Logical Methods in Computer Science
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PREFACE

This special issue of LMCS contains extended versions of some of the best papers of the conference IJCAR 2020 (10th International Joint Conference on Automated Reasoning). IJCAR is the premier international joint conference on all aspects of automated reasoning, including foundations, implementations, and applications. IJCAR 2020 was initially planned to be held in Paris (France) on July 1-4 2020, but due to the COVID-2019 pandemic, it was eventually held by remote conferencing. IJCAR 2020 merged four leading events in automated reasoning: CADE (Conference on Automated Deduction), FroCoS (Symposium on Frontiers of Combining Systems), ITP (International Conference on Interactive Theorem Proving) and TABLEAUX (Conference on Analytic Tableaux and Related Methods).

All the papers included in the special issue underwent a two-round reviewing process. First, all the papers submitted to IJCAR were evaluated by the programme committee, who selected 46 regular papers, 11 system descriptions, and 5 short papers out of a total of 150 submissions. Then the authors of some of the papers that obtained the highest ratings were invited to submit an extension of their work to LMCS. The submitted papers went through a second reviewing round, in accordance to the high standards of LMCS.

All articles have already been published in the regular issues of Logical Methods in Computer Science.

The present special issue focuses on *interactive theorem proving*. (A special issue of the Journal of Automated Reasoning, also devoted to IJCAR 2020, contains papers that cover a wide range of topics in *automated theorem proving*). This special issue of LMCS contains 5 papers which describe formal developments in various proof assistants and also expand the theoretical foundations of interactive theorem provers. In *Beyond Notations: Hygienic Macro Expansion for Theorem Proving Languages*, S. Ullrich and L. de Moura propose a novel macro system for interactive theorem proving, which is extremely powerful and flexible, and describe the way it was integrated into the Lean theorem prover. In *Formalizing the Face Lattice of Polyhedra*, X. Allamigeon, R. D. Katz and P.-Y. Strub present a formal description in the proof assistant Coq of some computational aspects of polyhedra, with a special focus on faces. In the paper entitled *Trakhtenbrot's Theorem in Coq: Finite Model Theory through the Constructive Lens*, D. Kirst and D. Larchey-Wendling formalize some undecidability and decidability results for first-order satisfiability in Coq. In *Verified Approximation Algorithms*, R. Eßmann, T. Nipkow, S. Robillard and U. Sulejmani describe a formal verification in the proof assistant Isabelle of different approximation algorithms for NP-complete optimization problems. Finally, in *Quotients of Bounded Natural Functors*, B. Fürer, A. Lochbihler, J. Schneider and D. Traytel expand the theory of abstract data types in Isabelle by showing that bounded natural functors are closed under a quotient construction, in some appropriate sense.

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