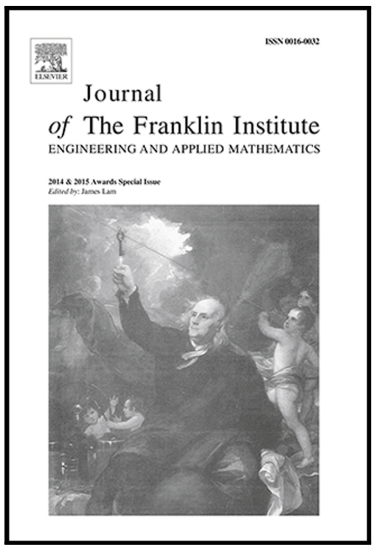

A new class of fixed-time bipartite consensus protocols for multi-agent systems with antagonistic interactions

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A new class of fixed-time bipartite consensus protocols for multi-agent systems with antagonistic interactions

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Abstract

In this paper, we study the fixed-time consensus problem for multi-agent systems with structurally balanced signed graph. A new class of fixed-time nonlinear consensus protocols is designed by employing the neighbor's information. By using Lyapunov stability method, states of all agents can be guaranteed to reach agreement in a fixed time under our presented protocols, and the consensus values are the same in modulus but different in sign. Moreover, it is shown that the settling time is not dependent on the initial conditions, and it makes a good convenience to estimate the convergence time by just knowing the graph topology and the information flow of the multi-agent systems. Finally, two numerical examples are given to demonstrate the effectiveness of the proposed consensus protocols.

Keywords: Fixed-time bipartite consensus, Structurally balanced signed graph, Lyapunov function, Multi-agent systems.

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