

Dry Friction Occurring in the Suspensions for Passive and Switchable Damper Systems and Its Effect on Ride Comfort

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Abstract : In all vehicle suspension, there is a dry friction. One of the various active suspensions, which have been shown to have considerable practical potential, is a switchable damper suspension system. In this paper, vehicle ride comfort for the passive and switchable damper suspension systems as affected by the value of frictional force generated in springs is discussed. A mathematical model of a quarter vehicle model for two setting switchable damper suspension system with dry friction force is developed to evaluate vehicle ride comfort in terms of suspension performance criteria. The vehicle itself is treated as a rigid body undergoing vertical motions. Comparisons between passive and switchable damper suspensions systems with dry friction force in terms of ride performance are also discussed. The results showed that the ride comfort for the passive and switchable damper suspension systems was deteriorated due to dry friction occurring in the suspensions. The two setting switchable damper with and without dry friction force gives better ride improvements compared with the passive suspension system. Also, the obtained results show an optimum value of damping ratio of the passive suspension system.

Keywords : ride comfort, dry friction, switchable damper, passive suspension

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