Michal Feldman Hu Fu Inbal Talgam-Cohen (Eds.)

Web and Internet Economics

17th International Conference, WINE 2021 Potsdam, Germany, December 14–17, 2021 Proceedings



Lecture Notes in Computer Science

13112

Founding Editors

Gerhard Goos, Germany Juris Hartmanis, USA

Editorial Board Members

Elisa Bertino, USA Wen Gao, China Bernhard Steffen , Germany Gerhard Woeginger, 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 subseries at https://link.springer.com/bookseries/7409	

Michal Feldman · Hu Fu · Inbal Talgam-Cohen (Eds.)

Web and Internet Economics

17th International Conference, WINE 2021 Potsdam, Germany, December 14–17, 2021 Proceedings



Editors
Michal Feldman

Tel Aviv University
Tel Aviv, Israel

Inbal Talgam-Cohen
Technion – Israel Institute of Technology Haifa, Israel

Hu Fu Shanghai University of Finance and Economics Shanghai, China

ISSN 0302-9743 ISSN 1611-3349 (electronic) Lecture Notes in Computer Science ISBN 978-3-030-94675-3 ISBN 978-3-030-94676-0 (eBook) https://doi.org/10.1007/978-3-030-94676-0

LNCS Sublibrary: SL3 - Information Systems and Applications, incl. Internet/Web, and HCI

© 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 17th Conference on Web and Internet Economics (WINE 2021). WINE 2021 was held as an Internet event during December 14–17, 2021, organized at the Hasso Plattner Institute, Potsdam, Germany.

Over the last 17 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 2021 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 2020.

We tried for the first time having a Senior Program Committee, which was composed of 27 researchers from the field; the Program Committee had 63 researchers. The committees reviewed 136 submissions and decided to accept 41 papers. Each paper had at least three 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 Best Paper and Best Student Paper Awards.

In addition to the contributed talks, the program included four invited talks by leading researchers in the field: Eli Ben Sasson (Technion – Israel Institute of Technology), Colin Camerer (California Institute of Technology, USA), Annie Liang (Northwestern University, USA), and Jenn Wortman Vaughan (Microsoft Research, USA).

Also for the first time we invited Spotlights Beyond WINE talks; the nomination and selection of these talks was adjudicated by Costis Daskalakis, Fuhito Kojima, Ruta Mehta, and Jamie Morgenstern.

Our special thanks go to the general chairs, Ágnes Cseh and Pascal Lenzner, and the local organization team, as well as the poster chair Gagan Aggarwal and the global outreach chair Francisco Marmolejo.

November 2021 Michal Feldman Hu Fu

Inbal Talgam-Cohen

Organization

General Chairs

Ágnes CsehHasso Plattner Institute, GermanyPascal LenznerHasso Plattner Institute, Germany

Program Committee Chairs

Michal Feldman Tel-Aviv University, Israel

Hu Fu Shanghai University of Finance and Economics, China

Inbal Talgam-Cohen Technion – Israel Institute of Technology, Israel

Steering Committee

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

Senior Program Committee

Itai AshlagiStanford University, USAOmar BesbesColumbia University, USALiad BlumrosenHebrew University, IsraelIoannis CaragiannisAarhus University, DenmarkJose CorreaUniversidad de Chile, ChilePaul DuettingGoogle Research, SwitzerlandAmos FiatTel-Aviv University, Israel

Nick Gravin Shanghai University of Finance and Economics, China

Amy R. Greenwald Brown University, USA
Thomas Kesselheim University of Bonn, Germany
Scott Kominers Harvard University, USA
Elias Koutsoupias University of Oxford, UK

Ron Lavi Technion – Israel Institute of Technology, Israel,

and University of Bath, UK

Stefano Leonardi Sapienza Università di Roma, Italy

Tracy Xiao Liu Tsinghua University, China Brendan Lucier Microsoft Research, USA Vahideh Manshadi Yale University, USA

Organization

viii

Thanh Nguyen

Noam Nisan

Malesh Pai

Renato Paes Leme

Ariel Procaccia

Daniela Saban

Purdue University, USA

Hebrew University, Israel

Rice University, USA

Google Research, USA

Harvard University, USA

Stanford University, USA

Rann Smorodinsky Technion – Israel Institute of Technology, Israel

Éva TardosCornell University, USAAdrian VettaMcGill University, CanadaGabriel WeintraubStanford University, USA

Program Committee

Saeed Alaei Google Research, USA
Amine Allouah Columbia University, USA
Eric Balkanski Columbia University, USA

Hedyeh Beyhaghi Toyota Technological Institute at Chicago, USA

Kshipra Bhalwalkar Google Research, USA
Arpita Biswas Harvard University, USA
Yang Cai Yale University, USA

