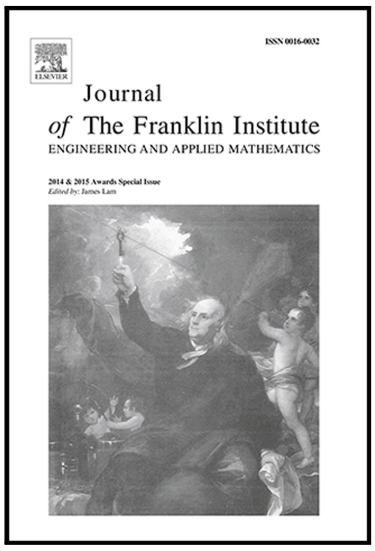

General Synchronization Criteria for Nonlinear Markovian Systems with Random Delays

Xinsong Yang, Chen Xu, Jianwen Feng, Jianquan Lu

PII: S0016-0032(18)30037-1
DOI: 10.1016/j.jfranklin.2017.12.029
Reference: FI 3281

To appear in: *Journal of the Franklin Institute*

Received date: 29 May 2017
Revised date: 26 October 2017
Accepted date: 14 December 2017

Please cite this article as: Xinsong Yang, Chen Xu, Jianwen Feng, Jianquan Lu, General Synchronization Criteria for Nonlinear Markovian Systems with Random Delays, *Journal of the Franklin Institute* (2018), doi: 10.1016/j.jfranklin.2017.12.029

General Synchronization Criteria for Nonlinear Markovian Systems with Random Delays

Xinsong Yang[1,2*], Chen Xu[3], Jianwen Feng[3], and Jianquan Lu[4,5]

[1]School of Mathematical Sciences, Chongqing Normal University, Chongqing 401331, China

[2]Key Laboratory of Optimization and Control, Ministry of Education, Chongqing 401331, China

[3]College of Mathematics and Statistics, Shenzhen University, Shenzhen 518060, China

[4]School of Mathematics, Southeast University, Nanjing 210096, China

[5]Department of Mathematics, Faculty of Science, King Abdulaziz University, Jeddah 21589, Saudi Arabia

Abstract. It is well known that control of Markovian systems is a difficult problem. This paper considers synchronization control of Markovian coupled nonlinear systems with random delays. A new control scheme is proposed. Sufficient conditions in terms of linear matrix inequalities (LMIs) are obtained such that the coupled system can be asymptotically synchronized onto an isolated system. The synchronization criteria include classical mode-dependent and mode-independent results as special cases. The design method of the control gains is also given. Compared with mode-dependent and mode-independent control methods, our results are more practical and have lower conservatism, respectively. Numerical simulations are given to verify the effectiveness of the theoretical results.

Keywords. Control; Markov; Synchronization; Time delay.

* Corresponding author. Tel.: +86 23 65362798; fax: +86 23 65362798.

E-mail addresses: xinsongyang@163.com (X. Yang); xuchen_szu@szu.edu.cn (C. Xu); fengjw@szu.edu.cn (J. Feng); jqluma@seu.edu.cn (J. Lu).