**The University of Chicago**

**Department of Statistics**

## Ph.D. Seminar

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## "Optimal Bridge Sampling with Dependent Draws

**Thursday, October 2, 2003 at 3:00 PM**
**110 Eckhart Hall, 5734 S. University Avenue**

## ABSTRACT

Let $f_X(u) = c_X^{-1} q_X(u)$ and $f_Y(u) = c_Y^{-1} q_Y(u)$ be two density functions. Bridge sampling (Bennett 1976, Meng and Wong 1996) is a Monte Carlo technique that estimates $R = c_Y/c_X$ based on the equality

$$R \equiv \frac{E_X\{\alpha(X) q_Y(X)\}}{E_Y\{\alpha(Y) q_X(Y)\}},$$

whenever it is well defined; where $\alpha(u)$ is called a bridge function and it can be chosen according to some criteria. Thus, bridge sampling replaces the expected values by the sample averages of $\alpha(X)q_Y(X)$ and $\alpha(Y)q_X(Y)$. Bennett (1976), and Meng and Wong (1996) derived the optimal bridge function that minimizes the mean square error of $\hat{R}$ when the sequences $\{X_i\}_{i\geq 1}$, $\{Y_j\}_{j\geq 1}$, and the draws within the sequences are independent.

I am going to present the optimal bridge function for the case where the sequences $\{X_i\}_{i\geq 1}$ and $\{Y_j\}_{j\geq 1}$ are independent, but the draws within the sequences are dependent; the result is relevant because bridge sampling is usually applied with dependent draws generated by a Markov chain Monte Carlo method.

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