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Title: On the choice of importance distributions for multiple importance sampling estimators

Abstract:
Importance sampling (IS) is a popular Monte Carlo procedure where samples from one distribution are weighted to estimate means with respect to others. The naive IS estimator, based on a single importance density, suffers from high variance if it is not 'close' to the target density. There are situations where simultaneous estimation of means with respect to a large set of pdfs arise. The problems of the naive IS estimator are exacerbated in this case, as a single (importance) density may not work for all target pdfs. In this talk, the issues with naive IS will be demonstrated when used to evaluate the partition function of the spatial autologistic model. To reduce the variability of the naive IS estimator, one may use samples from multiple densities, giving rise to the so-called multiple IS estimator. I will discuss one such estimator based on reweighting samples from a mixture distribution and present a central limit theorem for the asymptotic distribution of this estimator. Finally, I will present clever ways of choosing these importance densities to achieve low variability based on spatial sampling design ideas.