第三届全国概率统计青年学者会议

会议日程

2013 年 11 月 1 日 (星期五)	
全天报到	
地　　点	金晨假日酒店 B 座 1 楼大厅

2013 年 11 月 2 日 (星期六) 上午	
地　　点	金晨假日酒店 A 座 2 楼正德厅
8:00-9:00	开幕式及合影
9:00-10:30	邀请报告(3)
10:30-10:50	茶歇
10:50-12:20	邀请报告(3)
12:20-14:00	午餐，休息

2013 年 11 月 2 日 (星期六) 下午				
地　　点	圣德厅	贤德厅	明德厅	201 室
14:00-16:00	统计报告 1 组(6)	统计报告 2 组(6)	概率报告 1 组(6)	概率报告 2 组(6)
16:00-16:20	茶歇			
16:20-18:20	统计报告 1 组(6)	统计报告 2 组(6)	概率报告 1 组(5)	概率报告 2 组(5)
18:30	宴会			

2013 年 11 月 3 日(星期日) 上午				
地　　点	圣德厅	贤德厅	明德厅	
8:00-10:00	统计报告 1 组(6)	统计报告 2 组(6)	概率报告 (6)	
10:00-10:20	茶歇			
10:20-12:00	统计报告 1 组(5)	统计报告 2 组(5)	概率报告 (3)	
12:00-13:30	午餐，休息			

2013 年 11 月 3 日(星期日) 下午	
13:30-17:30	徐州市内观光
18:00	晚餐

2013年11月1日(星期五)全天报到

地点：徐州金晨假日酒店B座一楼大厅

2013年11月2日(星期六)上午

8:00-9:00	开幕式及合影　　　　　　　　　　　　　　　　地点：正德厅
	邀请报告　　　　　　　　　　　　　　　　地点：正德厅 **主持人：耿直 教授　北京大学**
9:00-9:30 **9:30-10:00** **10:00-10:30**	董昭，中国科学院 Malliavin Matrix of Degenerate PDE and Gradient Estimates 朱仲义，复旦大学 Functional single-index model for volatility 张希承，武汉大学 L^p-maximal regularity of nonlocal parabolic equation and applications
10:30-10:50	茶歇
	邀请报告　　　　　　　　　　　　　　　　地点：正德厅 **主持人：巩馥州 研究员　中国科学院**
10:50-11:20 **11:20-11:50** **11:50-12:20**	孙六全，中国科学院 A flexible semiparametric transformation model for recurrent event data 刘伟，江苏师范大学 Recent progress on stochastic evolution equations in variational framework 赵鹏，江苏师范大学 Order statistics from heterogeneous populations with applications
12:20-14:00	午餐，休息

	2013年11月2日(星期六)下午
	统计报告1组 地点: 圣德厅 主持人: 孙六全 研究员 中国科学院
14:00-14:20	樊亚莉，上海理工大学 Variable Selection in fixed censored quantile regression with high dimensional data
14:20-14:40	黄恒振，南开大学 Variable Selection for The Mean Function of Kriging in Computer Experiments
14:40-15:00	林鹏，中国科学院 一般线性混合效应模型的随机效应选择研究
15:00-15:20	苗旺，北京大学 Nonignorable Missing Data Analysis and Causal Inference
15:20-15:40	唐炎林，同济大学 Variable Selection via Composite Quantile Regression with Dependent Errors
15:40-16:00	许佩蓉，东南大学 Double Penalized H-likelihood for Selection of Fixed and Random Effects in Mixed Effects Models
16:00-16:20	茶歇
	主持人: 朱仲义 教授 复旦大学 地点: 圣德厅
16:20-16:40	武萍，华东师范大学 Estimation of genewise variance for microarray data with P-spine
16:40-17:00	黄初，杭州师范大学 Nonparametric Estimation of Quantiles for a Class of Stationary Processes
17:00-17:20	叶鹏，中国科学院 Analysis of multivariate recurrent event data with missing event category under additive rates model
17:20-17:40	刘鹏飞，香港中文大学 Transformation Structural Equation Models with Highly Non-normal and Incomplete Data
17:40-18:00	王纯杰，吉林大学 Nonparametric Estimation of Interval-censored Failure Time Data in the Presence of Informative Censoring
18:00-18:20	杨雪，南开大学 Nested orthogonal and nearly orthogonal latin hypercube designs
18:30	宴会
第一天结束	

2013年11月2日(星期六)下午	
	统计报告2组　　　　　　　　　　　　　地点：贤德厅 主持人：邹国华 研究员 中国科学院
14:00-14:20	郑雪莹，复旦大学 Time-varying correlation structure estimation and local-feature detection for spatio-temporal data
14:20-14:40	胡涛，首都师范大学 Efficient Estimation for Semiparametric Cure Models with Interval-Censored Data
14:40-15:00	方方，华东师范大学 Estimation of response from longitudinal binary data withnonignorable missing values in migraine trials
15:00-15:20	来鹏，南京信息工程大学 Semiparametric efficient estimation for partially linear single-index models with responses missing at random
15:20-15:40	刘玉坤，华东师范大学 High-order inference in a genetic semiparametric mixture model
15:40-16:00	张海祥，中国科学院 Analysis of Panel Count Data with Time-Dependent Covariates and Informative Observation Process
16:00-16:20	茶歇
	主持人：王德辉 教授 吉林大学　　　　　　地点：贤德厅
16:20-16:40	冯龙，南开大学 Nonparametric testing in regression models with Wilcoxon-type generalized likelihood ratio
16:40-17:00	孔新兵，复旦大学 FDR control in multiple testing under non-normality
17:00-17:20	李纯，香港中文大学 Information Theory based conditional independence tests
17:20-17:40	齐德全，南开大学 Weighted Likelihood Ratio Charts for Statistical Monitoring of Queueing Systems
17:40-18:00	郭文雯，首都师范大学 Quasi-Maximum Likelihood Estimations for Single-Index models with Autoregressive Processes
18:00-18:20	王占锋，中国科技大学 Partial area under the ROC curve subject to limit of detection
18:30	宴会
第一天结束	

2013年11月2日(星期六)下午

	概率报告1组 　　　　　　　　　　　　　　　　地点：明德厅 主持人：高洪俊 教授 南京师范大学
14:00-14:20	张少钦，中央财经大学 Harnack inequalities for 1-d stochastic Klein-Gordon equations
14:20-14:40	宋玉林，北京师范大学 Derivative Formula for Semilinear SDEs Driven by Levy Processes on Hilbert Spaces
14:40-15:00	解龙杰，武汉大学 Heat kernel estimates for critical fractional diffusion operator
15:00-15:20	许晓明，南京师范大学 Anticipated backward doubly stochastic differential equations
15:20-15:40	刘俊峰，东华大学 On a class of semilinear stochastic partial differential equation with fractional noises
15:40-16:00	程丽娟，北京师范大学 Stochastic differential equations on manifolds carrying geometric flows
16:00-16:20	茶歇
	主持人：李应求 教授　长沙理工大学 　　　　　　　　地点：明德厅
16:20-16:40	杨洋，南京审计学院 Uniform asymptotics for discounted aggregate claims in dependent risk models
16:40-17:00	毕俊娜，华东师范大学 Behavioral Mean-Risk Portfolio Selection in Continuous Time via Quantile
17:00-17:20	程建华，吉林大学 一类带干扰二维随机保费风险模型的破产概率
17:20-17:40	徐伟，北京师范大学 Parameter Estimation in Two-type Continuous-state Branching Processes with Immigration
17:40-18:00	毕洪伟，北京师范大学 A population model with non-neutral mutations in CBI
18:30	宴会
第一天结束	

2013年11月2日(星期六)下午

	概率报告2组　　　　　　　　　　　　　　　　地点: **201室** 主持人：闫理坦 教授　东华大学
14:00-14:20	姚强，华东师范大学 Contact Processes on Some Random Graphs
14:20-14:40	王开永，苏州科技学院 Asymptotics for tail probability of random sums with a heavy-tailed number and dependent increments
14:40-15:00	宗高峰，山东大学 On the law of large numbers for capacities
15:00-15:20	周珂，北京师范大学 Hitting time distribution for finite states Markov chain
15:20-15:40	国洪松，北京师范大学 Limit properties of subcritical CMJ processes about the coming generation
15:40-16:00	刘广应，南京审计学院 Central limit theorems for power variation of Gaussian integral processes with jumps
16:00-16:20	茶歇
	主持人：张希承 教授　武汉大学　　　　　　　　地点: **201室**
16:20-16:40	张美娟，中央财经大学 随机环境中分枝随机游动的极限定理
16:40-17:00	王绍臣，武汉大学 Moderate deviation principles for estimators in EV regression models with \alpha-mixing errors
17:00-17:20	高武军，北京师范大学 Spectral gap and decay rate for diffusion processes with Markov switching
17:20-17:40	张铭，北京师范大学 Another criteria for geometric ergodicity
17:40-18:00	胡二彦，北京理工大学 Heat Kernel for Perturbation of $\Delta+\Delta^{\alpha/2}$ by gradient operator
18:30	宴会
	第一天结束

