Editorial

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FM 2009, the 16th International Symposium on Formal Methods, marked the 10th anniversary of the First World Congress on Formal Methods that was held in 1999 in Toulouse, France. We wished to celebrate this by organizing FM 2009 as the **2nd World Congress in the FM series**, aiming to bring together once again the formal methods communities from all over the world. The programme committee had members from 46 countries, authors from 38 countries submitted papers, and authors from 23 countries had papers accepted. The five invited speakers represented four continents.

The authors of a selection of the accepted papers were invited to submit extended versions of their papers to special anniversary issues of two reputable journals. This is one of them; the companion anniversary issue is in Formal Methods in System Design.

The first two papers here are concerned with refinement. In “Automated Property Verification for Large Scale B Models with ProB” (by Michael Leuschel, Jérôme Falampin, Fabian Fritz, and Daniel Plagge), we have a report on the application of the ProB tool on industrial cases: the San Juan metro system, and lines of the Barcelona, Paris, and São Paulo metros. The results lead to the development of improvements to ProB verification capabilities, which are described and evaluated in the paper.

“Compositional refinement in agent-based security protocols” (by AK McIver and CC Morgan) describes a refinement-based approach for the development of security programs that contain hidden variables that must not be revealed to an observer. The observer can observe the execution of the program, and thus can use this knowledge to deduce the value of hidden variables. Refinement preserves the ignorance of the observer, and a calculus calculus is used to solve a number of well known security case studies.

“A Tableau-based Decision Procedure for CTL*” (by Mark Reynolds) presents a top-down style tableau method for deciding satisfiability of propositional CTL*. Proofs of its soundness and completeness are given. An implementation based on the presented algorithm is available online for experimentation. Choices made in this implementation are discussed, and some experiments reported. The paper contains many examples to clarify the technical constructions presented.

Finally, “Symbolic Predictive Analysis for Concurrent Programs” (by Chao Wang, Sudipta Kundu, Rhishikesh Limaye, Malay Ganai, and Aarti Gupta) introduces a novel predictive analysis algorithm. The algorithm takes into account the source code of the program being monitored, which can be utilized in addition to the observed events. Furthermore, it uses SMT-based symbolic methods, to improve the interleaving coverage. Lastly, it is shown how to improve the scalability by symbolically bounding the number of context switches allowed in the predicted interleavings.

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