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Preface

The Workshop on Internet and Network Economics (WINE 2007), held December 12–14, 2007 at San Diego for its third edition, provided a forum for researchers from different disciplines to communicate their research works in this emerging field.

We had four plenary speakers: Kenneth Arrow, Herbert Scarf, Vijay Vazirani, and Christos Papadimitriou, speaking on economic equilibrium and its history, its solution methodologies (the simplicial structure method and the primal dual method), as well as the computation of Nash equilibrium.

This final program included 61 peer-reviewed papers covering topics including equilibrium, information market, sponsored auction, network economics, mechanism design, social networks, advertisement pricing, computational general equilibrium, network games, algorithms and complexity for games.

December 2007

Xiaotie Deng
Fan Chung Graham

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Table of Contents

WINE 2007

Invited Talks

Getting to Economic Equilibrium: A Problem and Its History 1
Kenneth J. Arrow

My Favorite Simplicial Complex and Some of Its Applications 3
Herbert E. Scarf

Markets and the Primal-Dual Paradigm 4
Vijay V. Vazirani

The Computation of Equilibria 5
Christos H. Papadimitriou

Equilibrium

A Note on Equilibrium Pricing as Convex Optimization 7
Lihua Chen, Yinyu Ye, and Jiawei Zhang

New Algorithms for Approximate Nash Equilibria in Bimatrix Games 17
Hartwig Bosse, Jaroslaw Byrka, and Evangelos Markakis

A Unified Approach to Congestion Games and Two-Sided Markets 30
Heiner Ackermann, Paul W. Goldberg, Vahab S. Mirrokni, Heiko Röglin, and Berthold Vöcking

An Optimization Approach for Approximate Nash Equilibria 42
Haralampos Tsaknakis and Paul G. Spirakis

Gradient-Based Algorithms for Finding Nash Equilibria in Extensive Form Games 57
Andrew Gilpin, Samid Hoda, Javier Peña, and Tuomas Sandholm

Information Market

Bluffing and Strategic Reticence in Prediction Markets 70
Yiling Chen, Daniel M. Reeves, David M. Pennock, Robin D. Hanson, Lance Fortnow, and Rica Gonen

Pari-Mutuel Markets: Mechanisms and Performance 82
Mark Peters, Anthony Man-Cho So, and Yinyu Ye

Information Sharing Communities 96
Gabrielle Demange

Sponsored Auction

Competitive Safety Strategies in Position Auctions 108
Danny Kuminov and Moshe Tennenholtz

Maintaining Equilibria During Exploration in Sponsored Search Auctions 119
Jennifer Wortman, Yevgeniy Vorobeychik, Lihong Li, and John Langford

Stochastic Models for Budget Optimization in Search-Based Advertising 131
S. Muthukrishnan, Martin Pál, and Zoya Svitkina

Auctions with Revenue Guarantees for Sponsored Search 143
Zoë Abrams and Arpita Ghosh

Equilibrium Analysis of Dynamic Bidding in Sponsored Search Auctions 155
Yevgeniy Vorobeychik and Daniel M. Reeves

Cooperative or Vindictive: Bidding Strategies in Sponsored Search Auction 167
Li Liang and Qi Qi

Network Economics

Cost-Balancing Tolls for Atomic Network Congestion Games 179
Dimitris Fotakis and Paul G. Spirakis

Network Formation: Bilateral Contracting and Myopic Dynamics 191
Esteban Arcaute, Ramesh Johari, and Shie Mannor

Who Should Pay for Forwarding Packets? 208
Heiner Ackermann, Patrick Briest, Alexander Fanghänel, and Berthold Vöcking

On the Performance of Congestion Games for Optimum Satisfiability Problems 220
Aristotelis Giannakos, Laurent Gourvès, Jérôme Monnot, and Vangelis Th. Paschos

Incentive-Compatible Interdomain Routing with Linear Utilities 232
Alexander Hall, Evdokia Nikolova, and Christos Papadimitriou

Mechanism Design I

False-Name-Proof Mechanisms for Hiring a Team 245
Atsushi Iwasaki, David Kempe, Yasumasa Saito, Mahyar Salek, and Makoto Yokoo

Mechanism Design on Trust Networks 257
Arpita Ghosh, Mohammad Mahdian, Daniel M. Reeves, David M. Pennock, and Ryan Fugger

Stochastic Mechanism Design (Extended Abstract) 269
Samuel Ieong, Anthony Man-Cho So, and Mukund Sundararajan

