

47th International Colloquium on Automata, Languages, and Programming

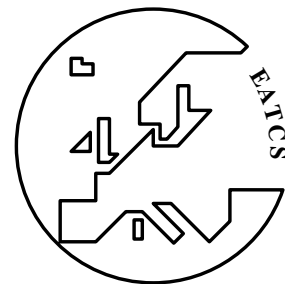
ICALP 2020, July 8–11, 2020, Saarbrücken, Germany
(Virtual Conference)

Edited by


Artur Czumaj

Anuj Dawar

Emanuela Merelli



Editors

Artur Czumaj 

University of Warwick, UK
A.Czumaj@warwick.ac.uk

Anuj Dawar 

University of Cambridge, UK
anuj.dawar@cl.cam.ac.uk

Emanuela Merelli 

University of Camerino, Italy
emanuela.merelli@unicam.it

ACM Classification 2012

Theory of Computation

ISBN 978-3-95977-138-2

PRINT ISBN: 978-1-7138-1475-7

Published online and open access by

Schloss Dagstuhl – Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at <https://www.dagstuhl.de/dagpub/978-3-95977-138-2>.

Publication date

June, 2020

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <https://portal.dnb.de>.

License

This work is licensed under a Creative Commons Attribution 3.0 Unported license (CC-BY 3.0):

<https://creativecommons.org/licenses/by/3.0/legalcode>.



In brief, this license authorizes each and everybody to share (to copy, distribute and transmit) the work under the following conditions, without impairing or restricting the authors' moral rights:

- Attribution: The work must be attributed to its authors.

The copyright is retained by the corresponding authors.

Digital Object Identifier: 10.4230/LIPICs.ICALP.2020.0

ISBN 978-3-95977-138-2

ISSN 1868-8969

<https://www.dagstuhl.de/lipics>

■ Contents

Preface	
<i>Artur Czumaj, Anuj Dawar, and Emanuela Merelli</i>	0:xv–0:xvi
Organization	
.....	0:xvii–0:xxiv
List of Authors	
.....	0:xxv–0:xxxvi

Invited Talks

An Incentive Analysis of Some Bitcoin Fee Designs	
<i>Andrew Chi chih Yao</i>	1:1–1:12
Sketching Graphs and Combinatorial Optimization	
<i>Robert Krauthgamer</i>	2:1–2:1
How to Play in Infinite MDPs	
<i>Stefan Kiefer, Richard Mayr, Mahsa Shirmohammadi, Patrick Totzke, and Dominik Wojtczak</i>	3:1–3:18

Track A: Algorithms, Complexity and Games

Scheduling Lower Bounds via AND Subset Sum	
<i>Amir Abboud, Karl Bringmann, Danny Hermelin, and Dvir Shabtay</i>	4:1–4:15
On the Fine-Grained Complexity of Parity Problems	
<i>Amir Abboud, Shon Feller, and Oren Weimann</i>	5:1–5:19
Optimal Streaming Algorithms for Submodular Maximization with Cardinality Constraints	
<i>Naor Alaluf, Alina Ene, Moran Feldman, Huy L. Nguyen, and Andrew Suh</i>	6:1–6:19
Dynamic Averaging Load Balancing on Cycles	
<i>Dan Alistarh, Giorgi Nadiradze, and Amirmojtaba Sabour</i>	7:1–7:16
Asynchronous Majority Dynamics in Preferential Attachment Trees	
<i>Maryam Bahrani, Nicole Immorlica, Divyarthi Mohan, and S. Matthew Weinberg</i>	8:1–8:14
The Power of Many Samples in Query Complexity	
<i>Andrew Basilakis, Andrew Drucker, Mika Göös, Lunjia Hu, Weiyun Ma, and Li-Yang Tan</i>	9:1–9:18
Medians in Median Graphs and Their Cube Complexes in Linear Time	
<i>Laurine Bénéteau, Jérémie Chalopin, Victor Chepoi, and Yann Vaxès</i>	10:1–10:17
Graph Coloring via Degeneracy in Streaming and Other Space-Conscious Models	
<i>Suman K. Bera, Amit Chakrabarti, and Prantar Ghosh</i>	11:1–11:21
Improved Bounds for Matching in Random-Order Streams	
<i>Aaron Bernstein</i>	12:1–12:13



