

Effect of Road Profile on Normal Force Generated on Electric Vehicle

K. Baarath¹, Muhammad Aizzat Zakaria¹, A. Fakhri A. Nasir¹ and Umar Zakir Abdul Hamid²

¹Intelligent Robotics and Vehicles Laboratory (IRoV), iMAMS Laboratory, Faculty of Mechanical and Manufacturing Engineering, Universiti Malaysia Pahang, 26600 Pekan Pahang, Malaysia

²Sensible 4, Otakaari 51/5A, Espoo 02150, Finland

e-mail: maizzat@ump.edu.my

ABSTRACT

Electric vehicles are gaining popularity for its various advantages including environmental aspects. However, the vehicles are still susceptible to accidents due to factors such as uneven road surface. Thus, this paper focus on the effect of road profile on the suspension and normal force produced on an electric vehicle. A simple vehicle model is designed in MATLAB Simulink using longitudinal vehicle dynamic model and passive suspension of the quarter-car model. The vehicle is accelerated on the road while introducing an uneven road surface. The result obtained shows an increase of the vehicle suspension deflection and normal force produced. A vehicle moving on three varying hump height is shown to produce a minor disturbance on the total normal force of the vehicle. However, the effect is significant enough on the normal force on each tire.

Keywords: Electric vehicles

DOI: https://doi.org/10.1007/978-981-13-8323-6_20

ACKNOWLEDGEMENTS

The authors would like to thank Universiti Malaysia Pahang (UMP) for the financial aid for the research under grant RDU1803130.