

Call for Papers

IEEE Communications Feature Topic on Game Theory in Wireless Networks

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For over two decades, game theory has been applied to networking problems including routing, pricing, flow control, and Quality of Service, to name a few. The trend towards decentralization and autonomy in wireless networks has led to increased interest in game theory to model these networks.

As wireless nodes become more autonomous (e.g., as expected of cognitive radios) and the network architecture more decentralized (e.g., as in sensor networks, ad hoc networks, and femto-cell deployments), game theory becomes a powerful tool to predict the adaptations that will occur in such networks. Game theory is so prevalent as a technique for the analysis of wireless communications and networks that it is crucial that today's researchers in this field be acquainted with its basic principles and how they can be applied to engineering problems. Indeed, basic concepts such as the Nash equilibrium, and toy examples such as the Prisoner's Dilemma are now known to the average graduate student in electrical engineering and computer science. This special issue will provide a forum for how game theory is currently being used to deepen our understanding and inform our design of wireless networks.

We invite authors to consider the following questions:

- ✓ *Why game theory?* What particular insights can game theory bring into the wireless networking problem of interest, and how do they differ from those obtained from other tools, such as classical optimization?
- ✓ *How well does the model fit the problem?* A number of types of games and approaches in game theory can be applied to networking problems. These include repeated games, potential games, Stackelberg games, and games of imperfect information. We ask authors to provide brief background on the particular area of game theory that is of interest and discuss how well their assumptions match the problem of interest.
- ✓ *What results are achievable?* What practical results derive from the model? Do these results aim at analyzing the expected performance of the network or are they also used to design new protocols or mechanisms?

Topics of interest include, but are not limited to, the following:

- Power control and interference games
- Channel assignment and topology control games
- Game-theoretic analysis of adaptations in a cognitive network
- Spectrum auctions and pricing mechanisms for wireless resources
- Routing games for wireless networks

- Incentives for cooperative communications
- Reputation and trust models using game theory
- Intrusion detection, jamming and other security threats
- Interactions between primary and secondary users in dynamic spectrum sharing
- Mechanism design in wireless networks

Important dates:

- Deadline for submission of manuscripts: January 31, 2011
- Decision to authors: April 30, 2011
- Deadline for sending final versions of accepted papers to the production staff: June 1, 2011

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