2013年11月3 日(星期日)上午

	统计报告**1**组　　　　　　　　　　　　　　地点：圣德厅 主持人：　房祥忠　教授　北京大学
8:00-8:20	李霓，海南师范大学 Identifying Genetic Variants for Addiction via Propensity Score Adjusted Generalized Kendall's　Tau
8:20-8:40	李康，北京大学 Optimal design for interference model when neighbor effects are proportional to direct treatment effects
8:40-9:00	王琳，南开大学 Construction of higher order orthogonal and nearly orthogonal Latin hypercube designs
9:00-9:20	刘小惠，江西财经大学 Approximating projection depth median in higher dimensions
9:20-9:40	李涵，香港中文大学 Pivotal allocation based relabeling algorithm for handling label switching problem in Bayesian mixture model
9:40-10:00	徐平峰，长春工业大学 A localized implementation of the iterative proportional scaling procedure for Gaussian graphical models by partitioning cliques
10:00-10:20	茶歇
	主持人：赵鹏　副教授　江苏师范大学　　　　　地点：圣德厅
10:20-10:40	陈雪平，东南大学 Orthogonal arrays containing partially clear main effects
10:40-11:00	单娜，长春工业大学 Conditions for detecting confounders in observational studies
11:00-11:20	杨金语，南开大学 Construction of sliced maximin-orthogonal latin hypercube designs
11:20-11:40	姜博川，北京大学 Construction of sliced space-_lling designs based on balanced sliced orthogonal arrays
11:40-12:00	邓世容，武汉大学 Monotone Splines-based Sieve Estimation Methods for Panel Count Data with Informative Observation Times
12:20-13:30	午餐，休息

2013年11月3日(星期日)上午

	统计报告2组　　　　　　　　　　　　　地点：贤德厅 主持人：　艾明要　教授　北京大学
8:00-8:20	陈心洁，中国科学院 Focused Information Criterion and Model Averaging for Linear Mixed-Effects Models
8:20-8:40	刘吉彩，　华东师范大学 A robust and efficient estimation method for single index models
8:40-9:00	潘东东，云南大学 Robust joint analysis with data fusion in two-stage quantitative trait genome-wide association studies
9:00-9:20	秦国友，复旦大学 Robust Estimation of Generalized Partially Linear Model for Longitudinal Data with Dropouts
9:20-9:40	肖立群，中国科学技术大学 Random weighting approximation for Tobit regression models with longitudinal data
9:40-10:00	高研，中国科学院 Model Averaging for Threshold Models
10:00-10:20	茶歇
	主持人：　李建波　副教授　江苏师范大学　　　　地点：贤德厅
10:20-10:40	郭红，南开大学 Calibrated Empirical Likelihood for High-Dimensional Data in Regression Model
10:40-11:00	李周平，兰州大学 Empirical likelihood for least absolute relative error regression
11:00-11:20	宇世航，吉林大学 Empirical likelihood for first-order autoregressive error-in-explanatory variable models with validation data
11:20-11:40	刘畅，华东师范大学 成交价分析在高频交易中的应用
11:40-12:00	王磊，华东师范大学（新添） Adjusted Empirical Likelihood with High-order Precision through Resampling
12:00-13:30	午餐，休息

2013年11月3日(星期日)上午

	概率报告 地点：明德厅 主持人：陈增敬 教授 山东大学
8:00-8:20	翟建梁，中国科学技术大学 Large Deviations for SPDEs of Jump Type
8:20-8:40	李育强，华东师范大学 Exact moduli of continuity for operator-scaling Gaussian random fields
8:40-9:00	梁志彬，南京师范大学 Optimal reinsurance and investment with unobservable claim size and intensity
9:00-9:20	林祥，浙江工商大学 On ruin minimization under optimal outward reinsurance and inward reinsurance policies
9:20-9:40	谭中权，嘉兴学院 Extremes of Shepp Statistics for the Fractional Brownian Motion
9:40-10:00	陈勇，湖南科技大学 On the eigenfunctions of the complex Ornstein-Uhlenbeck operators
10:00-10:20	茶歇
	主持人：董昭 研究员 中国科学院 地点：明德厅
10:20-10:40	徐方军，华东师范大学 Central limit theorem for functionals of two independent fractional Brownian motions
10:40-11:00	贺鑫，北京师范大学 Lebesgue approximation of superprocesses with a regularly varying branching mechanism
11:00-11:20	胡泽春，南京大学 Extended Kanda-Forst-Rao theorem and related results on Hunt's hypothesis (H) for Levy processes
12:00-13:30	午餐，休息

2013年11月3日(星期日)下午

13:30-17:30	徐州市内观光
18:00	晚餐
会议结束	

邀请报告摘要

Malliavin Matrix of Degenerate PDE and Gradient Estimates

Dong Zhao

(Chinese Academy of Sciences)

Abstract In this talk, we present the bounded of the inverse for Malliavin Matrix of Degenerate PDE under a new condition, which is equivalent to the Hoermander condition as the coefficients are smooth. Also, the gradient estimatats for the semigroup is given.

Functional Single-Index Model for Volatility

Zhongyi Zhu

(Fudan University)

Abstract In this paper, the functional single-index model is sproposed for functional response data, possibly measured with error, for predictor and response. Using the two-step algorithm, the coefficient functions and the unknown smooth link function are estimated, and their asymptotic properties are studied under mild conditions. Simulation studies and an application of intra-day volatility patterns of the S &P 500 index are conducted to illustrate our method and theory.

L^p- Maximal Regularity of Nonlocal Parabolic Equation and Applications

Xicheng Zhang

(Wuhan University)

Abstract By using Fourier's transform and Fefferman-Stein's theorem, we investigate the L^p- maximal regularity of nonlocal parabolic and elliptic equations with singular and non-symmetric Lévy operators, and obtain the unique strong solvability of the corresponding nonlocal parabolic and elliptic equations, where the probabilistic representation plays an important role. As a consequence, a characterization for the domain of pseudo-differential operators of Lévy type with singular kernels is given in terms of the Bessel potential spaces. As a byproduct, we also show that a large class of non-symmetric Lévy operators generates an analytic semigroup in L^p-spaces. Moreover, as applications, we prove a Krylov's estimate for stochastic differential equations driven by Cauchy processes (i.e. critical diffusion processes), and also obtain the global well-posedness to a class of fully nonlinear parabolic equation with critical diffusions. In particular, critical Hamilton-Jacobi equations and multidimensional critical Burger's equations are uniquely solvable and the smooth solutions are obtained.

A Flexible Semiparametric Transformation Model for Recurrent Event Data

Liuquan Sun

(Chinese Academy of Sciences)

Abstract We propose a class of semiparametric transformation models for recurrent event data, in which the baseline mean function is allowed to depend on covariates through an additive model, and some covariate effects are allowed to be time-varying. For inference on the model parameters, estimating equation approaches are developed, and the asymptotic properties of the resulting estimators are established. In addition, a lack-of-fit test is presented to assess the adequacy of the model. The finite sample behavior of the proposed estimators is evaluated through simulation studies, and an application to a bladder cancer study is illustrated.

Recent Progress on Stochastic Evolution Equations
in Variational Framework

Wei Liu

(Jiangsu Normal University)

Abstract In this talk we will first briefly review some recent results on stochastic evolution equations in variational framework, e.g. well-posedness, large deviation principle and long time asymptotics etc. Afterwards, we will mainly concentrate on some recent results on the well-posedness of SPDE with locally monotone coefficients, which substantially generalize the classical results by Pardoux, Krylov and Rozovskii. This extension provides a unified framework to analyze a large class of SPDEs such as stochastic reaction-diffusion equations, stochastic Burgers type equations, stochastic 2D hydrodynamical systems, stochastic tamed 3D Navier-Stokes equations and stochastic equations of non-Newtonian fluids, which can not be included in the classical variational framework. Moreover, we will also show that a very general result on the existence of random attractors can be established in this extended variational framework. This talk is mainly based on some joint works with Michael Röckner (Universität Bielefeld) and Benjamin Gess (Technische Universität Berlin).

Order Statistics from Heterogeneous Populations with Applications

Peng Zhao

(Jiangsu Normal University)

Abstract Order statistics have received considerable attention in the literature as they play an important role in many areas including statistical inference, goodness-of-fit tests, reliability theory, economics, and operations research. In this talk, we discuss the stochastic properties of order statistics from independent and heterogeneous proportional hazard rates models, gamma variables. We highlight the close connections that exist between some classical stochastic orders and majorization-type orders.

分组报告摘要

周六下午 (统计 1 组)

Variable Selection in Fixed Censored Quantile Regression with High Dimensional Data

Yali Fan

(University of Shanghai for Science and Technology)

Abstract We propose a two-step variable selection procedure for high dimensional fixed censored quantile regression, in which the response subject to fixed censoring, and the dimension of the covariates, p is very large, possibly much larger than the sample size n. To account for fixed censoring data with multivariate covariates, we employ the ideas of informative subset-based estimator (Tang et el. (2012a)) and effective dimension reduction. Under some regularity conditions, we show our procedure enjoys the model selection consistency, as long as the conditional censoring probability can be estimated consistently. We demonstrate that the first step penalized estimator with LASSO penalty can reduces the model from ultra-high dimensional to a model whose size has the same order with the true model, and the selected model can cover the true model. The second step excludes the remained irrelevant covariates by applying adaptive LASSO penalty to the reduced model obtained from the first step. We conduct a simulation study and a real data analysis to evaluate the definite sample performance of the proposed approach. Joint work with Yanlin Tang and Zhongyi Zhu.