Social Networks

A Note on Maximizing the Spread of Influence in Social Networks 281
Eyal Even-Dar and Asaf Shapira

A Network Creation Game with Nonuniform Interests 287
Yair Halevi and Yishay Mansour

A Theory of Loss-Leaders: Making Money by Pricing Below Cost 293
Maria-Florina Balcan, Avrim Blum, T-H. Hubert Chan, and MohammadTaghi Hajiaghayi

PageRank as a Weak Tournament Solution 300
Felix Brandt and Felix Fischer

Competitive Influence Maximization in Social Networks 306
Shishir Bharathi, David Kempe, and Mahyar Salek

Advertisement Pricing I

Sponsored Search with Contexts 312
Eyal Even-Dar, Michael Kearns, and Jennifer Wortman

Capacity Constraints and the Inevitability of Mediators in Adword Auctions 318
Sudhir Kumar Singh, Vwani P. Roychowdhury, Himawan Gunadhi, and Behnam A. Rezaei

Cost of Conciseness in Sponsored Search Auctions 326
Zoë Abrams, Arpita Ghosh, and Erik Vee

Adwords Auctions with Decreasing Valuation Bids 335
Gagan Goel and Aranyak Mehta

An Adaptive Sponsored Search Mechanism δ-Gain Truthful in Valuation, Time, and Budget 341
Rica Gonen and Elan Pavlov

Computational General Equilibrium

Extending Polynomial Time Computability to Markets with Demand Correspondences 347
Benton McCune

Market Equilibrium Using Auctions for a Class of Gross-Substitute Utilities 356
Rahul Garg and Sanjiv Kapoor

Continuity Properties of Equilibrium Prices and Allocations in Linear Fisher Markets 362
Nimrod Megiddo and Vijay V. Vazirani

Computing Market Equilibrium: Beyond Weak Gross Substitutes 368
Chinmay Karande and Nikhil Devanur

On Competitiveness in Uniform Utility Allocation Markets 374
Deeparnab Chakrabarty and Nikhil Devanur

Network Games

Total Latency in Singleton Congestion Games 381
Martin Gairing and Florian Schoppmann

The Importance of Network Topology in Local Contribution Games 388
Jacomo Corbo, Antoni Calvó-Armengol, and David C. Parkes

Secure Relative Performance Scheme 396
Kurt Nielsen and Tomas Toft

Selfishness, Collusion and Power of Local Search for the ADMs Minimization Problem (Extended Abstract) 404
Stefania Di Giannantonio, Michele Flammini, Gianpiero Monaco, Luca Moscardelli, Mordechai Shalom, and Shmuel Zaks

The Wi-Fi Roaming Game 412
Hossein Falaki

Algorithmic Issues

On the Complexity of Pure Nash Equilibria in Player-Specific Network Congestion Games 419
Heiner Ackermann and Alexander Skopalik

The Stable Roommates Problem with Globally-Ranked Pairs 431
David J. Abraham, Ariel Levavi, David F. Manlove, and Gregg O'Malley

A PSPACE-complete Sperner Triangle Game 445
Kyle W. Burke and Shang-Hua Teng

Group Dominant Strategies (Extended Abstract) 457
Ola Rozenfeld and Moshe Tennenholtz

Weighted Boolean Formula Games 469
Marios Mavronicolas, Burkhard Monien, and Klaus W. Wagner

Core Stability of Vertex Cover Games 482
Qizhi Fang and Liang Kong

Mechanism Design II

Maximizing Revenue in Sequential Auctions 491
Edith Elkind and Shaheen Fatima

Approximate Mechanisms for the Graphical TSP and Other Graph Traversal Problems 503
Davide Bilò, Luca Forlizzi, Luciano Gualà, and Guido Proietti

To Be or Not to Be (Served) 515
Yvonne Bleischwitz, Burkhard Monien, and Florian Schoppmann

Advertisement Pricing II

Ad Auction Design and User Experience 529
Zoë Abrams and Michael Schwarz

Personalized Ad Delivery When Ads Fatigue: An Approximation Algorithm 535
Zoë Abrams and Erik Vee

Empirical Price Modeling for Sponsored Search 541
Kuzman Ganchev, Alex Kulesza, Jinsong Tan, Ryan Gabbard, Qian Liu, and Michael Kearns

