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Design on Non-Convex Regions: Optimal Experiments for Spatial Process Prediction

Modeling a response over a non-convex design region is a common problem in diverse areas such as engineering and geophysics. The tools available to model and design for such responses are limited and have received little attention. We propose a new method for selecting design points over non-convex regions that is based on the application of multidimensional scaling to the geodesic distance. Optimal designs for prediction are described, with special emphasis on Gaussian process models, followed by a simulation study and an application in glaciology.