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Ride comfort performance of a non-linear full-car using active suspension system with active disturbance rejection control and input decoupling transformation

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Abstract

In this paper, active disturbance rejection control (ADRC) and a control method combining ADRC with input decoupling transformation (ADRC-IDT) are proposed to improve ride comfort of a non-linear full-car with active suspension system. Simulation of the model in frequency domain as well as time domain with three types of road profile - speed hump, double bumps and random excitation, as the disturbance to the system is performed to evaluate the performance of the proposed ADRC-IDT in comparison with ADRC and the passive system. Through experimental simulation studies, the ability of the proposed controllers to cope with varying process is investigated. Results show that ADRC-IDT is able to produce comparable performance to a typical ADRC control structure with fewer control parameters.

Keywords

Author Keywords: active suspension; ride comfort; ADRC; active disturbance rejection control; input decoupling transformation; non-linear spring; non-linear damper; full-car; ADRC-IDT; ADRC with input decoupling transformation

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