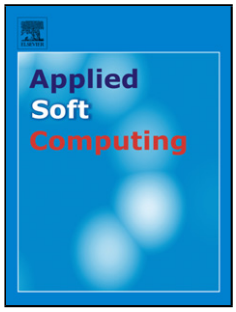

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Adaptive sliding mode control with moving sliding surface

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Abstract

A continuous sliding mode control with moving sliding surface for nonlinear systems of arbitrary order is presented in this paper. The sliding surface is moved repetitively towards the target sliding surface in order to ensure that the system trajectory is close to the actual surface during the whole control process. The parameters of sliding mode control are tuned by a fuzzy logic. The proposed procedure reduces the time when the system operates in the approaching phase during which the control performance is deteriorated since the system is more susceptible to external disturbances and model uncertainties. The effectiveness of the presented approach is demonstrated on a control of a flexible robot manipulator arm.

Keywords: sliding mode control, fuzzy logic control, variable structure control

1. Introduction

Since its introduction sliding mode control (SMC) [1] has become one of the most popular approach to control of nonlinear systems. The main reason is its high robustness and easy design and implementation that have resulted in a big number of applications (see e.g. [2, 3, 4, 5, 6, 7]). The fundamental idea of SMC consists in transferring a nonlinear system to a

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