

# Online Seminar

## Matrix Kendall's tau in High-dimensions: with Applications to Matrix Factor Model and 2-Dimensional (sparse) Principal Component Analysis

**Dr. Yong He**

**Date: 16 November 2023 (Thursday)**

**Time: 18: 00 - 18: 30**

**Link:**

<https://meeting.tencent.com/dm/x0eSSB4hkQqo>

**(Tencent Meeting ID: 350-529-712)**

**Abstract:** In this talk, I will introduce a new type of Kendall's tau for robust statistics, names as matrix-type Kendall's tau, which generalize the spatial Kendall's tau (Marden, 1999) in the literature to deal with random matrix elliptical observations. I will elaborate on its use in robust estimation for both factor model and principal eigenvectors (under both sparse and nonsprase settings) in High-dimensions.

**专家介绍:** 何勇，山东大学金融研究院，教授，博士生导师，山东大学齐鲁青年学者；山东大学学士（2012），复旦大学博士（2017），师从张新生教授；从事金融计量统计、数理统计以及机器学习等方面的研究，在国际统计学、计量经济学权威期刊Journal of Econometrics, Journal of Business and Economic Statistics, Biometrics（封面文章），Biostatistics等发表研究论文30余篇；现主持国家自然科学基金面上项目以及全国统计科学研究重点项目等。获第一届统计科学技术进步奖一等奖（第二位），担任美国数学评论评论员、中国现场统计研究会机器学习分会常务理事及JASA, JRSSB, AOS, JOE, JBES等国际学术期刊匿名审稿人。

**Your attendance is most welcome!**

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# Conformalized Jackknife Model Averaging

Dr. Xiaodong Yan

**Date: 16 November 2023 (Thursday)**

**Time: 18: 30 - 19: 00**

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(Tencent Meeting ID: 350-529-712 )

**Abstract:** Model averaging provides a robust solution to address model uncertainty. However, constructing interval predictions via model averaging remains challenging due to the intricacies of weight criteria. To address this, we introduce a novel approach: the Conformalized Jackknife Model Averaging (CJMA) method, which synergistically melds the model averaging process with conformal prediction, leveraging the Jackknife criterion. Within this framework, each model is incorporated into the conformal prediction process, and weights derived from model averaging are then allocated to the residuals of each distinct model. Consequently, this method capitalizes on the strengths of both model averaging and conformal prediction, resulting in superior interval predictions. The efficacy of our proposed method is validated through both simulated experiments and real world analysis. The proposed CJMA is scalable for a variety of MA procedures.

**专家介绍:** 严晓东，山东国家应用数学中心PI，山东省高等学校青年创新团队负责人，山东大学未来学者，副研究员，博士生导师，香港理工大学研究员 (ResearchFellow)，加拿大阿尔伯塔大学博士后研究员，云南大学与香港理工大学联合培养博士，中关村软联智能算法委员会秘书长，全国工业统计学教学研究会理事，中国现场统计研究会多元分析应用专业委员会常务理事和高维数据统计分会理事，山东省大数据专业建设委员会常务副秘书长，山东省应用统计学会副秘书长，山东省财政厅第一批和第二批省级政策性农业保险咨询专家。在统计学顶级期刊JRSSB, AOS, JASA, 计量经济顶刊JOE以及机器学习顶级期刊Neurocomputing和人工智能顶级会议AAAI等发表论文30余篇，荣获“云南省2020年优秀博士论文”奖，以主持人或联系人身份获得了国自科面上和青年基金，科技部、教育部、国家统计局、省自科、社科的项目以及济南市科技局等资助。

**Your attendance is most welcome!**

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# Differential Network Analysis Methods with Application to Alzheimer's Disease Brain Connectivity Study

Dr. Jiadong Ji

**Date: 16 November 2023 (Thursday)**

**Time: 19: 00 - 19: 30**

**Link:**

<https://meeting.tencent.com/dm/x0eSSB4hkQqo>

(Tencent Meeting ID: 350-529-712 )

**Abstract:** The brain functional connectivity can typically be represented as a brain functional network, where nodes represent brain regions and edges symbolize their connections. Studying group differences in brain functional connectivity can help identify brain regions and recover the brain functional network linked to neurodegenerative diseases. This process, known as differential network analysis, focuses on the differences between estimated precision matrices for two groups. Current methods struggle with individual heterogeneity in measuring the brain connectivity, false discovery rate (FDR) control, and accounting for confounding factors, resulting in biased estimates and diminished power. To address these issues, we present a two stage FDR-controlled feature selection method for differential network analysis using functional magnetic resonance imaging (fMRI) data. First, we create individual brain connectivity measures using a high-dimensional precision matrix estimation technique. Next, we devise a penalized logistic regression model that employs individual brain connectivity data and integrates a new knockoff filter for FDR control when detecting significant differential edges. Through extensive simulations, we showcase the superiority of our approach compared to other methods. Additionally, we apply our technique to fMRI data to identify differential edges between Alzheimer's disease (AD) and control groups. Our results are consistent with prior experimental studies, emphasizing the practical applicability of our method.

**专家介绍:** 季加东, 山东大学副研究员, 入选山东大学青年学者未来计划。主要研究方向包括生物统计、大数据机器学习以及生物信息学等交叉学科的研究, 在统计学、生物统计学国际权威期刊 *Biometrics* (入选期刊封面文章), *Biostatistics*, *Statistics in Medicine*, *Bioinformatics*, *Journal of Multivariate Analysis* 等发表SCI论文30余篇。主持国家自然科学基金青年基金1项, 省部级基金3项。2020年获得山东医学科技奖-科技创新成果奖三等奖。担任 *Genes*, *Frontiers in Genetics* 等期刊的 Guest Editor。

**Your attendance is most welcome!**



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# Partially linear varying-coefficient quantile regression with truncated and missing data

**Dr. Cuijuan Kong**

**Date: 16 November 2023 (Thursday)**

**Time: 19: 30 - 20: 00**

**Link:**

<https://meeting.tencent.com/dm/x0eSSB4hkQqo>

(Tencent Meeting ID: 350-529-712)

**Abstract:** We, in this paper, focus on partially linear varying-coefficient quantile regression when the response is subject to random left-truncation and the covariates are missing at random. In particular, based on weighted adjusted method, we propose a three-stage procedure to estimate the unknown parameter and nonparametric function vectors, and prove the asymptotic distributions of the estimators. Further, restricted estimators and test statistics are proposed under null hypothesis and local alternative hypothesis, respectively. At the same time, a penalization-based procedure is proposed to achieve variable selection, and we establish oracle properties of the penalized estimators. Simulation studies are carried out to investigate finite sample behavior of the proposed methods.

**专家介绍:** 孔翠娟，博士毕业于同济大学数学科学学院，山东大学金融研究院助理研究员，主要研究方向为复杂数据的非参数、半参数统计推断问题，在统计学权威期刊发表多篇论文。

**Your attendance is most welcome!**