Andrea Celli Facebook Core Data Science, UK

Yu Cheng Microsoft Research, USA Avi Cohen Tel-Aviv University, Israel Yuan Deng Google Research, USA Tomer Ezra Tel-Aviv University, Israel Yiding Feng Northwestern University, USA Aris Filos-Ratsikas University of Liverpool, UK Rupert Freeman University of Virginia, USA Federico Fusco Sapienza Università di Roma, Italy

Nikhil Garg Cornell Tech, USA

Ganesh Ghalme Technion – Israel Institute of Technology, Israel Yiannis Giannakopoulos Friedrich-Alexander-Universität Erlangen-Nürnberg

(FAU), Germany

Vasilis Gkatzelis Drexel University, USA Swati Gupta Georgia Tech, USA

Nima Haghpanah Pennsylvania State University, USA

Xin Huang Technion – Israel Institute of Technology, Israel

Shahin Jabbari Harvard University, USA

Anson Kahng Carnegie Mellon University, USA
Max Klimm Technische Universität Berlin, Germany

Kostas Kollias Google Research, USA
Yuqing Kong Peking University, China
Moran Koren Tel-Aviv University, Israel
Annamaria Kovaks University of Frankfurt, Germany

Ron Kupfer Hebrew University, Israel Irene Lo Stanford University, USA

Jiaqi Lu Columbia University, USA Will Ma Columbia University, USA Jieming Mao Google Research, USA

Simon Mauras Research Institute on the Foundations of Computer

Science, France

Divyarthi Mohan Princeton University, USA

Ioannis (Yannis) Panageas University of California, Irvine, USA

Chara Podimata Harvard University, USA
Emmanouil Pountourakis Alexandros Psomas Drexel University, USA
Purdue University, USA

Qi Qi Hong Kong University of Science and Technology,

China

Manish Raghavan Cornell University, USA
Nidhi Rathi Aarhus University, Denmark
Rebecca Reiffenhauser Sapienza Università di Roma, Italy
Fedor Sandomirskiy California Institute of Technology, USA

Jon Schneider Google Research, USA

Okke Schrijvers Facebook, USA

Shreyas Sekar University of Toronto, Canada Ran Shorrer Pennsylvania State University, USA Sujoy Sikdar Binghamton University, USA

Sahil Singla Princeton University and Institute for Advanced Study,

USA

Balu Sivan Google Research, USA
Piotr Skowron University of Warsaw, Poland

Warut Suksompong National University of Singapore, Singapore

Zhihao Tang Shanghai University of Finance and Economics, China

Laura Vargas-Koch RWTH Aachen University, Germany
Ellen Vitercik Carnegie Mellon University, USA

Tiba Wargania University, China

Zihe Wang Renmin University, China Haifeng Xu University of Virginia, USA Fang-Yi Yu Harvard University, USA

Manolis Zampetakis University of California, Berkeley, USA

Mingfei Zhao Yale University, USA

Additional Reviewers

Jerry Anunrojwong Thirumulanathan D. Omer Ben-Porat Argyrios Deligkas Antoine Desir Ben Berger Martin Bullinger Maya Dotan Linda Cai Katharina Eickhoff George Christodoulou Hadi Elzayn Riccardo Colini Baldeschi Meryem Essaidi Natalie Collina Alireza Farhadi

Organization

Gabriele Farina
Zhe Feng
Giannis Fikioris
Yotam Gafni
Jugal Garg
Ira Globus-Harris
Denizalp Goktas
Minbiao Han

х

Gregory Herschlag Cyrus Hettle Kazuyuki Higashi

Martin Hoefer
Alexandros Hollender
Chien-Chung Huang
Ayumi Igarashi
Shweta Jain
Michał Jaworski
Yaonan Jin
Christopher Jung

Fivos Kalogiannis Martin Knaack Anand Krishna Pooja Kulkarni Rucha Kulkarni Omer Lev

Bo Li Weian Li

Jason Cheuk Nam Liang

Shuze Liu Ali Makhdoumi Azarakhsh Malekian Aghaheybat Mammadov

Claire Mathieu
Stephen McAleer
Kaleigh Mentzer
Julian Mestre
Hassan Mortagy
Omar Mouchtaki
Shivika Narang
Eric Neyman

Argyris Oikonomou William Parker Neel Patel Dominik Peters

Grzegorz Pierczyński Tristan Pollner Sharon Qian Frederick Oiu

Mayank Ratan Bhardwaj

Niklas Rieken Scott Rodilitz Jad Salem Daniel Schoepflin

Ariel Schvartzman Seyed Ali Shameli

Ravi Sojitra

Gogulapati Sreedurga Maximilian Stahlberg Samuel Taggart Yifeng Teng Ece Teoman Clayton Thomas Robin Vacus Carmine Ventre Alexandros Voudouris

