Abstract

In industrial experiments, cost considerations will sometimes make it impractical to design experiments so that effects of all the factors can be estimated simultaneously. Therefore experimental designs are frequently constructed to estimate main effects and a few pre-specified interactions. A criticism frequently associated with the use of many optimality criteria is the specific reliance on an assumed statistical model. One way to deal with such a criticism may be to assume that instead the true model is an approximation of an unknown element of a known set of models. In this thesis, we consider a class of designs that are robust for change in model specification.

This paper is motivated by the belief that appropriate Bayesian approaches may also perform well in constructing model robust designs and by the limitation of such approaches in the literature. We introduce an idea that uses the traditional Bayesian design method for parameter estimation and incorporates a discrete prior probability on the set of models of interest. Two-levels designs were used in the examples. Comparisons with designs resulting from existing approaches and under similar conditions will be provided.