Cao, Yongtao; **Smucker, Byran J.**; **Robinson, Timothy J.**

A hybrid elitist Pareto-based coordinate exchange algorithm for constructing multi-criteria optimal experimental designs. (English) Zbl 06697665

Stat. Comput. 27, No. 2, 423-437 (2017).

Summary: This paper presents a new Pareto-based coordinate exchange algorithm for populating or approximating the true Pareto front for multi-criteria optimal experimental design problems that arise naturally in a range of industrial applications. This heuristic combines an elitist-like operator inspired by evolutionary multi-objective optimization algorithms with a coordinate exchange operator that is commonly used to construct optimal designs. Benchmarking results from both a two-dimensional and three-dimensional example demonstrate that the proposed hybrid algorithm can generate highly reliable Pareto fronts with less computational effort than existing procedures in the statistics literature. The proposed algorithm also utilizes a multi-start operator, which makes it readily parallelizable for high performance computing infrastructures.

MSC:

62 Statistics

Keywords:

multi-criteria optimal experimental design; Pareto front; hybrid algorithm

Software:

GA; hitandrun; NBI; R

Full Text: DOI

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