Variable Selection for The Mean Function of Kriging in Computer Experiments

Hengzhen Huang

(Nankai University)

Abstract Kriging models are commonly used in the analysis of computer experiments. The most popular kriging model which uses either a constant or some pre-specified variables in the mean function could lead to a poor prediction. Identifying an appropriate mean function for kriging is an important problem. In this paper, we develop a variable selection method for the mean function of kriging. The proposed method is Bayesian and its basic idea is to introduce an indicator vector for all candidate variables for the mean function. The posterior distribution of such an indicator vector contains the information relevant to variable selection, and its posterior sample can be conveniently generated by the Gibbs sampler. A well-known practical example from the computer experiments literature is used to illustrate the implementation and consequently the performance of the proposed method. The advantages of the proposed method over the existing variable selection methods for the mean function of kriging are demonstrated via some simulation studies. Joint work with Dennis K. J. Lin and Minqian Liu.

一般线性混合效应模型的随机效应选择研究

林鹏

(中国科学院)

Abstract 本文研究线性混合效应模型中随机效应的选择问题. 对 Chen and Dunson (2003) 中提出的修正 Cholesky 分解给出进一步的定义, 使得协方差矩阵的分解具有 $1-1$ 变换的性质. 在随机效应和误差项没有分布假定的条件下, 利用修正 Cholesky 分解, 研究了硬阈值估计与一种罚估计在随机效应选择和方差分量估计的表现. 从理论上证明了两种估计方法具有相合性, 并且罚估计方法具有神谕性质, 即罚估计方法的渐近表现和真实模型已知时的表现一样好.

Nonignorable Missing Data Analysis and Causal Inference

Wang Miao

(Beijing University)

Abstract Ignorability is an indispensable assumption for identification in causal inference and missing data analysis. But this assumption can not be tested by data. In real data analysis, scientists tend to find as many covariates as possible to guarantee ignorability in causal inference, or missing at random/completely at random (MAR/MCAR) in missing data analysis. In this paper, we explore Gaussian models that are identifiable without ignorability. We first attack nonignorable missing data problem, then concentrate on nonignorable causal inference. We demonstrate their identifiability and present estimation method. The results of Gaussian models can extend to symmetric distribution family that is much bigger. We also conduct simulation to illustrate our method. We apply the method to a wage survey conducted in Netherland to estimate the wage returns to training.

Variable Selection via Composite Quantile Regression with Dependent Errors

Yanlin Tang

(Tongji University)

Abstract We propose composite quantile regression (CQR) for dependent data, in which the errors are from short-range dependent linear processes. Under some regularity conditions, we show that CQR enjoys root-n consistency and asymptotic normality. We investigate the asymptotic relative efficiency of CQR to both single-level quantile regression and least squares regression (LS). When the errors have finite variance, the relative efficiency of CQR with respect to the LS estimator has a universal lower bound. Under some regular conditions, the adaptive LASSO penalty leads to consistent variable selection, and the asymptotic distribution of the nonzero coefficient are the same as that of the counterparts obtained when the true model is known. We conduct a simulation study and a real data analysis to evaluate the performance of the proposed approach.

Double Penalized H-likelihood for Selection of Fixed and Random Effects in Mixed Effects Models

Peirong Xu

(Southeast University)

Abstract The aim of this paper is to develop a double penalized hierarchical likelihood (DPHL) with a modified Cholesky decomposition for simultaneously selecting fixed and random effects in mixed effects models. DPHL avoids the use of data likelihood, which usually involves a high-dimensional integral, to define an objective function for variable selection. The resulting DPHL-based estimator enjoys the oracle properties with no requirement on the convexity of loss function. Moreover, a two-stage algorithm is proposed to effectively implement this approach. An H-likelihood-based Bayesian information criterion (BIC) is developed for tuning parameter selection. Simulated data and a real dataset are examined to illustrate the efficiency of the proposed method. Joint work with Tao Wang, Hongtu Zhu and Lixing Zhu.

Estimation of Genewise Variance for Microarray Data with P-Spine

Ping Wu

(East China Normal University)

Abstract In this paper, a two-way nonparametric model with correlating measurement, an extension to the famous Neyman-Scott one, is to be used to analysis microarray data. Before selecting significantly differentially expressed and checking normalization, how to estimate genewise variance is very important. In order to overcome this high-dimensional nonparametric problem, we firstly construct an estimating equation, whose right hand is just a linear combination of the different values of the variance function, and then a p-spline without intercept is applied. Furthermore, we construct another estimating equation to estimate the intercept of the p-spine and correlating coefficient by a simple iterative algorithm. The asymptotic normality of all the estimators is provided. Moreover, s simulation study is carried out to examine the performance of the new method. Joint work with Lixing Zhu.

Nonparametric Estimation of Quantiles for a Class of Stationary Processes

Chu Huang

(Hangzhou Normal University)

Abstract In this paper we study smoothed quantile estimator for a class of stationary process. We obtain the weak and strong convergence rates for the estimator, and get the Bahadur representation by martingale approximation and m-dependent approximation. The simulation explains that the smoothed quantile estimator has better performance than that for classical sample quantile estimator. Our method can be used in the study of time series and econometrics, for example, the estimation of value-at-risk (VaR). Joint work with Hanchao Wang.

Analysis of Multivariate Recurrent Event Data with Missing Event Category under Additive Rates Model

Peng Ye

(Chinese Academy of Sciences)

Abstract Multi-type recurrent event data arise when study subjects experience several different types of recurrent events of interest. In many applications, however, event times can be always observed, but types for some events may be missing. A existing complete-case analysis usually leads to biased estimators of regression parameters unless event types are missing completely at random, an assumption which is stringent in practice. In this article, we propose a semiparametric additive rates model for analyzing such incomplete data. We consider the situation where missingness probability depends on covariates. An approach based on weighted estimating equation is developed to estimate model parameters. The resulting estimates are shown to be consistent and asymptotically normal. Finite sample behaviors of the proposed estimators are demonstrated by simulation studies, and the proposed methods are applied to a set of bivariate recurrent event data from a study of platelet transfusion reactions. Joint work with Liuquan Sun.

Transformation Structural Equation Models with Highly Non-normal and Incomplete Data

Pengfei Liu

(The Chinese University of Hong Kong)

Abstract As useful multivariate techniques, structural equation models (SEMs) have attracted significant attention from various fields. When analyzing SEMs, most existing statistical methods and software have been developed based on the assumption that the response variables are normally distributed. Several recently developed methods can partially address violations of this assumption, but still encounter difficulties in analyzing highly non-normal data. Moreover, the presence of missing data is a practical issue in substantive research. Simply ignoring missing data or improperly treating nonignorable missingness as ignorable could seriously distort statistical influence results. The main purpose of this paper is to develop a Bayesian approach for analyzing transformation SEMs with highly non-normal and missing data. Different types of missingness are discussed and selected via the deviance information criterion. The empirical performance of our method is examined via a simulation study. Application to a study concerning people's job satisfaction, home life, and work attitude is presented.

Nonparametric Estimation of Interval-censored Failure Time Data in the Presence of Informative Censoring

Chunjie Wang

(Jilin University)

Abstract Nonparametric estimation of a survival function is one of the most commonly asked questions in the analysis of failure time data and for this, a number of procedures have been developed under various types of censoring structures (Kalbfleisch and Prentice, 2002). In particular, several algorithms are available for interval-censored failure time data with independent censoring mechanism (Sun, 2006; Turnbull, 1976). In this paper, we consider the interval-censored data where the censoring mechanism may be related to the failure time of interest, for which there does not seem to exist a nonparametric estimation procedure. It is well-known that with informative censoring, the estimation is possible only under some assumptions. To attack the problem, we take a copula model approach to model the relationship between the failure time of interest and censoring variables and present a simple nonparametric estimation procedure. The method allows one to conduct a sensitivity analysis among others. Joint work with Jianguo Sun, Dehui Wang and Ningzhong Shi.

Nested Orthogonal and Nearly Orthogonal Latin Hypercube Designs

Xue Yang

(Nankai University)

Abstract Nested Latin hypercube designs are useful for computer experiments with multi-fidelity. And orthogonality can be viewed as stepping stones to space-filling designs. In this paper, we provide methods for constructing nested Latin hypercube designs with exact or near orthogonality. The method is easy to implement. The constructed designs have a flexible number of runs and factors and one more property that the sum of element-wise product of any three columns is zero.

周六下午 (统计 2 组)

Time-Varying Correlation Structure Estimation and Local-Feature Detection for Spatio-Temporal Data

Xueying Zheng

(Fudan University)

Abstract Capturing dynamic change of time-varying correlation structure is both interesting and scientifically important in spatio-temporal data analysis. We approximate the time-varying empirical estimator of the spatial correlation matrix by groups of selected basis matrices which represent substructures of correlation matrix. After projecting the correlation structure matrix onto space spanned by basis matrices, we incorporate varying-coefficient model selection and estimation for signals associated with relevant basis matrices. The unique feature of the proposed model and estimation is that time-dependent local region signals can be detected by the proposed penalized objective function. In theory, we show model selection consistency on detecting local signals and provide statistical inference for varying-coefficient estimators. The proposed method will be illustrated through simulation studies and fMRI data. Joint work with Annie Qu.

