Computing optimal experimental designs with R

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Many algorithms have been proposed for the computation of efficient designs of experiments. However, the available R packages for implementing these algorithms are limited. We introduce an R package OptimalDesign which provides a toolbox for the computation of D- , A- and IV-efficient exact and approximate designs of experiments on finite domains, for regression models with real-valued, uncorrelated observations. An important feature of the package is that several implemented procedures allow for multiple linear constraints on the vector of design weights. The package incorporates several algorithms based on significantly different principles, including search heuristics, state-of-the-art mathematical programming methods, and a combination of convex optimization methods. This allows the user to cross-check the quality of the results, and, in many cases, provides efficient design alternatives to choose for the experiment.

Keywords: R, mathematical programming, design of experiments, constrained optimization