

Armando Castañeda
Francisco Rodríguez-Henríquez (Eds.)

ARCOSS

LNCS 13568

LATIN 2022: Theoretical Informatics

**15th Latin American Symposium
Guanajuato, Mexico, November 7–11, 2022
Proceedings**



Springer

Founding Editors

Gerhard Goos, Germany
Juris Hartmanis, USA

Editorial Board Members

Elisa Bertino, USA
Wen Gao, China

Bernhard Steffen , Germany
Moti Yung , USA


Advanced Research in Computing and Software Science

Subline of Lecture Notes in Computer Science

Subline Series Editors

Giorgio Ausiello, *University of Rome 'La Sapienza', Italy*
Vladimiro Sassone, *University of Southampton, UK*

Subline Advisory Board

Susanne Albers, *TU Munich, Germany*
Benjamin C. Pierce, *University of Pennsylvania, USA*
Bernhard Steffen , *University of Dortmund, Germany*
Deng Xiaotie, *Peking University, Beijing, China*
Jeannette M. Wing, *Microsoft Research, Redmond, WA, USA*

More information about this series at <https://link.springer.com/bookseries/558>

Armando Castañeda ·
Francisco Rodríguez-Henríquez (Eds.)

LATIN 2022: Theoretical Informatics

15th Latin American Symposium
Guanajuato, Mexico, November 7–11, 2022
Proceedings

Editors

Armando Castañeda 
Universidad Nacional Autónoma de México
Mexico City, Mexico

Francisco Rodríguez-Henríquez
Centro de investigación y de Estudios
Avanzados
Mexico City, Mexico

Cryptography Research Centre of the
Technology Innovation Centre
Abu Dhabi, United Arab Emirates

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-031-20623-8 ISBN 978-3-031-20624-5 (eBook)
<https://doi.org/10.1007/978-3-031-20624-5>

© Springer Nature Switzerland AG 2022

Chapter “Klee’s Measure Problem Made Oblivious” is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>). For further details see license information in the chapter.

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

This volume contains the papers presented at the 15th Latin American Theoretical Informatics Symposium (LATIN 2022) held during November 7–11, 2022, in Guanajuato, Mexico. 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, Perú (2012), Montevideo, Uruguay (2014), Ensenada, Mexico (2016), Buenos Aires, Argentina (2018), and São Paulo, Brazil (2021).

The symposium received 114 submissions from around the world. Each submission was reviewed by four Program Committee members, and carefully evaluated on quality, originality, and relevance to the conference. Committee members often reviewed the submissions with the help of additional external referees. Based on an extensive electronic discussion, the committee selected 46 papers. In addition to the accepted contributions, the symposium featured keynote talks by David Eppstein (University of California, Irvine, USA), Mauricio Osorio (Universidad de las Américas, Mexico), Merav Parter (Weizmann Institute of Science, Israel), and Jeffrey D. Ullman (Stanford University, USA).

LATIN 2022 featured two awards: the 2022 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 was Johannes Fischer for his paper “Optimal Succinctness for Range Minimum Queries,” which appeared in LATIN 2010. For the Alejandro López-Ortiz Best Paper Award, the Program Committee selected the paper “Theoretical Analysis of Git Bisect,” by Julien Courtiel, Paul Dorbec, and Romain Lecoq. We thank Springer for supporting both awards.

A round table to honor the research and legacy of Héctor García-Molina was held as part of the LATIN 2022 program. The panel comprised Carlos Coello Coello (Cinvestav, Mexico), Jeffrey D. Ullman (Stanford University, USA), and Gio Wiederhold (Stanford University, USA). The round table was moderated by Mariano Rivera (CIMAT, Mexico).

The program of the symposium included tutorial sessions devoted mainly to theory students and young researchers. Edgar Chávez (CICESE, Mexico) chaired the Tutorial Session Committee.

The main organizer of the conference was the Centro de Investigación en Matemáticas (CIMAT), located in Guanajuato, Mexico. Mariano Rivera chaired the Local Arrangements Committee.

