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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 (Article)

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Abstract

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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. Copyright © 2019 Inderscience Enterprises Ltd.

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Author keywords

Active disturbance rejection control Active suspension ADRC
ADRC with input decoupling transformation ADRC-IDT Full-car Input decoupling transformation
Non-linear damper Non-linear spring Ride comfort

Indexed keywords

Engineering controlled terms: Active suspension systems Automobile suspensions Disturbance rejection
Frequency domain analysis Linear transformations Mathematical transformations

Engineering uncontrolled terms: Active disturbance rejection controls Active suspension ADRC ADRC-IDT
Decoupling transformation Non-linear dampers Non-linear springs Ride comforts

Engineering main heading: Suspensions (components)

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