山东大学学报(工学版) 2009, 39(5) 62-67 DOI: ISSN: 0412-1961 CN: 21-1139

控制科学与工程

基于神经网络控制器的高压电缆测温系统

张迎春 王佐勋 王桂娟

张迎春，王佐勋 ：山东轻工业学院电子信息与控制工程学院, 山东 济南 250353; 王桂娟：山东建筑大学信息与电气工程学院, 山东 济南 250101

摘要：

针对目前对高压电缆的温度测量方法大都是只能测量当前的温度,滞后控制,不能进行提前辨识的问题,对传统电缆测温方法进行研究,提出用神经网络控制器对高压电缆温度进行测量的方法.在3种常规控制器的基础上设计了3种基于神经网络的控制器:神经自校正控制器、神经PID(proportion integration differentiation)控制器和神经自适应控制器,不仅对它们进行神经网络训练,而且用MATLAB软件进行仿真.通过仿真结果最终选用神经PID控制器,并将其应用于实际高压电缆测温系统当中,经在新疆供电系统检验,效果良好.

关键词： 神经网络;自校正控制器;自适应控制器

High voltage cable temperature measurement system based on neural network controller

ZHANG Ying-chun,WANG Zuo-xun:School of Electronic Information and Control Engineering, Shandong Institute of Light Industry, Jinan 250353, China; WANG Gui-juan:School of Information and Electrical Engineering, Shandong University of Architecture, Jinan 250101, China

Abstract:

At present the methods for measuring high voltage cable temperature can only measure current temperature, lag behind control and not identify it in advance. After research on the traditional methods to measuring cable temperature, a new method using neural network controller to measuring high voltage cable temperature was proposed. On the basis of three conventional controllers, three kinds of controllers using a neural network were designed. They are the neural self-adjustment controller, the neural PID controller and the neural adaptive controller. All themethods were simulated by MATLAB. According to the simulation results, the neural PID controller was proved to be the best controller to apply to high voltage cable measuring temperature system, which was verified by the power supply system in Xinjiang with good results.

Keywords: neural network; self-adjustment controller; adaptive controller

收稿日期 2009-03-30 修回日期 网络版发布日期 2009-10-16

DOI:

基金项目:

通讯作者:

作者简介: 张迎春（1965-），女，山东莱州人，副教授，硕士，主要研究方向为电子技术应用、控制理论等. E-mail:zyc-10@126.com

作者Email:

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