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## Pareto Solutions Resilience

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The simultaneous optimization of multiple objectives (or responses) has been a popular research line because processes and products are, in nature, multidimensional. Thus, it is not surprising that the variety and quantity of responses modelling techniques, optimization algorithms, and optimization methods or criteria put forward in the RSM literature for solving multiresponse problems are large. The quality of Pareto frontiers has been also evaluated by various authors, and there are several approaches and metrics to rank those solutions. However, no metric to assess the resilience of Pareto solutions was proposed so far. Thus, assuming that the experiments were well planned and conducted, and their results appropriately analysed, a novel metric is proposed to assess and rank the Pareto solutions in terms of their resilience (sensitivity to changes or perturbations in the variables setting when implemented in the production process (equipments) or during its operation). This metric is easy-to-implement and its application is not limited to problems developed in the RSM framework. To consider the solutions resilience in the solution selection process can avoid wasting resources and time in implementing theoretical solutions in production process (equipments) that do not produce the expected product output(s) or equipment behaviour. A classical case study selected from the literature is used to illustrate the applicability (usefulness) of the proposed metric.

### Keywords

Multiobjective, Optimization, Solution selection,

### Classification

Mainly methodology

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