

Table of Contents

Invited Speech

Toward Practical Application of Formal Methods in Software Lifecycle Processes	1
<i>Mario Tokoro</i>	
Formal Methods in the Aerospace Industry: Follow the Money	2
<i>Darren Cofer</i>	
Applying Term Rewriting to Speech Recognition of Numbers	4
<i>Robert E. Shostak</i>	

Concurrency

Variable Permissions for Concurrency Verification	5
<i>Duy-Khanh Le, Wei-Ngan Chin, and Yong-Meng Teo</i>	
A Concurrent Temporal Programming Model with Atomic Blocks	22
<i>Xiaoxiao Yang, Yu Zhang, Ming Fu, and Xinyu Feng</i>	
A Composable Mixed Mode Concurrency Control Semantics for Transactional Programs	38
<i>Granville Barnett and Shengchao Qin</i>	

Applications of Formal Methods to New Areas

Towards a Formal Verification Methodology for Collective Robotic Systems	54
<i>Edmond Gjondrekaj, Michele Loretta, Rosario Pugliese, Francesco Tiezzi, Carlo Pinciroli, Manuele Brambilla, Mauro Birattari, and Marco Dorigo</i>	
Modeling Resource-Aware Virtualized Applications for the Cloud in Real-Time ABS	71
<i>Einar Broch Johnsen, Rudolf Schlatte, and Silvia Lizeth Tapia Tarifa</i>	
Specification and Model Checking of the Chandy and Lamport Distributed Snapshot Algorithm in Rewriting Logic	87
<i>Kazuhiro Ogata and Phan Thi Thanh Huyen</i>	

Quantity and Probability

Quantitative Program Dependence Graphs	103
<i>Chunyan Mu</i>	
Quantitative Analysis of Information Flow Using Theorem Proving	119
<i>Tarek Mhamdi, Osman Hasan, and Sofiène Tahar</i>	
Modeling and Verification of Probabilistic Actor Systems Using pRebeca	135
<i>Mahsa Varshosaz and Ramtin Khosravi</i>	

Formal Verification

Modular Verification of OO Programs with Interfaces	151
<i>Qiu Zongyan, Hong Ali, and Liu Yijing</i>	
Separation Predicates: A Taste of Separation Logic in First-Order Logic	167
<i>François Bobot and Jean-Christophe Filiâtre</i>	
The Confinement Problem in the Presence of Faults	182
<i>William L. Harrison, Adam Procter, and Gerard Allwein</i>	

Modeling and Development Methodology

Verification of ATL Transformations Using Transformation Models and Model Finders	198
<i>Fabian Büttner, Marina Egea, Jordi Cabot, and Martin Gogolla</i>	
Automatic Generation of Provably Correct Embedded Systems	214
<i>Shang-Wei Lin, Yang Liu, Pao-Ann Hsiung, Jun Sun, and Jin Song Dong</i>	
Complementary Methodologies for Developing Hybrid Systems with Event-B	230
<i>Wen Su, Jean-Raymond Abrial, and Huibiao Zhu</i>	

Temporal Logics

A Temporal Logic with Mean-Payoff Constraints	249
<i>Takashi Tomita, Shin Hiura, Shigeki Hagihara, and Naoki Yonezaki</i>	
Time Constraints with Temporal Logic Programming	266
<i>Meng Han, Zhenhua Duan, and Xiaobing Wang</i>	
Stepwise Satisfiability Checking Procedure for Reactive System Specifications by Tableau Method and Proof System	283
<i>Yoshinori Neya and Noriaki Yoshiura</i>	

Abstraction and Refinement

Equational Abstraction Refinement for Certified Tree Regular Model Checking	299
<i>Yohan Boichut, Benoit Boyer, Thomas Genet, and Axel Legay</i>	
SMT-Based False Positive Elimination in Static Program Analysis	316
<i>Maximilian Junker, Ralf Huuck, Ansgar Fehnker, and Alexander Knapp</i>	
Predicate Analysis with Block-Abstraction Memoization	332
<i>Daniel Wonisch and Heike Wehrheim</i>	
Heuristic-Guided Abstraction Refinement for Concurrent Systems	348
<i>Nils Timm, Heike Wehrheim, and Mike Czech</i>	
More Anti-chain Based Refinement Checking	364
<i>Ting Wang, Songzheng Song, Jun Sun, Yang Liu, Jin Song Dong, Xinyu Wang, and Shanping Li</i>	

Tools

An Analytical and Experimental Comparison of CSP Extensions and Tools	381
<i>Ling Shi, Yang Liu, Jun Sun, Jin Song Dong, and Gustavo Carvalho</i>	
Symbolic Model-Checking of Stateful Timed CSP Using BDD and Digitization	398
<i>Truong Khanh Nguyen, Jun Sun, Yang Liu, and Jin Song Dong</i>	
Annotations for Alloy: Automated Incremental Analysis Using Domain Specific Solvers	414
<i>Svetoslav Ganov, Sarfraz Khurshid, and Dewayne E. Perry</i>	
State Space c-Reductions of Concurrent Systems in Rewriting Logic	430
<i>Alberto Lluch Lafuente, José Meseguer, and Andrea Vandin</i>	

Testing and Runtime Verification

A Practical Loop Invariant Generation Approach Based on Random Testing, Constraint Solving and Verification	447
<i>Mengjun Li</i>	
ConSMutate: SQL Mutants for Guiding Concolic Testing of Database Applications	462
<i>Tanmoy Sarkar, Samik Basu, and Johnny S. Wong</i>	

Demonic Testing of Concurrent Programs	478
<i>Scott West, Sebastian Nanz, and Bertrand Meyer</i>	
Towards Certified Runtime Verification	494
<i>Jan Olaf Blech, Yliès Falcone, and Klaus Becker</i>	
Author Index	511