The Study and Experiment of Vehicle Stability Control for Brake by Wire System

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ABSTRACT

This thesis is to develop a vehicle dynamic control system in passenger car using the brake-by-wire system and to build a vehicle model for the experimental car (Ford Focus) in CARSIM RT, in order to analyze the tire interference of the car when it is out of control. In this study, we carry out hardware-in-the-loop (HIL) experiments. At first, we measure the environment data by CARSIM RT, and then send them to the VDC Controller to generate the braking control signals. The braking control signals are later sent to the brake-by-wire system via the CAN BUS. After controlling the Brake-by-Wire system, the brake pressure response is measured and sent to CARSIM RT. In this study, we develop the VDC Controller used to control the brake pressure in Simulink. By using the genetic algorithm (GA), we can find the optimal membership functions of the fuzzy controller. After developing the VDC Controller, it is connected to CARSIM RT and SBC braking control system for doing the experiment of HIL to verify the stability of the VDC Controller.

Keywords : Brake controller ; Fuzzy control ; Vehicle dynamic control ; Hardware in the Loop

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