

Summary of Effect Aliasing Structure for Design Selection and Factor-Column Assignment for Supersaturated Designs

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Abstract

In the assessment and selection of supersaturated designs, the aliasing structure of interaction effects is usually ignored in traditional criterion such as $E(s^2)$ -optimality. We introduce the Summary of Effect Aliasing Structure (SEAS) for assessing the aliasing structure of supersaturated designs. SEAS takes account of interaction terms and provides more informative summaries than traditional design criteria, such as (generalized) resolution and wordlength patterns, for design evaluations. The new summary consists of three criteria, abbreviated as MAP: (1) the Maximum dependency aliasing (M-)pattern; (2) the Average square aliasing (A-)pattern; and (3) the Pairwise dependency ratio (P-)pattern. We theoretically study the relationships among the three criteria of SEAS and traditional criteria, and demonstrate the use of SEAS for evaluating and comparing some examples of supersaturated designs, including those suggested in the literature. We further apply the SEAS to the assignment of columns of a supersaturated design when some important experimental factors are known in prior. This is a joint work with Dave Woods (University of Southampton, UK) and Yi-Hua Liu (National Tsing Hua University, Taiwan).