عنوان مقاله:

Pareto Optimal Design of Passive and Active Vehicle Suspension Models

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خلاصه مقاله:

It would be difficult to deny the importance of optimization in the areas of science and technology. This is in fact, one of the most critical steps in any design process. Even small changes in optimization can improve dramatically upon any process or element within a process. However, determining whether an optimization approach will improve on an original design is usually a question that its response in this study has led to an optimal design out of an existing car model. First of all, the optimization of a passive car-quarter model has been accomplished by means of a genetic algorithm. This initial optimization gives a figure of points named "Pareto optimum points". Secondly, through selecting a point amongst them, the design of active model has been completed and optimized based on genetic algorithm. Continuing with this thought, a similar process has been also accomplished with a car-half vehicle model with five degrees of freedom. Though the last optimized active model may prove a more reliable efficient design due to the more comprehensive feature related to the degrees of freedom, the results of each optimization should be considered and may supply equally attractive and diverse choices as well. Anyway, let's focus on the final purpose which is to reduce the vibrations as much as possible. This is what is observed through all the optimization jobs in this study. Comparison of these results with those reported in the literature affirms the excellence of the proposed optimal designs.

کلمات کلیدی:

Active suspension system, Genetic Algorithm, Multi-objective optimization, Passive suspension system, PID Controller, Vehicle vibration model