Distributed multiple-bipartite consensus in networked Lagrangian systems with cooperative-competitive interactions

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Abstract

In combination with the collective behavior evolutions of bipartite consensus and cluster/group consensus, this paper proposes the notion of multiple-bipartite consensus in networked Lagrangian systems (NLSs). The distributed leaderless and leader-following multiple-bipartite consensus control laws for NLSs are presented in the cooperative-competitive network, where the negative interactions between agents can exist in the same subnetwork. By introducing an acyclic partition and adding the integral item in the control protocols, the final explicit convergence states in the leaderless case are eventually obtained. Moreover, the leader-following scenario can be realized in finite time with integrated controllers. All of the effectiveness has been illustrated through numerical simulations.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

Figures

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Two-link revolute arm agent

Figure 2

Network topology graph G1 of ten two-link revolute arm agents

Figure 3

Generalized coordinate state evolutions of ten two-link revolute arm agents under G1

Figure 4

Generalized velocity state evolutions of ten two-link revolute arm agents under G1

Figure 5

Network topology graph G_2 of ten two-link revolute arm agents with three virtual leaders

Figure 6

Generalized coordinate state evolutions of ten two-link revolute arm agents under G2

Figure 7

Generalized velocity state evolutions of ten two-link revolute arm agents under G2