A NEW APPROACH TO VEHICULAR SUSPENSION

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Abstract— An active vehicular suspension consists of 8 degrees of freedom, The suspensions considered in vehicles are McPherson strut-type independent suspensions. Three cases of control strategies are taken into account. In the first case, only the passenger seat is controlled. In the second case, only the vehicle body is controlled. In the third case, both the vehicle body and the passenger seat are controlled at the same time. The non-linearity is due to the friction in the dampers. The time responses of the non-linear vehicle model due to road disturbance and the frequency responses of the harmonically linearised non-linear vehicle mode are plotted and discussed to obtain better performance.

Index Terms— Hydrogen nitrile butadiene rubber, Suspension, Technology, vehicular suspension, Design modicifaction of suspension.

1 INTRODUCTION

The vehicle suspension is a dynamic system using vehicle properties and simulating the response of the vehicle to various inputs and disturbances. The suspension separates the chassis and the passenger seat and provides a better stiffness for the wheels to be on the ground. The sole purpose of the suspension is to keep the wheels on road and provide comfort to the passenger. The recent developments give a wide range of options to select the control system, the control system needs to be selected at the time of design. The use of electronic suspensions which is controlled by a microprocessor has attracted a lot of interest in recent times. In this study, PID controllers parallel to McPherson strut-type independent suspensions are used. The major advantages of this control method are its relative simplicity in design and the availability of well known standard hardware.

In the last decade, many researchers applied some linear and non-linear control methods to vehicle models. Because of simplicity, quarter car models were most preferred.

2 DESIGN MODIFICATIONS.

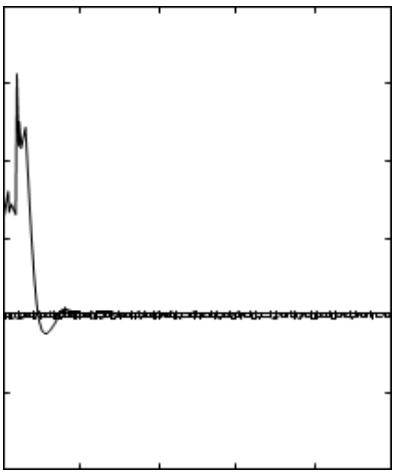
2.1 Design.

In the Compressive liquid adaption system, a fluid pressure is used to control the movement of the shock absorber at the time of the shock. This system can be compressed by using a diaphragm instead of the fluid acting in the control system. A 10mm of Hydrogenated Nitrile Butadiene rubber can be used as the diaphragm. HNBR is widely known for its physical strength and retention of properties after long-term exposure to heat, oil, and chemicals. Trade names include Zhanber, Therban and Zetpol (Zeon Chemical). It is commonly used to manufacture O-rings for automotive air-conditioning systems.

Depending on filler selection and loading, HNBR compounds typically have tensile strengths of 20–31 MPa when measured at 23 °C. Compounding techniques allow for HNBR to be used over a broad temperature range, −40 °C to 165 °C, with minimal degradation over long periods of time. For low-temperature performance, low ACN grades should be used; high-temperature performance can be obtained by using highly saturated HNBR grades with white fillers. As a group, HNBR elastomers have excellent resistance to common automotive fluids (e.g., engine oil, coolant, fuel, etc.) and many industrial chemicals. Like NBR, fluid and chemical resistance improves as the ACN content is increased.

The unique properties and higher temperature rating attributed to HNBR when compared to NBR have resulted in the wide adoption of HNBR in automotive, industrial, and assorted, performance-demanding applications. On a volume basis, the automotive market is the largest consumer, using HNBR for a host of dynamic and static seals, hoses, and belts. HNBR has also been widely employed in industrial sealing for oil field exploration and processing, as well as rolls for steel and paper mills. The use of 10mm HNBR right on top of the shock absorber provides better comfort to the passenger and provides stiffness at the time of shock for a longer duration. This is also simple in design and efficient. The production rates will be more and easy in this method. The Simulated Graph for the Non-linear vehicle suspension is as given below with time on X axis and travel on y axis.

2.3 Figures



3 Conclusion:

The main idea behind proposing this controller is the ability to use these types of controllers on vehicles with developing the technology.

The simulation results prove that The passenger and vehicular comfort is obtained in this method. 4 Citations

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References

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