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Effect of Road Profile on Normal Force Generated on Electric Vehicle

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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.

Keyword: Electric Vehicle; Simulink; Road Profile