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A new approach to optimal design for linear models with correlated observations. (English)

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Summary: We consider the problem of designing experiments for regression in the presence of correlated observations with the location model as the main example. For a fixed correlation structure approximate optimal designs are determined explicitly, and it is demonstrated that under the model assumptions made by *P. J. Bickel* and *A. M. Herzberg* [Ann. Stat. 7, 77–95 (1979; Zbl 0403.62051)] for the determination of asymptotic optimal design, the designs derived in this article converge weakly to the measures obtained by these authors.

We also compare the asymptotic optimal design concepts of *J. Sacks* and *D. Ylvisaker* [Ann. Math. Stat. 37, 66–89 (1966; Zbl 0152.17503); Ann. Math. Stat. 39, 49–69 (1968; Zbl 0165.21505)] and Bickel and Herzberg [loc. cit.] and point out some inconsistencies of the latter. Finally, we combine the best features of both concepts to develop a new approach for the design of experiments for correlated observations, and it is demonstrated that the resulting design problems are related to the (logarithmic) potential theory.

MSC:

62K05 Optimal statistical designs

62J05 Linear regression; mixed models

Cited in **13** Documents

Keywords:

arcsine distribution; Bickel-Herzberg approach; logarithmic potentials; positive definite functions; singular kernel

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