Kristoffer Arnsfelt Hansen Tracy Xiao Liu Azarakhsh Malekian (Eds.)

Web and Internet Economics

18th International Conference, WINE 2022 Troy, NY, USA, December 12–15, 2022 Proceedings



Lecture Notes in Computer Science

13778

Founding Editors

Gerhard Goos, Germany Juris Hartmanis, USA

Editorial Board Members

Elisa Bertino, USA Bernhard Steffen D, Germany Wen Gao, China Moti Yung D, 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

Kristoffer Arnsfelt Hansen · Tracy Xiao Liu · Azarakhsh Malekian (Eds.)

Web and Internet Economics

18th International Conference, WINE 2022 Troy, NY, USA, December 12–15, 2022 Proceedings



Editors
Kristoffer Arnsfelt Hansen
Aarhus University
Aarhus, Denmark

Azarakhsh Malekian Rotman School of Management University of Toronto Toronto, ON, Canada

Tracy Xiao Liu Tsinghua University Beijing, China

ISSN 0302-9743 ISSN 1611-3349 (electronic) Lecture Notes in Computer Science ISBN 978-3-031-22831-5 ISBN 978-3-031-22832-2 (eBook) https://doi.org/10.1007/978-3-031-22832-2

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2022

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 all regular papers and abstracts presented at the 18th Conference on Web and Internet Economics (WINE 2022) held during December 12–15, 2022, in Troy, NY, USA, at Rensselaer Polytechnic Institute.

Over the last 18 years, the WINE conference series has become a leading interdisciplinary forum for the exchange of ideas and scientific progress across continents on incentives and computation arising in diverse areas, such as theoretical computer science, artificial intelligence, economics, operations research, and applied mathematics. WINE 2022 built on the success of previous editions of WINE (named the Workshop on Internet and Network Economics until 2013) which were held annually from 2005 to 2021.

We continued the successful initiative introduced in 2021 of having a Senior Program Committee, this year composed of 30 researchers from the field. The Program Committee had 63 researchers. The committees reviewed 126 submissions and decided to accept 38 papers. Each paper had at least three single blind reviews, with additional reviews solicited as needed. We are very grateful to all members of the Senior Program Committee and the Program Committee for their insightful reviews and discussions. We thank EasyChair for providing a virtual platform to organize the review process. We also thank Springer for publishing the proceedings and offering support for the Best Paper and Best Student Paper Awards. The Best Paper award was given to "Eliminating Waste in Cadaveric Organ Allocation" by Peng Shi and Junxiong Yin; the Best Student Paper award was given to "Optimal Private Payoff Manipulation against Commitment in Extensive-form Games" by Yurong Chen, Xiaotie Deng, and Yuhao Li.

The program included four invited talks by leading researchers in the field: Vincent Conitzer (Carnegie Mellon University, USA), Robert Kleinberg (Cornell University, USA), Marzena Rostek (University of Wisconsin-Madison, USA), and David Simchi-Levi (Massachusetts Institute of Technology, USA).

We also invited Spotlights beyond WINE talks; the nomination and selection of these talks was decided by Edith Elkind, Michal Feldman, Philipp Strack, and Gabriel Weintraub.

Our special thanks go to the general chairs David Pennock and Lirong Xia and the local organization team.

October 2022

Kristoffer Arnsfelt Hansen Tracy Xiao Liu Azarakhsh Malekian

Organization

General Chairs

David Pennock Rutgers University, USA

Lirong Xia Rensselaer Polytechnic Institute, USA

Program Committee Chairs

Kristoffer Arnsfelt Hansen
Tracy Xiao Liu
Azarakhsh Malekian
Aarhus University, Denmark
Tsinghua University, China
University of Toronto, Canada

Steering Committee

Xiaotie Deng Peking University, China
Paul Goldberg University of Oxford, UK
Christos Papadimitriou Columbia University, USA
Paul Spirakis University of Liverpool, UK
Rakesh Vohra University of Pennsylvania, USA
Andrew Yao Tsinghua University, China
Yinyu Ye Stanford University, USA

Senior Program Committee

Itai AshlagiStanford University, USAHaris AzizUNSW Sydney, AustraliaMoshe BabaioffMicrosoft Research, IsraelSantiago BalseiroColumbia University, USAOmar BesbesColumbia University, USAOzan CandoganUniversity of Chicago, USAJing ChenStony Brook University, USA

