Isotonic Nonparametric Regression in the Presence of Measurement Error

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School of Physical and Mathematical Sciences

In a great many regression problems the explanatory variable, $X$, represents the value taken by a treatment, for example a dosage, and the conditional mean of the response, $Y$, is anticipated to be a monotone function of $X$. Indeed, if this regression mean is not monotone (in the appropriate direction) then the medical or commercial value of the treatment is likely to be significantly curtailed, at least for values of $X$ that lie beyond the point at which monotonicity fails. Addressing these problems requires a method for testing the hypothesis that the regression mean is monotone, and, if the conclusion of the test is positive, a technique for estimating the mean response subject to the constraint that it is monotone. Methodology for solving these problems already exists, but it ignores the potential for errors in measuring $X$. In this talk we outline an approach that accommodates those errors, using statistical tilting.

Speaker Biography
Professor Peter Hall is among the world's most prolific and highly-cited authors in both probability and statistics. Mathscinet lists him with more than 500 publications as of January 2008. He has made very substantial and important contributions to nonparametric statistics, in particular for curve estimation and resampling: the bootstrap method, smoothing, density estimation, and bandwidth selection. He has worked on numerous applications across fields of economics, engineering, physical science and biological science. Hall has also made groundbreaking contributions to surface roughness measurement using fractals. In probability theory he has made many contributions to limit theory, spatial processes and stochastic geometry. His paper "Theoretical comparison of bootstrap confidence intervals" (Annals of Statistics, 1988) has been reprinted in the Breakthroughs in Statistics collection.

Professor Hall is a fellow of American Statistical Association, of Institute of Mathematical Science, of Australia Academy of Science and of Royal Society of London. He won numerous awards including The COPSS Presidents’ Award. He is currently a professor and ARC Federation Fellow at the Department of Mathematics and Statistics, University of Melbourne, and also has a joint appointment at University of California Davis. He previously held a professorship at the Centre for Mathematics and its Applications at the Australian National University.

Host: Prof Pan Guangming, Division of Mathematical Sciences, School of Physical and Mathematical Sciences