

Accepted Manuscript

Adaptive Neural Control of a 3-DOF Helicopter with Unknown time delay

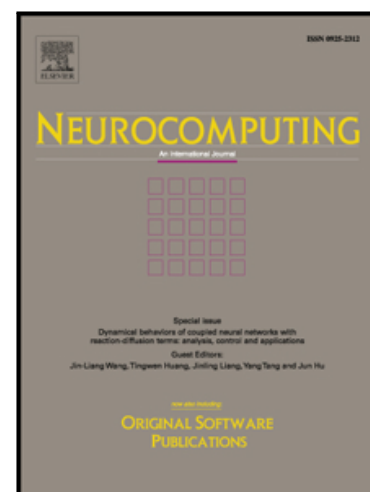
Yuhong Chen, Xuebo Yang, Xiaolong Zheng

PII: S0925-2312(18)30475-2
DOI: [10.1016/j.neucom.2018.04.041](https://doi.org/10.1016/j.neucom.2018.04.041)
Reference: NEUCOM 19508

To appear in: *Neurocomputing*

Received date: 7 February 2018
Revised date: 19 April 2018
Accepted date: 23 April 2018

Please cite this article as: Yuhong Chen, Xuebo Yang, Xiaolong Zheng, Adaptive Neural Control of a 3-DOF Helicopter with Unknown time delay, *Neurocomputing* (2018), doi: [10.1016/j.neucom.2018.04.041](https://doi.org/10.1016/j.neucom.2018.04.041)



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final 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.

Adaptive Neural Control of a 3-DOF Helicopter with Unknown time delay

Yuhong Chen, Xuebo Yang*, Xiaolong Zheng

Research Institute of Intelligent Control and Systems, School of Astronautics, Harbin Institute of Technology, Harbin 150001, China.

Abstract

In this paper, an adaptive neural network controller is designed for a three-degrees of freedom (3-DOF) helicopter using backstepping technique. As there is uncertain time delays in the system, appropriate Lyapunov-Krasovskii functions are used to compensate the delay and neural networks are introduced to deal with the uncertainty. The feasibility of neural network approximation of unknown system functions is guaranteed over practical compact sets. It is proved that all the signals are semiglobal uniformly ultimate bounded and the connections between the tracking error and the controller parameters are analyzed in detail. Simulation and practical experiment results are given to show that the proposed controller is practically effective when tracking the time-varying signals.

Keywords: Adaptive control, neural networks, time delays, 3-DOF Helicopters

1. Introduction

Recently, the small-sized aerospace vehicle is widely used due to its portability and low cost. The first unmanned aerial vehicles (UAVs) was born in the 1920s for warfare. Initially UAVs was merely used as unrecoverable bomb. With the development of technology, the performance of UAVs boosts [1]. The ap-

*Corresponding author

Email addresses: yuhong7246@gmail.com (Yuhong Chen), yangxuebo@gmail.com (Xuebo Yang), zxlwlsj@gmail.com (Xiaolong Zheng)

Download English Version:

<https://daneshyari.com/en/article/6863736>

Download Persian Version:

<https://daneshyari.com/article/6863736>

[Daneshyari.com](https://daneshyari.com)