

Optimal designs for the Michaelis Menten model with correlated observations

Holger Dette¹ and Joachim Kunert²

¹*Ruhr University Bochum, Germany*

²*Technical University of Dortmund, Germany*

Abstract

In this paper we investigate the problem of designing experiments for weighted least squares analysis in the Michaelis Menten model. We study the structure of exact D -optimal designs in a model with an autoregressive error structure. Explicit results for locally D -optimal are derived for the case where 2 observations can be taken per subject. Additionally standardized maximin D -optimal designs are obtained in this case. The results illustrate the enormous difficulties to find exact optimal designs explicitly for nonlinear regression models with correlated observations.

Keywords

Autoregressive errors, Michaelis Menten model, Exact designs, Locally D -optimal designs, Standardized maximin optimal design.

References

- [1] Dette, H. and S. Biedermann (2003). Robust and efficient designs for the Michaelis-Menten model. *J. Amer. Statist. Assoc.* 98, 679–686.
- [2] Dette, H., J. Kunert and A. Pepelyshev (2008). Exact optimal designs for weighted least squares analysis with correlated errors. *Statist. Sinica* 18, 135–154.
- [3] Pepelyshev, A. (2007). Optimal Designs for the Exponential Model with Correlated Observations. In: J. Lopez-Fidalgo, J.M. Rodriguez-Diaz and B. Torsney (Eds.), *MODA 8, Advances in Model-Oriented Design and Analysis*, (pp. 165–172), Physica Verlag.