Pay-per-action Model for Online Advertising 549
Mohammad Mahdian and Kerem Tomak

Public Advertisement Broker Markets 558
Atish Das Sarma, Deeparnab Chakrabarty, and Sreenivas Gollapudi

Mechanism Design III

K-NCC: Stability Against Group Deviations in Non-cooperative Computation 564
Itai Ashlagi, Andrey Klinger, and Moshe Tenneholtz

Monotone Properties of Randomized Symmetric Incentive Compatible Auctions 570
Aries Wei Sun

Computing Optimal Bundles for Sponsored Search 576
Arpita Ghosh, Hamid Nazerzadeh, and Mukund Sundararajan

On the Price of Truthfulness in Path Auctions 584
Qiqi Yan

Characterizing Truthful Market Design 590
Mira Gonen, Rica Gonen, and Elan Pavlov

Author Index 597

Getting to Economic Equilibrium: A Problem and Its History (Abstract)

Kenneth J. Arrow

Economics Department, Stanford University

The very concept of equilibrium, economic or otherwise, presupposes a dynamic system which determines change as a function of state variables. An equilibrium is a vector of state variables for which no change occurs. In economics, this is interpreted as a set of quantities and prices for which there is no incentive on anyone's part to change. The dynamics runs in terms of profit opportunities or incentives to outbid others for scarce commodities or for market opportunities. The idea that traders will respond to profit opportunities by increasing their activities and by, doing so, tend to wipe them out must have been recognized whenever there was trade. A 12th century rabbinical commentary argues that if someone charges "too high a price", others will offer the good at a lower price and thereby bring it down. Somewhat more systematic discussions of economic equilibrium are to be found in the founders of modern economic theory, Adam Smith and David Ricardo. Smith's principal emphasis was on the flow of capital from low-profit to high-opportunities, leading to a zero-profit equilibrium. Ricardo added the adjustment of population to wages and the setting of rents on scarce land.

The true complexity of the adjustment processes was not grasped until the formulation of general equilibrium theory. This introduced a formal element, the formulation of the market in terms of supply and demand, and an empirical element, the influence of the price on one market on the supplies and demands in other markets. Léon Walras recognized the need for an argument for stability (convergence of the dynamic system to an equilibrium ([8], pp. 84-86, 90-91, 105-106, 169-172, 243-254 and 284-295). He assumed crucially that the price for any given commodity increases proportionately to the difference between supply and demand on that market and used essentially a Gauss-Seidel argument, implicitly imposing the condition of a dominant diagonal on the excess demand functions. Walras introduced the term, "tatonnement" for the dynamic system, a term which has become standard. Despite casual references (e.g., Vilfredo Pareto's analogy between the market and the computer [5], pp. 233-234), the stability question was not addressed again until the magisterial work of John R. Hicks in 1939 [3]. In part by criticizing Hicks, Paul Samuelson (1941[6]) gave perhaps the first explicit formulation of a dynamic system based on supply and demand whose equilibrium was the competitive equilibrium. A subsequent literature (Metzler [4], Arrow, Block, and Hurwicz [2,1]) gave various sufficient conditions for the Samuelson system to be stable. These results could be used, when the conditions held, to actually calculate general equilibria. What started

X. Deng and F.C. Graham (Eds.): WINE 2007, LNCS 4858, pp. 1–2, 2007.

as a description of the economy could also be regarded as a way of computing its outcome. As computing power became available, this became a practicable possibility. However, Scarf (1960)[7] showed by example that the tatonnement process did not necessarily converge.

References

1. Arrow, K.J.: On the stability of competitive equilibrium ii. Econometrica 27, 82–109 (1959)
2. Arrow, K.J., Hurwicz, L.: On the stability of competitive equilibrium i. Econometrica 26, 522–532 (1958)
3. Hicks, J.R.: Value and capital. Oxford U. Press, Oxford (1939)
4. Metzler, L.A.: Stability of multiple markets: the Hicks conditions. Econometrica 13, 277–292 (1945)
5. Pareto, V.: Manuel déconomie politique. 2e ed., Paris: Marcel Giard, 1927 originally published in Italian in (1904)
6. Samuelson, P.A.: The stability of equilibrium: Comparative statics and dynamics. Econometrica 9, 97–120 (1941)
7. Scarf, H.E.: Some examples of global instability of the competitive equilibrium. International Economic Review 1, 157–172 (1960)
8. Walras, L.: Elements of pure economics. ed. and tr. by W. Jaffé, London: George Allen and Unwin, 1954 (originally published in 1874, 1877)