

东方红拖拉机自动转向控制系统设计 Development of Automatic Steering Control System Based on Dongfanghong Tractor

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关键词: 自动导航拖拉机 自动转向控制 电控比例液压阀 SD卡存储

摘要: 以东方红-X804型拖拉机为平台, 改造原拖拉机的油路, 使用电控比例液压阀, 并设计电控单元, 组成了自动转向控制系统。简述了油路的改造与电控比例液压阀安装, 电控单元的设计, 包括单片机(C8051F040)、角度传感器(KMA199)以及CAN总线网络, 实现了SD卡存储系统, 实时存储试验过程中的数据。试验结果表明: 信号跟踪的最大误差 1.1° 、平均误差 0.5° 、平均延时为 0.2 s 。自动转向控制系统具有良好的响应特性, 满足转向系统的性能要求。 Automatic steering control plays an important part in an automatic navigation system. A Dongfanghong-X804 tractor is used as a platform and an electro-hydraulic proportional valve is added to the original manually operated steering system. The original circuit of the tractor is improved. An electronic control unit is designed to control the valve, which is composed of a microcomputer (C8051F040), an angle sensor (KMA199), and a CAN bus network. A SD card data storage system is realized for real-time storing experimental data. The experimental results show that the largest and the average signal tracking errors are 1.1° and 0.5° , respectively, and the average delay is 0.2 s . The automatic steering system has good response and can meets the performance requirements.

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