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MIMO CHANNEL COMMUNICATION-BASED H_∞ CONTROL OF WIRELESS NETWORKED CONTROL SYSTEMS

Jinna Li[1,2], Haibin Yu[2], Qingling Zhang[3] and Chao Liu[4]

[1]Department of Science
Shenyang University of Chemical Technology
11 St. Economic and Technological Development Zone, Shenyang 110142, P. R. China
lijinna_721@yahoo.com.cn

[2]Key Lab of Industrial Informatics
Shenyang Institute of Automation, Chinese Academy of Sciences
No. 114, Nanta Street, Shenhe District, Shenyang 110016, P. R. China
yhb@sia.cn

[3]Institute of Systems Science
Northeastern University
No. 11, Lane 3, Wenhua Road, Heping District, Shenyang 110004, P. R. China
qlzhang@mail.neu.edu.cn

[4]Institute of Systems Engineering
Tianjin University
No. 92, Weijin Road, Nankai District, Tianjin 300072, P. R. China
singularsystem@yahoo.com.cn

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Abstract. *This paper investigates the optimal control scheme for wireless networked control systems over multi-input and multi-output (MIMO) channel communication. With the introduction of concept of packet displacement, a mathematical model is constructed to fully describe the real-time dynastic characteristic of MIMO wireless network, such as packet disordering. It is worthwhile mentioned that the resulting closed-loop systems are jump linear systems due to the newest signals executed subject to Markovian chains, based on which an adaptive and optimal controller is designed such that optimal H_∞ norm bound is obtained in terms of Markovian theory combined with linear matrix inequality (LMI) techniques. Finally, experimental simulations are carried out to illustrate the effectiveness of the proposed method.*
Keywords: Wireless networked control systems, H_∞ control, Multi-input and multi-out channel, Packet disordering, Markovian chain

1. **Introduction.** Since computer network technology and control innovation are extensively utilized into the industrial field, networked control systems are increasingly required in the practical control application [1-3]. Due to the utilization of a common wire or wireless communication network, the closed-loop wire networked control systems (NCSs) or wireless networked control systems (WNCSs) are constructed, wherein control nodes (sensors, controller and actuators) are distributed and connected over wire or wireless networks. Compared with NCSs, advantages of WNCSs include reduced signal cables, high mobility and so on. Moreover, multi-input and multi-output (MIMO) systems can provide huge capacity and improved performance gains as pointed out by Hu (see [4] and the references therein). Therefore, MIMO channel communication-based WNCSs have been considered as promising communication systems. However, MIMO channel communication-based WNCSs are susceptible to the statistical properties of the