

D-optimal chemical balance weighing designs for three objects if $n \equiv 2 \pmod{4}$

Krystyna Katulska and Łukasz Smaga

Adam Mickiewicz University, Poznań, Poland

Abstract

In this paper, chemical balance weighing design problem for three objects and the errors between the observations follow a first-order autoregressive process is considered. From such assumptions, the covariance matrix of error components depends on the known parameter ρ . We prove the D-optimality of some designs in the class of designs for three objects, when the number of observations $n \equiv 2 \pmod{4}$ and some $\rho \geq 0$. Some necessary and sufficient conditions under which the design is D-optimal in considered class of designs are also proved.

Keywords

D-optimal chemical balance weighing designs, First-order autoregressive process.

References

- [1] Jacroux, M., C.S. Wong and J.C. Masaro (1983). On the optimality of chemical balance weighing designs. *J. Statist. Plann. Inference* 8, 231–240.
- [2] Katulska, K. and L. Smaga (2012a). D-optimal chemical balance weighing designs with $n \equiv 0 \pmod{4}$ and 3 objects. *Comm. Statist. Theory Methods*. DOI:10.1080/03610926.2011.608587.
- [3] Katulska, K. and L. Smaga (2012b). D-optimal chemical balance weighing designs with autoregressive errors. *Metrika*. DOI:10.1007/s00184-012-0394-8
- [4] Li, C.H. and S.Y. Yang (2005). On a conjecture in D -optimal designs with $n \equiv 0 \pmod{4}$. *Linear Algebra Appl.* 400, 279–290.
- [5] Yeh, H.G. and M.N. Lo Huang (2005). On exact D -optimal designs with 2 two-level factors and n autocorrelated observations. *Metrika* 61, 261–275.