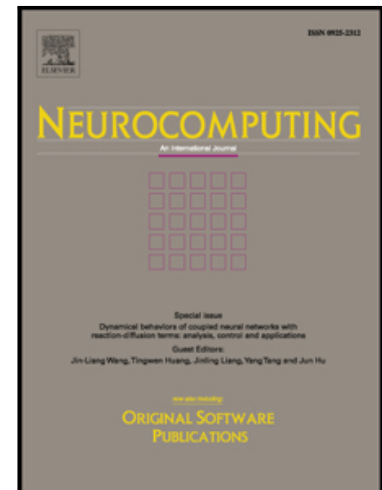


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Mean-square consensus of heterogeneous multi-agent systems with nonconvex constraints, Markovian switching topologies and delays[☆]

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Abstract

This paper addresses the velocity-constrained mean-square consensus problem of heterogeneous multi-agent systems with Markovian switching topologies and time-delay, which consist of first-order and second-order agents. A distributed control law with time-varying gains is proposed to make the position states of both first-order and second-order agents mean-square converge to a common point and the velocities of second-order agents mean-square converge to zero, while their velocities remain in the corresponding nonconvex constraint sets. Based on novel multiple model transformations, the consensus analysis is completed by studying the asymptotic dynamics of a time-varying matrix system. Finally, simulations are provided to demonstrate the effectiveness of the proposed algorithms.

Keywords: Multi-agent systems, time-varying gain, velocity-constraint, mean-square consensus.

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