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Distributed containment tracking of multiple stochastic nonlinear systems. (English)


Summary: This paper investigates distributed containment tracking for multiple stochastic nonlinear systems with multiple dynamic leaders under directed network topology. The control input of each agent can only use its local state and the states of its neighbors. With the backstepping design method, distributed tracking controllers are designed. By using stochastic analysis and graph theory, it is shown that the followers’ outputs will exponentially converge to the convex hull spanned by the dynamic leaders’s outputs with tunable tracking errors while all the states of the closed-loop system remain bounded in probability. A numerical example is provided to illustrate the effectiveness of the theoretical results.

MSC:
93E03 Stochastic systems in control theory (general)
93A14 Decentralized systems
68T42 Agent technology and artificial intelligence
94C15 Applications of graph theory to circuits and networks

Keywords:
containment tracking; multiple stochastic nonlinear systems; directed network topology

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