



### 论文摘要

中南大学学报(自然科学版)

ZHONGNAN DAXUE XUEBAO(ZIRAN KEXUE BAN)

Vol.41 No.3 Jun.2010

[PDF全文下载] [全文在线阅读]

文章编号: 1672-7207(2010)03-0960-06

## 电液位置伺服系统的规则自校正模糊PID控制器

邵俊鹏, 王仲文, 李建英, 韩桂华

(哈尔滨理工大学 机械动力工程学院, 黑龙江 哈尔滨, 150080)

**摘要:** 介绍电液位置伺服控制系统的组成与工作原理, 并利用实时工作间(RTW)的半物理仿真环境和MATLAB系统辨识工具箱, 对电液位置伺服系统进行系统模型辨识及验证。提出一种规则自校正模糊PID控制器, 并将其用于辨识得到的模型中, 设计一种在线的模糊推理算法, 使得模糊控制规则可以得到实时在线调整。仿真结果表明: 基于规则自校正模糊PID控制器的电液位置伺服系统的性能得到较大改善, 既具有PID控制器高精度的优点, 又具有模糊控制器快速、适应性强的特点, 保证系统具有良好的动、稳态特性。

**关键字:** 电液位置伺服系统; 模型辨识; 自校正模糊PID; 半物理仿真

## Rule self-tuning fuzzy-PID controller of electro-hydraulic position servo system

SHAO Jun-peng, WANG Zhong-wen, LI Jian-ying, HAN Gui-hua

(College of Mechanical and Power Engineering, Harbin University of Science and Technology, Harbin 150080, China)

**Abstract:** The composition and principle of the electro-hydraulic position servo control system were introduced, and system model identification and verification of electro-hydraulic position servo system were carried out based on semi-physical simulation environment of real-time workshop (RTW) and system identification toolbox in MATLAB. A rule self-tuning fuzzy-PID controller was presented to control the identified model and a new fuzzy inference algorithm was designed to adjust the rules of fuzzy controller on line. The results of simulation show that the performance of the electro-hydraulic position servo system based on rule self-tuning fuzzy-PID controller is improved significantly, which not only holds the precise character of PID controller but also possesses the flexible advantage of fuzzy controller, and it can guarantee that the system has good dynamic and static quality.

**Key words:** electro-hydraulic position servo system; model identification; self-tuning fuzzy-PID; semi-physical simulation

版权所有：《中南大学学报(自然科学版、英文版)》编辑部

地 址：湖南省长沙市中南大学 邮编： 410083

电 话： 0731-88879765 传真： 0731-88877727

电子邮箱： zngdxb@mail.csu.edu.cn 湘ICP备09001153号