
Sequential Monte Carlo with estimated likelihoods

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Abstract

The development of exact approximate Monte Carlo methods, in which unbiased estimates of densities are used within Markov chain Monte Carlo (MCMC) or sequential Monte Carlo (SMC) algorithms without loss of exactness, is one of the most important recent innovations in the field. This talk concerns the use of both exact approximations and inexact approximations or "noisy" methods (where low variance alternatives to unbiased approximations are used instead) within importance sampling and SMC algorithms. In noisy methods the exactness of the algorithm is lost, but in some cases this proves to be insignificant compared to computational savings or improved variance of estimates produced by finite runs. In the context of many applied researchers accepting the use of other approximate methods (such as approximate Bayesian computation) further investigation of the use of noisy methods is warranted.

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