

Bayesian Analysis of Definitive Screening Designs When the Response is Nonnormal

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Abstract

Definitive Screening Designs (DSDs) are a class of experimental designs that may estimate linear, quadratic and interaction effects with little experimental effort. The number of experimental runs is twice the number of factors of interest plus one. Many industrial experiments involve nonnormal responses. Generalized linear models (GLMs) are a useful alternative for analyzing these kind of data. The analysis of GLMs is based on asymptotic theory, something very debatable for example in the case of the DSD with only thirteen experimental runs. In this work, we show a five step strategy that makes use of tools coming from the Bayesian approach to analyze this kind of experiments when the response is nonnormal. This kind of analysis does not have to resort to asymptotic approximations.

Keywords: Generalized linear models, significant effects, model selection, posterior distribution of the effects, posterior odds