Xujin Chen Chinese Academy of Sciences, China

Yi-Chun Chen National University of Singapore, Singapore

Bolin Ding Alibaba Group, China

Shahar Dobzinski Weizmann Institute of Science, Israel

Aris Filos-Ratsikas University of Liverpool, UK

Hu Fu Shanghai University of Finance and Economics, China

Nima Haghpanah Pennsylvania State University, USA
Tobias Harks University of Augsburg, Germany
Martin Hoefer Goethe University Frankfurt, Germany
Ayumi Igarashi National Institute of Informatics, Japan

Yuqing Kong Peking University, China

Organization

viii

Irene Lo Stanford University, USA
Brendan Lucier Microsoft Research, USA
Ali Makhdoumi Duke University, USA
Malesh Pai Rice University, USA

Qi Qi Renmin University of China, China

Daniela Saban Stanford University, USA Balu Sivan Google Research, USA

Christos Tzamos University of Wisconsin-Madison, USA

Carmine Ventre King's College London, UK Matt Weinberg Princeton University, USA

Lirong Xia Rensselaer Polytechnic Institute, USA
Jun Zhang Nanjing Audit University, China

Program Committee

Mete Şeref Ahunbay Technical University of Munich, Germany
Elliot Anshelevich Rensselaer Polytechnic Institute, USA
Jackie Baek Massachusetts Institute of Technology, USA
Xiaohui Bei Nanyang Technological University, Singapore

Hedyeh Beyhaghi Carnegie Mellon University, USA
Kodric Bojana Gran Sasso Science Institute, Italy
Modibo Camara University of Chicago, USA
Zhigang Cao Beijing Jiaotong University, China

Bhaskar Ray Chaudhury University of Illinois Urbana-Champaign, USA Ningyuan Chen University of Toronto Mississauga, Canada

Yukun Cheng Suzhou University of Science and Technology, China

Giorgos Christodoulou Aristotle University of Thessaloniki, Greece Argyrios Deligkas Royal Holloway, University of London, UK

Yuan Deng Google Research, USA

Songzi Du University of California, San Diego, USA

Zhixuan Fang Tsinghua University, China
Yiding Feng Microsoft Research, USA
Diodato Ferraioli University of Salerno, Italy
Matheus Ferreira Harvard University, USA
Huiyi Guo Texas A&M University, USA

Huseyin Gurkan ESMT Berlin, Germany

Kevin He University of Pennsylvania, USA Alexandros Hollender University of Oxford, UK

Bart de Keijzer King's College London, UK

Philip Lazos IOHK, UK

Pascal Lenzner Hasso Plattner Institute, Germany Stefanos Leonardos King's College London, UK

Bo Li Hong Kong Polytechnic University, China Jiangtao Li Singapore Management University, Singapore

Mengling Li Xiamen University, China Yingkai Li Yale University, USA Thodoris Lykouris MIT, USA

Will Ma Columbia University, USA
Jieming Mao Google Research, USA
Faidra Monachou Harvard University, USA

Swaprava Nath Indian Institute of Technology Bombay, India

Dario Paccagnan Imperial College London, UK Harry Pei Northwestern University, USA Emmanouil Pountourakis Drexel University, USA

Nidhi Rathi Drexel University, USA
Aarhus University, Denmark

Scott Rodilitz UCLA, USA

Kang Rong Shanghai University of Finance and Economics, China

Daniel Schmand University of Bremen, Germany Grant Schoenebeck University of Michigan, USA

Ariel Schvartzman DIMACS, USA

Sujoy Sikdar Binghamton University, USA Xiang Sun Wuhan University, China

Biaoshuai Tao Shanghai Jiao Tong University, China Nguyễn Kim Thắng Paris-Saclay University, France Kyushu University, Japan Cosimo Vinci University of Salerno, Italy Alexandros Voudouris University of Essex, UK

Changjun Wang Chinese Academy of Sciences, China

Chun Wang Tsinghua University, China

Zihe Wang Renmin University of China, China

Zenan Wu Peking University, China Yiqing Xing Johns Hopkins University, USA Fang-yi Yu George Mason University, USA

Yuan Yuan Purdue University, USA

Boyu Zhang Beijing Normal University, China Mu Zhang University of Michigan, USA Dengji Zhao ShanghaiTech University, China Jingtong Zhao Renmin University of China, China

Additional Reviewers

Karl Fehrs Hannaneh Akrami Vincenzo Auletta Bryce Ferguson Simone Fioravanti Rangeet Bhattacharyya Xiaolin Bu Miriam Fischer Linda Cai Pin Gao Wenjie Cao Abheek Ghosh Xiaomeng Ding Yue Han Katharina Eickhoff Chin-Chia Hsu Markus Ewert Chien-Chung Huang

