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Gaussian fields: the non-stationary / nonsparse case

Efficient sampling of high-dimensional

F. Orieux, O. Féron, J.-F. Giovannelli

(Submitted on 30 May 2011)

This paper is devoted to the problem of sampling Gaussian fields in high dimension. Solutions exist for two specific structures of inverse covariance : sparse and circulant. The proposed approach is valid in a more general case and especially as it emerges in inverse problems. It relies on a perturbation-optimization principle: adequate stochastic perturbation of a criterion and optimization of the perturbed criterion. It is shown that the criterion minimizer is a sample of the target density. The motivation in inverse problems is related to general (non-convolutive) linear observation models and their resolution in a Bayesian framework implemented through sampling algorithms when existing samplers are not feasible. It finds a direct application in myopic and/or unsupervised inversion as well as in some non-Gaussian inversion. An illustration focused on hyperparameter estimation for super-resolution problems assesses the effectiveness of the proposed approach.

Subjects: **Computation (stat.CO)**; Learning (cs.LG); Applications (stat.AP) Cite as: **arXiv:1105.5887 [stat.CO]** (or **arXiv:1105.5887v1 [stat.CO]** for this version)

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