

The University of Chicago

Department of Statistics

Seminar

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**“Nonparametric Estimation Under Shape Constraints:
Monotone, Convex, and Beyond”**

Monday, April 12, 2004 at 4:00 PM
133 Eckhart Hall, 5734 S. University Avenue

ABSTRACT

In this talk I will consider nonparametric estimation of an unknown density function g under shape constraints from a mixture model perspective. Let k be a non-negative integer and let G be a distribution function on $(0, \infty)$. Then

$$f(x) = \int_0^\infty \frac{k}{y^k} (y-x)^{k-1} 1_{[0,y]}(x) dG(y)$$

is monotone (decreasing) when $k = 1$, g is convex and decreasing when $k = 2$, and higher values of k correspond to densities which are k times differentiable with derivatives of alternating sign. I will discuss what is known concerning estimation of f and the mixing distribution G when $k = 1$ and $k = 2$, and then discuss current work connected with the cases $3 \leq k < \infty$. Splines and a particular Hermite interpolation problem begin to play a role.