An Optimal Algorithm for Online Multiple Knapsack <i>Marcin Bienkowski, Maciej Pacut, and Krzysztof Piecuch</i>	13:1–13:17
Space Efficient Construction of Lyndon Arrays in Linear Time <i>Philip Bille, Jonas Ellert, Johannes Fischer, Inge Li Gørtz, Florian Kurpicz, J. Ian Munro, and Eva Rotenberg</i>	14:1–14:18
New Fault Tolerant Subset Preservers <i>Greg Bodwin, Keerti Choudhary, Merav Parter, and Noa Shahar</i>	15:1–15:19
Bridge-Depth Characterizes Which Structural Parameterizations of Vertex Cover Admit a Polynomial Kernel <i>Marin Bougeret, Bart M. P. Jansen, and Ignasi Sau</i>	16:1–16:19
The Complexity of Promise SAT on Non-Boolean Domains <i>Alex Brandts, Marcin Wrochna, and Stanislav Živný</i>	17:1–17:13
A Simple Dynamization of Trapezoidal Point Location in Planar Subdivisions <i>Milutin Brankovic, Nikola Grujic, André van Renssen, and Martin P. Seybold</i>	18:1–18:18
Faster Minimization of Tardy Processing Time on a Single Machine <i>Karl Bringmann, Nick Fischer, Danny Hermelin, Dvir Shabtay, and Philip Wellnitz</i>	19:1–19:12
Fréchet Distance for Uncertain Curves <i>Kevin Buchin, Chenglin Fan, Maarten Löffler, Aleksandr Popov, Benjamin Raichel, and Marcel Roeloffzen</i>	20:1–20:20
Counting Homomorphisms in Plain Exponential Time <i>Andrei A. Bulatov and Amineh Dadsetan</i>	21:1–21:18
From Holant to Quantum Entanglement and Back <i>Jin-Yi Cai, Zhiguo Fu, and Shuai Shao</i>	22:1–22:16
Counting Perfect Matchings and the Eight-Vertex Model <i>Jin-Yi Cai and Tianyu Liu</i>	23:1–23:18
Roundtrip Spanners with $(2k - 1)$ Stretch <i>Ruoxu Cen, Ran Duan, and Yong Gu</i>	24:1–24:11
New Extremal Bounds for Reachability and Strong-Connectivity Preservers Under Failures <i>Diptarka Chakraborty and Keerti Choudhary</i>	25:1–25:20
Matrices of Optimal Tree-Depth and Row-Invariant Parameterized Algorithm for Integer Programming <i>Timothy F. N. Chan, Jacob W. Cooper, Martin Koutecký, Daniel Král', and Kristýna Pekárková</i>	26:1–26:19
Dynamic Longest Common Substring in Polylogarithmic Time <i>Panagiotis Charalampopoulos, Paweł Gawrychowski, and Karol Pokorski</i>	27:1–27:19
Improved Black-Box Constructions of Composable Secure Computation <i>Rohit Chatterjee, Xiao Liang, and Omkant Pandey</i>	28:1–28:20

