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**A coordinate-exchange two-phase local search algorithm for the D- and I-optimal designs of split-plot experiments.** (English) [Zbl 06975457](#)  
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Summary: Many industrial experiments involve one or more restrictions on the randomization. In such cases, the *split-plot design* structure, in which the experimental runs are performed in groups, is a commonly used cost-efficient approach that reduces the number of independent settings of the hard-to-change factors. Several criteria can be adopted for optimizing split-plot experimental designs: the most frequently used are D-optimality and I-optimality. A multi-objective approach to the optimal design of split-plot experiments, the coordinate-exchange two-phase local search (CE-TPLS), is proposed. The CE-TPLS algorithm is able to approximate the set of experimental designs which concurrently minimize the D-criterion and the I-criterion. It allows for a flexible choice of the number of hard-to-change factors, the number of easy-to-change factors, the number of whole plots and the total sample size. When tested on four case studies from the literature, the proposed algorithm returns meaningful sets of experimental designs, covering the whole spectrum between the two objectives. On most of the analyzed cases, the CE-TPLS algorithm returns better results than those reported in the original papers and outperforms the state-of-the-art algorithm in terms of computational time, while retaining a comparable performance in terms of the quality of the optima for each single objective.

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**MSC:**

62 Statistics

**Keywords:**

[coordinate-exchange algorithm](#); [D-optimality](#); [I-optimality](#); [Pareto-optimality](#); [split-plot design](#); [two-phase local search](#)

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