D-optimal chemical balance weighing designs with $n \equiv 0 \pmod 4$ and 3 objects

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Abstract

In this paper the problem of estimation of the individual weights of three objects using a chemical balance weighing design is considered. We use the criterion of D-optimality. We assume that the variance matrix of errors is the matrix of first-order autoregressive process. Such problems were discussed in Li and Yang (2005) and also in Yeh and Lo Huang (2005). We present new results of D-optimal designs in certain class of designs with the design matrix $\boldsymbol{X} \in M_{n \times 3}(\pm 1)$ such that each column of matrix $\boldsymbol{X}$ has at least one 1 and one -1.

Keywords

Chemical balance weighing design, D-optimality, First-order autoregressive process.

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