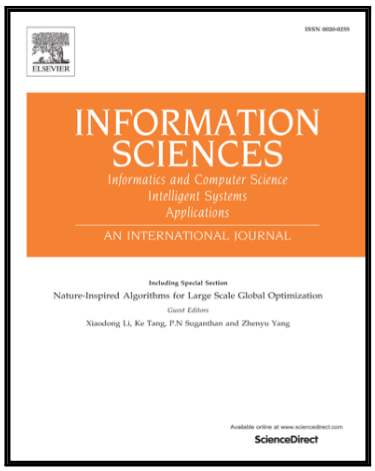

A new design of sliding mode control for Markovian jump systems based on stochastic sliding surface

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PII: S0020-0255(17)30414-0
DOI: 10.1016/j.ins.2017.02.005
Reference: INS 12728

To appear in: *Information Sciences*

Received date: 28 December 2015
Revised date: 19 August 2016
Accepted date: 2 February 2017

Please cite this article as: Jianyu Zhang, Qingling Zhang, Yingying Wang, A new design of sliding mode control for Markovian jump systems based on stochastic sliding surface, *Information Sciences* (2017), doi: 10.1016/j.ins.2017.02.005

A new design of sliding mode control for Markovian jump systems based on stochastic sliding surface

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Abstract

With the jumping transfer matrix unknown, partly unknown or known, the stabilization problems for Markovian jump systems are considered by use of sliding mode control method in this paper. Firstly, a new integral sliding mode surface named stochastic sliding surface (SSS) is introduced. The SSS is characterized that the state trajectories are on the sliding surface all the time even at the time of system switching. So the problem of the state trajectories moving among several sliding surfaces by use of traditional sliding mode control method is settled perfectly. Based on the new sliding mode surface, sufficient conditions for the stability of the sliding mode dynamics are derived. Secondly, sliding mode control (SMC) law is synthesized to avoid the state trajectories escaping from the surface. Finally, some simulations are provided to illustrate the validity of the proposed method.

Keywords: Stochastic sliding surface; Markovian jump systems; Time delay; Integral sliding mode control; Uncertainty.

1. Introduction

In the last years, there has been significant improvements in control field, e.g., stabilization [21], [36], sliding mode control [1], [7], [11], [14], [16], fuzzy

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