

عنوان مقاله:

Improvement of Parameters Affecting the Vehicle's Handling and Ride Comfort Using the Taguchi Experimental Design and TOPSIS Method

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خلاصه مقاله:

In this paper, the optimization of the suspension system's parameters is performed using a combined Taguchi and TOPSIS method, in order to improve the car handling and ride comfort. The car handling and ride comfort are two contradictory dynamic indices; therefore, to improve both car handling and ride comfort, there is a need for compromising between these two indices. For this purpose, the criteria affecting these two are first identified. The lateral acceleration and the body roll angle were used to evaluate the handling, and the RMS of vertical acceleration of the vehicle body was used to evaluate the ride comfort. The design factors including stiffness of springs and damping coefficient of dampers in the front and rear suspension system were also taken into account. On this basis, the results obtained from the vehicle's motion in the DLC test were evaluated in the CarSim software. Then, the ideal tests were identified using the combined entropy and TOPSIS technique; this method has been proposed for managing the handling and ride comfort criteria. Finally, the optimal level of the suspension system's factors was extracted using Taguchi method. It is evident from the results that, for different speeds, the body roll angle was improved up to ۶.۵%, and the RMS of the vertical acceleration of the vehicle body was optimized up to ۴% to ۷%

کلمات کلیدی:

Ride comfort Vehicle's handling Taguchi method TOPSIS method Optimization

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