

STATISTICS COLLOQUIUM

MONDAY, FEBRUARY 26, 2007

TALK: 4:00 PM — SCIENCE CENTER B-10

RECEPTION: 5:15 PM — SCIENCE CENTER, 7TH FLOOR

ESTIMATION IN HIDDEN MARKOV MODELS VIA EFFICIENT IMPORTANCE SAMPLING

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ABSTRACT

Given a sequence of observations from a discrete time, finite-state hidden Markov model, we would like to estimate the sampling distribution of a statistic. The bootstrap method is employed to approximate the confidence regions of a multi-dimensional parameter. In order to have efficient Monte Carlo simulation, we propose an importance sampling formula in this context. Our approach consists of constructing a locally asymptotically normal (LAN) family of probability distributions around the default resampling rule and then minimizing the asymptotic variance within the LAN family. The solution of this minimization problem characterizes the asymptotically optimal resampling scheme, which is given by a tilting formula. The implementation of the tilting formula is facilitated by solving a Poisson equation. A few numerical examples are given to demonstrate the efficiency of the proposed importance sampling scheme.

This is a joint work with Professor Inchi Hu.