Simulation of Steer-by-Wire

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ABSTRACT

The main purpose of this research is to control the steering servo motor of a steer-by-wire system. The entire steer-by-wire setup of this system is also established in the experiments. In control theory, we use analog control and digital control. In analog control, we use LabVIEW with DAQ card to proceed analog signals collected and to control the output signals. In digital control, we use Keil μ-Vision2 software with 8051 microprocessor to proceed digital signals collected and output signals. The test bench of Steer-by-Wire includes: steering-angle sensor for CAN-Bus system, AC servo motor, frequency and voltage converter, 8051 in-circuit emulator: ICE, etc. Finally, we hope that the servo motor can follow the motions of the steer wheel, includes: steering directions, steering positions, steering velocities, etc. The digital output signals of the steering – angle sensor and the servo motor encoder are transferred to analog signals by D/A IC AD7243 to verify the model. The model is also used to compare the results of the cases by varying the loading of the system.

Keywords : Steer-by-wire ; Servo motor ; rise time

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