Many people helped to make LATIN 2022 possible. First, we would like to recognize the outstanding work of the members of the Program Committee. Their commitment contributed to a very detailed discussion on each of the submitted papers. The LATIN Steering Committee offered valuable advice and feedback; the conference benefitted immensely from their knowledge and experience. We would also like to

recognize Conrado Martínez, Jacques Sakarovitch, and Yoshiko Wakabayashi for their work in the 2022 Imre Simon Test-of-Time Award Committee.

Finally, the conference would not have been possible without our generous sponsors, Springer, the Cryptography Research Center of the Technology Innovation Institute, Abu Dhabi, United Arab Emirates, and the Centro de Investigación en Matemáticas (CIMAT), Guanajuato, Mexico. We are also grateful for the facilities provided by EasyChair for paper evaluation and the preparation of this volume.

November 2022

Armando Castañeda
Francisco Rodríguez-Henríquez

The Imre Simon Test-of-Time Award

The winner of the 2022 Imre Simon Test-of-Time Award, considering papers up to the 2012 edition of the Latin American Theoretical Informatics Symposium (LATIN), is

Optimal Succinctness for Range Minimum Queries by Johannes Fischer,
LATIN 2010, LNCS 6034, 158–169, 2010.

Range Minimum Query (RMQ) is used on arrays to find the position of an element with the minimum value between two specified indices. This simple problem—in its formulation—has many different applications including the fundamental problem of finding the *least common ancestor* (LCA) of two nodes in a tree or the *longest common prefix problem* (LCP), as well as other exact and approximate string matching problems. A witness of the relevance of these problems is the first Imre Simon Test-of-Time award won in 2012 by the LATIN 2000 paper *The LCA Problem Revisited*, by Martin Farach-Colton and Michael Bender.

In order to make RMQs very efficient, there has been a long quest for preprocessing algorithms and data structures with which RMQs could later be answered very efficiently, ideally in constant time. The first non-trivial solution to the problem, presented by Berkman and Vishkin (SIAM J. Computing, 1993), required linear time for preprocessing and linearithmic space ($\Theta(n \log n)$ bits, for an array of n items). Many authors have thus been looking for succinct data structures; in this case, data structures using a linear number of bits, without sacrificing the preprocessing or the query times. The first solution which does not need to keep the original input to answer RMQs (*non-systematic*, in the terminology of the awarded paper) was by Sadakane (J. Discrete Algorithms, 2007), using $4n + o(n)$ bits for the balanced-parentheses-encoding of the Cartesian tree. Besides the query and preprocessing times, the space used in the final data structure **and** during the preprocessing phase has been of concern. The LATIN paper of 2010 presented the first scheme achieving $O(1)$ time for queries, $O(n)$ preprocessing time, using only $2n + o(n)$ bits in the final succinct data structure to answer queries—thus meeting the information-theoretic bound—, and only $n + o(n)$ additional bits during construction time.

To achieve the space and time efficiency above, the paper introduced *2d-min-heaps*, which are equivalent to the also well-known LRM-trees (left-to-right minima trees) of Navarro and Sadakane (ACM Trans. Algorithms, 2014). The 2d-min-heaps were originally intended to efficiently support RMQs, but they have proved also very useful for several other applications, e.g., the succinct representation of ordinal trees.

Fischer's contributions in the LATIN 2010 paper made their way into the journal article *Space-Efficient Preprocessing Schemes for Range Minimum Queries on Static Arrays*, published in *SIAM Journal on Computing* 40(2):465–492, together with Volker Heun, in 2011. That paper became very influential in the area of compressed and succinct data structures, and it is a milestone in the quest for the best solutions in time and space to RMQs, with numerous quotations and references too.

The relevance of the problem addressed, the originality of the technique used to solve it, the clarity of presentation, and the continued and widespread recognition of this contribution throughout the years since its publication heavily weighed in the committee's choice.

The committee for the 2022 Imre Simon Test-of-Time Award.

