IEEE ICUS 2022
Invited Session Summary

Title of Session

Cooperative/Game Control and Decision Making in Complex Environment

Name, Salutation and Affiliation of Organizers

1. Prof. Yuan Yuan

Northwestern Polytechnical University, China

2. Assoc. Prof. Huanhuan Yuan

Northwestern Polytechnical University, China

3. Dr. Peng Zhang

Nanjing University of Aeronautics and Astronautics, China

Biosketches of Organizers

Yuan Yuan is the Professor in School of Astronautics, Northwestern Polytechnical University. He is awarded as National Natural Science Foundation--Outstanding Youth Foundation, the novel star in science and technology in Shaanxi Province, and the Aoxiang Scholar in Northwestern Polytechnical University. He got the bachelor's degree in Beihang University in 2009 and Ph.D in Tsinghua University in 2015. Yuan focuses on game theory and artificial intelligence. He is awarded the Wuwenjun youth award on artificial intelligence and the second prize for nature science in Shaanxi Province. He currently serves as the IEEE senior member, the reviewer for Mathematical Reviews, and Associate Editor for Neurocomputing，Transactions of the Institute of Measurement and Controland so on. He also serves as the session chair, publication chair, and committee member in a number of international conferences.

Huanhuan Yuan is an Associate Professor in School of Astronautics, Northwestern Polytechnical University. Her research interests include security of aerospace cyber-physical system, security of multiple pursuit-evasion game system, game theory and technology. The cyber layer and physical layer unified anti-jamming attack defense strategy for aerospace cyber-physical system under denied environment has been proposed. The defense and attack resources optimization scheme with game theoretical approach has been investigated for large scale multi-task networked control system based on reinforcement learning

method. She has published more than 20 SCI papers, applied for 2 invention patents and 2 software copyrights. She has presided over and participated in a number of national, provincial and ministerial projects.

Peng Zhang received the Ph.D. degree in the School of Astronautics, Northwestern Polytechnical University. He is currently a lecturer with the College of Automation Engineering, Nanjing University of Aeronautics and Astronautics. He proposed a set of game control approaches for multi-agent systems. He published 20 related papers and applied five invention patents. He participated in a number of national projects.

Details of Session

With the rapid development of robotics and ever-increasing mission demands, unmanned systems often face complex working environments, such as battlefield environments, harsh climates, denial environments, cyber attacks, etc. These complex environmental factors seriously affect the control performance and decision-making success or failure of unmanned systems. In addition, with the rapid development of game theory, it has been widely used in economic activities, animal herds, social systems, and swarm systems. In the internal activities and evolution of the systems, game decision plays a decisive role. Therefore, studying the cooperative/game control and decision-making of unmanned systems in complex environments is a key problem which needs to be solved urgently.

The special invited session provides a platform for the following scholars related to the theme of "Cooperation/Game Control and Decision-making in Complex Environment". The topics of the call for papers include but are not limited to:

- Game control under multi-source disturbances
- Game control under cyber attacks
- Bio-inspired learning and control in unmanned systems
- Intelligent decision in complex environments
- Applications in game control of unmanned systems