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STUDENT'S DECLARATION

I **Arun Singh**, hereby certify that the work which is being presented in this thesis entitled **"Dynamic Modelling and Analysis of car Suspension System"** is submitted in the partial fulfillment of the requirements for degree of **Master of Technology (Computational Design)** Submitted in Department of Mechanical Engineering at **Delhi Technological University** is an authentic record of my own work carried under the supervision of **Dr. Vikas Rastogi**. The matter presented in this thesis has not been submitted in any other University/Institute for the award of Master of Technology Degree. Also it has not been directly copied from any source without giving its proper reference.

Signature of Student

This is to certify that the above statement made by the candidate is correct to best the of my knowledge.

Signature of Supervisor

The Master of Technology Viva-Voice examination of Mr. Arun Singh has been held on ……. and accepted.

Signature of Supervisor **Signature of HOD**

Signature of External Examiner

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CERTIFICATE

This is to certify that this thesis report entitled, **"Dynamic Modelling and Analysis of car Suspension System"** being submitted by **Arun Singh (Roll no. 2K13/CDN/19)** at Delhi Technological University, Delhi for the award of the Degree of Master of Technology as per academic curriculum. It is a record of bonafide research work carried out by student under my supervision and guidance, towards partial fulfillment of the requirement for the award of Master of Technology degree in Computational Design. The work is original as it has not been submitted earlier in part or full for any purpose before.

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ABSTRACT

The vehicle suspension system is generally considered as the linkage between the vehicle body and wheels. The main task of the suspension system is to provide a comfortable and safe ride. The good ride quality requires high damping setting at low frequencies to stifle pitch, and lower damping setting at higher frequencies to prevent harshness. However, to improve handling performance, springs and dampers must be made stiffer at all frequencies to reduce body attitude. The design of a better-quality suspension system remains an important development objective for the automotive industry. An ideal vehicle suspension system should have the capability to reduce the displacement and acceleration of the vehicle body, and thus; maximizing the ride comfort.

Present work analyzed the dynamic behavior of a road car through bond graph technique, where vertical dynamics has been evaluated. However, simulation of this model has been carried out on Symbol Sonata software which use the fourth order Runge-Kutta method. Furthermore, vertical acceleration of a road car are examined through OROS 36 system. These obtained data is used to validate the simulation results.

Present work also includes the different types of suspension system such as passive, semi-active and active suspension system, where physical and mathematical model of car suspension system has been evaluated, which may further be used to analyze the car suspension system.

Key Words: Bond graph modeling, Vehicle dynamics, Car model, Comfort evaluation, Active suspension system, Passive suspension system.

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