Setareh Farajollahzadeh Kasper Høgh

Organization

Ryota Iijima Zsuzsanna Jankó Zhile Jiang Kai Kang Tim Koglin Simon Krogmann

Х

Zhonghong Kuang

Pooja Kulkarni Rucha Kulkarni Dominik Kaaser Alexander Lam Stefano Leucci

Hannah Li Junjie Li Weian Li Wenhao Li Zihao Li

Jason Cheuk Nam Liang

Panfeng Liu Qingsong Liu Edwin Lock Xinhang Lu

Themistoklis Melissourgos

Shivika Narang Rishi Patel Dominik Peters Elias Pitschmann Nicos Protopapas Pengyu Qian Kaihua Oin

Rojin Rezvan

David Salas

Marco Schmalhofer Marc Schroder Alkmini Sgouritsa Golnoosh Shahkarami Garima Shakya

Garina Shakya George Skretas

Aikaterini-Panagiota Stouka

Ankang Sun Hailong Sun Wei Tang

Sri Aravindakrishnan Thyagarajan

Rohit Vaish Yllka Velaj Chenhao Wang Kangning Wang Nianyi Wang Xiaomin Wang Ziwei Wang Yi Xiong Menghan Xu Xiang Yan Ruigi Yang Shuoguang Yang Hanrui Zhang Yuhao Zhang Tan Zhibin Yu Zhou

Zhengxing Zou Song Zuo

Contents

Equilibria in Games	
Inefficiency of Pure Nash Equilibria in Series-Parallel Network Congestion Games	3
Bainian Hao and Carla Michini	
Insightful Mining Equilibria	21
Learning and Online Algorithms	
Online Allocation and Display Ads Optimization with Surplus Supply Melika Abolhassani, Hossein Esfandiari, Yasamin Nazari, Balasubramanian Sivan, Yifeng Teng, and Creighton Thomas	41
Online Ad Allocation in Bounded-Degree Graphs	60
Online Team Formation Under Different Synergies	78
Stability of Decentralized Queueing Networks Beyond Complete Bipartite Cases	96
Optimal Prophet Inequality with Less than One Sample Nick Gravin, Hao Li, and Zhihao Gavin Tang	115
Exploiting Extensive-Form Structure in Empirical Game-Theoretic Analysis	132
Constructing Demand Curves from a Single Observation of Bundle Sales Will Ma and David Simchi-Levi	150
Mechanism Design	
Fair and Efficient Multi-resource Allocation for Cloud Computing Xiaohui Bei, Zihao Li, and Junjie Luo	169
Optimal Impartial Correspondences	187

Javier Cembrano, Felix Fischer, and Max Klimm

Improved Approximation to First-Best Gains-from-Trade	204
Better Approximation for Interdependent SOS Valuations	219
Social Choice	
On Best-of-Both-Worlds Fair-Share Allocations	237
Nash Welfare Guarantees for Fair and Efficient Coverage	256
Tight Bounds on 3-Team Manipulations in Randomized Death Match Atanas Dinev and S. Matthew Weinberg	273
Auditing for Core Stability in Participatory Budgeting	292
Core-Stable Committees Under Restricted Domains	311
Beyond the Worst Case: Semi-random Complexity Analysis of Winner Determination	330
Abstracts	
Strategyproof and Proportionally Fair Facility Location	351
Robust Misspecified Models and Paradigm Shifts	352
Information Design in Allocation with Costly Verification Yi-Chun Chen, Gaoji Hu, and Xiangqian Yang	353
Optimal Private Payoff Manipulation Against Commitment in Extensive-form Games	355
Optimal Feature-Based Market Segmentation and Pricing Titing Cui and Michael L. Hamilton	356
Competition Among Parallel Contests	357

Contents	X111
Revenue Management with Product Retirement and Customer Selection Adam N. Elmachtoub, Vineet Goyal, Roger Lederman, and Harsh Sheth	358
Order Selection Problems in Hiring Pipelines	359
Strategyproofness in Kidney Exchange with Cancellations	361
Tractable Fragments of the Maximum Nash Welfare Problem	362
Project Selection with Partially Verifiable Information	364
Revenue Management Under a Price Alert Mechanism	366
Bicriteria Nash Flows over Time	368
Truthful Generalized Linear Models	369
Algorithmic Challenges in Ensuring Fairness at the Time of Decision Jad Salem, Swati Gupta, and Vijay Kamble	371
Eliminating Waste in Cadaveric Organ Allocation	372
Matrix-Exact Covers of Minimum-Cost-Spanning-Tree Games Zhibin Tan, Zhigang Cao, and Zhengxing Zou	373
Personalized Assortment Optimization Under Consumer Choice Models with Local Network Effects	374
Exploring the Tradeoff Between Competitive Ratio and Variance in Online-Matching Markets	375
Author Index	377