Conrado Martínez
Jacques Sakarovitch
Yoshiko Wakabayashi

Organization

Conference Chair

Francisco Rodríguez
Henríquez
Centro de investigación y de Estudios Avanzados,
Mexico, and Cryptography Research Centre, TII,
United Arab Emirates

Program Committee Chair

Armando Castañeda
Universidad Nacional Autónoma de México, Mexico

Steering Committee

Michael A. Bender
Cristina G. Fernandes
Joachim von zur Gathen
Evangelos Kranakis
Conrado Martínez
Flávio Keidi Miyazawa
Stony Brook University, USA
Universidade de São Paulo, Brazil
Bonn-Aachen International Center for Information
Technology, Germany
Carleton University, Canada
Universitat Politècnica de Catalunya, Spain
Universidade Estadual de Campinas, Brazil

Program Committee

Martin Aumöler
Jérémy Barbay
Leonid Barenboim
Frédérique Bassino
Luciana Buriol
Witold Charatonik
Min Chih Lin
Amalia Duch Brown
Leah Epstein
Martín Farach-Colton
Esteban Feuerstein
David Flores-Peñaloza
Fedor Fomin
Jesper Jansson
Gabriela Jeronimo
Christos Kaklamani
Shuji Kijima
Gregory Kucherov
François Le Gall
University of Copenhagen, Denmark
Universidad de Chile, Chile
The Open University of Israel, Israel
Université Sorbonne Paris Nord, France
Amazon, USA
University of Wrocław, Poland
Universidad de Buenos Aires, Argentina
Universitat Politècnica de Catalunya, Spain
University of Haifa, Israel
Rutgers University, USA
Universidad de Buenos Aires, Argentina
Universidad Nacional Autónoma de México, Mexico
University of Bergen, Norway
Kyoto University, Japan
Universidad de Buenos Aires, Argentina
University of Patras and CTI “Diophantus”, Greece
Kyushu University, Japan
CNRS/LIGM, France
Nagoya University, Japan

Jérémy Ledent	University of Strathclyde, UK
Reut Levi	IDC Herzliya, Israel
Giovanni Manzini	Università di Pisa, Italy
Andrea Marino	Università degli Studi di Firenze, Italy
Elvira Mayordomo	Universidad de Zaragoza, Spain
Marco Molinaro	Pontifical Catholic University of Rio de Janeiro, Brazil
Guilherme Oliveira Mota	Universidade de São Paulo, Brazil
Lucia Moura	University of Ottawa, Canada
Gonzalo Navarro	Universidad de Chile, Chile
Rafael Oliveira	University of Waterloo, Canada
Daniel Panario	Carleton University, Canada
Gopal Pandurangan	University of Houston, USA
Seth Pettie	University of Michigan, USA
Miguel A. Pizaña	Universidad Autónoma Metropolitana, Mexico
Igor Potapov	University of Liverpool, UK
Svetlana Puzynina	Sobolev Institute of Mathematics, Russia
Pablo Rotondo	Université Gustave Eiffel, France
Jared Saia	University of New Mexico, USA
Rodrigo I. Silveira	Universitat Politècnica de Catalunya, Spain
Mohit Singh	Georgia Tech, USA
José A. Soto	Universidad de Chile, Chile
Frank Stephan	National University of Singapore, Singapore
Martin Strauss	University of Michigan, USA
Subhash Suri	University of California, Santa Barbara, USA
Dimitrios M. Thilikos	Université de Montpellier, CNRS, France
Christopher Thraves	Universidad de Concepción, Chile
Denis Trystram	Université de Grenoble Alpes, France
Seoun William Umboh	University of Sydney, Australia
Jorge Urrutia	Universidad Nacional Autónoma de México, Mexico
Alfredo Viola	Universidad de la República, Uruguay
Mikhail V. Volkov	Ural Federal University, Russia
Sebastian Wild	University of Liverpool, UK
Georg Zetsche	Max Planck Institute for Software Systems, Germany

Imre Simon Test-of-Time Award Committee

Conrado Martínez (Chair)	Universitat Politècnica de Catalunya, Spain
Jacques Sakarovitch	IRIF CNRS and Telecom ParisTech, France
Yoshiko Wakabayashi	Universidade de São Paulo, Brazil

