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The use of a grey-based Taguchi method for optimizing multi-response simulation problems

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Abstract

Simulation modelling is a widely accepted tool in system design and analysis, particularly when the system or environment has stochastic and nonlinear behaviour. However, it does not provide a method for optimization. In general, problems contain more than one response, which are often in conflict with each other. This article proposes a grey-based Taguchi method to solve the multi-response simulation problem. The grey-based Taguchi method is based on the optimizing procedure of the Taguchi method, and adopts grey relational analysis (GRA) to transfer multi-response problems into single-response problems. A practical case study from an integrated-circuit packaging company illustrates that differences in performance of the proposed grey-based Taguchi method and other methods found in the literature were not significant.

The grey-based Taguchi method thus provides a new option when solving a multi-response simulation-optimization problem.

Keywords:

grey relational analysis | integrated circuit packaging | multiple attribute decision making | simulation optimization | Taguchi method

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