

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Alfred Kobsa

University of California, Irvine, CA, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Germany

Madhu Sudan

Microsoft Research, Cambridge, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Farhad Arbab Marjan Sirjani (Eds.)

Fundamentals of Software Engineering

Third IPM International Conference, FSEN 2009
Kish Island, Iran, April 15-17, 2009
Revised Selected Papers

Volume Editors

Farhad Arbab
Center for Mathematics and Computer Science (CWI)
Science Park 123, 1098 XG Amsterdam, The Netherlands
and Leiden University, The Netherlands
E-mail: farhad@cw.nl

Marjan Sirjani
Reykjavik University, School of Computer Science
Kringlan 1, 103 Reykjavik, Iceland
and University of Tehran, Iran
E-mail: marjan@ru.is

Library of Congress Control Number: 2009942995

CR Subject Classification (1998): D.2, D.2.4, F.4.1, D.2.2

LNCS Sublibrary: SL 2 – Programming and Software Engineering

ISSN	0302-9743
ISBN-10	3-642-11622-1 Springer Berlin Heidelberg New York
ISBN-13	978-3-642-11622-3 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

springer.com

© Springer-Verlag Berlin Heidelberg 2010
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 12840984 06/3180 5 4 3 2 1 0

Preface

The present volume contains the proceedings of the Third IPM International Conference on Fundamentals of Software Engineering (FSEN), Kish, Iran, April 15–17, 2009. FSEN 2009 was organized by the School of Computer Science at the Institute for Studies in Fundamental Sciences (IPM) in Iran, in cooperation with the ACM SIGSOFT and IFIP WG 2.2.

This conference brought together around 100 researchers and practitioners working on different aspects of formal methods in software engineering from 15 different countries. The topics of interest in FSEN span over all aspects of formal methods, especially those related to advancing the application of formal methods in software industry and promoting their integration with practical engineering techniques. The Program Committee of FSEN 2009 consisted of top researchers from 24 different academic institutes in 11 countries. We received a total of 88 submissions from 25 countries out of which the Program Committee selected 22 as regular papers, 5 as short papers, and 7 as poster presentations in the conference program. Each submission was reviewed by at least three independent referees, for its quality, originality, contribution, clarity of presentation, and its relevance to the conference topics. This volume contains the revised versions of the regular and short papers presented at FSEN 2009.

Three distinguished keynote speakers delivered their lectures at FSEN 2009 on models of computation: automata and processes (Jos Baeten), verification, performance analysis and controller synthesis for real-time systems (Kim Larsen), and theory and tool for component-based model-driven development in rCOS (Zhiming Liu). Our invited speakers also contributed to this volume by submitting their keynote papers, which were accepted after they were reviewed by independent referees.

We thank the Institute for Studies in Fundamental Sciences (IPM), Tehran, Iran for their financial support and local organization of FSEN 2009. We thank the members of the Program Committee and the external reviewers for their time, effort, and contributions to making FSEN a quality conference. We are grateful for the help of Behnaz Changizi in preparing the pre-proceedings of FSEN 2009 and this volume. Last but not least, our thanks go to our authors and conference participants, without whose submissions and participation FSEN would not have been possible.

November 2009

Farhad Arbab
Marjan Sirjani

Conference Organization

General Chair

Hamid Sarbazi-azad	IPM, Iran; Sharif University of Technology, Iran
--------------------	---

Steering Committee

Farhad Arbab	CWI, The Netherlands; Leiden University, The Netherlands
Christel Baier	University of Dresden, Germany
Frank de Boer	CWI, The Netherlands; Leiden University, The Netherlands
Ali Movaghar	IPM, Iran; Sharif University of Technology, Iran
Jan Rutten	CWI, The Netherlands; Vrije University Amsterdam, The Netherlands
Hamid Sarbazi-azad	IPM, Iran; Sharif University of Technology, Iran
Marjan Sirjani	Reykjavik University, Reykjavik, Iceland; University of Tehran, Iran; IPM, Iran

Program Chairs

Farhad Arbab	CWI, The Netherlands; Leiden University, The Netherlands
Marjan Sirjani	Reykjavik University, Reykjavik, Iceland; University of Tehran, Iran; IPM, Iran

Program Committee

Luca Aceto	Reykjavik University, Reykjavik, Iceland
Gul Agha	University of Illinois at Urbana - Champaign, USA
Christel Baier	University of Dresden, Germany
Frank de Boer	CWI, The Netherlands; Leiden University, The Netherlands

