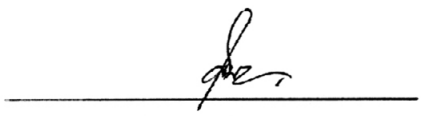
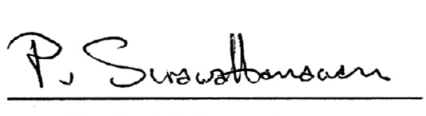
Surachai Nakphrommin 2006: Driving Safety Analysis Using Dynamic Simulation Technique to a Four-Wheel Vehicle Model. Master of Engineering (Safety Engineering), Major Field: Safety Engineering, Interdisciplinary Graduate Program. Thesis Advisor: Assistant Professor Prakob Surawattanawan, Ph.D. 76 pages.
ISBN 974-16-2473-5

Automotive passive suspensions are an important element for driving safety in terms of controlling road handling and passenger ride comfort. The designs of automotive suspension usually are performed by computer simulations in order to determine appropriate spring stiffness and damping rate of shock absorber. The majority of these designs have been performed based on a quarter car model which has a limitation for the analysis of vertical motion only and can not integrate the rotating motion into the model. The complexity of dynamic coupling between both is the obstacle of these designs. Therefore, this research work proposed a simulation model that can be used to analyze both vertical and rotating motion at the same time. The suspension characteristics have been investigated by using Matlab/Simulink program.

The result shows that when the passenger car carries heavy burden, the road holding capability is degraded dynamically while the ride comfort is getting better because the huge mass can reduce the vibration of the car body. When the tire stiffness is getting lower because of the reduction of pressure in the tire, this phenomenon can affect to the driving safety and ride comfort in the same way as the increment of load burden. In addition, for the optimum operation the shock absorber must be specified according to the dynamic condition of the car. If the damping rate is too high or too low due to the wear of internal element, this can cause the high vibration and degrade the road holding ability.



Student's signature



Thesis Advisor's signature

30 / May / 06