

Journal of Low Frequency Noise, Vibration and Active Control  
Volume 27, Issue 3, Pages 219-235  
Multi Science Publishing, September 2008

A Study of Semi-Active Vibration Control for Vehicle Suspension System Using  
an Adjustable Shock Absorber

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Abstract

A semi-active vehicle suspension system using an adjustable shock absorber for a quarter-car model vibration control is presented in this paper. Two control techniques are developed for assessing both ride comfort and road handling. Apart from the conventional proportional-integral-derivative (PID) controller, a controller using fuzzy sets and fuzzy inferences is developed and its performance is experimentally tested. In the preliminary work, the characteristics and performance of an adjustable shock absorber are measured in order to build a data bank on various road conditions. The experimental results indicated that both the PID controller and the fuzzy controller effectively suppress the vibration of the proposed quarter-car model. The comparison and analysis of the proposed controllers are also described in this paper. Furthermore, the characteristic analysis and evaluation of the human exposure to whole body vibration has also been established by international standard.

Key words : Semi-active vibration control; Vehicle suspension system; Adjustable shock absorber