For Favour of Posting

THE CHINESE UNIVERSITY OF HONG KONG

Department of Statistics

will present a seminar entitled

On Hierarchical Nonparametric Quantile Regression

by

Prof. Mao-Zai Tian
School of Statistics
Remin University of China

on

Tuesday, 28 March 2006
2:00pm – 3:00pm

in

Lady Shaw Building C4
The Chinese University of Hong Kong

Abstract:

The classic hierarchical linear model formulation provides a considerable flexibility for modeling the random effects structure and a powerful tool for analyzing nested data that arise in various areas such as agriculture, biology, economics, education, geophysics, manufacturing and sociology. On the other hand, it assumes the within-group errors to be independently and identically distributed (i.i.d.) and models at all levels to be linear. In many applications, the within-group errors are however heteroscedastic or correlated, and models at different levels may not necessarily be linear. Most importantly, traditional hierarchical models (just like other ordinary mean regression methods) cannot characterize the entire conditional distribution of a dependent variable given a set of covariates and thus fail to yield robust estimators. In this article, we relax the aforementioned assumptions and develop a so-called *Hierarchical Nonparametric Quantile Regression Models* in which the within-group errors could be heteroscedastic and models at some levels are allowed to be nonparametric. We present the ideas with a 2-level model. Under the proposed nonparametric setting the vector of partial derivatives of the nonparametric function, which is usually called the marginal effects in econometrics, becomes the response variable vector in Level 2. To reveal the dependence of the entire conditional distribution of response on the set of covariates, we consider quantile regression coefficients. The proposed method allows us to model the fixed effects in the innermost level (i.e., Level 2) as a function of the covariates instead of a constant effect. We outline some mild regularity conditions required for $n^{1/2}$-convergence and asymptotic normality for our estimators. We illustrate our methodologies with a real hierarchical data set from a laboratory study and some simulation studies.

All are Welcome