Fuzzy Control Design for the Semi-Active Suspension of Vehicle

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ABSTRACT

The main purpose in this thesis is to design a fuzzy controller for the semi-active suspension to achieve ride comfort and handling safety at the same time. The full-car model is defined by CarSim and the fuzzy controller is implemented by MATLAB Simulink. Comparing from the passive suspension and traditional semi-active suspensions in different road profiles, the fuzzy controller has better performance in ride comfort and handling safety. In addition, a window-root-mean-square value is proposed to measure the ride comfort and it can represent the actual comfort more instantly than the past continuous-root-mean-square value. Using the road profiles with different wavelengths and constant amplitudes, turning around in ring-type smooth road, and lane change drive mode etc to test these controllers, the proposed fuzzy controller can achieve ride comfort and handling safety at the same time.

Keywords : adjustable shock absorber ; semi-active suspension ; comfort ; safety ; CarSim ; RMS

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