Efficient Estimation for Semiparametric Cure Models with Interval-Censored Data

Tao Hu

(Capital Normal University)

Abstract This paper is concerned with the analysis of interval-censored survival data in the presence of a nonnegligible cure fraction using semiparametric nonmixture cure models. We propose a spline-based sieve estimation method which overcomes numerical difficulties encountered in the existing semiparametric maximum likelihood estimation for the unknown nonparametric component in models. The proposed estimation is easy to implement using the sequential quadratic programming technique. Under certain regularity conditions, we show the consistency, asymptotic normality and semiparametric efficiency of the proposed estimators for parameters. For the nonparametric component, our estimator has an explicit convergence rate, higher than that conjectured in the literature. We conduct extensive simulation studies to evaluate the finite sample performance of the proposed method. The application of the method is also illustrated by analyzing data from a smoking cessation study.

Estimation of Response from Longitudinal Binary Data with Nonignorable Missing Values in Migraine Trials

Fang Fang

(East China Normal University)

Abstract In migraine trials pain relief responses from a headache at specific time points and the sustained pain relief response over a period of time are both important efficacy measures. When the patients record individual time point pain scores and headache recurrences during a migraine trial, the common approach used in practice to estimate the sustained response is statistically inconsistent even if the data are missing completed at random. Methods dealing with nonignorable longitudinal missing data usually assume certain models for the missing mechanism which can not be checked as they involve unobserved data. Taking advantage of the specific definition of the 'sustained pain relief' response, we propose several estimating methods based on intuitive imputation, which do not require model assumptions on the missing probability or specify the correlation structure among the longitudinal observations. The consistence of the proposed methods is discussed in theory and the performance is assessed through an intensive simulation study. The results show that the proposed methods perform well in terms of reducing bias and MSE except in several extreme cases which are unlikely to happen in real trials.Joint work with X. Fan.

Semiparametric Efficient Estimation for Partially Linear Single-Index Models with Responses Missing at Random

Peng Lai

(Nanjing University of Information Science and Technology)

Abstract In this paper, we establish the semiparametric efficient bound for the heteroscedastic partially linear single-index model with responses missing at random, and develop an efficient estimating equation estimating method. By solving the estimating equation, we obtain estimators for the parameter vectors in the linear part and the single index part simultaneously. The estimators are asymptotically semiparametrically efficient when the propensity score function is specified correctly. It should be noted that the inverse probability weighted efficient estimating equation cannot be obtained directly from the full data efficient estimating equation by the inverse probability weighted approach. We establish the estimating equation by deriving the observed data efficient score function. Some simulation studies and a real data application were conducted to evaluate and illustrate the proposed methods. Joint work with Qihua Wang.

High-Order Inference in a Genetic Semiparametric Mixture Model

Yukun Liu

(East China Normal University)

Abstract In genetic experiments, data are often collected from complex mixtures of distribution functions with known mixing proportions. Well-known examples include plants and animal quantitative trait locus (QTL) studies and human genetic linkage analysis. Previous approaches to estimation involve parametrizing the component distributions. Model misspecification of any form is expected to have detrimental effects. Under the exponential tilting model assumption, in which the log ratio of the probability (density) functions from the components is linear in the observations, we apply the empirical likelihood method to genetic mixture models. An application to mice QTL involves random numbers of offspring within a litter, and an application to human genetic linkage involves random numbers of pedigrees. In other words, the cluster size is a random variable. To test the null hypothesis that the two-component difference parameter $\beta = \beta_0$, we show that the semiparametric likelihood ratio statistic has an asymptotic chisquare distribution if the true $\beta_0 \neq 0$, and it behaves like a mixture of a chisquare variable and 0 (with weights 0.5 and 0.5) if $\beta_0 = 0$. The underlying distribution function of each component can also be estimated semiparametrically. Simulation results and a real cancer application are presented. Joint work with Pengfei Li and Jing Qin.

Analysis of Panel Count Data with Time-Dependent Covariates and Informative Observation Process

Haixiang Zhang

(Jilin University and Chinese Academy of Sciences)

Abstract Panel count data occur in many clinical and observational studies and in some situations the observation process is informative. In this article, we propose a new joint model for the analysis of panel count data with time-dependent covariates and possibly in the presence of informative observation process via two latent variables. For the inference on the proposed model, a class of estimating equations is developed and the resulting estimators are shown to be consistent and asymptotically normal. In addition, a lack-of-fit test is provided for assessing the adequacy of the model. The finite-sample behavior of the proposed methods is examined through Monte Carlo simulation studies which suggest that the proposed approach works well for practical situations. Also an illustrative example is provided.

Nonparametric Testing in Regression Models with Wilcoxon-Type Generalized Likelihood Ratio

Long Feng

(Nankai University)

Abstract The generalized likelihood ratio (GLR) statistic (Fan et al. 2001) proposed a generally applicable method for testing nonparametric hypotheses about nonparametric functions. However, the efficiency of this method is adversely affected by outlying observations and heavy-tailed distributions. To attack this challenge, a robust testing procedure is developed under the framework of the GLR by incorporating a Wilcoxontype artificial likelihood function and adopting the associated local smoothers. Under some useful hypotheses, the proposed test statistic is proved to be asymptotically normal and free of nuisance parameters and covariate designs. Its asymptotic relative efficiency with respect to the least squares-based GLR method is closely related to that of the signed-rank Wilcoxon test in comparison with the t-test. It outperforms the least squares-based GLR with heavier-tailed data in the sense that asymptotically it can yield substantially larger power. On the other hand, when the data are normally distributed, both methods have similar power. Simulation results are consistent with the asymptotic analysis.

FDR Control in Multiple Testing Under Non-Normality

Xinbing Kong

(Fudan University)

Abstract There is a growing literature on large-scale multiple testing, in which Benjamini-Hochberg (BH) procedure and its variants play a key role. However, almost all literature assumes that the underlying distribution is normal in calculating the *p*-values. Here we study the effect of non-normality on the false discovery control in large scale multiple testing. Three methods, i.e., the normal approximation, bootstrap calibration and the skewness-corrected normal approximation methods, to approximate the individual *p*-values used to rank the significance levels are investigated. As an illustration, we compare these procedures with the BH method in terms of cutting threshold and false discovery rate. It turns out that the bootstrap calibration method and the skewness-corrected normal approximation method perform better than normal approximation. Joint work with Bingyi Jing and Wang Zhou.

Information Theory Based Conditional Independence Tests

Chun Li

(The Chinese University of Hong Kong)

Abstract Classical conditional independent tests heavily depend on certain distributional assumptions, which limit their application scopes. Many recent biological datasets show nonlinear and non-Gaussian relationships among variables. A more general conditional independence test is needed for these problems. In this study, we investigate new conditional independence tests based on information theory criterions such as mutual information and conditional mutual information. These tests make no assumption on functional forms or probability distributions of the variables that are investigated. A new procedure is proposed for reducing confounding effects of conditioned variables on the conditional association under study. Simulation results show that (conditional) mutual information based permutation tests work well in more general settings.

Weighted Likelihood Ratio Charts for Statistical Monitoring of Queueing Systems

Dequan Qi

(Nankai University)

Abstract In recent years, statistical monitoring for effective detection of queueing system has increasingly attracted attention of researchers. However, most existing research did not consider the data autocorrelation, nor evaluate rigorously the performance either. In this paper, considering the data autocorrelation and motivated by giving higher weights to recent data, a new control chart based on the weighted likelihood ratio test (WLRT) is proposed to efficiently monitor the utilization of M/M/1 queueing system. Our approach can be naturally extended to other general queueing systems if we can obtain the likelihood function based on information available according the queueing theory. Simulation results show, as expected, that the performance of the proposed WLRT-chart is satisfactory by comparing with several alternative methods. Joint work with Zhonghua Li and Zhaojun Wang.

Quasi-Maximum Likelihood Estimations for Single-Index models with Autoregressive Processes

Wenwen Guo

(Capital Normal University)

Abstract The paper focus on a single-index model with autoregressive processes

$$y_t = g(x_t^T \beta) + \varepsilon_t, t = 1, 2, \ldots, n,$$

where

$$\varepsilon_1 = \eta_1, \varepsilon_t = \rho \varepsilon_{t-1} + \eta_t, t = 2, 3, \ldots, n,$$

g is a unknown and continuous differentiable function, (β, ρ) is an unknown vector in $R^d \times R^1$ with $||\beta|| = 1$, $\eta_i's$ are independent and identically distributed, with mean zero and finite variance σ^2. We want to provide an estimation method which does not depend on the structure of the random error. Firstly, use polynomial regression to estimate the link function and the parametric part. Then the quasi-MLEs of ρ and σ^2 are given. Secondly, under mild assumptions, the asymptotic properties of the estimations are shown. Joint work with Hengjian Cui.

