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Galina Jirásková · Giovanni Pighizzini (Eds.)

Descriptional Complexity of Formal Systems

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Preface

The 22nd International Conference on Descriptional Complexity of Formal Systems (DCFS 2020) was expected to be organized by Rudolf Freund at the TU Wien as part of the Summer of Formal Languages 2020 in Wien, Austria, and by the International Federation for Information Processing (IFIP) Working Group 1.02 "Descriptional Complexity." Unfortunately, due to development of the crisis caused by COVID-19, the conference had to be canceled. However, in order to allow researchers in the area of descriptional complexity to still present their recent results in some form, the DCFS Steering Committee decided to prepare this volume, collecting papers that have been selected by a committee after a standard review process.

Descriptional complexity is a field in computer science that deals with the size of all kinds of objects that occur in computational models, such as Turing machines, finite automata, grammars, splicing systems, and others. The topics of DCFS conferences are related to all aspects of descriptional complexity and include, but are not limited to:

- Automata, grammars, languages, and other formal systems; various modes of operations and complexity measures.
- Succinctness of description of objects, state-explosion-like phenomena.
- Circuit complexity of Boolean functions and related measures.
- Size complexity of formal systems.
- Structural complexity of formal systems.
- Trade-offs between computational models and mode of operation.
- Applications of formal systems – for instance in software and hardware testing, in dialogue systems, in systems modeling, or in modeling natural languages – and their complexity constraints.
- Cooperating formal systems.
- Size or structural complexity of formal systems for modeling natural languages.
- Complexity aspects related to the combinatorics of words.
- Descriptional complexity in resource-bounded or structure-bounded environments.
- Structural complexity as related to descriptional complexity.
- Frontiers between decidability and undecidability.
- Universality and reversibility.
- Nature-motivated (bio-inspired) architectures and unconventional models of computing.
- Blum static (Kolmogorov/Chaitin) complexity, algorithmic information.

DCFS became an IFIP working conference in 2016, continuing the former Workshop on Descriptional Complexity of Formal Systems, which was a merger in 2002 of two other workshops: Formal Descriptions and Software Reliability (FDSR) and Descriptional Complexity of Automata, Grammars and Related Structures (DCAGRS). DCAGRS was previously held in Magdeburg, Germany (1999), London, UK (2000), and Vienna, Austria (2001). FDSR was previously held in Paderborn, Germany (1998),

Boca Raton, USA (1999), and San Jose, USA (2000). Since 2002, DCFS has been successively held in London, Ontario, Canada (2002), Budapest, Hungary (2003), London, Ontario, Canada (2004), Como, Italy (2005), Las Cruces, New Mexico, USA (2006), Nový Smokovec, High Tatras, Slovakia (2007), Charlottetown, Prince Edward Island, Canada (2008), Magdeburg, Germany (2009), Saskatoon, Canada (2010), Gießen, Germany (2011), Braga, Portugal (2012), London, Ontario, Canada (2013), Turku, Finland (2014), Waterloo, Ontario, Canada (2015), Bucharest, Romania (2016), Milano, Italy (2017), Halifax, Nova Scotia, Canada (2018), and Košsice, Slovakia (2019).

This volume contains 19 contributed papers, selected by the Selection Committee out of a total of 31 submissions, by a total of 54 authors from 17 countries (61.3% acceptance rate). The selection was done on the basis of three reviews per submission, with the exception of a few papers for which we received only two reviews. The selection process was carried out by taking into account originality, quality, significance, pertinence with DCFS topics, and presentation. We thank all authors who submitted their works for consideration in this volume. We wish to thank all Selection Committee members and external reviewers for their competent and timely handling of the submissions. The scientific level of the volume is guaranteed by their hard work.

During the selection process, we used the EasyChair conference management system, which provided excellent support. We wish to thank the editorial team at Springer, for the efficient production of this volume.

Unfortunately, the conference could not take place this year. Anyway, we hope that this volume will be of inspiration for new research and cooperations. We really hope to restart our series of conferences very soon, hopefully in 2021, when DCFS is planned to take place in Seoul, South Korea.

October 2020

Galina Jirásková
Giovanni Pighizzini

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