

# EVOLUTIONARY COMPUTATION AND GAMES: FROM THEORY TO APPLICATIONS

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Game-theoretic modelling and solution methods are important in many application areas such as: biology, robotics, defense, economics, social science, computer games and AI. Evolutionary computation has been applied not only to searching for strategies, but also to other aspects of games such as the generation of games, learning players' behavior, design of non-player characters and more.

The aim of this special session is to bring together the IEEE-CEC community of researchers who are interested in the theory and applications of Evolutionary Games (EG) to present their recent research findings and work.

**Note:** The term evolutionary game theory commonly refers to game models of evolution in nature. Here, this term refers also to game models of evolutionary computations, which may be associated with the development of technical systems.

## Topics

- Theory including
  - Analysis of equilibrium and evolutionary stable strategies in evolutionary games
  - Pareto optimality in evolutionary games
  - Theoretical analysis of evolutionary games
  - Theoretical analysis of mechanism design and social choice
  - Theoretical analysis of uncertainty, robustness, and delays in evolutionary games
- Computational Methods such as
  - Co-evolutionary learning of strategies
  - Evolutionary design of NPCs
  - Evolutionary machine learning applied to game theoretic models



- Evolutionary multi-objective games
- GP, GA, ES, DE, MC and game-theoretic models
- Game-generation using evolutionary computation techniques
- Generalization and transfer learning in co-evolutionary learning of game strategies
- Hybrid methods and games
- Neuroevolution and games
- One-sided evolutionary search of strategies
- Rolling horizon evolutionary algorithms
- Applications including
  - Applications of EG in computer games and AI
  - Applications of EG in robotics
  - Applications of EG in biological systems
  - Applications of EG in economics
  - Applications of EG in defense (air, land, sea, and cyber)
  - Applications of EG in social science
  - Applications of EG in engineering design and manufacturing
  - Real-life examples of using EG