IEEE ICUS 2021

Invited Session Summary

Title of Session

Recent Advances in Cooperative Control of Swarm Systems

Name, Salutation, Affiliation and Email of Organizers

1. Prof. Xiwang Dong

Beihang University, China

xwdong@buaa.edu.cn

2. Prof. Mengyi Wang

Beijing Institute of Electronic System Engineering, China

22873378@qq.com

3. Prof. Zhang Ren

Beihang University, China

renzhang@buaa.edu.cn

Details of Session(including aim and scope)

Swarm systems can also be named as multi-agent systems consisting of multiple agents with neighboring interactions. Cooperative control of swarm systems has been a hot research topic in many scientific communities, especially the control and robotics communities. In the cooperative control of swarm systems, how to design the controller or protocol using only local relative information is the main challenge. Cooperative control of swarm systems is promising due to that the emerging behavior has the features of low cost, high scalability and flexibility, great robustness, and easy maintenance. It has been demonstrated that cooperative control has broad potential applications in various areas, such as cooperative control of intelligent transportation systems, distributed control of power systems, cooperation of multiple robots, distributed optimization of networked systems, formation flying of multiple satellites and unmanned aerial vehicles. Motivated by the facts stated above, more and more researchers are devoting themselves to obtain sound results on this topic.

The objective of this invited session is to present the recent advanced techniques on cooperative control for swarm systems. In particular, relevant papers include those on:

- consensus control
- consensus tracking control
- containment control
- formation control
- formation and containment control
- distributed optimization of swarm systems