Partial Area under the ROC Curve Subject to Limit of Detection

Zhanfeng Wang

(University of Science Technology of China)

Abstract The receiver operating characteristic curve (ROC) is an important statistical tool for measuring the diagnostic performance of a variable or classification rule. The area user curve (AUC), measuring the potential classification power of a variable under all possible force positive rate (1-specificity), and the partial AUC (pAUC), focusing on a specific range of the force positive rate are two commonly used indexes in ROC curve analysis. However, in practice, the measure of variables might subject to some detection limit; for example, the sensitivity of measurement instruments. Hence, to study how the limit of detection (LOD) can effect the AUC and partial AUC, and the corresponding analysis under such a situation are important problems. In the literature, there are some reports about AUC under LOD. But there is a lack of results on the partial AUC under similar situations. In this paper, when LOD exists, we propose some nonparametric estimates of pAUC via substituting the unobservable variable values with a replacement value. Because of the nature of partial AUC, the LOD affects a partial AUC in a different way from that of AUC case. Numerical simulation studies and a real data example are studied to show the performance of the proposed method. Joint work with Bochao Jia and Yuan-chin Ivan Chang.

周六下午 (概率 1 组)

Harnack Inequalities for 1-d Stochastic Klein-Gordon Equations

Shaoqin Zhang

(Central University of Finance and Economics)

Abstract By the coupling method, we establish the Harnack inequalities, derivative formula and Driver's integration by parts formula for the stochastic Klein-Gordon equations in the interval. We provide a complete discussion on the parameter ρ of the nonlinear term $|x|^{\rho-1}x$. Some applications are given.

Derivative Formula for Semilinear SDEs Driven by Lévy Processes on Hilbert Spaces

Yulin Song

(Beijing Normal University)

Abstract By using Malliavin calculus for jump processes, we established a Bismut type derivative formula for semilinear SDEs driven by Lévy processes on Hilbert spaces. As applications, the strong Feller property and coupling property were also investigated.

Heat Kernel Estimates for Critical Fractional Diffusion Operator

Longjie Xie

(Wuhan University)

Abstract In this work we construct the heat kernel of the $1/2$-order Laplacian perturbed by the first-order gradient term in Holder space and the zero-order potential term in generalized Kato's class, and obtain sharp two-sided estimates as well as the gradient estimate of the heat kernel. Joint work with Xicheng Zhang.

Anticipated Backward Doubly Stochastic Differential Equations

Xiaoming Xu

(Nanjing Normal University)

Abstract In this paper, we deal with a new type of differential equations called anticipated backward doubly stochastic differential equations (anticipated BDSDEs).The coefficients of these BDSDEs depend on the future value of the solution (Y,Z). We study the existence and uniqueness of the solution, and a comparison theorem is proved. Besides, we also establish a duality between the anticipated BDSDEs and the delayed doubly stochastic differential equations (delayed DSDEs).

On a Class of Semilinear Stochastic Partial Differential Equation with Fractional Noises

Junfeng Liu

(Nanjing Audit University)

Abstract In this paper, we study the existence, uniqueness and Hölder regularity of the solution to a stochastic nonlinear equation arising from 1-dimension integro-differential scalar conservation laws. The equation is driven by double-parameter fractional noises. In addition, the existence and moment estimate are also obtained for the density of the law of such a solution.

Stochastic Differential Equations on Manifolds Carrying Geometric Flows

Lijuan Cheng

(Beijing Normal University)

Abstract Let $L_t := \Delta_t + Z_t$, $t \in \mathbb{R}$ on a differential manifold equipped with a complete geometric flow (g_t), where Δ_t is the Laplacian operator induced by metric g_t and (Z_t) is a family of $C^{1,1}$-vector fields. In this paper, by applying coupling method, we first prove that under suitable curvature conditions, there exists a unique tight evolution system of measures $\{\mu_t, t \in \mathbb{R}\}$ for stochastic differential equation with operator L_t. Then, we characterize the behaviors of supercontractive, hypercontractive and ultraboundedness for the diffusion semigroup generated by L_t. To this end, gradient estimates and a family of logarithmic Sobolev inequalities with respect to the unique tight evolution system $\{\mu_t, t \in \mathbb{R}\}$ are established.

Uniform Asymptotics for Discounted Aggregate Claims in Dependent Risk Models

Yang Yang

(Nanjing Audit University)

Abstract In this paper, we consider some non-standard renewal risk models with some dependent claim sizes and stochastic return, where an insurance company is allowed to invest her/his wealth in financial assets, and the price process of the investment portfolio is described as a geometric Lévy process. When the claim-size distribution belongs to some classes of heavy-tailed distributions and a constraint is imposed on the Lévy process in terms of its Laplace exponent, we obtain some asymptotic formulas for the tail probability of discounted aggregate claims and ruin probabilities holding uniformly for some finite or infinite time horizons. Joint work with Kaiyong Wang and D. G. Konstantinides.

Behavioral Mean-Risk Portfolio Selection in Continuous Time via Quantile

Junna Bi

(East China Normal University)

Abstract A behavioral mean-risk portfolio selection problem in continuous time is formulated and studied in this paper. Based on the standard mean-variance portfolio selection problem, the cumulative distribution function of the cash flow is distorted by a probability distortion function. This probability distortion function represents the risk preference in a different way. Then the problem is no longer a convex optimization problem. This feature distinguishes it from the conventional linear-quadratic (LQ) problems. The stochastic optimal LQ control theory no longer applies. We take the quantile function of the terminal cash flow as the decision variable. The corresponding optimal terminal cash flow can be recovered by the optimal quantile function. Then the efficient strategy is the hedging strategy of the optimal terminal cash flow.

Ruin Probabilities for a Two-Dimensional Perturbed Risk Model with Stochastic Premiums

Jianhua Cheng

(Jilin University)

Abstract In this paper, we consider a two-dimensional perturbed risk model with stochastic premiums and certain dependence between the two marginal surplus processes. We obtain the Lundberg type upper bound for the infinite time ruin probability by martingale approach, discuss how the dependence affects the obtained upper bound and give some numerical examples to illustrate our results. For the heavy-tailed claims case, we derive an explicit asymptotic estimation for the finite time ruin probability. Joint work with Dehui Wang.

Parameter Estimation in Two-type Continuous-state Branching Processes with Immigration

Wei Xu

(Beijing Normal University)

Abstract We study the parameter estimation of two-type continuous-state branching processes with immigration based on low frequency observations at equidistant time points. The ergodicity of the processes is proved. The estimators are based on the minimization of a sum of squared deviation about conditional expectations. We also establish the strong consistency and central limit theorems of the conditional least squares estimators and the weighted conditional least squares estimators of the drift and diffusion coefficients based on low frequency observations.

Non-neutral Mutations in CBI-Processes

Hongwei Bi

(Beijing Normal University)

Abstract We consider a stationary continuous model of random size population with non-neutral mutations using a continuous state branching process with non-homogeneous immigration. We assume the type (or mutation) of the immigrants is random given by a constant mutation rate measure. We determine some genealogical properties of this process such as: distribution of the time to the most recent common ancestor (MRCA), bottleneck effect at the time to the MRCA (which might be drastic for some mutation rate measures), favorable type for the MRCA, asymptotics of the number of ancestors.

周六下午 (概率 2 组)

Contact Processes on Some Random Graphs

Qiang Yao

(East China Normal University)

Abstract In this talk, a brief review of some basic facts on random graph theory and contact processes followed by an introduction to some existing models on contact processes on random graphs will be given at the beginning. Then, a result of our recent work on this topic will be reported. In our work, the random graphs are chosen according to the power law model of Newman, Strogatz and Watts(2001). Our results show that there are three distinct regimes for the limiting density which depend on the tail of the degree law. Joint work with Thomas Mountford and Daniel Valesin.

Asymptotics for Tail Probability of Random Sums with a Heavy-Tailed Number and Dependent Increments

Kaiyong Wang

(Suzhou University of Science and Technology; Southeast University)

Abstract This paper obtains the asymptotics for the tail probability of random sums, where the random number and the increments are all heavy-tailed, and the increments follow a certain wide dependence structure. This dependence structure can contain some commonly-used negatively dependent random variables as well as some positively dependent random variables. Joint work with Jinguan Lin and Yang Yang.

On the Law of Large Numbers for Capacities

Gaofeng Zong

(Shandong University)

Abstract In this paper, we investigate strong laws of large numbers for capacities under weaken conditions. We obtain two results: One is a sufficient and almost necessary condition under which any cluster point of empirical average lies, with probability (capacity) one, between upper and lower Choquet integrals; The other is a sufficient and almost necessary under which the interval between upper and lower Choquet integrals is the unique smallest interval in which any cluster point of empirical average lies with probability (capacity) one. Furthermore, we study some examples to explain the application about the strong laws of large numbers for capacities. Joint work with Zengjing Chen.

Hitting Time Distribution for Finite States Markov Chain

Ke Zhou

(Beijing Normal University)

Abstract Consider a Markov chain (both in the discrete and continuous time) with finite state $\{0, 1, \cdots, d\}$. We give an alternative and simple proof for the generation functions (or Laplace transforms) for absorbing time in the following two situations : (1) the absorbing time of state d when the chain starts from any state i and absorbing at state d; (2) the hitting time of state 0 when the chain starts from the stationary distribution suppose the chain is time reversible and ergodic. Our proof is directly and simple.

