LIKELIHOOD-FREE BAYESIAN INFERENCE VIA TRANSPORTATION OF MEASURE

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ABSTRACT

Many practical Bayesian inference problems fall into the "likelihood-free" setting, where evaluations of the likelihood function or prior density are unavailable or intractable; instead, one can only simulate (i.e., draw samples from) the associated distributions. I will discuss how transportation of measure can help solve such problems, by constructing maps that push prior samples to the desired conditional distribution. These methods have broad utility for inference in stochastic and generative models, as well as for data assimilation problems motivated by geophysical applications. Key issues in this construction center on: (1) the estimation of transport maps from few samples; and (2) parameterizations of monotone triangular maps. Both of these tasks have interesting parallels in the ML literature, though scientific applications often demand better small-sample performance and computational tractability. I will discuss recent developments and applications on both fronts.