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SEMINAR

"Rates of Contraction of Posterior Distributions Based on Gaussian Process Priors"

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Thursday, 18th October 2007 – h. 16.30
Room 137 – Viale Isonzo 25 - 20135 Milano

Abstract:

We consider Bayesian inference by modelling a function (e.g. a density, regression or classification function) by the sample path of a Gaussian process. If the observations are generated according to a "true" function that is in the support of the corresponding Gaussian measure, then the posterior distribution typically contracts to this true function. The rate of contraction can be characterized in terms of the reproducing kernel Hilbert space of the Gaussian measure, in particular the "size" of its unit ball and the position of the true function relative to it. We illustrate the general result by several examples, including multiply integrated Brownian motion and smooth stationary processes. To obtain rates of contraction that are optimal in a minimax sense one needs to carefully select the Gaussian process or apply a correct scaling of the sample paths. We finish by discussing random scaling.[Joint work with Harry van Zanten.]