Limit Properties of Subcritical CMJ Processes about the Coming Generation

Hongsong Guo

(Beijing Normal University)

Abstract We consider branching processes with overlapping generations, which is sometimes referred as CMJ (Crump-Mode-Jagers) processes. CMJ processes depict populations of individuals who can produce offsprings at different ages. We mainly talk about $\{H_t\}$, the count of the coming generation at time t, and its expectation. With the help of renewal theorem, we obtain a conditional limit theorem for $\{H_t\}$. Joint work with Mei Zhang .

Central Limit Theorems for Power Variation of Gaussian Integral Processes with Jumps

Guangying Liu

(Nanjing Audit University)

Abstract This paper presents limit theorems for realized power variation of processes of the form $X_t = \int_0^t \phi_s dG_s + \xi_t$ observed at high frequency. Here G is a Gaussian process with stationary increments, ξ is a purely non-Gaussian Lévy process, and G, ξ are independent. More specifically, under some mild assumptions on the variance functions of the increments of G, certain regularity conditions on the path of the process ϕ, and some proper constraint of the jump activity of ξ, we present the central limit theorems for the case where the continuous part and jump part work at the same time in large number law. Joint work with Jiashan Tang and Xinsheng Zhang.

随机环境中分枝随机游动的极限定理

张美娟

(中央财经大学)

Abstract 假定环境平稳遍历, 考虑随机环境中的分枝随机游动. 在此模型中, 粒子以上临界的 Galton-Watson 过程分枝产生后代, 而以一维紧邻随机环境中的随机游动进行运动. 令 $Z_n(B)$ 表示时间 n 落于 B 中的粒子数, 其中 B 为 $\mathbb{R}$ 中任一子集. 文章得到了计数测度 $Z_n(\cdot)$ 经过适当的规范化之后, 在 "annealed" 情形下的中心极限定理.

Moderate Deviation Principles for Estimators in EV Regression Models with α-Mixing Errors

Shaochen Wang

(Wuhan University)

Abstract We study the asymptotic behavior of least square estimators of unknown parameters in simple linear errors-in-variables regression models. We assume the error variables form a α-mixing sequence, the corresponding moderate deviation principles for estimators are obtained.

Spectral Gap and Decay Rate for Diffusion Processes with Markov Switching

Wujun Gao

(Beijing Normal University)

Abstract Consider a Markov process on $E = \mathbb{R}_+ \times \mathbb{M}$, where $\mathbb{R}_+ = [0, \infty)$, $\mathbb{M} = \{1, 2, \cdots, m\}$, with its infinitesimal generator

$$\mathcal{L}f(x, k) = a_k(x)f''(x, k) + b_k(x)f'(x, k) + \sum_{l \in \mathbb{M}} q_{kl}(f(x, l) - f(x, k)).$$

The uniqueness, symmetry and reversibility of this process are studied. By using the decomposition method and Poincaré inequality, the spectral gap and decay rate estimations are given. Joint work with Yonghua Mao.

Another Criteria for Geometric Ergodicity

Ming Zhang

(Beijing Normal University)

Abstract We generalize the well-known Dobrushin coefficient δ in total variation to weighted total variation δ_V, which gives a criterium for the geometric ergodicity of discrete-time Markov chains.

Heat Kernel for Perturbation of $\Delta + \Delta^{\alpha/2}$ by Gradient Operator

Eryan Hu

(Beijing Institute of Technology)

Abstract For $d \geq 2$, $\alpha \in (0, 2)$ and $M > 0$, we consider the gradient perturbation of the operator $\{\Delta + a^\alpha \Delta^{\alpha/2}, a \in (0, M]\}$. We establish the existence of the continuous heat kernel of the operator

$$\mathcal{L}^{a,b} = \Delta + a^\alpha \Delta^{\alpha/2} + b \cdot \nabla,$$

where b is in Kato class $\mathbb{K}_{d,1}$ on $\mathbb{R}^d$. Furthermore, we give the sharp two-sided estimates of the heat kernel of $\mathcal{L}^{a,b}$. Joint work with Zhenqing Chen.

周日上午 (统计 1 组)

Identifying Genetic Variants for Addiction via Propensity Score Adjusted Generalized Kendall's Tau

Ni Li

(Hainan Normal University)

Abstract Identifying replicable genetic variants to addiction has been extremely challenging. Besides the common difficulties with genome-wide association studies (GWAS), environmental factors are known to be critical to addiction, and comorbidity is widely observed. Despite the importance of environmental factors and comorbidity for addiction study, few GWAS analyses adequately considered them due to the limitations of the existing statistical methods. Although parametric methods have been developed to adjust for covariates in association analysis, difficulties arise when the traits are multivariate because there is no ready-to-use model for them. Recent nonparametric development includes U-statistics to measure the phenotype-genotype association weighted by a similarity score of covariates. However, it is not clear how to optimize the similarity score. Therefore, we propose a semiparametric method to measure the association adjusted by covariates. In our approach, the nonparametric U-statistic is adjusted by parametric estimates of propensity scores using the idea of inverse probability weighting. The new measurement is shown to be asymptotically unbiased under our null hypothesis while the previous non-weighted and weighted ones are not. Simulation results show that our test improves power as opposed to the non-weighted and two other weighted U-statistic methods, and it is particularly powerful for detecting gene-environment interactions. Finally, we apply our proposed test to the Study of Addiction: Genetics and Environment (SAGE) to identify genetic variants for addiction. Novel genetic variants are found from our analysis, which warrant further investigation in the future. Joint work with Yuan Jiang and Heping Zhang.

Optimal Design for Interference Model when Neighbor Effects are Proportional to Direct Treatment Effects

Kang Li

(Beijing University)

Abstract Interference model has been widely used for block design experiments where the treatments have side effects on neighbor units. Here we consider the optimal design for the circular interference model when neighbor effects are proportional to direct treatment effects. We discover that there always exists a symmetric design which is optimal under the Bayesian type optimal criterion. Moreover, we establish equivalence theorems of Kiefer-Wolfowitz's type for both direct treatment effects and total treatment effects under four popular optimality criteria, namely A, D, E and T. The similar results are obtained when the left neighbor effect and the right neighbor effect have the same proportion to the direct treatment effect. Some examples are given to illustrate the results.

Construction of Higher Order Orthogonal and Nearly Orthogonal Latin Hypercube Designs

Lin Wang

(Nankai University)

Abstract Latin hypercube designs (LHDs) have found wide applications in computer experiments. Recently, a number of methods have been proposed to construct orthogonal LHDs and nearly orthogonal LHDs. In this paper, we construct orthogonal LHDs and nearly orthogonal LHDs with the property that the elementwise square of each column and elementwise product of every two columns are orthogonal to all columns in the design. When second-order effects are present, this property is desirable such that we can estimate the linear effects without being correlated with the estimates of quadratic effects and bilinear interations. The orthogonal LHDs constructed by several authors possess this property. However, there is a rather severe restriction on their run sizes, while our methods produce desings with more flexible run sizes. Together with former methods, the run sizes of the these LHDs can even cover the whole set of positive integers. Such designs can be very useful in factor screening by fitting a first order model. Joint work with Minqian Liu.

Approximating Projection Depth Median in Higher Dimensions

Xiaohui Liu

(Jiangxi University)

Abstract As a multivariate generalization of the univariate median, the projection depth median is *unique*, and enjoys a very high breakdown point, much higher than its affine equivariant competitors such as halfspace depth median (Zuo, 2013). Nevertheless, its computation is very challenging. Until now the projection depth median can only be computed *efficiently* for bivariate data (Liu and Zuo, 2012). In the current paper, we develop an algorithm to approximate the projection depth median in higher dimensions. Some data examples indicate that the proposed algorithm performs well in terms of both accuracy and efficiency. As an application, we utilize a Matlab implementation of this algorithm in investigating the finite sample relative efficiency of projection depth median in some spaces with dimension $p \geq 3$.

Pivotal Allocation Based Relabeling Algorithm for Handling Label Switching Problem in Bayesian Mixture Model

Han Li

(The Chinese University of Hong Kong)

Abstract In Bayesian analysis of finite mixture model, we usually employ Markov Chain Monte Carlo (MCMC) algorithm to draw samples for the model parameters, and estimate those parameters by their posterior mean. However, the so-called label switching problem occurs as a result of the posterior distribution being invariant to permutations of the labels under symmetric priors, which brings about difficulty in inferring the component specific parameters. Various relabeling algorithms have been proposed to "undo" the label switches by minimizing the posterior expected value of certain loss functions. Here we develop a novel relabeling algorithm called Pivotal Allocation Relabeling (PAR) and its variants by matching the allocation variables at each MCMC iteration to the pivotal allocation labeling instead of dealing with the component parameters directly. Using simulation studies and real data, we demonstrate the success of our algorithms in dealing with the label switching problem. Joint work with Xiaodan Fan.

