Accepted Manuscript

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PII: S0167-9473(16)30154-2
DOI: http://dx.doi.org/10.1016/j.csda.2016.06.017
Reference: COMSTA 6304

To appear in: *Computational Statistics and Data Analysis*

Received date: 23 January 2016
Revised date: 25 June 2016
Accepted date: 30 June 2016

Please cite this article as: Dette, H., Schorning, K., Konstantinou, M., Optimal designs for comparing regression models with correlated observations. *Computational Statistics and Data Analysis* (2016), http://dx.doi.org/10.1016/j.csda.2016.06.017

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ACCEPTED MANUSCRIPT

Optimal designs for comparing regression models with correlated observations

Holger Dette[a,*], Kirsten Schorning[a], Maria Konstantinou[a]

[a] *Ruhr-Universität Bochum*
Fakultät für Mathematik
44780 Bochum, Germany

Abstract

The problem under investigation is that of efficient statistical inference for comparing two regression curves estimated from two samples of dependent measurements. Based on a representation of the best pair of linear unbiased estimators in continuous time models as a stochastic integral, a pair of linear unbiased estimators with corresponding optimal designs for finite sample size is constructed. This pair minimises the width of the confidence band for the difference between the estimated curves in a class of linear unbiased estimators approximating the stochastic integrals and is very close to the pair of weighted least squares estimators with corresponding optimal design. Thus results readily available in the literature are extended to the case of correlated observations and an easily implementable solution is provided which is practically non distinguishable from the weighted least squares estimators. The advantages of using the proposed pairs of estimators with corresponding optimal designs for the comparison of regression models are illustrated via several numerical examples.

Keywords: linear regression, correlated observations, comparing regression curves, confidence band, optimal design

*Corresponding author: Ruhr-Universität Bochum, Universitätsstrasse 150, Department of Mathematics, Institute of Statistics, Building NA 3/73, 44780 Bochum, Germany, Tel.: +49 (0)234 / 32 28284, Fax: +49 (0)234 / 32 14559

Email address: holger.dette@ruhr-uni-bochum.de (Holger Dette)

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