

Optimization in a Multivariate Generalized Linear Model Situation

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The purpose of this article is to find the settings of the factors which simultaneously optimize several mean responses in a multivariate generalized linear model (GLM) environment. The generalized distance approach, initially developed for the simultaneous optimization of several linear response surface models, is adapted to this multivariate GLM situation. An application of the proposed methodology is presented in the special case of a bivariate binary distribution resulting from a drug testing experiment concerning two responses, namely, the efficacy and toxicity of a particular drug combination. One of the objectives of this application is to find the dose levels of two drugs that simultaneously maximize their therapeutic effect and minimize any possible toxic effects. A second application is presented in the case of a multivariate gamma distribution.

Keywords: Bivariate binary distribution, generalized distance approach, multiresponse data, multivariate gamma distribution, simultaneous optimization.