THE THREE-DIMENSIONAL MOTION SIMULATION AND DYNAMICAL ANALYSIS OF THE TRACKED VEHICLES

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ABSTRACT

In this thesis, we use computer simulations to analyze the dynamics of the tracked vehicle. In most related studies of other researchers, the track system in the vehicle are usually modeled and simulated by continuous belts or plates. The forces between and on the tracks are seldom investigated. Therefore, we want to model the tracked vehicle chassis system including all the contact forces between roadwheels and tracks, tracks and tracks, tracks and ground. Also, different ground surface properties, geometric profiles and different paths to travel have been simulated in this study. We will use the software ADAMS to build a three-dimensional model of the tracked vehicle. In the model, all moving components are created and imported from CAD software. Their mass properties, like masses, moment of inertias, will be computed as parameters in the simulation. We write FORTRAN subroutines to model the contact forces between components in the tracked system. These codes are integrated in ADAMS model and simulated with the vehicle dynamics simultaneously. Further, the computed forces exerted on the components from the dynamic simulation are used to improve the component design via the finite element analysis software and its design optimization function.

Keywords : Tracked Vehicle ; Chassis System ; Finite Element ; Vehicle Dynamics ; Design Optimization

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