OPTIMAL RATES AND ADAPTATION FOR BAYESIAN METHODS OF DIFFUSION PROCESSES

van Waaij, Jan
University of Amsterdam, The Netherlands, j.vanwaaij@uva.nl
Moritz Schauer *Leiden University, The Netherlands*
Frank van der Meulen *Delft University of Technology, The Netherlands*
Harry van Zanten *University of Amsterdam, The Netherlands*

SDE; POSTERIOR CONVERGENCE:

We observe a continuous process $X^T = \{X_t : t \in [0,T]\}$ which is a solution to a stochastic differential equation $dX_t = b(X_t)dt + dW_t$. We assume that b is 1-periodic and square integrable on $[0,1]$. We are interested in estimating b. In this talk I will consider several priors (i.e. probability measures) on the infinite dimensional parameter space to which b belongs. In Bayesian statistics inference is done via the posterior, i.e. the distribution of the parameter space given the data. We are interested in the frequentist behaviour of the posterior. In particular in the rate with which the posterior contracts around the true parameter. Bayesian methods for this model were first considered by [1]. Posterior consistency for their prior was derived in [2]. In our paper [3] we derive minimax posterior contraction rates for this prior and extend the prior to make it adaptive to the unknown Sobolev smoothness. Efficient numerical methods were considered in [4]. In recent work we showed optimal convergence rates for their prior and adaptation over certain Besov classes of functions.

References

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