



航空学报 » 2006, Vol. 27 » Issue (3) :515-519 DOI:

论文

最新目录 | 下期目录 | 过刊浏览 | 高级检索

<< Previous Articles | Next Articles >>

### 基于CMAC的伺服系统控制研究

刘媛, 王卫红

北京航空航天大学 自动化与电气工程学院, 北京 100083

### CMAC Controller Research for Servo System

LIU Yuan, WANG Wei-hong

School of Automation Science and Electrical Engineering, Beijing University of Aeronautics and Astronautics, Beijing 100083, China

摘要

参考文献

相关文章

Download: PDF (689KB) HTML OKB Export: BibTeX or EndNote (RIS) Supporting Info

**摘要** 针对高精度伺服系统中存在的非线性及各种不确定性因素,提出了基于小脑模型神经网络的复合控制方法,控制器由前馈控制器、比例微分控制器(PD)和小脑模型神经网络控制器(CMAC)构成,该方法在传统的PD+前馈控制方法上加入了CMAC神经网络算法的快速学习,精确逼近的优点,既保证了快速实时跟踪,又进一步提高了跟踪精度。实验结果证明,用CMAC控制方法后系统的跟踪精度比PD+前馈控制方法提高近一个数量级,同时该方法对摩擦引起的波形畸变有很好的抑制作用,仿真和实验研究表明了该方法的可行性和有效性,并能满足实时性要求,对提高伺服系统的高精度动态跟踪性能有很好的工程参考价值。

**关键词:** CMAC 复合控制 最小均方误差算法 伺服系统 摩擦补偿

**Abstract:** A digital tracking controller based on Cerebellar Model Articulation Controller(CMAC) neural network is presented, aiming at some non-linear and uncertain factors in the high precision servo systems. This controller consists of feed forward controller, Pulse Doppler (PD) controller and CMAC. It absorbs fast-learning and precise approaching advantages of CMAC to enhance traditional control method. Data form experiments demonstrate that the amplitude error of CMAC method is more precise compared to PD method by one order of magnitude. Meanwhile, it has good inhibitory effect on distortion caused by friction. The proposed controller is shown to be effective and valid, and has good referenced value to improve the dynamic tracking performance of high precise servo system.

**Keywords:** CMAC compound control Least Mean Square(LMS) servo system friction compensation

Received 2004-12-15; published 2006-06-25

#### 引用本文:

刘媛;王卫红. 基于CMAC的伺服系统控制研究[J]. 航空学报, 2006, 27(3): 515-519.

LIU Yuan;WANG Wei-hong. CMAC Controller Research for Servo System[J]. Acta Aeronautica et Astronautica Sinica, 2006, 27(3): 515-519.

#### Service

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ Email Alert
- ▶ RSS

#### 作者相关文章

- ▶ 刘媛
- ▶ 王卫红