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Yoshiharu Kohayakawa ·
Flávio Keidi Miyazawa (Eds.)

LATIN 2020: Theoretical Informatics

14th Latin American Symposium
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Proceedings

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Preface

We are very pleased to present this volume with the papers accepted to the 14th Latin American Theoretical INformatics Symposium (LATIN 2020). The conference was scheduled to run in May 2020, in São Paulo, Brazil, the birthplace of this series of meetings, but owing to the global COVID-19 pandemic, it was postponed to 2021. Previous editions of LATIN took place in São Paulo, Brazil (1992), Valparaíso, Chile (1995), Campinas, Brazil (1998), Punta del Este, Uruguay (2000), Cancún, Mexico (2002), Buenos Aires, Argentina (2004), Valdivia, Chile (2006), Búzios, Brazil (2008), Oaxaca, Mexico (2010), Arequipa, Peru (2012), Montevideo, Uruguay (2014), Ensenada, Mexico (2016), and Buenos Aires, Argentina (2018).

The conference received 136 submissions from around the world. Each submission was reviewed by three Program Committee members, often with the help of additional external referees. After an intense reviewing process, the Program Committee selected 50 submissions for presentation.

We are delighted that the following distinguished speakers accepted our invitation to give a plenary lecture at LATIN 2020: Maria-Florina Balcan (Carnegie Mellon University, USA), Nikhil Bansal (Centrum Wiskunde & Informatica and Eindhoven University of Technology, The Netherlands), Maria Chudnovsky (Princeton University, USA), Nicole Immorlica (Microsoft Research, USA) Eduardo Sany Laber (Pontifical Catholic University of Rio de Janeiro, Brazil), Alexander Razborov (The University of Chicago, USA), Luca Trevisan (Bocconi University, Italy), and Bianca Zadrozny (IBM Research, Brazil). Furthermore, Nikhil Bansal kindly accepted to give the course “Algorithmic Discrepancy and Applications” in LATIN 2020. We are very grateful to all the speakers for accepting to support and enrich LATIN 2020. The title and abstract of the keynote talks as well as the course are available on the conference website.

LATIN 2020 featured two awards: the Imre Simon Test-of-Time Award and the Alejandro López-Ortiz Best Paper Award. In this edition, the Imre Simon Test-of-Time Award winner is Anne Brüggemann-Klein, for her paper “Regular expressions into finite automata,” which appeared in LATIN 1992. For the Alejandro López-Ortiz Best Paper Award, the Program Committee selected the paper “Monotone Circuit Lower Bounds from Robust Sunflowers,” by Bruno Pasqualotto Cavalier, Mrinal Kumar, and Benjamin Rossman. We thank Springer for supporting both awards.

In order to facilitate and promote attendance, poster sessions were planned for LATIN 2020 to encourage theory students and young researchers to report their ongoing research and preliminary findings. We thank the Posters Committee members for their work.

Our heartfelt thanks go to the authors for their excellent papers and cooperation, to the Program Committee members for the insightful discussions, to the subreferees for their careful reports, and to the Steering Committee for their valuable advice and feedback.

We are very grateful to the organizing team for all their support and commitment in these challenging times, which demanded inventiveness and all sorts of additional work. Last but not least, we warmly thank all our academic and corporate sponsors: B2W, CAPES, CNPq, FAPESP, Google, IME-USP, SBC, Springer, UFABC, UNICAMP, and USP.

August 2020

Yoshiharu Kohayakawa
Flávio Keidi Miyazawa

The Imre Simon Test-of-Time Award

The winner of the 2020 Imre Simon Test-of-Time Award, considering papers up to the 2010 edition of the Latin American Theoretical INformatics Symposium (LATIN), is:

“Regular expressions into finite automata” by Anne Brüggemann-Klein,
LATIN 1992, LNCS 583, 87–98, 1992,

which has also been published in *Theoretical Computer Science*, vol. 120 (1993), 197–213, in its more detailed journal version.

Not many results in (theoretical) computer science are considered as being as basic and fundamental as Kleene’s theorem. This result states the equality of the family of regular languages, that is, the family of languages denoted by regular expressions, with the family of languages accepted by finite automata.

If the fact that languages accepted by finite automata are regular is mostly of theoretical, or aesthetical, interest, the one that regular languages are accepted by finite automata, that is, more precisely, that a regular expression can be turned into an equivalent finite automaton, is of paramount importance and ubiquitously implemented in countless pieces of software. Every textbook in computer science, especially those dealing with parsing and compiler construction, has a chapter where such algorithms are described. They are due to Thompson, Glushkov, Brzozowski, or Antimirov, to name a few.

The contribution of the awarded paper in the abundant literature on the subject is original and unique in the sense that it does not offer a new algorithm or an improvement of an algorithm that computes an automaton from an expression. It describes a syntactic transformation of a regular expression E into an equivalent expression, called the ‘star normal form of E ’. An expression is in star normal form (SNF) if the star operator applies only to subexpressions that denote languages which do not contain the empty word.

The computation of the SNF of an expression is achieved by a recursive traversal of the syntactic tree of the expression, hence with a linear complexity in the size of the expression. The paper then establishes that the ‘Glushkov construction’ applied to an expression in SNF is of quadratic complexity – in contrast with the general case, which is of cubic complexity. And the two properties together thus yield the first quadratic algorithm for computing an automaton from an expression.

The interest of the concept of SNF goes beyond this complexity breakthrough which already brings the paper numerous quotations and references. It first allows one to clarify the notions of weak and strong unambiguity (an expression is weakly unambiguous iff its SNF is strongly unambiguous). More important, the definition of SNF underlies those of 1-unambiguous expressions and languages, developed in a subsequent paper by the same author (together with D. Wood) and that were motivated by

the study of the grammars appearing in markup languages. This is another strong background for the long-lasting interest in the paper selected for the 2020 Imre Simon Test-of-Time Award.

January 2020

Marcos Kiwi
Conrado Martínez
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