Title: Statistical Inference for Fokker-Planck operators.
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Abstract
We consider the problem of inferring the interaction kernel of stochastic interacting particle systems and of their corresponding mean field McKean-Vlasov (Fokker-Planck) PDE. We consider two measurement models: we either observe a **single** particle of the interacting particle system, or we are given noisy spatiotemporal discrete measurement of the solution to the mean field PDE. We show how spectral theoretical methods as well the generalized method of moments can be used in order to infer the interaction kernel for trajectory observations. Furthermore, we show how the inference problem for the McKean-Vlasov PDE can be formulated as a Bayesian inverse problem and we prove posterior consistency with optimal convergence rates, under appropriate assumptions on the initial conditions of the mean field PDE and on the interaction kernel.