

CALL FOR PAPERS
IEEE Journal on Selected Areas in Communications
Game Theory in Communication Systems

Game theory is a formal framework with a set of mathematical tools to study the complex interactions among interdependent rational players. For more than half a century, game theory has led to revolutionary changes in economics, and has found important applications in politics, sociology, psychology, and transportation. Recently, there has been a surge in research activities that employ game theory to model and analyze a wide range of problems in modern communication systems. This is mainly due to (1) the emergence of the Internet as a global platform for computation and communication, which has sparked the development of large-scale, distributed and heterogeneous communication systems; (2) the deregulation of the telecommunication industry and the dramatic improvement in computation power, which make it possible for various network entities to make independent and selfish operational decisions; and (3) the need for robust designs against uncertainties modeled as games between the user and a malicious nature. Game theory can help us better understand various complicated communication systems and design more efficient, scalable and robust communication protocols and resource allocation algorithms.

The aim of this issue is to bring together the state-of-the-art research contributions that address the major opportunities and challenges of applying game theory to understanding and designing modern communication systems, with emphasis on both new analytical techniques and novel application scenarios. We seek original completed and unpublished work not currently under review by any other journal/magazine. Topics of interest include (but are not limited to):

- Game theoretical analysis/design of communication networks
 - Wireless resource allocation
 - DSL spectrum management
 - Network pricing
 - Peer-to-peer and overlay networks
 - Medium access control, routing, and congestion control
 - Information theoretical analysis
 - Cognitive radio networks
 - Security and privacy
- Minimax robustness in communication systems
 - Minimax/maximin formulations
 - Worst-case robust designs
 - Saddle-point optimizations
 - H-infinity designs
- Emerging game-theoretical models in communication systems
 - S-modular and potential games
 - Stackelberg and Wardrop equilibria
 - Coalition games and Nash bargaining models
 - Multi-stage and repeated games
 - Incentive compatible mechanism design (e.g., auction)
- General game-theoretic methodologies and techniques
 - Efficiency loss compared with optimization model (i.e., price of anarchy)
 - Games of imperfect or asymmetric information
 - Effects of bounded rationality
 - Learning mechanisms in games
 - Computation of Nash, correlated, and market equilibria
 - Preference elicitation and winner determination in combinatorial auctions

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