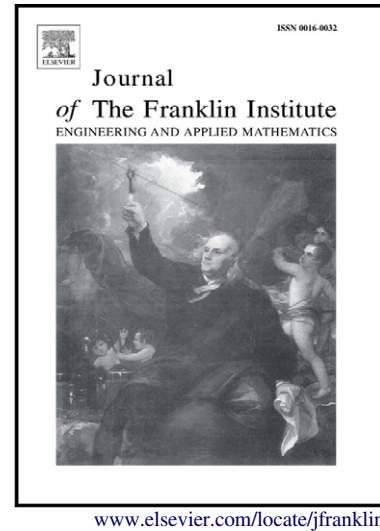


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State Consensus for Hierarchical Multi-agent Dynamical Systems with Inter-layer Communication Time Delay

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Abstract: This paper studies the consensus problem for hierarchical multi-agent dynamical systems with the inter-layer communication time-varying delay. This paper firstly finds a mathematical model for the hierarchical multi-agent dynamical systems with inter-layer communication time-varying delay, and then delay-dependent sufficient conditions are proposed for reaching a consensus based on Lyapunov function approach. A Lyapunov function is introduced to quantify the total disagreement among the nodes of a hierarchical network. All the results are in the form of linear matrix inequalities (LMIs). Simulation results are provided to verify the effectiveness of the proposed condition for agreement in networks with inter-layer communication time-delay.

Keywords: hierarchical multi-agent, inter-layer communication delay, Lyapunov function, LMI

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