

Computational aspects of optimal experimental designs

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Abstract

In the talk, we will review various classes of algorithms proposed to compute efficient experimental designs. We also introduce our R package `OptimalDesign` which provides a toolbox for the computation of D-, A-, I-, and c-efficient exact and approximate designs of experiments on finite domains, for regression models with real-valued, uncorrelated observations, with multiple linear constraints on the vector of design weights. We will demonstrate how to apply the procedures to selected practical optimal design situations. In addition, we will show that some well-known problems from computational geometry, matrix theory and graph theory are special cases of the general problem of optimal experimental design. We will discuss to which extent these problems can be solved via existing algorithms used for computing optimum experimental designs.

Keywords

Experimental design, Minimum volume enclosing ellipsoid, Outliers, Hadamard hypothesis.