

Special Focus on Distributed Cooperative Analysis, Control and Optimization in Networks*

Distributed cooperative analysis, control and optimization in networked systems (including multi-agent systems, complex networks, and some real-world networked systems) has received considerable attention from different scientific communities over the last ten years. Two critical concerns for networked systems with large-scale data and information are how collective behaviors can emerge because of local interaction and how some global optimization problems can be solved by employing distributed optimization solvers. Understanding the fundamental mechanism responsible for the emergence of collective behaviors and regulating these collective behaviors have a considerable impact on infrastructure networks, such as the Internet, power systems, social networks, and transportation systems.

This special focus concentrates on new approaches for distributed cooperative analysis, control and optimization in networked systems. Specifically, the special focus contains five contributed papers covering the following three topics:

(1) Three papers discuss the recent advantages of cooperative distributed control in networked systems. An overview is given on distributed cooperative anti-disturbance control of multi-agent systems in one contributed paper. Event-triggered encirclement control and multi-leader multi-follower coordination control are studied in the other two contributed papers.

(2) One contributed paper analyzes in detail the recent advances and future challenges of next generation innovation and development of an intelligent transportation system in China.

(3) One contributed paper discusses cooperation and distributed optimization for an unreliable wireless game with indirect reciprocity, where distributed optimization and game theory are utilized.

Finally, we would like to express our sincere appreciation to all the authors for contributing their manuscripts to this special focus. Moreover, we would like to express our deepest gratitude to all the anonymous reviewers and editors for their high-quality review and helpful work. We would also like to thank Ms. Fei SONG and Haiyan YANG in the SCIENCE CHINA Information Sciences Editorial Office for their support and input.

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