

# Orthogonal Uniform Composite Designs

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## Abstract

Composite designs are frequently utilized for fitting response surfaces in practice. This paper proposes a new type of composite designs, orthogonal uniform composite designs (OUCDs), which combine orthogonal arrays and uniform designs. Such designs not only inherit the advantages of orthogonal-array composite designs such as high estimation efficiencies and ability for multiple analysis for cross validation, but also have more flexible run sizes than central composite designs and orthogonal-array composite designs. Moreover, OUCDs are more robust than other types of composite designs under certain conditions. Some construction methods for OUCDs under the maximin distance criterion are provided and their properties are also studied.

## Keywords

Central composite design, Maximin distance criterion, Orthogonal-array composite design, Robustness, Uniform design.

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