A Localized Implementation of the Iterative Proportional Scaling Procedure for Gaussian Graphical Models by Partitioning Cliques

Pingfeng Xu

(Changchun University of Technology)

Abstract In this paper, we proposed localized implementations of the iterative proportional scaling (IPS) procedure by partitioning cliques for computing maximum likelihood estimations in large Gaussian graphical models. Our new procedures first divide the set of cliques into several non-overlapping and non-empty blocks, and then adjust clique marginals in each block locally. Thus, high order matrix operations can be avoided and the IPS procedure is accelerated. We apply the simulated annealing algorithm to find an approximation to the optimal partition which leads to the least complexity of our procedures. Numerical experiments are presented to demonstrate the competitive performance of our new procedures and strategies. Joint work with Jianhua Guo and Manlai Tang.

Orthogonal Arrays Containing Partially Clear Main Effects

Xueping Chen

(Southeast University)

Abstract Clear effects criterion is an important rule for selecting optimal designs. A main effect or two-factor interaction is said to be clear if it is not aliased with any other main effects or two-factor interactions. More recently, Lekivetz and Tang (2011, Biometrika) considered the situation in which certain two-factor interactions are assumed to be negligible while other two-factor interactions are not, and constructed the associated two-level robust design with partially clear two-factor interactions of strength larger than two. In this paper, orthogonal arrays with partially clear main effects are investigated. One construction method of the corresponding orthogonal arrays are obtained. Joint work with Jinguan Lin.

Conditions for Detecting Confounders in Observational Studies

Na Shan

(Changchun University of Technology)

Abstract This paper addresses a definition of a confounder based on the adjustment estimands proposed by Pearl and Paz (2009). To derive the conditions for a covariate to be a confounder, inspired by Geng et al. (2002), we introduce the concepts of an irrelevant factor, an occasional confounder and a uniformly irrelevant factor. Then, we obtain some criteria for checking these and show whether the precision of estimation of causal effect can be improved by adjusting for a uniformly irrelevant factor. Moreover, we consider situations with multiple potential confounders, and we obtain some conditions for deleting a subset of covariates from a potential confounder set. Joint work with Pingfeng Xu, Xiaogang Dong and Jianhua Guo.

Construction of Sliced Maximin-Orthogonal Latin Hypercube Designs

Jinyu Yang

(Nankai University)

Abstract A sliced Latin hypercube design is a special Latin hypercube design, which can be divided into slices of smaller Latin hypercube designs. This type of designs is useful for computer experiments with qualitative and quantitative factors, multiple experiments, data pooling and cross-validation. Orthogonality and uniformity are important properties for Latin hypercube designs. In this paper, sliced maximin-orthogonal Latin hypercube designs are first constructed using orthogonal designs, Goethals-Seidel arrays and Kharaghani arrays. The resulting designs not only have the second-order orthogonality, but also have a good uniformity measured by the maximin distance criterion. Joint work with Hao Chen, Dennis K. J. Lin and Minqian Liu.

Construction of Sliced Space-Filling Designs Based on Balanced Sliced Orthogonal Arrays

Bochuan Jiang

(Beijing University)

Abstract Latin hypercube designs have been widely used in computer experiments with quantitative factors. When there are both qualitative and quantitative factors in computer experiments, sliced space-filling designs have been proposed to deal with such experiments. In this article, we propose a general framework for constructing sliced space-filling designs for more flexible parameters of designs in which the whole design and each slice not only achieve maximum stratification in univariate margins, but also achieve stratification in two- or more-dimensional margins. Compared with other designs, the new constructed designs have better space-filling property or have more columns. The construction is based on a new class of sliced orthogonal arrays, called balanced sliced orthogonal arrays, in which each slice is balanced and becomes an orthogonal array after some level-collapsing. Several approaches to constructing such balanced sliced orthogonal arrays under different level-collapsing projections are developed. Some examples are given to illustrate the construction methods.

Monotone Splines-based Sieve Estimation Methods for Panel Count Data with Informative Observation Times

Shirong Deng

(Wuhan University)

Abstract Analyzing irregularly spaced panel count data often involves modeling possibly correlated underlying recurrent event process and observation process. In this article we propose a new class of semiparametric mean models that allows for the interaction between the observation history and covariates, leaving patterns of the observation process to be arbitrary. For inference on the regression parameters and the baseline monotone unknown function, a monotone splines-based sieve least-squares estimation approach is proposed. The consistency, rate of convergence and asymptotic normality of the proposed estimators are established. Our new approach is different from the usual approaches relying on the model specification of the observation scheme, and it can be easily used for predicting the underlying recurrent event process. Simulation studies demonstrate that the proposed inference procedure performs well. The analysis of a bladder tumor data is presented to illustrate the proposed method. Joint work with Li Liu and Xingqiu Zhao.

周日上午 (统计 2 组)

Focused Information Criterion and Model Averaging for Linear Mixed-Effects Models

Xinjie Chen

(Chinese Academy of Sciences)

Abstract Linear mixed-effects models (LME) have a wide variety of application in many scientific fields. This paper studies the focused information criterion (FIC) and model averaging for LME models. Firstly, FIC for LME models is derived. Then based on the unbiased estimator of the risk for model averaging, we establish a new focused approach to choose weights of model average estimators. Further, the resultant estimators are proved to be asymptotic optimal under both a discrete set and a continuous set. Finally, we conduct a simulation and a real data analysis. Joint work with Guohua Zou, Xinyu Zhang, Hua Liang and Alan T.K. Wan.

A Robust and Efficient Estimation Method for Single Index Models

Jicai Liu

(East China Normal University)

Abstract Single index models are natural extensions of linear models and overcome the so-called curse of dimensionality. They have applications to many fields, such as medicine, economics and finance. However, most existing methods based on least squares or likelihood are sensitive when there are outliers or the error distribution is heavy tailed. Although a M-type regression is often considered as a good alternative to those methods, it may lose efficiency for normal errors. In this paper, we propose a new robust and efficient estimation procedure based on local modal regression for single index models. The asymptotic normality of proposed estimators for both the parametric and nonparametric parts is established. We show that the proposed estimators are as asymptotically efficient as the least-square based estimators when there are no outliers and the error distribution is normal. A modified EM algorithm is presented for efficient implementation. The simulations and real data analysis are conducted to illustrate the finite sample performance of the proposed method.

Robust Joint Analysis with Data Fusion in Two-Stage Quantitative Trait Genome-Wide Association Studies

Dongdong Pan

(Yunnan University)

Abstract Genome-wide association studies (GWASs) in identifying the disease-associated genetic variants have been proved to be a great pioneering work. Two-stage design and analysis is often adopted in GWASs. Considering the genetic model uncertainty, many robust procedures have been proposed and applied in GWASs. However, the existing approaches mostly focused on binary traits and few work has been done on continuous (quantitative) traits, since the statistical significance of these robust tests is difficult to calculate. In this paper, we develop a powerful F-statistic-based robust joint analysis method for quantitative traits using the combined raw data from both stages in the framework of two-staged GWASs. Explicit expressions are obtained to calculate the statistical significance and power. We show using simulations that the proposed method is substantially more robust than the F-test based on the additive model when the underlying genetic model is unknown. An example for rheumatic arthritis (RA) is used for illustration.

Robust Estimation of Generalized Partially Linear Model for Longitudinal Data with Dropouts

Guoyou Qin

(Fudan University)

Abstract a weighted likelihood method is first proposed to obtain the robust estimation of the parameters involved in the dropout model for describing the missing process. Then a robust inverse probability weighted generalized estimating equation is developed to achieve robust estimation of the mean model. To approximate the nonparametric function in the GPLM, a regression spline smoothing method is adopted which can linearize the nonparametric function such that statistical inference can be conducted operationally as if a generalized linear model was used. The asymptotic properties of the proposed estimator are established under some regularity conditions, and simulation studies show the robustness of the proposed estimator. In the end, the proposed method is applied to analyze a real data set. Joint work with Zhongyi Zhu and Wing K. Fung.

Random Weighting Approximation for Tobit Regression Models with Longitudinal Data

Liqun Xiao

(China Academy of Sciences)

Abstract Longitudinal data arise naturally in medical studies, psychology, sociology and so on. Due to some lower detection limits the responses are often left censored. In this paper, we study regression models for longitudinal data with left censored response which we call Tobit response regression models. We propose quantile estimators of regression parameters and M-test statistics for linear hypotheses. The distributions of the proposed estimators and test statistics are estimated by random weighting method. By this approach we do not need to estimate nuisance parameters involved in asymptotic distributions of the quantile estimators and the M-test statistics. Extensive simulations and a real data example are presented to demonstrate the performance of our proposed methods. Joint work with B. Hou, Z.F. Wang and Y.H. Wu.

Model Averaging for Threshold Models

Yan Gao

(Chinese Academy of Sciences)

Abstract This paper develops a new model averaging approach based on an approximate gener- alized cross-validation which can be applied to both threshold and general linear models. The resulting estimators are proved to be asymptotically optimal in the sense of achiev- ing the lowest possible squared errors. Simulation results show good performance of the proposed estimators. An empirical application of our method on the US unemployment data is given. Joint work with Xinyu Zhang, Shouyang Wang, Terence Tai-leung Chong and Guohua Zou.

