

Computing Rare Event Probabilities by Stratified Markov Chain Monte Carlo

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In stratified survey sampling, one divides a population into homogeneous subgroups and then draws samples from each subgroup independently. Stratification often permits accurate computation of statistics from a sample much smaller than required otherwise. One can stratify Markov chain Monte Carlo (MCMC) simulations as well as surveys. This idea arose in computational statistical physics, and stratified MCMC has been instrumental in resolving important questions related to ion channels and protein folding. I will explain how to extend stratified MCMC to a broad class of problems, including the calculation of probabilities of rare events. I will then present theoretical results and numerical experiments which demonstrate the advantages of stratified MCMC.