Grenoble, France, April 10–12, 2002. FOSSACS is an event of the *Joint European Conferences on Theory and Practice of Software (ETAPS)*. The previous four FOSSACS conferences took place in Lisbon (1998), Amsterdam (1999), Berlin (2000), and Genova (2001).

FOSSACS presents papers, which offer progress in foundational research with a clear significance to Software Sciences. Central objects of interest are the algebraic, categorical, logical, and geometric theories, models, and methods which support the specification, synthesis, verification, analysis, and transformation of sequential, concurrent, distributed, and mobile programs and software systems. This volume contains research contributions to a wide spectrum of topics within this scope, many of which are motivated by recent trends and problems in the practice of software and information technology.

These proceedings contain 29 papers. The first one accompanies the invited lecture *Semantical Evaluations as Monadic Second-Order Compatible Structure Transformations* delivered by Bruno Courcelle, University of Bordeaux. The other 28 are contributed papers, selected from a total of 67 submissions. I would like to sincerely thank all members of the FOSSACS 2002 Program Committee for the excellent job they did in the difficult selection process. Also I would like to thank all the sub-referees for their invaluable contributions to this process.

Thanks also to the co-editor of this volume, Uffe H. Engberg, for his assistance in handling and preparing the files for the publisher. And special thanks to Pawel Sobocinski for his excellent administrative handling of the conference web page, the electronic submissions, the reviewing, and the notification process. Thanks also to Rich Gerber for allowing us to use his conference management system START. And finally thanks to the ETAPS 2002 Organizing Committee chaired by Susanne Graf, and the Steering Committee of ETAPS for their efficient coordination of all the activities leading up to FOSSACS 2002.

Aarhus, January 2002

Mogens Nielsen
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Peter Csaba Ölveczky

Table of Contents

Invited Paper

Semantical Evaluations
as Monadic Second-Order Compatible Structure Transformations 1
Bruno Courcelle

Contributed Papers

Verification for Java's Reentrant Multithreading Concept 5
Erika Ábrahám-Mumm, Frank S. de Boer, Willem-Paul de Roever, Martin Steffen

On the Integration of Observability and Reachability Concepts 21
Michel Bidoit, Rolf Hennicker

Proving Correctness of Timed Concurrent Constraint Programs 37
Frank S. de Boer, Maurizio Gabbrielli, Maria Chiara Meo

Generalised Regular MSC Languages 52
Benedikt Bollig, Martin Leucker, Thomas Noll

On Compositional Reasoning in the Spi-calculus 67
Michele Boreale, Daniele Gorla

On Specification Logics for Algebra-Coalgebra Structures:
Reconciling Reachability and Observability 82
Corina Cîrstea

A First-Order One-Pass CPS Transformation 98
Olivier Danvy, Lasse R. Nielsen

The Demonic Product of Probabilistic Relations 114
Ernst-Erich Doberkat

Minimizing Transition Systems for Name Passing Calculi:
A Co-algebraic Formulation 129
Gianluigi Ferrari, Ugo Montanari, Marco Pistore

Varieties of Effects 144
Carsten Führmann

A Characterization of Families of Graphs in Which Election Is Possible ... 159
Emmanuel Godard, Yves Métivier

Equivalence-Checking with One-Counter Automata:
A Generic Method for Proving Lower Bounds 172
Petr Jančar, Antonín Kučera, Faron Moller, Zdeněk Sawa

Efficient Type Matching 187
Somesh Jha, Jens Palsberg, Tian Zhao

Higher-Order Pushdown Trees Are Easy 205
Teodor Knapik, Damian Niwiński, Paweł Urzyczyn

Conflict Detection and Resolution
in Access Control Policy Specifications 223
Manuel Koch, Luigi V. Mancini, Francesco Parisi-Presicce

Logics Admitting Final Semantics 238
Alexander Kurz

Model Checking Fixed Point Logic with Chop 250
Martin Lange, Colin Stirling

On Model Checking Durational Kripke Structures 264
François Laroussinie, Nicolas Markey, Philippe Schnoebelen

Model-Checking Infinite Systems Generated by Ground Tree Rewriting . . . 280
Christof Löding

Bounded MSC Communication 295
Markus Lohrey, Anca Muscholl

The Informatic Derivative at a Compact Element 310
Keye Martin

Heterogeneous Development Graphs and Heterogeneous Borrowing 326
Till Mossakowski

Notions of Computation Determine Monads 342
Gordon Plotkin, John Power

A Calculus of Circular Proofs and Its Categorical Semantics 357
Luigi Santocanale

Verifying Temporal Properties Using Explicit Approximants:
Completeness for Context-free Processes 372
Ulrich Schöpp, Alex Simpson

Note on the Tableau Technique for Commutative Transition Systems 387
Jiří Srba

A Semantic Basis for Local Reasoning 402
Hongseok Yang, Peter O'Hearn

Linearity and Bisimulation 417
Nobuko Yoshida, Kohei Honda, Martin Berger

Author Index 435