Organizing Committee

Tutorial Chair

Edgar Chávez	CICESE, Ensenada, Mexico
--------------	--------------------------

Local Arrangements Chair

Mariano Rivera CIMAT, Guanajuato, Mexico

Publicity Chair

Tássio Naia Universidade de São Paulo, Brazil

Student Scholarships Chair

Joel A. Trejo-Sánchez CIMAT, Mérida, Mexico

Additional Reviewers

Mikkel Abrahamsen	Varsha Dani	Peter Gyorgyi
Federico Albanese	Pablo De Caria	Sariel Har-Peled
Jean-Paul Allouche	Paloma de Lima	Atsuya Hasegawa
José Alvarado Morales	Elie de Panafieu	Meng He
Avah Banerjee	Holger Dell	Juan Heguiabehere
Kevin Bello	Diego Diaz	Shuichi Hirahara
Rémy Belmonte	Daniel A. Díaz-Pachón	Carlos Hoppen
Shalev Ben-David	Michael Dinitz	Khalid Hourani
Pascal Bergsträßer	Henk Don	Clemens Huemer
Giulia Bernardini	Gaëtan Douéneau-Tabot	Ullrich Hustadt
Dario Bezzi	Philippe Duchon	Tomohiro I.
Hans L. Bodlaender	Fabien Dufoulon	Emmanuel Iarussi
Richard Brewster	Bruno Escoffier	Allen Ibiapina
Adam Brown	Vincent Fagnon	Christian Ikenmeyer
Boris Bukh	Wenjie Fang	Shunsuke Inenaga
Andrei Bulatov	Andreas Emil Feldmann	Mohammad Abirul Islam
Laurent Bulteau	Moran Feldman	Haitao Jiang
Xavier Bultel	Michael Fuchs	Vincent Jugé
Sergiy Butenko	Martin Fürer	Nikolay Kaleski
Sergio Caverio	Eric Fusy	Haim Kaplan
Sofia Celi	Joaquim Gabarro	Roman Karasev
María Chara	Anahi Gajardo	Jarkko Kari
Abhranil Chatterjee	Guilhem Gamard	Maximilian Katzmann
Vincent Chau	Moses Ganardi	Dominik Kempa
Juhi Chaudhary	Peter Gartland	Ali Keramatipour
Bhadrachalam Chitturi	Christian Glasser	Kamil Khadiev
Julien Clément	Eric Goles	Eun Jung Kim
Alessio Conte	Petr Golovach	Bjørn Kjos-Hanssen
Alfredo Costa	Lev Gordeev	Hartmut Klauck
Jonas Costa	Inge Li Gørtz	Yasuaki Kobayashi
Marcio Costa Santos	Claude Gravel	Yusuke Kobayashi
Ágnes Cseh	Daniel Grier	Ekkehard Köhler
Luís Cunha	Luciano Grippio	Dominik Köppl
Konrad K. Dabrowski	Mauricio Guillermo	Tuukka Korhonen

William Kretschmer	Yakov Nekrich	David Saulpic
Matjaž Krnc	Joachim Niehren	Luke Schaeffer
Michal Kunc	Hugo Nobrega	Marinella Sciortino
O-Joung Kwon	Loana Nogueira	Louisa Seelbach Benkner
Jacques-Olivier Lachaud	Pascal Ochem	Maria Serna
Hung Le	Alexander Okhotin	Jeffrey Shallit
Thierry Lecroq	Francisco Olivares	Mark Siggers
Asaf Levin	Juan M. Ortiz de Zarate	Jefferson Elbert Simões
Jason Li	Ferruh Ozbudak	Matias Pavez Signe
Bingkai Lin	Anurag Pandey	Patrick Solé
Alexei Lisitsa	Roberto Parente	Mauricio Soto
Markus Lohrey	Lehilton L. C. Pedrosa	Uéverton Souza
Sylvain Lombardy	Pablo Pérez-Lanero	Raphael Steiner
Bruno Lopes	Kévin Perrot	Benedikt Stufler
Matteo Loporchio	Dominik Peters	Dániel Szabó
Jérémie Lumbroso	Duy Pham	Marek Szykuła
Marten Maack	Marta Piecyk	Guido Tagliavini
Pasin Manurangsi	Aditya Pillai	Claudio Telha
Vladislav Makarov	Solon Pissis	Alexander Tiskin
Andreas Maletti	Madhusudhan R. Pittu	Gabriel Tolosa
Javier Marengo	Thomas Place	Alfredo Torrico
Nestaly Marín	Adam Polak	Konstantinos Tsakalidis
Conrado Martínez	Nicola Prezza	Cristian Urbina
Moti Medina	Evangelos Protopapas	André van Renssen
Wilfried Meidl	Saladi Rahul	Nikolay Vereshchagin
Sihem Mesnager	Santiago Ravelo	Stéphane Vialette
Félix Miravé	Kilian Risse	Giorgio Vinciguerra
Benjamin Monmege	Javiel Rojas-Ledesma	Yukiko Yamauchi
Fabrizio Montecchiani	Puck Rombach	Maxwell Young
Peter MörTERS	Hamza Safri	Raphael Yuster
William K. Moses Jr.	Nicolás Sanhueza	Pascal Weil
Phablo Moura	Matamala	Viktor Zamaraev
Tuan Anh Nguyen	Ignasi Sau	

