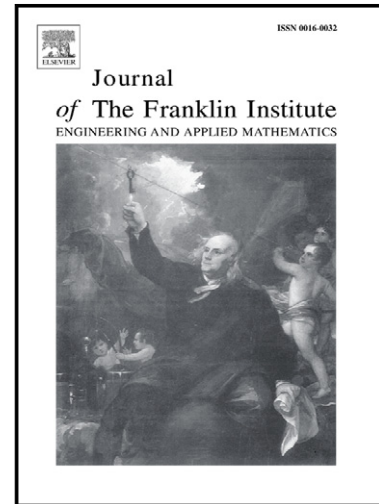


Synchronizability, Controllability and Observability
of Networked Multi-Agent Systems

Yang Tang



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Editorial

Synchronizability, Controllability and Observability of Networked Multi-Agent Systems

Networked multi-agent systems, usually composed of a number of homogeneous/heterogeneous agents interconnected via communication channels, have shown their wide applicability in various areas, such as power grids, lasers, bioinformatics, sensor networks, vehicles, robotics and neuroscience, for instance. Due to the great demands on system performance such as control/estimation accuracy, robustness and flexibility, distributed coordination of networked multi-agent systems is posing a tremendous challenge because of the inherent complexity of the communication topology and agents' dynamics. Moreover, there is an urgent requirement to alleviate distinct communication constraints in networked multi-agent systems to achieve desired coordination performance, such as mode switchings, transmission delays, packets losses and data quantization.

For these reasons, the Guest Editors have proposed this "Special Issue on Synchronizability, Controllability and Observability of Networked Multi-Agent Systems" which is aimed at presenting the latest achievements of researchers and practitioners to the readers of the *Journal of the Franklin Institute*. Critical issues and challenges are expected to be identified for future investigations on synchronization, control, state estimation of complex multi-agent systems in a networked environment. This Special Issue has drawn strong interest within the community of control theory and applied mathematics. Various contributions focused on topics like multi-agent systems, complex networks, and other relevant fields have been submitted for the peer review process.

The Special Issue consists of 28 papers divided into six clusters:

- ◆ New trends in coordination of multi-agent systems (3 papers)
- ◆ Coordination with event-triggered and intermittent control (5 papers)
- ◆ Coordination with transmission delays (5 papers)
- ◆ Coordination with switching topology (4 papers)
- ◆ Tracking, filtering, fault detection of multi-agent systems (5 papers)
- ◆ Applications of multi-agent systems (6 papers)

The cluster "New trends in coordination of multi-agent systems" contains the contributions in two areas: robust consensus and consensus with linear/nonlinear dynamics. In the work entitled "*On robust and optimal imperfect information state equipartitioning for network systems*" by Qing Hui et al., robust and optimal imperfect information state equipartitioning is considered by means of a computational framework of a system-theoretic approach called semistable Gaussian Linear-Quadratic Consensus. Necessary and sufficient conditions to connect semistability and optimal information state equipartitioning are derived and the existence of optimal solutions to the proposed optimization problem has been proved for network systems. In the work entitled "*Linear-transformation-based*

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