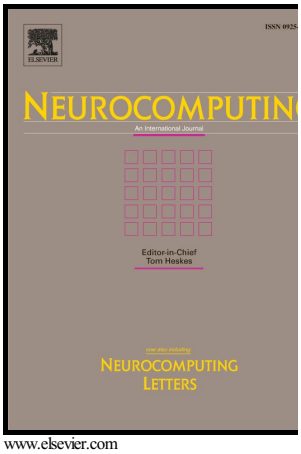

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Decentralized Adaptive NN State-feedback Control for Large-scale Stochastic High-order Nonlinear Systems

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Abstract

This paper solves the decentralized state-feedback control problem for a class of large-scale stochastic high-order nonlinear systems. By generalizing neural network (NN) approximation approach to this kind of systems, we completely remove the growth conditions on system nonlinearities and the power order restriction. It is shown that through using dynamic surface control (DSC) and backstepping technique, an adaptive state-feedback controller is constructed, which guarantees the closed-loop system to be semi-globally uniformly ultimately bounded (SGUUB). Finally, a simulation example is given to demonstrate the effectiveness of the proposed control scheme.

Keywords: Decentralized control, dynamic surface control, neural network, stochastic high-order nonlinear systems, backstepping.

1. Introduction

Since decentralized control method considers an interconnected system as a set of several subsystems, the design of controllers can independently proceed for local subsystems, decentralized control schemes are more efficient than centralized control methods for interconnected systems. In the past decades, the decentralized backstepping control for large-scale interconnected systems has received considerable attention, e.g. [1]-[4]. However, these

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