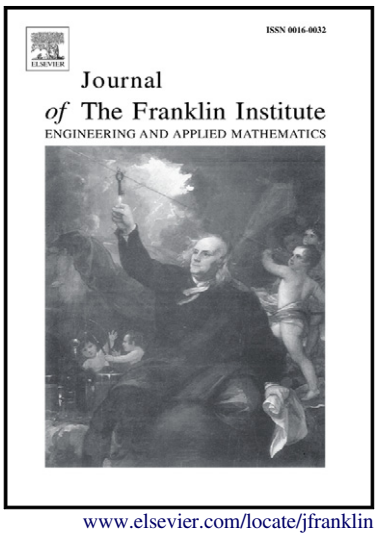

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Input-to-State Stability for Networked Control System with Predictive Scheme

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Abstract

This paper studies the input-to-state stability (ISS) problem for a class of networked control systems (NCSs). The improved varying controller gain predictive scheme is used to compensate the effects of network-induced delays and packet dropouts. By introducing a new auxiliary variable and analyzing the relationship of the network-induced delays and packet dropouts between two consecutive sampling instants, the considered networked control system (NCS) is converted into a coupled switched system. Based on the small gain theorem, a novel stability criterion is proposed to guarantee the ISS property of the considered system. Compared with existing works in literature, the stability criterion obtained here is easier to test and is much less conservative. A numerical simulation is presented to show the effectiveness of the proposed method.

Keywords: Networked control system, input-to-state stability, predictive control

1. Introduction

During the past decades, networked control systems (NCSs) have received considerable attention due to its wide applications in many fields such as power grid, industrial systems, teleoperation, and so on. Networked control systems (NCSs) are spatially distributed systems in which the sensors, actuators, and controllers are connected through

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