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Delay-dependent state feedback stabilization for a networked control model with two additive input delays. (English) Zbl 1410.93097

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Summary: This paper is centered on delay-dependent state feedback stabilization for a networked control model with two additive input delays. Firstly delay-dependent stability is investigated. By splitting the whole delay interval into subintervals according to the delays, a Lyapunov functional is constructed. To reduce conservatism we handle the Lyapunov functional in two ways. More specifically, we take the Lyapunov functional as a whole to examine its positive definite, rather than restrict each term of it to positive definite as usual. In addition, when estimating the derivative of the Lyapunov functional, we manage to get a fairly tighter upper bound by introducing different slack variables for the different subintervals. The resulting stability results turn out dependent on the two delays separately, and less conservative than some existing ones. Then, based on the stability results state feedback stabilization is studied. Delay-dependent conditions are formulated for the controller such that the closed-loop system is asymptotically stable. Finally examples are given to show the less conservatism of the stability results and the effectiveness of the proposed stabilization method.

MSC:

93D15 Stabilization of systems by feedback

93C23 Control/observation systems governed by functional-differential equations

Cited in **15** Documents

Keywords:

[networked control systems](#); [delay systems](#); [state feedback control](#); [delay-dependent stability](#); [stabilization](#)

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