

## Minimax design criterion for fractional factorial designs

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**Abstract** An A-optimal minimax design criterion is proposed to construct fractional factorial designs, which extends the study of the D-optimal minimax design criterion in Lin and Zhou (*Canadian Journal of Statistics* **41**, 325–340, 2013). The resulting A-optimal and D-optimal minimax designs minimize, respectively, the maximum trace and determinant of the mean squared error matrix of the least squares estimator (LSE) of the effects in the linear model. When there is a misspecification of the effects in the model, the LSE is biased and the minimax designs have some control over the bias. Various design properties are investigated for two-level and mixed-level fractional factorial designs. In addition, the relationships among A-optimal, D-optimal, E-optimal, A-optimal minimax and D-optimal minimax designs are explored.

**Keywords** A-optimal design · D-optimal design · Factorial design · Model misspecification · Requirement set · Robust design