

NONLINEAR DYNAMICS MODEL AND ANALYSIS OF INTERACTION BETWEEN VEHICLE AND ROAD SURFACES FOR 5-AXLE HEAVY TRUCK

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TÓM TẮT:

Based on the analysis of nonlinear geometric characteristics of the suspension systems and tires, a 3D nonlinear dynamic model of a typical heavy truck is established. The impact factors of dynamic tire loads including the dynamic load stress factors and the maximal and the minimal vertical dynamic load factors are used to evaluate the dynamic interaction between heavy vehicles and roads under the condition of random road surface roughness. Matlab /Simulink is used to simulate the nonlinear dynamic system and calculate the impact factors. The effects of different road surface conditions on the safety of vehicle movement and the durability of parts of a vehicle are analyzed as well as the effects of different structural parameters and different vehicle speeds on road surfaces. The study results provide both the warning limits of road surface roughness and the limits of corresponding dynamic parameters for the 5-axle heavy truck.