Abstract

Ride comfort has become one of the important criteria in a passenger vehicle. Isolating the passenger compartment from the vibration sources is the main idea in achieving a good ride comfort. This role is mainly covered by the suspension system of a car.

There are three types of s :Passive system, semi active system and active system suspension system in these thesis passive suspension system is studied and derived the equation of mathematical model of the quarter car of sprung mass and un sprung mass . The basic part of a passive suspension system is a damper and a coil spring. These two mechanical components have some limitation in isolating vibration. The stiffness of spring changed and studied the influence at improve the response of vertical displacement of quarter car. Active PID control used to enhancement the response of the car against the external disturbance and isolated the vibration. The stiffness of spring suspension verify according to road condition such as the spring subjected under a crack so the gain of PID control changed .Fuzzy PID control design in order to tuning the parameter of the active PID gain and increased the isolation of vibration .Theoretical results of the simulation passive system , active PID control and fuzzy PID control are obtained by using MATLAB\Simulink.

Experimental rig with all instruments was built up by taking the quarter of car actually manufactured. The oscilloscope device used to appeared the signal by connecting the accelerometer sensor: first on spring mass part and second on unsprung mass part to study the dynamical behavior of the response and a comparison these results after uncertain stiffness.

III

The improvement of theoretical result noticed that the active fuzzy PID control is the best to improve the response of quarter car and isolation the vibration.