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Abstract

Measures minimizing regularized dispersion

We consider a continuous extension of a regularized version of the minimax, or dispersion, criterion widely used in space-filling design for computer experiments and quasi-Monte Carlo methods. We show that the criterion is convex for a certain range of the regularization parameter (depending on space dimension) and give a necessary and sufficient condition characterizing the optimal distribution of design points. Using results from potential theory, we investigate properties of optimal measures. The example of design in the unit ball is considered in details and some analytic results are presented. Using recent results and algorithms from experimental design theory, we show how to construct optimal measures numerically. They are often close to the uniform measure but do not coincide with it. The results suggest that designs minimizing the regularized dispersion for suitable values of the regularization parameter should have good space-filling properties. An algorithm is proposed for the construction of n -point designs.