NONPARAMETRIC SPATIAL STATISTICS

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The talk will be divided in two parts.
First, we study kernel estimation of the density of amultidimensional spatial process $(Z_{\mathbf{x}}, \mathbf{x} \in \mathbb{R}_+^N)$, where the spatial index $\mathbf{x}$ varies continuously throughoutthe space $\mathbb{R}_+^N$ ($N \geq 1$). The loss between the estimator and theunknown density is measured by means of mean square error. Under appropriateconditions, we prove the existence of optimal, parametric and intermediaterates, provided the process is observed on an hyperrectangle of $\mathbb{R}_+^N$. Since such an observation is impossible in practice, it isshown that the parametric rate is preserved by using a suitable spatial samplingscheme. Our results are a natural extension of the existing results innonparametric density estimation for continuous time series ($N = 1$).
Seconds, letting $\mathbb{N}^N$ be the integer lattice points in the$N$-dimensional Euclidean space, we define a nonparametric spatial predictorfor the values of a random field indexed by $\mathbb{N}^N$ using a kernelmethod. As for prerequisites, we first examine the general problem of theregression estimation for random fields. Then we show the uniform consistencyon compact sets of our spatial predictor as well as its asymptotic normality.

Joint work with Benoît Cadre, University Montpellier II.

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