Bayesian One- and Two-Stage Design for Generalized Linear Models

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Bayesian experimental designs for the generalized linear models are discussed under the statistical decision-theory framework by Lindley (1972). Chaloner and Larntz (1989) presented a unifying theory of optimal design and they investigated optimal designs under different criteria for the logistic regression model by using the Nelder-Mead algorithm. We will discuss the Bayesian optimal design for the Poisson regression models. In computation, we propose a hybrid algorithm, by combining a genetic algorithm and a local optimization criterion, to obtain the possible optimal designs. Furthermore, such designs will be validated by the equivalence theorem. In addition, we developed Bayesian two-stage optimal designs for the generalized linear models, especially for the logistic and Poisson regression models, by implementing our hybrid computational method.

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