Einladung

zum Vortrag im Rahmen des **SFB Colloquiums** (Standort Linz), mit dem Titel

A discrepancy bound for deterministic acceptance-rejection samplers beyond $N^{-1/2}$

VORTRAGENDE: **Houying Zhu**, University of New South Wales
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Abstract: In this talk we consider an acceptance-rejection (AR) sampler based on deterministic driver sequences. We prove that the star-discrepancy between the target distribution and the empirical distribution of an N element sample set generated by the AR sampler is bounded by $\mathcal{O}(N^{-2/3}\log N)$, provided that the target density is twice continuously differentiable with non-vanishing curvature and the AR sampler uses the driver sequence

$$\mathcal{K}_M = \{\boldsymbol{x}_n = (n\alpha, n\beta) \ \ mod \ \ 1 \text{ for } n = 1, \dots, M\}.$$

Here α, β are real algebraic numbers such that $1, \alpha, \beta$ is a basis of a number field over $\mathbb{Q}$ of degree 3. For the driver sequence

$$\mathcal{F}_k = \{\boldsymbol{x}_j = (j/F_k, \{jF_{k-1}/F_k\}) \text{ for } j = 1, \dots F_k\},$$

where F_k is the k-th Fibonacci number, we can remove the log factor to improve the convergence rate to $\mathcal{O}(N^{-2/3})$, where again N is the number of samples we accepted.
We also introduce a criterion for measuring the goodness of driver sequences. The proposed approach is numerically tested by calculating the star-discrepancy of samples generated for some target densities using $\mathcal{K}_M$ and $\mathcal{F}_k$ as driver sequences. These results confirm that achieving a convergence rate beyond $N^{-1/2}$ is possible in practice using $\mathcal{K}_M$ and $\mathcal{F}_k$ as driver sequences in the AR sampler.

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