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Construction of uniform designs via an adjusted threshold accepting algorithm

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Abstract

The threshold accepting (TA) algorithm, a stochastic heuristic technique, has been proposed as an effective method for constructing uniform designs (UDs). However, some flaws of this algorithm have been detected recently, especially when optimizing designs with large sizes. This paper proposes an adjusted TA algorithm that can overcome the defects of traditional TA. This new algorithm successfully updated the website UD tables by designs with better uniformity. Furthermore, the adjusted TA helps us to obtain a new UD with 27 runs and 13 factors each having 3 levels under the mixture L_2-discrepancy. This UD is a minimum aberration design.

Keywords:

Level permutation, Minimum aberration, Mixture L_2-discrepancy, Threshold accepting algorithm, Uniform design

1. Introduction

The task of obtaining an efficient experimental design is a major challenge in scientific research. Most projects involves high-dimensional inputs with limited resources available. The uniform experimental design (Fang [1] and Wang and Fang [8]) is one of the most popular approaches to tackle such difficulties. Uniform design (UD) is a space-filling design by filling up

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