

Lecture Notes in Artificial Intelligence 5663

Edited by R. Goebel, J. Siekmann, and W. Wahlster

Subseries of Lecture Notes in Computer Science

Renate A. Schmidt (Ed.)

Automated Deduction – CADE-22

22nd International Conference on Automated Deduction
Montreal, Canada, August 2-7, 2009
Proceedings

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Library of Congress Control Number: Applied for

CR Subject Classification (1998): I.2.3, I.2, F.4.1, F.3, F.4, D.2.4

LNCS Sublibrary: SL 7 – Artificial Intelligence

ISSN 0302-9743
ISBN-10 3-642-02958-2 Springer Berlin Heidelberg New York
ISBN-13 978-3-642-02958-5 Springer Berlin Heidelberg New York

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Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 12717996 06/3180 5 4 3 2 1 0

Preface

This volume contains the proceedings of the 22nd International Conference on Automated Deduction (CADE-22). The conference was hosted by the School of Computer Science at McGill University, Montreal, Canada, during August 2–7, 2009. CADE is the major forum for the presentation of research in all aspects of automated deduction. Within this general topic the conference is devoted to foundations, applications, implementations and practical experiences. CADE was founded in 1974 when it was held in Argonne, USA. Since then CADE has been organized first on a bi-annual basis mostly and since 1996 on an annual basis, in 2001, 2004, 2004, 2006 and 2008 as a constituent of IJCAR.

This year the Program Committee selected 32 technical contributions out of 77 initial submissions. Of the selected papers 27 were regular papers and 5 were system papers. Each paper was refereed by at least three reviewers on its significance, technical quality, originality, quality of presentation and relevance to the conference. The refereeing process and the Program Committee meeting were conducted electronically via the Internet using the EasyChair conference management system. The program included three invited lectures by distinguished experts in the area: *Instantiation-Based Automated Reasoning: From Theory to Practice* by Konstantin Korovin (The University of Manchester, UK), *Integrated Reasoning and Proof Choice Point Selection in the Jahob System: Mechanisms for Program Survival* by Martin Rinard (Massachusetts Institute of Technology, USA), and *Building Theorem Provers* by Mark Stickel (SRI International, USA). In addition, the conference included a two-day program of a diverse range of workshops and tutorials. Two system competitions were held during the conference: *The CADE ATP System Competition (CASC)* organized by Geoff Sutcliffe, and *The Satisfiability Modulo Theories Competition (SMT-COMP)* organized by Clark Barrett, Morgan Deters, Albert Oliveras and Aaron Stump.

The papers in these proceedings cover a diversity of logics, extending from classical propositional logic, first-order logic and higher-order logic, to non-classical logics including intuitionistic logic, modal logic, temporal logic and dynamic logic. Also covered are theories, extending from various theories of arithmetic to equational theories and algebra. Many of the papers are on methods using superposition, resolution, SAT, SMT, instance-based approaches, tableaux and term rewriting but also hierarchical reasoning and the inverse method, or combinations of some of these. The most salient issues include, for example, termination and decidability, completeness, combinations, interpolant computation, model building, practical aspects and implementations of fully automated theorem provers. Considerable impetus comes from applications, most notably analysis and verification of programs and security protocols, and the provision and support of various automated reasoning tasks.

The CADE-22 Program Committee was part of the Herbrand Award Committee, which additionally consisted of the previous award winners of the last ten years and the Trustees of CADE Inc. The committee has decided to present the Herbrand Award for Distinguished Contributions to Automated Reasoning to Deepak Kapur in recognition of his seminal contributions to several areas of automated deduction including inductive theorem proving, term rewriting, unification theory, integration and combination of decision procedures, lemma and loop invariant generation, as well as his work in computer algebra, which helped to bridge the gap between the two areas.

I would like to thank the many people without whom the conference would not have been possible. First, I would like to thank all authors who submitted papers, all participants of the conference as well as the invited keynote speakers, the tutorial speakers, the workshop organizers and the system competition organizers for their contributions. I am very grateful to the members of the Program Committee and the external reviewers for carefully reviewing and selecting the papers. We are all indebted to Andrei Voronkov for providing EasyChair and his support during the discussion phase of the submissions. I also thank the Trustees of CADE Inc. for their advice and support.

Special thanks go to the members of the local organization team in the School of Computer Science at McGill University for their tremendous amount of effort, especially Maja Frydrychowicz, who did outstanding work. Moreover, I am extremely grateful to Aaron Stump, the Workshop Chair, Carsten Schürmann, the Publicity Chair, and of course Brigitte Pientka, who as Conference Chair was involved in almost every aspect of the organization of the conference.

Finally, it is my pleasure to acknowledge the generous support by the School of Computer Science and the Faculty of Science at McGill University, and Microsoft Research.

May 2009

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