Contribution ID: **51** Type: **not specified**

Incremental Designs for Simultaneous Kriging Predictions Based on the Generalized Variance as Criterion

Wednesday, 13 September 2023 09:10 (20 minutes)

In this talk, the problem of selecting a set of design points for universal kriging, which is a widely used technique for spatial data analysis, is further investigated. The goal is to select the design points in order to make simultaneous predictions of the random variable of interest at a finite number of unsampled locations with maximum precision. Specifically, a correlated random field given by a linear model with an unknown parameter vector and a spatial error correlation structure is considered as response. A new design criterion that aims at simultaneously minimizing the variation of the prediction errors at various points is proposed. There is also presented an efficient technique for incrementally building designs for that criterion scaling well for high dimensions. Thus the method is particularly suitable for big data applications in areas of spatial data analysis such as mining, hydrogeology, natural resource monitoring, and environmental sciences or equivalently for any computer simulation experiments. The effectiveness of the proposed designs is demonstrated through a numerical example.

Keywords

optimal experimental design, active learning, Gaussian process

Classification

Mainly methodology

Primary author: WALDL, Helmut (Johannes Kepler University Linz)

Presenter: WALDL, Helmut (Johannes Kepler University Linz)

Session Classification: CONTRIBUTED Design of Experiments 3

Track Classification: Design and analysis of experiments