Marcello Bonsangue	Leiden University, The Netherlands
Mario Bravetti	University of Bologna, Italy
Michael Butler	University of Southampton, UK
James C. Browne	University of Texas at Austin, USA
Dave Clarke	CWI, The Netherlands; K.U. Leuven, Belgium
Nancy Day	University of Waterloo, Canada
Wan Fokkink	Vrije Universiteit Amsterdam, The Netherlands
Masahiro Fujita	University of Tokyo, Japan
Maurizio Gabbrielli	University of Bologna, Italy
Jan Friso Groote	Technical University of Eindhoven, The Netherlands
Einar Broch Johnsen	University of Oslo, Norway
Joost Kok	Leiden University, The Netherlands
Zhiming Liu	United Nations University, Macao, China
Seyyed Hassan Mirian	Sharif University of Technology, Iran
Ugo Montanari	University of Pisa, Italy
Peter Mosses	Swansea University, UK
Mohammad Reza Mousavi	Technical University of Eindhoven, The Netherlands
Ali Movaghar	IPM, Iran; Sharif University of Technology, Iran
Andrea Omicini	University of Bologna, Italy
Jan Rutten	CWI, The Netherlands; Vrije University Amsterdam, The Netherlands
Davide Sangiorgi	University of Bologna, Italy
Sandeep Shukla	Virginia Tech, USA
Carolyn Talcott	SRI International, USA
Zijiang Yang	Western Michigan University, USA

Local Organization

Hamidreza Shahrabi IPM, Iran

External Reviewers

Ahuja, Sumit	Behjati, Razieh
Amato, Gianluca	Birgisson, Arnar
Andrei, Oana	Bistray, Denes
Astefanoaei, Lacramioara	Blechmann, Tobias
Atif, Muhammad	Blom, Stefan
Bacciu, Davide	Bokor, Peter
Bartocci, Ezio	Browne, James

Bundgaard, Mikkel
Cacciagrano, Diletta Romana
Callanan, Sean
Carbone, Marco
Chen, Qichang
Chen, Zhenbang
Chessa, Stefano
Chiniforooshan Esfahani, Hesam
Chockler, Hana
Chothia, Tom
Costa, David
Crouzen, Pepijn
Cuijpers, Pieter
De Nicola, Rocco
Di Berardini, Maria Rita
Di Giusto, Cinzia
Dovland, Johan
Edmunds, Andrew
Eker, Steven
Fantechi, Alessandro
Ferreira, Carla
Ferretti, Stefano
Fuentes, Thaizel
Gerrits, Dirk
Ghassemi, Fatemeh
Grabe, Immo
Griesmayer, Andreas
Groesser, Marcus
Gruener, Andreas
Hugues, Jerome
Haghighi, Hassan
Hallerstede, Stefan
Hansen, Henri
Hasegawa, Masahito
Hoenicke, Jochen
Huang, Xiaowan
Izadi, Mohammad
Izadi, Mohammad Javad
Jaeger, Manfred
Jagannath, Vilas
Jaghooori, Mohammad Mahdi
Jahangard, Amir
Jose, Bijoy
Kane, Kevin
Karmani, Rajesh

Kemper, Stephanie
Khosravi, Ramtin
Kim, Minyoung
Kleijn, Jetty
Klein, Joachim
Klint, Paul
Klueppelholz, Sascha
Koehler, Christian
Korthikanti, Vijay Anand Reddy
Kyas, Marcel
Li, Dan
Lin, Cui
Lluch Lafuente, Alberto
Luettgen, Gerald
Maamria, Issam
Magnani, Matteo
Mathaikutty, Deepak
Mathijssen, Aad
Montaghami, Vajihollah
Montangero, Carlo
Mooij, Arjan
Morisset, Charles
Nangia, Saurabh
Nanz, Sebastian
Orzan, Simona
Osaiweran, Ammar
Patel, Hiren
Polini, Andrea
Razavi, Niloofar
Ren, Shangping
Reniers, Michel
Rezazadeh, Abdolbaghi
Riganelli, Oliviero
Ripon, Shamim
Roggenbach, Markus
Rossi, Davide
Said, Mar Yah
Sabouri, Hamideh
Schlatte, Rudolf
Shali, Amin
Silva, Alexandra
Snidaro, Lauro
Snook, Colin
Stappers, Frank
Steffen, Martin

Stehr, Mark-Oliver
Stolz, Volker
Suhaib, Syed
Sun, Meng
Tartamella, Chris
Tesei, Luca
Tuosto, Emilio
Turini, Franco
Voorhoeve, Marc
Wang, Chao

Wang, Shuling
Wang, Xu
Willemse, Tim
Wu, Zeng
van der Wulp, Jeroen
Xue, Bin
Yang, Ping
Yang, Zijiang
Zavattaro, Gianluigi
Zhan, Naijun

