State Feedback Controller Design of Networked Control Systems With Multiple Packet Dropouts

Abstract

This paper presents a kind of controller design method for a class of networked control systems (NCSs) with multiple packet dropouts, where the number of consecutive packet dropouts is limited by a known upper bound. A novel model that can be used to describe multiple packet dropouts in both sensor-to-controller and controller-to-actuator sides is provided. By constructing a new Lyapunov function and introducing some slack matrix variables, a sufficient condition for mean-square asymptotic stability is derived for the closed-loop networked control system, which is dependent on the upper bound of the packet dropouts number. The corresponding state feedback control law is presented in terms of linear matrix inequalities (LMIs), which can be solved efficiently by using existing LMI optimization techniques. A networked control system for an inverted pendulum is finally provided to show the effectiveness and applicability of the proposed method.

Biography

ZHANG Changzhu received his B.S. degree in Department of Automation from Qufu Normal University in 2007 and M.S. degree in the Department of Control Science and Engineering from Harbin Institute of Technology in 2009, respectively. He is currently working toward the Ph.D. degree in the Department of Manufacturing Engineering and Engineering Management, City University of Hong Kong. His current research interests include networked control systems, fuzzy control systems and control with communication constraints.