

## *k*-Circulant Supersaturated Designs and Metaheuristics: A Comparative Study on Construction Methods of Supersaturated Designs

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### Abstract

Supersaturated designs is a large class of factorial designs which can be used in screening experiments where the number of factors is large, while the experimentation is expensive. In this paper, we give a comparative study of several construction methods of supersaturated designs. An application of classes of evolutionary algorithms to *k*-circulant supersaturated designs is presented. In particular, a successful expansion to (9, 10)-circulant supersaturated designs with genetic algorithms is illustrated. Furthermore, a simulated annealing approach gives rise to new *k*-circulant supersaturated designs, with good optimality properties.

**Keywords:**  $E(s^2)$ -optimality, factorial designs, genetic algorithms, metaheuristics, simulated annealing, supersaturated designs.

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