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FAKULTÄT
FÜR MATHEMATIK, INFORMATIK
UND NATURWISSENSCHAFTEN

Fachbereich Mathematik

Kolloquium über Mathematische Statistik und Stochastische Prozesse

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**Concentration inequalities for diffusion processes and
their application to adaptive drift estimation (joint work
with Cathrine Aeckerle)**

Abstract:

We derive concentration inequalities for general (additive) functionals and the local time process of scalar diffusion processes. Our approach substantially relies on combining the device of martingale approximation and moment bounds which are obtained by the generic chaining method. As a concrete statistical application, we consider the question of estimating the drift function for a large class of ergodic diffusion processes. The unknown drift is supposed to belong to a nonparametric class of smooth functions of unknown order. We suggest a fully data-driven procedure which allows for rate-optimal drift estimation (with respect to sup-norm risk) and, at the same time, yields an asymptotically efficient estimator of the invariant density of the diffusion.

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