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Some results on $4^m 2^n$ designs with clear two-factor interaction components. (English)

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Summary: The clear effects criterion is one of the important rules for selecting optimal fractional factorial designs, and has become an active research issue in recent years. *B. Tang et al.* [*Can. J. Stat.* 30, No. 1, 127–136 (2002; Zbl 0999.62059)] derived upper and lower bounds on the maximum number of clear two-factor interactions (2fi's) in $2^{n-(n-k)}$ fractional factorial designs of resolutions III and IV by constructing a $2^{n-(n-k)}$ design for given k , which are only restricted for the symmetrical case.

This paper proposes and studies the clear effects problem for the asymmetrical case. It improves the construction method of Tang et al. for $2^{n-(n-k)}$ designs with resolution III and derives the upper and lower bounds on the maximum number of clear two-factor interaction components (2fic's) in $4^m 2^n$ designs with resolutions III and IV. The lower bounds are achieved by constructing specific designs. Comparisons show that the number of clear 2fic's in the resulting design attains its maximum number in many cases, which reveals that the construction methods are satisfactory when they are used to construct $4^m 2^n$ designs under the clear effects criterion.

MSC:

62K15 Factorial statistical designs

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