

Game Theoretic Problems in Network Economics and Mechanism Design Solutions

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Why Mechanism Design?

- Mechanism Design is the art and science of designing rules of a game to achieve a specific outcome; mechanism design is the reverse engineering of games.
- It has been successfully applied to a variety of high impact problems in Internet and network economics: Internet advertising, spectrum auctions, electronic procurement, logistics, supply chain management, grid computing, wireless networks, peer-to-peer networks, and social networks
- 5 out of the last 7 economics Nobel prizes have been awarded for work in mechanism design and game theory
- The most successful web company of our times - Google - owes its enormous revenue to successful implementation of ideas from mechanism design

Why You as a Reader?

- Mechanism Design is a fairly independent branch of economics
- Mechanism Design is a very interesting field to pursue as it is applicable to many everyday situations as well
- Mechanism Design is currently a tool used by researchers and professionals in computer science, communication networks, operations research, management science, economics, and sociology.
- The monograph is useful for Senior Undergrads, Master's students, and first year graduate students; for researchers in universities and also the industry

What Does the Monograph Contain?

- Chapter 1 provides motivating examples and introduces mechanism design
- Chapter 2 provides a tutorial like, comprehensive, self-sufficient introduction to the state-of-the-art in the topic of mechanism design
- Chapter 3 demonstrates the application of the theory by means of a contemporary study of sponsored search auctions, emphasizing the research carried out by the authors
- Chapter 4 applies the theory to a niche protocol design problem in the domain of ad hoc wireless networks, again emphasizing the recent research carried out by the authors

- Chapter 5 highlights the application of mechanism design explored by the authors in the domain of grid computing
- Chapter 6 provides a listing of key topics and important application areas of mechanism design for future exploration.

Who are the Target Audience?

- **Senior Undergraduate, Master's, and first year Graduate students in following departments**
 - Computer Science
 - Electrical Engineering, Communications
 - Economics
 - Industrial Engineering, Systems Engineering
 - Operations Research
 - Management Science and Business Schools
- **Academics and researchers working in following areas**
 - Electronic Commerce and Supply Chain Management
 - Auction Theory and Mechanism Design
 - Network and Internet Economics
 - Communication Networks
- **Industry professionals/researchers in following sectors**
 - Search Engines and e-commerce portals
 - Networking and Communications
 - E-procurement divisions in any company
 - Social Networking Portals

Why this Monograph?

- With its balanced blend of theory and compelling applications, this text offers a one stop research reference for graduate students, academics, and industry researchers.
- Provides a sound foundation of relevant concepts and theory to help apply mechanism design to problem solving in a rigorous way.
- Presents essential aspects of noncooperative game theory required to understand mechanism design, including Bayesian games
- Includes an extensive bibliography of up-to-date references.
- After a serious reading of this monograph, the readers would be able to model real-world situations using game theory, analyze the situations using game theoretic concepts, and design correct and robust solutions (mechanisms, protocols, algorithms) that would work well for agents that are rational and intelligent.

Unique Features of the Monograph

- This is the first book of its kind dealing exclusively with mechanism design and its current applications.
- A tutorial like, comprehensive, self-sufficient introduction to the topic of mechanism design, accessible to senior undergraduate students, graduate students, industry researchers
- Can be used as a textbook or reference book for a course on mechanism design
- Will be a suitable supplementary reference for courses such as game theory, microeconomic theory, electronic commerce, network economics, and supply chain management
- A large number of stylized illustrative examples from different domains: Economics, Grid Computing, Wireless Networks, E- Procurement, Supply Chains, Search Engines, Internet Analytics, etc.
- A single window reference source for getting introduced to the area and to gain a deep understanding of how mechanism design is applied in practical, contemporary situations
- A Comprehensive, up-to-date bibliography
- A good blend of theory and practice
- Crisp biographies of 15 celebrity researchers/Nobel laureates in the area of game theory and mechanism design

Keywords

- Mechanism Design
- Game Theory
- Rational and Intelligent Agents
- Bayesian Games
- Nash Equilibrium
- Auctions
- Electronic Markets
- Incentives and Incentive Compatibility
- VCG (Vickrey-Clarke-Groves) Mechanisms
- Sponsored Search Auctions
- Ad Hoc Wireless Networks
- Grid Computing
- Electronic Commerce
- Network Economics
- Microeconomics
- Internet Analytics
- E-Procurement

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