

IEEE Transactions on Systems, Man, and Cybernetics - Part B

Special Issue: Game Theory

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, **computational game theory** has led to revolutionary changes in economics, and has found important applications in politics, sociology, psychology, communication, transportation, biology.

Evolutionary Game Theory (EGT) is a solid basis for understanding learning and constructing new learning algorithms. The Replicator Equations will appear to be an interesting model to study learning in various settings. This model consists of a system of differential equations describing how a population (or a probability distribution) of strategies evolves over time, and plays a central role in biological and economical models. Thus, EGT is an integral part of AI.

The aim of this issue is to bring together the state-of-the-art research contributions that address the fundamentals and sound theoretical models of game theory and the major opportunities and challenges of applying game theory to solving real problems in industry, biology, medicine, communications, and other disciplines.

We seek original completed and unpublished work not currently under review by any other journal/magazine.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):

■ **Emerging game-theoretical models**

- Evolutionary Game Theory
- Game Theoretic approach to DAI
- Game Theory, Machine Learning, Artificial Intelligence
- S-modular and potential games
- Stackelberg and Wardrop equilibria
- Coalition games and Nash bargaining models
- Multi-stage and repeated games

■ **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
- Mechanism design and learning mechanisms in games

■ **Applications**

- Game theory and EGT algorithms for optimization in dynamic and noisy environments
- Game theory and EGT algorithms for multi-objective optimization
- Game theory and EGT algorithms for constrained optimization
- Game theory and EGT approach to autonomic systems
- Game theory and EGT in Communications Systems
- Real-world/novel applications of Game theory and EGT in biology, medicine, psychology, sociology, economics
- Comparative theoretical and empirical studies
- Combination of machine learning techniques and EGT.

All papers should be submitted in the PDF format to <http://smcb-ieee.manuscriptcentral.com> and the authors should state in their submission that "This manuscript is submitted for the special issue on Game Theory (editors: A. Vasilakos, R. Kannan, E. Hossain, H. Kintis)"

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