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基于PWM的喷头性能测试台控制系统设计

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Control System Design of Nozzle PerformancesTest Bench Based on PWM

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摘要 植保机械喷头综合性能测试试验台按照国家植保机械试验标准的要求设计，喷头需要模拟其在田间实际作业以不同速率并保持匀速的运动来设计其在测试台上的运动过程，这部分由控制系统来操作控制。本控制系统采用了直流电机作为驱动元件的接触器-继电器控制，其具有调速简单、准确的特点。由于PWM（晶体管脉宽调制）系统所需功率元件少、控制电路简单、调制放大器开关频率高等特点，所以采用了PWM调速方法。电机运行状态控制电路采用继电器-接触器控制，价格便宜。本论文叙述了PWM系统工作原理、定量调速参数设计以及外围控制电路的设计。运用晶体管脉冲调速系统能够满足喷头真实模拟田间的运动要求。

关键词： 喷头性能测试台 接触器-继电器 直流电机 调速 晶体管脉宽调制(PWM)

Abstract： The nozzle performance test bench is designed in accordance with national standards for plant protection machinery. The nozzles mounted on the bench were designed to simulate the actual operation of the movement in the field with different and uniform speed to meet the movement requirements of machinery, which was operated by the control system. The systems used contactors relays to control and direct current (DC) motors as drive parts, which had the features of simpler and more accurate speed control. The power components of pulse width modulation (PWM) required for the system was less so PWM was selected to control the speed. The control circuit of motor running state used contactors and relays to control because its cheap. This paper stated the working principle of PWM control system and the design of quantitative speed control parameter and the external control circuit. It can meet the requirements of simulating the actual operation of the nozzles movement in the field.

Keywords： nozzle performances test platform contactors and relays direct current motor Speed control pulse width modulation (PWM)

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