

Robust fuzzy control for all-terrain vehicle based on varies speeds

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The vibration transmitted to passengers from road terrain varies with the change of vehicle speed, since the road excitation is a function of the vehicle speed. It is difficult to keep constant driving speed for all terrain vehicle (ATV), due to the rugged terrain. Hence, the road uncertainty caused by varying speed should be considered in controller design processing. In this paper, the interval type-2 fuzzy logic controller combined with H_∞ technique of a semi-active ATV with magneto-rheological (MR) damper is investigated to reduce the vehicle body attitude vibration under various speeds. The seven-degree-of-freedom model with MR damper is adopt to represent the real ATV, and then the interval type-2 fuzzy logic controller associated with H_∞ technique is formulated on the basis of Lyapunov stability theory. Subsequently, in order to demonstrate the effectiveness of the proposed controller, the simulation with two different controllers have been done under off road. The simulation results shown the proposed controller can provide much better vibration than the interval type-2 fuzzy logic controller.

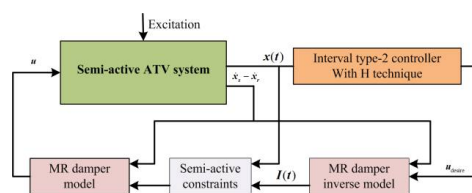


Figure 1. Schematic diagram

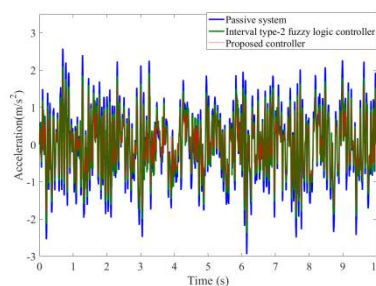


Figure 2. Vertical acceleration at the centroid of sprung mass