Study on the Semi-Active Suspension System Using Electrorheological Fluid

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ABSTRACT

Intelligent vehicle has become one of the most important research topics for next generation transportation. This technology involves information management, control of power train and vehicle dynamics, devices for driving safety and comfort, etc. This thesis concentrates on the development of the semi-active suspension system incorporating electrorheological (ER) shock absorber to improve the stability and maneuverability of the vehicle. The theoretical formulations for the 2-D and 3-D dynamic equations and their numerical simulations using Fortran programming are performed. By incorporating the mechanical parameters of the vehicle into the dynamic model, the responses of suspension system under the acceleration, deceleration, passing the road bump and taking turns are investigated. Finally, a semi-active suspension system, including four ER shock absorbers and the associated power control units are fabricated and retrofitted onto a commercial sedan. The field test conducted in the facility of ARTC demonstrates the improved performance of the semi-active suspension system over its passive counterparts.

Keywords : Intelligent vehicle, semi-active suspension system, ER shock absorber.

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