Table of Contents

Session 1. Invited Papers

A Process-Theoretic Look at Automata	1
<i>J.C.M. Baeten, P.J.L. Cuijpers, B. Luttik, and P.J.A. van Tilburg</i>	
Verification, Performance Analysis and Controller Synthesis for Real-Time Systems	34
<i>Uli Fahrenberg, Kim G. Larsen, and Claus R. Thrane</i>	
rCOS: Theory and Tool for Component-Based Model Driven Development	62
<i>Zhiming Liu, Charles Morisset, and Volker Stolz</i>	

Session 2. Regular Papers

Termination in Higher-Order Concurrent Calculi	81
<i>Romain Demangeon, Daniel Hirschkoﬀ, and Davide Sangiorgi</i>	
Typing Asymmetric Client-Server Interaction	97
<i>Franco Barbanera, Sara Capecchi, and Ugo de'Liguoro</i>	
Equational Reasoning on Ad Hoc Networks	113
<i>Fatemeh Ghassemi, Wan Fokkink, and Ali Movaghar</i>	
Towards a Notion of Unsatisﬁable Cores for LTL	129
<i>Viktor Schuppan</i>	
Rule Formats for Determinism and Idempotence	146
<i>Luca Aceto, Arnar Birgisson, Anna Ingolfsdottir, MohammadReza Mousavi, and Michel A. Reniers</i>	
The Complexity of Reachability in Randomized Sabotage Games	162
<i>Dominik Klein, Frank G. Radmacher, and Wolfgang Thomas</i>	
Applying Step Coverability Trees to Communicating Component-Based Systems	178
<i>Jetty Kleijn and Maciej Koutny</i>	
Program Logics for Sequential Higher-Order Control	194
<i>Martin Berger</i>	
Modular Schedulability Analysis of Concurrent Objects in Creol	212
<i>Frank de Boer, Tom Chothia, and Mohammad Mahdi Jaghoori</i>	

A Timed Calculus for Wireless Systems	228
<i>Massimo Merro and Eleonora Sibilio</i>	
Model Checking Linear Duration Invariants of Networks of Automata	244
<i>Miaomiao Zhang, Zhiming Liu, and Naijun Zhan</i>	
Automata Based Model Checking for Reo Connectors	260
<i>Marcello M. Bonsangue and Mohammad Izadi</i>	
On the Expressiveness of Refinement Settings	276
<i>Harald Fecher, David de Frutos-Escrig, Gerald Lüttgen, and Heiko Schmidt</i>	
Bounded Rational Search for On-the-Fly Model Checking of LTL Properties	292
<i>Razieh Behjati, Marjan Sirjani, and Majid Nili Ahmadabadi</i>	
Automated Translation and Analysis of a ToolBus Script for Auctions	308
<i>Wan Fokkink, Paul Klint, Bert Lissner, and Yaroslav S. Usenko</i>	
Executable Interface Specifications for Testing Asynchronous Creol Components	324
<i>Immo Grabe, Marcel Kyas, Martin Steffen, and Arild B. Torjusen</i>	
Compositional Strategy Mapping	340
<i>Gregor Gössler</i>	
A Sound Analysis for Secure Information Flow Using Abstract Memory Graphs	355
<i>Dorina Ghindici, Isabelle Simplot-Ryl, and Jean-Marc Talbot</i>	
Refinement Patterns for Hierarchical UML State Machines	371
<i>Jens Schönborn and Marcel Kyas</i>	
Specification and Validation of Behavioural Protocols in the rCOS Modeler	387
<i>Zhenbang Chen, Charles Morisset, and Volker Stolz</i>	
The Interplay between Relationships, Roles and Objects	402
<i>Matteo Baldoni, Guido Boella, and Leendert van der Torre</i>	
A Coordination Model for Interactive Components	416
<i>Marco A. Barbosa, Luis S. Barbosa, and José C. Campos</i>	

Session 3. Short Papers

Evolution Control in MDE Projects: Controlling Model and Code Co-evolution	431
<i>Jacky Estublier, Thomas Leveque, and German Vega</i>	
An xADL Extension for Managing Dynamic Deployment in Distributed Service Oriented Architectures	439
<i>Mohamed Nadhmi Miladi, Ikbel Krichen, Mohamed Jmaiel, and Khalil Drira</i>	
A First Step towards Security Policy Compliance of Connectors	447
<i>Sun Meng</i>	
A Safe Implementation of Dynamic Overloading in Java-Like Languages	455
<i>Lorenzo Bettini, Sara Capecchi, and Betti Venneri</i>	
Fundamental Concepts for the Structuring of Functionality into Modular Parts	463
<i>Alexander Gruler and Michael Meisinger</i>	
Author Index	471