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SEMINAR

"New perspectives for estimating normalizing constants via posterior simulation"

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Abstract:

In this paper we recast the problem of evaluating the normalizing constant of an arbitrary density function with the aid of an arbitrary MC or MCMC sampling scheme. We start from the well known principles of the importance sampling technique and the generalized harmonic mean identity to show a different perspective under which one can look at some of the existing estimators available in the literature eventually devising new methods for implementing generalized harmonic estimator which allow to enhance its flexibility and possibly improve on currently implemented procedures. The new estimators start from the idea of suitably perturbing the original target density function whose normalizing constant has to be evaluated in such a way that the perturbed density has the same original normalizing constant plus a known arbitrary positive mass. We focus on the effectiveness of the new estimators when the perturbed density is obtained via the Hyperplane Inflation idea of Petris and Tardella (2003). The proposed estimators share the original simplicity of the harmonic mean estimator of Newton and Raftery (1994) yielding consistent MC or MCMC estimators based only on a simulated sample from the distribution proportional to the original density. However, under fairly general conditions, it avoids the infinite variance shortcoming. The calibration of the optimal choice of the arbitrary positive mass is also discussed. Effectiveness of the new estimators are illustrated through a bunch of simulated examples as well as on a more practical context of a real data set. Some possible extensions to difficult discrete distributions are discussed. This is a joint work with Giovanni Petris (University of Arkansas, Lafayette AR, U.S.A.).