Adaptative Neural Network Control for a Class of MIMO Uncertain Pure-Feedback Nonlinear Systems

International Journal of Computer Applications
Foundation of Computer Science (FCS), NY, USA

Volume 124

Number 16

Year of Publication: 2015

Authors:
Zhenfeng Chen, Zhongsheng Wang, Jian Cen

10.5120/ijca2015905776

Abstract

In this paper, robust adaptive neural network control is investigated for a class of multi-input-multi-output (MIMO) pure-feedback nonlinear system with unknown nonlinearities. The unknown nonlinearities could come from unmodeled dynamics, modeling errors, or nonlinear time-varying uncertainties. Based on the backstepping design technique and the universal approximation property of the neural network (NN), robust adaptive control is synthesized by employing a single NN to approximate the lumped uncertain nonlinearities. The proposed control can eliminate the circularity problem completely, and guarantees semiglobal uniform ultimate boundedness (SGUUB) of all the signals in the closed-loop and convergence of the tracking error to an arbitrarily small residual set.

References


Index Terms

Computer Science

Networks

Keywords

Adaptive control, neural network control, multi-input/multi-output (MIMO) nonlinear systems, backstepping