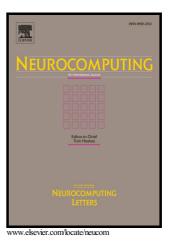
## Author's Accepted Manuscript

Decentralized Adaptive Tracking Control Scheme for Nonlinear Large-Scale Interconnected Systems via Adaptive Dynamic Programming

Qiuxia Qu, Huaguang Zhang, Tao Feng, He Jiang



 PII:
 S0925-2312(16)31300-5

 DOI:
 http://dx.doi.org/10.1016/j.neucom.2016.10.058

 Reference:
 NEUCOM17695

To appear in: Neurocomputing

Received date:20 June 2016Revised date:18 September 2016Accepted date:12 October 2016

Cite this article as: Qiuxia Qu, Huaguang Zhang, Tao Feng and He Jiang Decentralized Adaptive Tracking Control Scheme for Nonlinear Large-Scale Interconnected Systems via Adaptive Dynamic Programming, *Neurocomputing* http://dx.doi.org/10.1016/j.neucom.2016.10.058

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

## Decentralized Adaptive Tracking Control Scheme for Nonlinear Large-Scale Interconnected Systems via Adaptive Dynamic Programming

Qiuxia Qu, Huaguang Zhang\*, Tao Feng, He Jiang

College of Information Science and Engineering, Northeastern University, Shenyang, 110819, China

## Abstract

In this paper, the decentralized tracking problem for nonlinear large-scale interconnected systems is firstly transformed to optimal regulation problem for Naugmented subsystems composed of the error system dynamics and the command generator dynamic associated with each isolated subsystems. The proposed novel formulation of decentralized adaptive tracking control strategy consists of a steady-state controller and a modified optimal feedback controller. Design parameters-dependent feasibility conditions are formulated by using Lyapunov theory to guarantee the existence of our proposed decentralized control scheme. A single critic neural network (NN)-based adaptive dynamic programming algorithm is used to find the estimation of optimal control policy, which is implemented online in real-time. By employing a stabilizing term in the critic NN weight updating law, there is no requirement for adopting initial admissible control in the proposed algorithm. Stability analysis of the closed-loop augmented subsystem is performed to show that all tracking errors and NN weight approximation errors are uniformly ultimately bounded (UUB). Furthermore, the approximated tracking control policy converges to the ideal control input with a small bounded error. Finally, the effectiveness of the proposed approach is demonstrated by some simulation results.

\*Corresponding author

Preprint submitted to Neurocomputing

*Email addresses:* quqiuxia2010@163.com(Qiuxia Qu), hgzhang@ieee.org (Huaguang Zhang), sunnyfengtao@163.com (Tao Feng), jianghescholar@163.com (He Jiang)

Download English Version:

## https://daneshyari.com/en/article/4948058

Download Persian Version:

https://daneshyari.com/article/4948058

Daneshyari.com