Sponsors

Springer

Centro de Investigación en Matemáticas, Guanajuato, Mexico

Cryptography Research Center of the Technology Innovation, Institute, Abu Dhabi,
United Arab Emirates

Contents

Algorithms and Data Structures

Cutting a Tree with Subgraph Complementation is Hard, Except for Some Small Trees	3
<i>Dhanyamol Antony, Sagartanu Pal, R. B. Sandeep, and R. Subashini</i>	
Elastic-Degenerate String Matching with 1 Error.	20
<i>Giulia Bernardini, Esteban Gabory, Solon P. Pissis, Leen Stougie, Michelle Sweering, and Wiktor Zuba</i>	
Median and Hybrid Median K -Dimensional Trees.	38
<i>Amalia Duch, Conrado Martínez, Mercè Pons, and Salvador Roura</i>	
Weighted Connected Matchings	54
<i>Guilherme C. M. Gomes, Bruno P. Masquio, Paulo E. D. Pinto, Vinicius F. dos Santos, and Jayme L. Szwarcfiter</i>	
Space-Efficient Data Structure for Next/Previous Larger/Smaller Value Queries	71
<i>Seungbum Jo and Geunho Kim</i>	
Near-Optimal Search Time in δ -Optimal Space.	88
<i>Tomasz Kociumaka, Gonzalo Navarro, and Francisco Olivares</i>	
Computing and Listing Avoidable Vertices and Paths	104
<i>Charis Papadopoulos and Athanasios E. Zisis</i>	
Klee's Measure Problem Made Oblivious.	121
<i>Thore Thießen and Jan Vahrenhold</i>	

Approximation Algorithms

A Parameterized Approximation Algorithm for the Multiple Allocation k -Hub Center	141
<i>Marcelo P. L. Benedito, Lucas P. Melo, and Lehilton L. C. Pedrosa</i>	
Theoretical Analysis of git bisect	157
<i>Julien Courtiel, Paul Dorbec, and Romain Lecoq</i>	
Pathlength of Outerplanar Graphs	172
<i>Thomas Dissaux and Nicolas Nisse</i>	

Approximations for the Steiner Multicycle Problem.	188
<i>Cristina G. Fernandes, Carla N. Lintzmayer, and Phablo F. S. Moura</i>	
Approximation Schemes for Packing Problems with ℓ_p -norm Diversity Constraints.	204
<i>Waldo Gálvez and Víctor Verdugo</i>	
Obtaining Approximately Optimal and Diverse Solutions via Dispersion	222
<i>Jie Gao, Mayank Goswami, C. S. Karthik, Meng-Tsung Tsai, Shih-Yu Tsai, and Hao-Tsung Yang</i>	
Cryptography	
On APN Functions Whose Graphs are Maximal Sidon Sets	243
<i>Claude Carlet</i>	
On the Subfield Codes of a Subclass of Optimal Cyclic Codes and Their Covering Structures.	255
<i>Félix Hernández and Gerardo Vega</i>	
Social Choice Theory	
Multidimensional Manhattan Preferences	273
<i>Jiehua Chen, Martin Nöllenburg, Sofia Simola, Anaïs Villedieu, and Markus Wallinger</i>	
Theoretical Machine Learning	
Exact Learning of Multitrees and Almost-Trees Using Path Queries	293
<i>Ramtin Afshar and Michael T. Goodrich</i>	
Almost Optimal Proper Learning and Testing Polynomials.	312
<i>Nader H. Bshouty</i>	
Estimating the Clustering Coefficient Using Sample Complexity Analysis . . .	328
<i>Alane M. de Lima, Murilo V. G. da Silva, and André L. Vignatti</i>	
Automata Theory and Formal Languages	
Binary Completely Reachable Automata	345
<i>David Casas and Mikhail V. Volkov</i>	
Conelikes and Ranker Comparisons.	359
<i>Viktor Henriksson and Manfred Kufleitner</i>	
The Net Automaton of a Rational Expression.	376
<i>Sylvain Lombardy and Jacques Sakarovitch</i>	

