

Bi-Criteria Algorithm to Optimize the Assembly of an Automobile Suspension System

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Abstract

This paper presents an interactive algorithm to optimize the assembly of an automobile suspension system. The suspension system is modeled as a series parallel system and the algorithm determines the optimal allocation of interchangeable components in the system. The study assumes that the reliability of each component does not depend on the position where the component is assigned. Two criteria are considered: (1) system reliability and (2) system cost. Automobile components should be designed based on those two criteria to produce the automobile that is most reliable with the least possible cost. A goal programming formulation is presented to the bi-criteria optimization problem; and an interactive search algorithm is presented to determine the best compromise solution. The decision maker (automobile designer) interacts with the optimization algorithm throughout the solution process; and the algorithm follows the Golden Section Method to find the optimal utility function of the decision maker. A numerical example is also presented.