

Blocked Regular Fractional Factorial Designs with Minimum Aberration

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Abstract

The minimum aberration criterion is a popular criterion in the selection of blocked fractional factorial designs. It ranks blocked designs according to their treatment and block wordlength patterns, which are often obtained by counting words in the treatment defining contrast subgroups and alias sets. When the number of factors is large, there are a huge number of words to be counted, causing difficulties in computation. Based on coding theory, the concept of minimum moment aberration due to Xu (2003) for unblocked designs is extended to blocked designs. The coding theory approach studies designs in a row-wise fashion and therefore links blocked designs with nonregular and supersaturated designs. Some general theory on minimum aberration blocked designs is developed. Minimum aberration blocked designs for all 32 runs, 64 runs up to 32 factors, and all 81 runs are constructed with respect to four combined wordlength patterns.