Embedding Arbitrary Boolean Circuits into Fungal Automata 393
Augusto Modanese and Thomas Worsch

How Many Times Do You Need to Go Back to the Future in Unary
 Temporal Logic? 409
Thomas Place and Marc Zeitoun

String Attractors and Infinite Words 426
Antonio Restivo, Giuseppe Romana, and Marinella Sciortino

Combinatorics and Graph Theory

On the Zero-Sum Ramsey Problem over \mathbb{Z}_2^d 445
José D. Alvarado, Lucas Colucci, Roberto Parente, and Victor Souza

On χ -Diperfect Digraphs with Stability Number Two 460
*Caroline Aparecida de Paula Silva, Cândida Nunes da Silva,
 and Orlando Lee*

Percolation and Epidemic Processes in One-Dimensional Small-World
 Networks (Extended Abstract) 476
*Luca Becchetti, Andrea Clementi, Riccardo Denni, Francesco Pasquale,
 Luca Trevisan, and Isabella Ziccardi*

A Combinatorial Link Between Labelled Graphs and Increasingly Labelled
 Schröder Trees 493
Olivier Bodini, Antoine Genitrini, and Mehdi Naima

Min Orderings and List Homomorphism Dichotomies for Signed
 and Unsigned Graphs 510
*Jan Bok, Richard C. Brewster, Pavol Hell, Nikola Jedličková,
 and Arash Rafiey*

On the Zombie Number of Various Graph Classes 527
Prosenjit Bose, Jean-Lou De Carufel, and Thomas Shermer

Patterns in Ordered (random) Matchings 544
Andrzej Dudek, Jarosław Grytczuk, and Andrzej Ruciński

Tree 3-Spanners on Generalized Prisms of Graphs 557
Renzo Gómez, Flávio K. Miyazawa, and Yoshiko Wakabayashi

A General Approach to Ammann Bars for Aperiodic Tilings 574
Carole Porrier and Thomas Fernique

Complexity Theory

List Homomorphism: Beyond the Known Boundaries 593
*Sriram Bhyravarapu, Satyabrata Jana, Fahad Panolan, Saket Saurabh,
 and Shaily Verma*

On the Closures of Monotone Algebraic Classes and Variants
 of the Determinant 610
Prasad Chaugule and Nutan Limaye

MCSP is Hard for Read-Once Nondeterministic Branching Programs 626
Ludmila Glinskikh and Artur Riazanov

Bounds on Oblivious Multiparty Quantum Communication Complexity 641
François Le Gall and Daiki Suruga

Improved Parallel Algorithms for Generalized Baumslag Groups 658
Caroline Mattes and Armin Weiß

Computational Geometry

Piercing Pairwise Intersecting Convex Shapes in the Plane 679
Saman Bazargani, Ahmad Biniaz, and Prosenjit Bose

Local Routing Algorithms on Euclidean Spanners with Small Diameter 696
Nicolas Bonichon, Prosenjit Bose, and Yan Garito

On r -Guarding SCOTs – A New Family of Orthogonal Polygons 713
Vasco Cruz and Ana Paula Tomás

Complexity Results on Untangling Red-Blue Matchings 730
*Arun Kumar Das, Sandip Das, Guilherme D. da Fonseca, Yan Gerard,
 and Bastien Rivier*

On Vertex Guarding Staircase Polygons 746
*Matt Gibson-Lopez, Erik Krohn, Bengt J. Nilsson, Matthew Rayford,
 Sean Soderman, and Paweł Żyliński*

On the Complexity of Half-Guarding Monotone Polygons 761
Hannah Miller Hillberg, Erik Krohn, and Alex Pahlow

Author Index 779