Simplifying and Unifying Replacement Paths Algorithms in Weighted Directed Graphs <i>Shiri Chechik and Moran Nechushtan</i>	29:1–29:12
Sublinear Algorithms and Lower Bounds for Metric TSP Cost Estimation <i>Yu Chen, Sampath Kannan, and Sanjeev Khanna</i>	30:1–30:19
Computational Complexity of the α -Ham-Sandwich Problem <i>Man-Kwun Chiu, Aruni Choudhary, and Wolfgang Mulzer</i>	31:1–31:18
Existence and Complexity of Approximate Equilibria in Weighted Congestion Games <i>George Christodoulou, Martin Gairing, Yiannis Giannakopoulos, Diogo Poças, and Clara Waldmann</i>	32:1–32:18
On Packing Low-Diameter Spanning Trees <i>Julia Chuzhoy, Merav Parter, and Zihan Tan</i>	33:1–33:18
Online Two-Dimensional Load Balancing <i>Ilan Cohen, Sungjin Im, and Debmalya Panigrahi</i>	34:1–34:21
Conditionally Optimal Approximation Algorithms for the Girth of a Directed Graph <i>Mina Dalirrooyfard and Virginia Vassilevska Williams</i>	35:1–35:20
Symmetric Arithmetic Circuits <i>Anuj Dawar and Gregory Wilsenach</i>	36:1–36:18
An Efficient PTAS for Stochastic Load Balancing with Poisson Jobs <i>Anindya De, Sanjeev Khanna, Huan Li, and Hesam Nikpey</i>	37:1–37:18
Tree Polymatrix Games Are PPAD-Hard <i>Argyrios Deligkas, John Fearnley, and Rahul Savani</i>	38:1–38:14
Spectral Sparsification via Bounded-Independence Sampling <i>Dean Doron, Jack Murtagh, Salil Vadhan, and David Zuckerman</i>	39:1–39:21
Hard Problems on Random Graphs <i>Jan Dreier, Henri Lotze, and Peter Rossmanith</i>	40:1–40:14
A Scaling Algorithm for Weighted f -Factors in General Graphs <i>Ran Duan, Haoqing He, and Tianyi Zhang</i>	41:1–41:17
The Outer Limits of Contention Resolution on Matroids and Connections to the Secretary Problem <i>Shaddin Dughmi</i>	42:1–42:18
Extending Partial 1-Planar Drawings <i>Eduard Eiben, Robert Ganian, Thekla Hamm, Fabian Klute, and Martin Nöllenburg</i>	43:1–43:19
How to Hide a Clique? <i>Uriel Feige and Vadim Grinberg</i>	44:1–44:13
Sampling Arbitrary Subgraphs Exactly Uniformly in Sublinear Time <i>Hendrik Fichtenberger, Mingze Gao, and Pan Peng</i>	45:1–45:13

A Water-Filling Primal-Dual Algorithm for Approximating Non-Linear Covering Problems <i>Andrés Fielbaum, Ignacio Morales, and José Verschae</i>	46:1–46:15
Scattering and Sparse Partitions, and Their Applications <i>Arnold Filtser</i>	47:1–47:20
Approximate Nearest Neighbor for Curves – Simple, Efficient, and Deterministic <i>Arnold Filtser, Omrit Filtser, and Matthew J. Katz</i>	48:1–48:19
Computation of Hadwiger Number and Related Contraction Problems: Tight Lower Bounds <i>Fedor V. Fomin, Daniel Lokshtanov, Ivan Mihajlin, Saket Saurabh, and Meirav Zehavi</i>	49:1–49:18
Node-Max-Cut and the Complexity of Equilibrium in Linear Weighted Congestion Games <i>Dimitris Fotakis, Vardis Kandiros, Thanasis Lianeas, Nikos Mouzakis, Panagiotis Patsilnakos, and Stratis Skoulakis</i>	50:1–50:19
The Online Min-Sum Set Cover Problem <i>Dimitris Fotakis, Loukas Kavouras, Grigorios Koumoutsos, Stratis Skoulakis, and Manolis Vardas</i>	51:1–51:16
Efficient Diagonalization of Symmetric Matrices Associated with Graphs of Small Treewidth <i>Martin Fürer, Carlos Hoppen, and Vilmar Trevisan</i>	52:1–52:18
Counting Solutions to Random CNF Formulas <i>Andreas Galanis, Leslie Ann Goldberg, Heng Guo, and Kuan Yang</i>	53:1–53:14
Robust Algorithms for TSP and Steiner Tree <i>Arun Ganesh, Bruce M. Maggs, and Debmalya Panigrahi</i>	54:1–54:18
Cryptographic Reverse Firewalls for Interactive Proof Systems <i>Chaya Ganesh, Bernardo Magri, and Daniele Venturi</i>	55:1–55:16
Robust Algorithms Under Adversarial Injections <i>Paritosh Garg, Sagar Kale, Lars Rohwedder, and Ola Svensson</i>	56:1–56:15
Minimum Cut in $O(m \log^2 n)$ Time <i>Paweł Gawrychowski, Shay Mozes, and Oren Weimann</i>	57:1–57:15
Sparse Recovery for Orthogonal Polynomial Transforms <i>Anna Gilbert, Albert Gu, Christopher Ré, Atri Rudra, and Mary Wootters</i>	58:1–58:16
Hitting Long Directed Cycles Is Fixed-Parameter Tractable <i>Alexander Göke, Daniel Marx, and Matthias Mnich</i>	59:1–59:18
On the Central Levels Problem <i>Petr Gregor, Ondřej Mička, and Torsten Mütze</i>	60:1–60:17
Linearly Representable Submodular Functions: An Algebraic Algorithm for Minimization <i>Rohit Gurjar and Rajat Rathi</i>	61:1–61:15

