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Coupling effect and pole assignment in trajectory regulation of multi-agent systems. (English) Zbl 1461.93027


Summary: This paper revisits a well studied leader-following consensus problem of linear multi-agent systems, while aiming at follower nodes’ transient performance. Conventionally, when not all follower nodes have access to the leader’s state information, distributed observers are designed to estimate the leader’s state, and the observers are coupled via communication network. Then each follower node only needs to track its observer’s state independently, without interacting with its neighbors. This paper deliberately introduces certain coupling effect among follower nodes, such that the follower nodes tend to converge to each other cooperatively on the way they converge to the leader. Moreover, by suitably designing the control law, the poles of follower nodes can be assigned as desired, and thus transient tracking performance can also be adjusted.

MSC:

93A16 Multi-agent systems
93A13 Hierarchical systems
93D50 Consensus
93B55 Pole and zero placement problems
93C05 Linear systems in control theory

Keywords:
coupling effect; multi-agent system; pole assignment; trajectory regulation

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References:


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