

Dynamic analysis of an optimal active suspension system us-ing global search optimization

ABSTRACT

This paper addresses ride comfort for quarter car active suspension system. Suspension dynamics are modelled by using two degree of freedom vibrating system, linear with time invariant quarter car model to capture the system dynamics when it is subjected to the road disturbance with different velocities. Global search optimization method is a strategy that overcomes the defects of the suspension system performance index formula, objective function (discontinuity, non-smooth) is used to find the optimal suspension spring stiffness and damping coefficient. The optimal active suspension system design is tested when the active elements is malfunctioned. The optimal design is compared with optimal passive suspension system in terms of ride comfort. The results showed that the optimal passive elements of optimal active suspension system provided better ride comfort(2sec/37.0m)even at the absent of the active elements com-pared to optimal passive suspension system.

Keyword: Active suspension system; Ride comfort; Optimization