<i>d</i> -To-1 Hardness of Coloring 3-Colorable Graphs with $O(1)$ Colors <i>Venkatesan Guruswami and Sai Sandeep</i>	62:1–62:12
Feasible Interpolation for Polynomial Calculus and Sums-Of-Squares <i>Tuomas Hakoniemi</i>	63:1–63:14
Active Learning a Convex Body in Low Dimensions <i>Sariel Har-Peled, Mitchell Jones, and Saladi Rahul</i>	64:1–64:17
Node-Connectivity Terminal Backup, Separately-Capacitated Multiflow, and Discrete Convexity <i>Hiroshi Hirai and Motoki Ikeda</i>	65:1–65:19
A Dichotomy for Bounded Degree Graph Homomorphisms with Nonnegative Weights <i>Artem Govorov, Jin-Yi Cai, and Martin Dyer</i>	66:1–66:18
Sublinear-Space Lexicographic Depth-First Search for Bounded Treewidth Graphs and Planar Graphs <i>Taisuke Izumi and Yota Otachi</i>	67:1–67:17
Scheduling in the Random-Order Model <i>Susanne Albers and Maximilian Janke</i>	68:1–68:18
Online Algorithms for Weighted Paging with Predictions <i>Zhihao Jiang, Debmalaya Panigrahi, and Kevin Sun</i>	69:1–69:18
Popular Matchings with One-Sided Bias <i>Telikepalli Kavitha</i>	70:1–70:18
Obviously Strategyproof Single-Minded Combinatorial Auctions <i>Bart de Keijzer, Maria Kyropoulou, and Carmine Ventre</i>	71:1–71:17
Knapsack Secretary with Bursty Adversary <i>Thomas Kesselheim and Marco Molinaro</i>	72:1–72:15
The Iteration Number of Colour Refinement <i>Sandra Kiefer and Brendan D. McKay</i>	73:1–73:19
Towards Optimal Set-Disjointness and Set-Intersection Data Structures <i>Tsvi Kopelowitz and Virginia Vassilevska Williams</i>	74:1–74:16
Kinetic Geodesic Voronoi Diagrams in a Simple Polygon <i>Matias Korman, André van Renssen, Marcel Roeloffzen, and Frank Staals</i>	75:1–75:17
Polytopes, Lattices, and Spherical Codes for the Nearest Neighbor Problem <i>Thijs Laarhoven</i>	76:1–76:14
Deterministic Sparse Fourier Transform with an ℓ_∞ Guarantee <i>Yi Li and Vasileios Nakos</i>	77:1–77:14
Faster Random k -CNF Satisfiability <i>Andrea Lincoln and Adam Yedidia</i>	78:1–78:12
Succinct Filters for Sets of Unknown Sizes <i>Mingmou Liu, Yitong Yin, and Huacheng Yu</i>	79:1–79:19

A $(2 + \varepsilon)$ -Factor Approximation Algorithm for Split Vertex Deletion <i>Daniel Lokshtanov, Pranabendu Misra, Fahad Panolan, Geevarghese Philip, and Saket Saurabh</i>	80:1–80:16
Near Optimal Algorithm for the Directed Single Source Replacement Paths Problem <i>Shiri Chechik and Ofer Magen</i>	81:1–81:17
Quantum Distributed Complexity of Set Disjointness on a Line <i>Frédéric Magniez and Ashwin Nayak</i>	82:1–82:18
Can Verifiable Delay Functions Be Based on Random Oracles? <i>Mohammad Mahmoody, Caleb Smith, and David J. Wu</i>	83:1–83:17
On the Two-Dimensional Knapsack Problem for Convex Polygons <i>Arturo Merino and Andreas Wiese</i>	84:1–84:16
Proportionally Fair Clustering Revisited <i>Evi Micha and Nisarg Shah</i>	85:1–85:16
Breaking the Barrier of 2 for the Storage Allocation Problem <i>Tobias Mömke and Andreas Wiese</i>	86:1–86:19
On the Complexity of Zero Gap MIP* <i>Hamoon Mousavi, Seyed Sajjad Nezhadi, and Henry Yuen</i>	87:1–87:12
Hypergraph Isomorphism for Groups with Restricted Composition Factors <i>Daniel Neuen</i>	88:1–88:19
On Solving (Non)commutative Weighted Edmonds’ Problem <i>Taihei Oki</i>	89:1–89:14
A General Stabilization Bound for Influence Propagation in Graphs <i>Pál András Papp and Roger Wattenhofer</i>	90:1–90:15
Network-Aware Strategies in Financial Systems <i>Pál András Papp and Roger Wattenhofer</i>	91:1–91:17
Nondeterministic and Randomized Boolean Hierarchies in Communication Complexity <i>Toniann Pitassi, Morgan Shirley, and Thomas Watson</i>	92:1–92:19
A Spectral Bound on Hypergraph Discrepancy <i>Aditya Potukuchi</i>	93:1–93:14
Faster Dynamic Range Mode <i>Bryce Sandlund and Yinzhan Xu</i>	94:1–94:14
An FPT-Algorithm for Recognizing k -Apices of Minor-Closed Graph Classes <i>Ignasi Sau, Giannos Stamoulis, and Dimitrios M. Thilikos</i>	95:1–95:20
Contraction: A Unified Perspective of Correlation Decay and Zero-Freeness of 2-Spin Systems <i>Shuai Shao and Yuxin Sun</i>	96:1–96:15
Quasi-Majority Functional Voting on Expander Graphs <i>Nobutaka Shimizu and Takeharu Shiraga</i>	97:1–97:19