Calibrated Empirical Likelihood for High-Dimensional Data in Regression Model

Hong Guo

(Nankai University)

Abstract High-dimensional data is becoming prevalent, and many new methodology and accompanying theory for high-dimensional data analysis have emerged in response. Empirical likelihood, as a classical non-parametric method of statistical inference, has been proved to possess many good features. In this paper, we investigate the asymptotic behavior of empirical likelihood for regression coefficients in a high-dimensional linear model and give the regularity conditions under which the standard normal calibration of empirical likelihood is valid in high dimensions. Both random and fixed designs are considered. Simulation study is conducted to check the definite sample performance. Joint work with Changliang Zou and Zhaojun Wang.

Empirical Likelihood for Least Absolute Relative Error Regression

Zhouping Li

(Lanzhou University)

Abstract Multiplicative regression models are useful for analyzing data with positive responses, such as wages, stock prices and lifetimes, that are particularly common in economic, financial, epidemiological and social studies. Recently, the least absolute relative error (LARE) estimation was proposed to be a useful alternative to the conventional least squares (LS) or least absolute deviation (LAD). However, one may resort to the time-consuming resampling methods for the inference of the LARE estimation. This paper proposes an empirical likelihood approach towards constructing confidence intervals/regions of the regression parameters for the multiplicative models. The major advantage of the proposal is its ability of internal studentizing to avoid density estimation. And it is computationally fast. Simulation studies investigate the effectiveness of the proposed method. An analysis of the body fat data is presented to illustrate the new method. Joint work with Yuanyuan Lin, Guoliang Zhou and Wang Zhou.

Empirical Likelihood for First-Order Autoregressive Error-In-Explanatory Variable Models with Validation Data

Shihang Yu

(Jilin University)

Abstract In this paper, we consider the empirical likelihood for the autoregressive error-in-explanatory variable models. With the help of validation, we first develop an empirical likelihood ratio test statistic for the parameters of interest, and prove that its asymptotic distribution is that of a weighted sum of independent standard χ_1^2 random variables with unknown weights. Also we propose an adjusted empirical likelihood and prove that its asymptotic distribution is a standard χ^2. Furthermore, an empirical likelihood-based confidence region is given. Simulation results indicate that the proposed method works well for practical situations. Joint work with Dehui Wang.

成交价分析在高频交易中的应用

Chang Liu

(East China Normal University)

Abstract In recent years, the rapid development of high-frequency trading in the global financial market have gained widely attention. "Holding period for the assets is short but frequent" and "tiny yields in every trade" cause the trading sensitive to the transaction cost, in which the transaction price is the core. In this paper, a new transaction price model is constructed with the position information. Applied to the MACD indicator strategy, it has a good performance and bring a better return.

Adjusted Empirical Likelihood with High-order Precision through Resampling

Lei Wang

(East China Normal University)

Abstract Empirical likelihood based inference for parameters defined by general estimating equations has many nice properties (Qin and Lawless, 1994). However, when the sample size is small and/or the dimension of the accompanying estimating equations is high, its resulting confidence regions often have lower than nominal coverage probabilities. In addition, the use of the empirical likelihood can be hindered by an empty-set problem. The adjusted empirical likelihood (AEL) tackles both problems simultaneously. However, the AEL confidence region with high-order precision relies on accurate estimate of the required level of adjustment. This is proven difficult particularly when the model parameters are over-determined. In this paper, we show that the general AEL is Bartlett correctable and propose a two-stage procedure for constructing accurate confidence regions. A naive AEL is first employed to address empty-set problem and it is then Bartlett corrected through a resampling procedure. The finite sample performance of the proposed method is illustrated by simulations and a data example. Joint work with Jiahua Chen.

周日上午 (概率报告)

Large Deviations for SPDEs of Jump Type

Jianliang Zhai

(University of Science Technology of China)

Abstract In this paper, we establish a large deviation principle for a fully non-linear stochastic evolution equation driven by both Brownian motions and Poisson random measures on a given Hilbert space H. The weak convergence method plays an important role.

Exact Moduli of Continuity for Operator-Scaling Gaussian Random Fields

Yuqiang Li

(East China Normal University)

Abstract Let $X = \{X(t), t \in \mathbb{R}^N\}$ be a centered real-valued operator-scaling Gaussian random field with stationary increments, introduced by Biermé, Meerschaert and Scheffler (Stoch. Process. Appl. 2007). We prove that X satisfies a form of strong local nondeterminism and establish its exact uniform and local moduli of continuity. The main results are expressed in terms of the quasi-metric τ_E associated with the scaling exponent of X. Examples are provided to illustrate the subtle changes of the regularity properties. Joint work with Wensheng Wang and Yimin Xiao.

Pointwise Upper Estimates for Transition Probability of Continuous Time Random Walks

Xinxing Chen

(Shanghai Jiaotong University)

Abstract Let X be a continuous time random walk on a weighted graph. Given the on-diagonal upper bounds of transition probabilities at two vertices x_1 and x_2, we use an adapted metric initiated by Davies, and obtain Gaussian upper estimates for the o®-diagonal transition probability $P_{x_1}(X_t = x_2)$.

On Ruin Minimization under Optimal Outward Reinsurance and Inward Reinsurance Policies

Xiang Lin

(Zhejiang Gongshang University)

Abstract We consider a problem of optimal outward reinsurance and inward reinsurance policies for an insurance company whose surplus is governed by a linear diffusion. The insurance company's risk (and simultaneously its potential profit) is reduced through outward reinsurance, while the insurance company accepts inward reinsurance in order to increase insurance capacity or stabilize profits. In addition the insurance company invests its surplus in a financial market with only one risk-free asset. Our main goal is to find an optimal outward reinsurance and inward reinsurance policies which minimizes the ruin probability. We apply stochastic control theory to solve this problem. Employing dynamic programming techniques, we derive the corresponding Hamilton-Jacobi-Bellman (HJB) equation. We obtain the closed-form expression for the minimal ruin probability as well as optimal outward reinsurance and inward reinsurance policies. By comparing with the risk model only with outward reinsurance or inward reinsurance, we find that the ruin probability in our model is less than the risk model only with outward reinsurance or inward reinsurance, and risk tolerance in our model greater than the risk model only with outward reinsurance or inward reinsurance.

Extremes of Shepp Statistics for the Fractional Brownian Motion

Zhongquan Tan

(Jiaxing University)

Abstract Define the incremental fractional Brownian field with parameter $H \in (0,1)$ by $Z_H(\tau, s) = B_H(s + \tau) - B_H(s)$, where $B_H(s)$ is a fractional Brownian motion with Hurst parameter $H \in (0,1)$. We derive first the exact asymptotic tail behaviour of the maximum $M_H^*(T) = \max_{(\tau, s) \in [a,b] \times [0,T]} Z_H(\tau, s)/\tau^H$ with $0 < a < b < \infty$ of the standardised fractional Brownian motion field and then extend it to the case that T is a positive random variable independent of $\{B_H(s), s \geq 0\}$. As a by-product, we obtain the Gumbel limit law for $M_H^*(T)$ as $T \to \infty$. The obtained result extended the existing results in [1-3].

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On the Eigenfunctions of the Complex Ornstein-Uhlenbeck Operators

Yong Chen

(Hunan University of Science and Technology)

Abstract Starting from the 1-dimensional complex-valued Ornstein-Uhlenbeck process, we present two natural ways to imply the associated eigenfunctions of the 2-dimensional normal Ornstein-Uhlenbeck operator in the complex Hilbert space $L_{\mathcal{C}}^2(\mu)$. We call the eigenfunctions Hermite-Laguerre-Itô polynomials. In addition, the Mehler summation formula for the complex process is shown.

Central Limit Theorem for Functionals of Two Independent Fractional Brownian Motions

Fangjun Xu

(East China Normal University)

Abstract We prove a central limit theorem for functionals of two independent d-dimensional fractional Brownian motions with the same Hurst index H in $(\frac{2}{d+2}, \frac{2}{d})$ using the method of moments.

Lebesgue Approximation of Superprocesses with a Regularly Varying Branching Mechanism

Xin He

(Beijing Normal University)

Abstract Let $\xi = (\xi_t)$ be a superprocess with Brownian spatial motion and a regularly varying branching mechanism. Then for any fixed $t > 0$, the random measure ξ_t can be a.s. approximated by suitably normalized restrictions of Lebesgue measure to the ε-neighborhoods of supp ξ_t. This extends the Lebesgue approximation of Dawson-Watanabe superprocesses and $(2, \beta)$-superprocesses.

Extended Kanda-Forst-Rao Theorem and Related Results on Hunt's Hypothesis (H) for Lévy Processes

Zechun Hu

(Nanjing University)

Abstract In this paper, we consider Hunt's hypothesis (H) for Lévy processes. First, we give a new necessary and sufficient condition for (H), which extends the Kanda-Forst-Rao theorem. Second, we construct a type of subordinators which do not satisfy Rao's condition. Third, we present a comparison result on Lévy processes, which shows that big jumps have no effect on (H) in some sense. Finally, we give some new examples of subordinators satisfying (H). Joint work with Wei Sun and Jing Zhang.

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