

Xie, Dongmei; Liu, Qingli; Lv, Liangfu; Li, Songying

Necessary and sufficient condition for the group consensus of multi-agent systems. (English)

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Summary: This paper focuses on the group consensus issue of multi-agent systems, where the agents in a network can reach more than one consistent values asymptotically. A rotation matrix is introduced to an existing consensus algorithm for single-integrator dynamics. Based on algebraic matrix theories, graph theories and the properties of Kronecker product, some necessary and sufficient criteria for the group consensus are derived, where we show that both the eigenvalue distribution of the Laplacian matrix and the Euler angle of the rotation matrix play an important role in achieving group consensus. Simulated results are presented to demonstrate the theoretical results.

MSC:

91B06 Decision theory

93D15 Stabilization of systems by feedback

93A14 Decentralized systems

Cited in 11 Documents

Keywords:

multi-agent system (MAS); group consensus; normal consensus; fixed topology; directed graph

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