Chang Wang
Hongao Wang
Kangning Wang
Philipp Warode
Matt Weinberg
Andre Wibisono
Jibang Wu
Xiaowei Wu

Jonathan Wagner

Mobin Yahyazadeh Hanrui Zhang Qiankun Zhang Yuhao Zhang Shuran Zheng

Contents

Mechanism	Design	and	Pricing
-----------	--------	-----	----------------

Two-Way Greedy: Algorithms for Imperfect Rationality	3
Bayesian Persuasion in Sequential Trials	22
The Optimality of Upgrade Pricing	41
On Symmetries in Multi-dimensional Mechanism Design Meryem Essaidi and S. Matthew Weinberg	59
Welfare-Preserving ε-BIC to BIC Transformation with Negligible	
Revenue Loss	76
Strategyproof Facility Location in Perturbation Stable Instances Dimitris Fotakis and Panagiotis Patsilinakos	95
Contract Design for Afforestation Programs	113
Relaxing the Independence Assumption in Sequential Posted Pricing, Prophet Inequality, and Random Bipartite Matching	131
Allocating Indivisible Goods to Strategic Agents: Pure Nash Equilibria and Fairness	149
On the Benefits of Being Constrained When Receiving Signals	167
Towards a Characterization of Worst Case Equilibria in the Discriminatory Price Auction	186
Evangelos Markakis, Alkmini Sgouritsa, and Artem Tsikiridis	_00

Matching, Markets and Equilibria

Improved Analysis of RANKING for Online Vertex-Weighted Bipartite Matching in the Random Order Model	207
Beyond Pigouvian Taxes: A Worst Case Analysis	226
The Core of Housing Markets from an Agent's Perspective: Is It Worth Sprucing Up Your Home?	244
Mechanisms for Trading Durable Goods	262
Formal Barriers to Simple Algorithms for the Matroid Secretary Problem Maryam Bahrani, Hedyeh Beyhaghi, Sahil Singla, and S. Matthew Weinberg	280
Threshold Tests as Quality Signals: Optimal Strategies, Equilibria, and Price of Anarchy	299
The Platform Design Problem	317
A Consumer-Theoretic Characterization of Fisher Market Equilibria Denizalp Goktas, Enrique Areyan Viqueira, and Amy Greenwald	334
Learning, Fairness, Privacy and Behavioral Models	
A Tight Negative Example for MMS Fair Allocations	355
Approximating Nash Social Welfare Under Binary XOS and Binary Subadditive Valuations	373
Default Ambiguity: Finding the Best Solution to the Clearing Problem Pál András Papp and Roger Wattenhofer	391
Planning on an Empty Stomach: On Agents with Projection Bias Sigal Oren and Nadav Sklar	410
Eliciting Social Knowledge for Creditworthiness Assessment	428

Social Choice and Cryptocurrencies	
Decentralized Asset Custody Scheme with Security Against Rational Adversary	449
The Distortion of Distributed Metric Social Choice	467
Maximal Information Propagation via Lotteries	486
Envy-free Division of Multi-layered Cakes	504
Computing Envy-Freeable Allocations with Limited Subsidies	522
Abstracts	
Asymptotically Optimal Competitive Ratio for Online Allocation of Reusable Resources	543
Dynamic Bipartite Matching Market with Arrivals and Departures Naonori Kakimura and Donghao Zhu	544
Static Pricing for Multi-unit Prophet Inequalities (Extended Abstract) Shuchi Chawla, Nikhil R. Devanur, and Thodoris Lykouris	545
Fairness Maximization Among Offline Agents in Online-Matching Markets Will Ma, Pan Xu, and Yifan Xu	547
Funding Public Projects: A Case for the Nash Product Rule Florian Brandl, Felix Brandt, Matthias Greger, Dominik Peters, Christian Stricker, and Warut Suksompong	548
Screening with Limited Information: The Minimax Theorem and a Geometric Approach	549
Optimal DSIC Auctions for Correlated Private Values: Ex-Post Vs. Ex-Interim IR	550
Throttling Equilibria in Auction Markets	551

xiv Contents

Generalized Nash Equilibrium Problems with Mixed-Integer Variables Tobias Harks and Julian Schwarz	552
In Which Matching Markets Do Costly Compatibility Inspections Lead to a Deadlock?	553
Contest Design with Threshold Objectives	554
Confounding Equilibria for Platforms with Private Information on Promotion Value	555
Author Index	557