



Einladung zum Vortrag

von

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Bayesian estimation of excursion sets under Gaussian random field priors

In many industrial and scientific applications it is interesting to estimate the set of parameters that leads a response to exceed a particular value. For example, in reliability engineering the danger of a system can often be described by a real valued function and the safe configurations can be modelled as the set of parameters where this function takes values above or below a certain threshold. We focus here on cases where the function is expensive to evaluate and it is not possible to directly estimate the excursion set. We consider a Bayesian framework where the function can be described as one realization of a Gaussian random field (GRF). Given a GRF prior and few observed values of the function we approximate the response with the posterior field. This field gives rise to a posterior distribution of excursion sets of the function. We present here two recent results that reduce some of the computational challenges associated with excursion set estimates.

First we introduce a method to generate quasi realizations of the set from its posterior distribution under the Gaussian random field model. With this approach it is possible to generate approximate realizations of the posterior set discretized on high resolutions designs, thus opening the way for empirical expectations computed with realizations of the set. This approach is used to compute distance average expectation of the posterior set and to evaluate the uncertainty on this estimate with the distance average variability.

The second result is an efficient procedure to compute the probability of exceedance of the maximum of a high dimensional Gaussian random vector. This result is used to compute conservative estimates of the excursion set on high resolution grids without introducing sparsity assumptions on the Gaussian field.

Termin: Freitag, 15. April 2016, 10:30 Uhr

Ort: Universität Ulm, Helmholtzstr. 22, Raum 202

Interessenten sind herzlich eingeladen.

Der Vortrag findet im Rahmen des Mathematischen Kolloquiums statt.

gez. E. Spodarev