

IET Control Theory & Applications

Call for Papers



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Special Issue on:

Game Theoretical Methods and its Applications in the Control Systems under Extreme Environment

Game theory is a valid scheme dealing with strategic interactions among multiple decision makers whose objectives usually depend on the actions of the other players. This introduces a coupling between the actions of the players and binds them together in decision making even in the so-called non-cooperative setting. Recent years have witnessed game theoretical methods becoming a significant research area in optimization and control problems which attracts a lot of attention from both academy and industry. As a decentralized optimization scheme, game theory can make each decision maker in the control systems optimize the individual control performance rather than a common objective, which is more common in large-scaled industrial system. Owing to the complexity of the control systems that arises from the internal essence and external factors, the game theoretic methods are challenging on representation of cost function and solving of Nash equilibrium. It presents a fascinating field of the study of game theoretic technique that encompasses nonlinear control system, cluster system, etc., and also the Nash strategy seeking, Nash strategy solving with intelligence algorithms.

Furthermore, control systems become networked, complicated, and clustering and they are usually confronted with complicated extreme environment. The extreme environment refers to the operating environment of the control system constituted of multi-source disturbances, stochastic noises, non-cooperative behavior and even adversary attacks, etc. If the so-called extreme environment is neglected in the game strategies design procedure, the outcome of the game would be unpredictable. Nevertheless, it is worth mentioning that the control strategies obtained by solving a game problem which is essential an optimization method are fragile under extreme environment. Hence, designing effective game control strategy under extreme environment is challenging and there are many bottlenecks to be studied. In order to find the robust and resilient control strategy under extreme environment, how to represent the cost function in a worst-case, seek the game strategy and quantify the performance degradation are challenging problems to be considered. In a word, the interconnected dynamics as well as the compound negative effect from the extreme environment renders the game strategy design a nontrivial problem in nature.

This special issue aims to provide a platform for sharing recent developments in game theoretic methods, and their applications for practical control systems under the extreme environment constituted of multi-source disturbances, stochastic noises, non-cooperative behavior and even adversary attacks, etc. We are seeking high-quality original works on the related topics.

Topics of interest include, but are not limited to:

- Research advances of game theory
- Advanced control techniques with game theoretic methods
- Advances of game theory for nonlinear control system
- Game theory in networked control system
- Game theory and applications under extreme environment
- Game theoretic methods for clustering systems
- Game theory for the filtering problem under noises
- Reinforcement learning for Nash equilibrium solving
- Reinforcement learning for hierarchical game equilibrium solving
- Nash equilibrium seeking for graphical games
- Nash equilibrium seeking under multiple-source disturbances
- Nash equilibrium seeking under network environment
- Nash equilibrium seeking under extreme environment
- Advances of pursuit-evasion game and its applications
- Advanced algorithms for solving coupled Hamilton-Jacobi equation
- Game theory and applications to control system under cyber attack
- Game theory and applications to multi-agent systems
- Game theoretic methods for clustering systems

This will be a Virtual Collection: Accepted papers will be published without delay while the Collection remains open for submissions until the deadline.

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