车辆电动转向系统的卡尔曼滤波模糊PID控制

刘俊 陈无畏

合肥工业大学

关键词：　车辆 电动助力转向 模糊PID控制 卡尔曼滤波

摘　要：　通过对车辆动力转向系统的动力学分析，建立了动态数学模型。为了克服单独使用PID控制和模糊控制时的问题，提高控制系统的响应速度，减小超调量，减小稳态误差，设计了模糊控制和PID控制相结合的多模态控制器，实现了分段控制；并由卡尔曼滤波对控制信号进行滤波处理，减小路面随机干扰和传感器测量噪声的影响，从而进一步提高了控制效果。仿真和试验结果表明，该控制方法能够明显改善控制性能。 Based on analyzing the dynamics of vehicle EPS, a dynamical mathematical model is established. To overcome the problems when using fuzzy controller or PID controller respectively, to increase the responsing speed, decrease the over adjustment and reduce the stability tolerance, a fuzzy-PID multi-mode controller is designed to control the system, the system is controlled with fuzzy controller or PID controller according to the range of tolerance. In order to weaken the effect of road random disturbance and sensor measure noise and make the control effect better, the control signals are filtered with Kalman filter. The results of simulation and experiment show that the performance of control becomes better by using this designment.

查看全文　返回首页　　　引用本文