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Event-triggered network-based *state* observer design of positive systems[☆]

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Abstract

This paper studies the problem of network-based ℓ_1 -gain *state* observer design for nonlinear positive systems. With the received signals transmitted through common communication channels, a network-based observer is designed to estimate the state variables of a positive system. To save the limited communication bandwidth, a novel event generator is constructed in the network-based observer framework. In the established network-based models, nonlinear functions satisfying Lipschitz condition are considered and the probabilistic distribution of networked transmission delays is described by a Bernoulli distributed sequence. By constructing linear Lyapunov functions, a criterion ensuring the existence of the ℓ_1 -gain observer is proposed. And a linear programming method to compute the gain matrix of the desired observer is provided. The effectiveness of derived results are demonstrated by two numerical examples.

Keywords: Networked control systems, Stochastic systems, Discrete event systems, Positive observer

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