

RMI Research Workshop Series

	Session 1	Session 2
Speaker:	Prof Wolfgang Härdle Humboldt University	Prof James Gentle George Mason University
Title:	Dynamic Semiparametric Factor Models in Risk Neutral Density Estimation	The Contribution of Jumps to the Volatility of Asset Prices
Date / Time:	6th March 2009, 3.00pm – 4.10pm	6th March 2009, 4.30pm – 5.40pm
Venue:	SOC1 Level 6 Room 12 (Opposite Science Faculty)	
Chair-person:	Prof Xia Yingcun, National University of Singapore	

Light refreshments will be served during the break (4.10pm – 4.30pm)

Session 1: Abstract

Dimension reduction techniques for functional data analysis model and approximate smooth random functions by lower dimensional objects. In many applications the focus of interest lies not only in dimension reduction but also in the dynamic behaviour of the lower dimensional objects. The most prominent dimension reduction technique - functional principal components analysis - however, does not model time dependences embedded in functional data. In this paper we use dynamic semiparametric factor models (DSFM) to reduce dimensionality and analyse the dynamic structure of unknown random functions by means of inference based on their lower dimensional representation. We apply DSFM to estimate the dynamic structure of risk neutral densities implied by prices of option on the DAX stock index.

About the speaker

Wolfgang Karl Härdle has worked with the finance industry for nearly 15 years as a consultant, specialising in computer packages and advanced numerical methods. He has given many lectures and training workshops on quantitative finance to industry practitioners around the world. He is professor of statistics in the School of Economics and Business at the Humboldt University, Berlin. He has extensive cooperative research and consultancy engagements with the European banking industry and with the Treasury in Frankfurt. He is an author of several books on statistical methods in finance and insurance. Professor Härdle is a member of the advisory board of Ferrell Asset Management and Guanghua School of Business, Beijing University. He is also a Member of the National Centre for Econometric Research, Australia, and in 2003 he became a "Highly cited Scientist" on the list by the Institute for Scientific Information, currently the only such researcher at Humboldt. Recent consultancies and research have included CAT bond pricing, Value at Risk Calculations with GH distributions, and Independent Component Analysis and Recursive portfolio optimization with CART – Classification and Regression Trees. He currently develops a copula based model for market risk management and CDO pricing.

Session 2: Abstract

Modeling the volatility of asset prices is one of the most challenging problems in computational finance. While models based on a constant volatility may correspond to reality for brief periods of time, asset prices after some period exhibit a different level of volatility. The volatility itself tends to be relatively high for some periods, relatively low for other periods, and highly variable during other periods. Diffusion models may capture some of this change in volatility, but use of such models suffers from the same problems as the basic diffusion models of the changes of the asset prices themselves; it merely pushes the stochastic elements of the model to a different level. Shocks in the data-generating process can explain some of the changes in model parameters. A simple way of incorporating shocks in the model is to superimpose a jump process on the diffusion process. In this talk I will review this type of jump-diffusion model, discuss some of the consequences of the model, and consider some of the ways of evaluating the model. I will discuss some of the tests for the presence of jumps that have been proposed, and study the tests using both simulated data and some data from the US energy futures market.

About the speaker

James E. Gentle is University Professor of Computational Statistics at George Mason University. His interests are computational statistics, survey sampling, machine learning, and computational finance. He is a Fellow of the American Statistical Association (ASA) and of the American Association for the Advancement of Science. He has held several national offices in the ASA and has served as associate editor of journals of the ASA as well as for other journals in statistics and computing. He is author of Random Number Generation and Monte Carlo Methods and Elements of Computational Statistics.