



Efficient Prediction Designs for Random Fields

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For estimation and predictions of random fields it is increasingly acknowledged that the kriging variance may be a poor representative of true uncertainty. Experimental designs based on more elaborate criteria that are appropriate for empirical kriging are then often non-space-filling and very costly to determine. In this presentation, we investigate the possibility of using a compound criterion inspired by an equivalence theorem type relation to build designs quasi-optimal for the empirical kriging variance when space-filling designs become unsuitable. Two algorithms are proposed, one relying on stochastic optimization to explicitly identify the Pareto front, while the second uses the surrogate criteria as local heuristic to choose the points at which the (costly) true empirical kriging variance is effectively computed. We illustrate the performance of the algorithms presented on both a simple simulated example and a real oceanographic dataset.

Keywords: optimal design; Pareto front; empirical kriging; Gaussian process models.

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