Property Testing of LP-Type Problems <i>Rogers Epstein and Sandeep Silwal</i>	98:1–98:18
Lower Bounds for Dynamic Distributed Task Allocation <i>Hsin-Hao Su and Nicole Wein</i>	99:1–99:14
On the Degree of Boolean Functions as Polynomials over \mathbb{Z}_m <i>Xiaoming Sun, Yuan Sun, Jiaheng Wang, Kewen Wu, Zhiyu Xia, and Yufan Zheng</i>	100:1–100:19
On Quasipolynomial Multicut-Mimicking Networks and Kernelization of Multiway Cut Problems <i>Magnus Wahlström</i>	101:1–101:14
Hardness of Equations over Finite Solvable Groups Under the Exponential Time Hypothesis <i>Armin Weiß</i>	102:1–102:19
Graph Isomorphism in Quasipolynomial Time Parameterized by Treewidth <i>Daniel Wiebking</i>	103:1–103:16
Parameterized Inapproximability for Steiner Orientation by Gap Amplification <i>Michał Włodarczyk</i>	104:1–104:19
Near-Optimal Algorithm for Constructing Greedy Consensus Tree <i>Hongxun Wu</i>	105:1–105:14

Track B: Automata, Logic, Semantics, and Theory of Programming

Decision Problems in Information Theory <i>Mahmoud Abo Khamis, Phokion G. Kolaitis, Hung Q. Ngo, and Dan Suciu</i>	106:1–106:20
Invariants for Continuous Linear Dynamical Systems <i>Shaull Almagor, Edon Kelmendi, Joël Ouaknine, and James Worrell</i>	107:1–107:15
On Higher-Order Cryptography <i>Boaz Barak, Raphaëlle Crubillé, and Ugo Dal Lago</i>	108:1–108:16
Cost Automata, Safe Schemes, and Downward Closures <i>David Barozzini, Lorenzo Clemente, Thomas Colcombet, and Paweł Parys</i>	109:1–109:18
Sensitive Instances of the Constraint Satisfaction Problem <i>Libor Barto, Marcin Kozik, Johnson Tan, and Matt Valeriote</i>	110:1–110:18
The Complexity of Bounded Context Switching with Dynamic Thread Creation <i>Pascal Baumann, Rupak Majumdar, Ramanathan S. Thinniyam, and Georg Zetsche</i>	111:1–111:16
Two Variable Logic with Ultimately Periodic Counting <i>Michael Benedikt, Egor V. Kostylev, and Tony Tan</i>	112:1–112:16
Single-Use Automata and Transducers for Infinite Alphabets <i>Mikołaj Bojańczyk and Rafał Stefański</i>	113:1–113:14
Weakly-Unambiguous Parikh Automata and Their Link to Holonomic Series <i>Alin Bostan, Arnaud Carayol, Florent Koechlin, and Cyril Nicaud</i>	114:1–114:16

