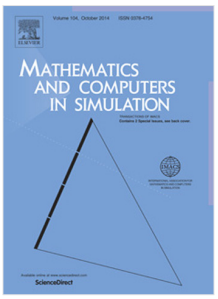

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PII: S0378-4754(17)30322-1
DOI: https://doi.org/10.1016/j.matcom.2017.09.003
Reference: MATCOM 4495

To appear in: *Mathematics and Computers in Simulation*

Received date : 3 April 2017
Revised date : 15 July 2017
Accepted date : 18 September 2017

Please cite this article as: Y. Zhang, Z.G. Feng, X. Yang, F.E. Alsaadi, B. Ahmad, Finite-time stabilization for a class of nonlinear systems via optimal control, *Math. Comput. Simulation* (2017), https://doi.org/10.1016/j.matcom.2017.09.003

Finite-time stabilization for a class of nonlinear systems via optimal control

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Abstract

Generally speaking, finite-time stabilization techniques can always stabilize a system if control cost is not considered. Considering the fact that control cost is a very important factor in control area, we investigate finite-time stabilization problem for a class of nonlinear systems in this paper, where the control cost can also be reduced. We formulate this problem into an optimal control problem, where the control functions are optimized such that the system can be stabilized with minimum control cost. Then, the control parameterization enhancing transform and the control parameterization method are applied to solve this problem. Two numerical examples are illustrated to show the effectiveness of the proposed method.

Keywords: Finite-time stabilization; Optimal control; Control parameterization method.

1. Introduction

Over the past decades, stability problems of dynamical systems have been successfully applied to secure communication [1], pattern recognition [2] and signal processing [3]. Stabilization control methods have also been studied,

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