

Active and Passive Suspension Control for Vehicle Dive and Squat

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Abstract

Performance capabilities of passive and active vehicle suspension systems will be examined from a mechanical networks point of view. It is known that the reduction of effects of road disturbances is a conflicting requirement with the reduction of effects of inertial loads in a quarter-car model when passive control is used, but not with active control of suitable structure. The extension of these ideas to a halfcar trailing-arm model will be considered. It will be shown that the choice of suspension geometry does not remove the basic trade-offs for passive suspensions. An active control structure to allow the road and load transmission paths to be optimised independently will be presented. The design approach will be applied to a non-linear trailing-arm vehicle model to demonstrate good anti-dive and anti-squat behaviour together with a soft ride in response to road disturbances. The performance of the controller will be demonstrated using the multi-body simulation code *AutoSim*.