On the Size of Finite Rational Matrix Semigroups <i>Georgina Bumpus, Christoph Haase, Stefan Kiefer, Paul-Ioan Stoienescu, and Jonathan Tanner</i>	115:1–115:13
Rational Subsets of Baumslag-Solitar Groups <i>Michaël Cadilhac, Dmitry Chistikov, and Georg Zetsche</i>	116:1–116:16
On Polynomial Recursive Sequences <i>Michaël Cadilhac, Filip Mazowiecki, Charles Paperman, Michał Pilipczuk, and Géraud Sénizergues</i>	117:1–117:17
A Recipe for Quantum Graphical Languages <i>Titouan Carette and Emmanuel Jeandel</i>	118:1–118:17
On the Power of Ordering in Linear Arithmetic Theories <i>Dmitry Chistikov and Christoph Haase</i>	119:1–119:15
The Post Correspondence Problem and Equalisers for Certain Free Group and Monoid Morphisms <i>Laura Ciobanu and Alan D. Logan</i>	120:1–120:16
Timed Games and Deterministic Separability <i>Lorenzo Clemente, Sławomir Lasota, and Radosław Piórkowski</i>	121:1–121:16
Dynamic Complexity of Reachability: How Many Changes Can We Handle? <i>Samir Datta, Pankaj Kumar, Anish Mukherjee, Anuj Tawari, Nils Vortmeier, and Thomas Zeume</i>	122:1–122:19
The Strahler Number of a Parity Game <i>Laure Daviaud, Marcin Jurdziński, and K. S. Thejaswini</i>	123:1–123:19
On the Structure of Solution Sets to Regular Word Equations <i>Joel D. Day and Florin Manea</i>	124:1–124:16
From Linear to Additive Cellular Automata <i>Alberto Dennunzio, Enrico Formenti, Darij Grinberg, and Luciano Margara</i>	125:1–125:13
The Complexity of Knapsack Problems in Wreath Products <i>Michael Figelius, Moses Ganardi, Markus Lohrey, and Georg Zetsche</i>	126:1–126:18
The Adversarial Stackelberg Value in Quantitative Games <i>Emmanuel Filiot, Raffaella Gentilini, and Jean-François Raskin</i>	127:1–127:18
The Topology of Local Computing in Networks <i>Pierre Fraigniaud and Ami Paz</i>	128:1–128:18
The Complexity of Verifying Loop-Free Programs as Differentially Private <i>Marco Gaboardi, Kobbi Nissim, and David Purser</i>	129:1–129:17
Logical Characterisation of Hybrid Conformance <i>Maciej Gazda and Mohammad Reza Mousavi</i>	130:1–130:18
Hrushovski’s Encoding and ω -Categorical CSP Monsters <i>Pierre Gillibert, Julius Jonušas, Michael Kompatscher, Antoine Mottet, and Michael Pinsker</i>	131:1–131:17

Descriptive Complexity on Non-Polish Spaces II <i>Mathieu Hoyrup</i>	132:1–132:17
On Decidability of Time-Bounded Reachability in CTMDPs <i>Rupak Majumdar, Mahmoud Salamati, and Sadegh Soudjani</i>	133:1–133:19
When Is a Bottom-Up Deterministic Tree Translation Top-Down Deterministic? <i>Sebastian Maneth and Helmut Seidl</i>	134:1–134:18
Implicit Automata in Typed λ -Calculi I: Aperiodicity in a Non-Commutative Logic <i>Lê Thành Dũng Nguyễn and Pierre Pradic</i>	135:1–135:20
Computing Measures of Weak-MSO Definable Sets of Trees <i>Damian Niwiński, Marcin Przybylko, and Michał Skrzypczak</i>	136:1–136:18
Finite Sequentiality of Finitely Ambiguous Max-Plus Tree Automata <i>Erik Paul</i>	137:1–137:15
On Skolem-Hardness and Saturation Points in Markov Decision Processes <i>Jakob Piribauer and Christel Baier</i>	138:1–138:17
The Power of a Single Qubit: Two-Way Quantum Finite Automata and the Word Problem <i>Zachary Remscrim</i>	139:1–139:18
Hardness Results for Constant-Free Pattern Languages and Word Equations <i>Aleksi Saarela</i>	140:1–140:15
Bisimulation Equivalence of Pushdown Automata Is ACKERMANN-Complete <i>Wenbo Zhang, Qiang Yin, Huan Long, and Xian Xu</i>	141:1–141:14