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## Ga-Optimal Partially Balanced Fractional $2^{m_1+m_2}$ Factorial Designs of Resolutions $R(\{00,10,01,20,02\} | \Omega)$ and $R(\{00,10,01,20,11\} | \Omega)$ with $2 \leq m_1, m_2 \leq 4$

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**Abstract:** Under the assumption that the three-factor and higher-order interactions are negligible, we consider two kinds of partially balanced fractional  $2^{m_1+m_2}$  factorial designs derived from simple partially balanced arrays, where  $2 \leq m_k$  for  $k = 1, 2$ . One is a design such that the general mean, the  $m_1 + m_2$  main effects, the  $\binom{m_1}{2}$  two-factor interactions, the  $\binom{m_2}{2}$  two-factor ones and some linear combinations of the  $m_1 m_2$  two-factor ones are estimable, and the other is a design such that the general mean, the  $m_1 + m_2$  main effects, the  $\binom{m_1}{2}$  two-factor interactions, the  $m_1 m_2$  two-factor ones and some linear combinations of the  $\binom{m_2}{2}$  two-factor ones are estimable. In each kind of designs, we present optimal designs with respect to the generalized A-optimality criterion when the number of assemblies is less than the number of non-negligible factorial effects, where  $2 \leq m_1, m_2 \leq 4$ .

**Key words:** association algebra, estimable parametric functions, GA-optimality criterion, PBFF designs, resolutions

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