A Study of Suspension System of an Off-road Mini Baja Vehicle

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ABSTRACT

Mini-Baja is the denomination of an off-road vehicle for one person designed and built by graduate and engineering students with the orientation of a professor board. In order to resist impact loadings that usually occur in an off-road circuit an integrated approach of mechanical design is developed to obtain an optimized vehicle suspension. Efforts were made to model a front suspension type double A of an off-road vehicle Mini-Baja. The focus was stressed in the transmissibility of mechanical forces through front suspension. A simple two-degree of freedom model originally developed by Kenedi et al. [3] was adopted to study the behavior of the rear suspension and the influence of the main parameters in the transmissibility of accelerations and loads to the structure. An estimate for an optimal suspension adjustment was obtained with this simple model.

A two-degree of freedom dynamic model was developed by Buarque et al. [4] was also adopted to study the behavior of a Mini-Baja. The model considers the coupling between the front and rear suspension systems. ADAMS numerical simulations were developed to study the suspension submitted to a disturbance, quite similar to what happens when a vehicle in movement comes across a road obstacle like an elevation. The ADAMS solutions were compared to experimental results obtained from accelerometers and load-cells in a simple test. The developed study indicates that this methodology can be used as an effective tool for the design and improvement of various vehicle suspensions.

Keywords : ADAMS、Mini Baja、suspension system、double A

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