

Foldover designs with column permutations

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Foldover is a commonly used follow-up strategy in experimental designs. Optimal foldover designs have been developed to maximize the number of aliased pairs of interactions that can be de-aliased. All existing foldover designs were constructed by revering the sign of columns of the original design. We propose a new methodology by allowing the permutation of columns in foldover. Focusing on resolution IV designs, we show that most proposed designs are better than existing results with respect to the minimum aberration criterion. While augmenting a design by a foldover with column permutation may result in a nonregular combined design, the proposed design is able to de-alias a larger number of aliased two-factor interactions. Furthermore, we demonstrate that they also have more desirable model-robustness properties against model uncertainty.