

中国现场统计研究会多元分析应用专业委员会
2026 年学术年会暨“九章”应用统计国际会议

会议手册



中国现场统计研究会

Chinese Association for Applied Statistics



数学与统计学院

School of Mathematics and Statistics



甘肃省数学会

Gansu Mathematical Society

甘肃省统计学会

Gansu Statistical Society

甘肃·兰州

2026 年 6 月 5-7 日

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学术委员会

姓名	单位
荆炳义	香港中文大学（深圳）/南方科技大学
常晋源	西南财经大学
崔恒建	首都师范大学
冯兴东	上海财经大学
胡 江	东北师范大学
孔新兵	东南大学
李周平	兰州大学
潘建新	北京师范大学
庞善起	河南师范大学
史建清	南方科技大学
孙建国	南方科技大学
田波平	哈尔滨工业大学
姚 方	北京大学
张 洪	中国科学技术大学
张 虎	中南财经政法大学
张荣茂	浙江工商大学
张新雨	中国科学技术大学
张艳青	云南大学
钟 威	厦门大学
周 望	新加坡国立大学
周永道	南开大学
朱仲义	复旦大学

组委会

姓名	单位
荆炳义	香港中文大学（深圳）/南方科技大学
蒋学军	南方科技大学
赵学靖	兰州大学
李周平	兰州大学
胡潇潇	兰州大学
魏海英	兰州大学
苏锦霞	兰州大学
张淑红	兰州大学
郭利苹	兰州大学
陈进源	兰州大学
刘卫玮	兰州大学
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刘岳巍	兰州大学
郭家琨	兰州大学
郝晨瑞	兰州大学
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赵子涵	兰州大学
林 莹	兰州大学
李文清	兰州大学
李雅柔	兰州大学
张钧倍	兰州大学
汪 悦	兰州大学
邵佳慧	兰州大学

联系方式

联系人：赵学靖 (13919273918)、李周平 (13893483752)、胡潇潇 (15095373097)

通讯地址：甘肃省兰州市城关区天水南路 222 号 兰州大学数学与统计学院

会议地址

兰州大学大学生活动中心、逸夫科学馆、理工楼

日程安排

6月5日 全天	
报到注册	兰州市城关区长城建国饭店
6月6日 08:30-09:00	
报到注册	大学生活动中心报告厅
6月6日 09:00-09:25	
开幕式	大学生活动中心报告厅
6月6日 09:40-11:55	
大会报告	大学生活动中心报告厅
6月6日 14:00-16:15	
大会报告	大学生活动中心报告厅
6月6日 16:30-18:10	
特邀报告 1	大学生活动中心报告厅
特邀报告 2	大学生活动中心 502
特邀报告 3	大学生活动中心 506
特邀报告 4	大学生活动中心 802
特邀报告 5	大学生活动中心 804
特邀报告 6	大学生活动中心 808
特邀报告 7	大学生活动中心 810
特邀报告 8	逸夫科学馆 201
特邀报告 9	逸夫科学馆 202
特邀报告 10	逸夫科学馆 203
特邀报告 11	理工楼 518
特邀报告 12	理工楼 601
特邀报告 13	理工楼 631
6月7日 08:00-10:15	
大会报告	大学生活动中心报告厅

6月7日 10:30-12:10	
特邀报告 14	大学生活动中心报告厅
特邀报告 15	大学生活动中心 502
特邀报告 16	大学生活动中心 506
特邀报告 17	大学生活动中心 802
特邀报告 18	大学生活动中心 804
特邀报告 19	大学生活动中心 808
特邀报告 20	大学生活动中心 810
特邀报告 21	逸夫科学馆 201
特邀报告 22	逸夫科学馆 202
特邀报告 23	逸夫科学馆 203
特邀报告 24	理工楼 518
特邀报告 25	理工楼 601
特邀报告 26	理工楼 631
6月7日 14:00-15:40	
特邀报告 27	大学生活动中心报告厅
特邀报告 28	大学生活动中心 502
特邀报告 29	大学生活动中心 506
特邀报告 30	大学生活动中心 802
特邀报告 31	大学生活动中心 804
特邀报告 32	大学生活动中心 808
特邀报告 33	大学生活动中心 810
特邀报告 34	逸夫科学馆 201
特邀报告 35	逸夫科学馆 202
分组报告 1	逸夫科学馆 203
分组报告 2	理工楼 518
分组报告 3	理工楼 601
分组报告 4	理工楼 631

日程安排

6月5日 全天报到注册， 兰州市城关区长城建国饭店

6月6日 大会报告：大学生活动中心报告厅
特邀专题：大学生活动中心、逸夫科学馆、理工楼

时间	日程安排		主持人
08:30-09:00	报到注册 (大学生活动中心报告厅)		
09:00-09:25	开幕式 (大学生活动中心报告厅)		赵学靖
09:25-09:40	茶歇 (合影留念)		
大会报告 (大学生活动中心报告厅)			
时间	报告人	报告题目	主持人
09:40-10:25	黄 坚 香港理工大学	Representation-Driven Diffusion for Semi-Supervised Conditional Generation	荆炳义
10:25-11:10	孔新兵 东南大学	Personalized Subspace Learning for Multi-view Tensor Observations	李周平
11:10-11:55	宋心远 香港中文大学	Statistical Learning for Heterogeneous Multivariate Data	蒋学军
11:55-12:05	宣读 2027 年学会年会暨换届选举承办单位及承办单位介绍		
12:05-14:00	午餐 (丹桂苑二楼)		
大会报告 (大学生活动中心报告厅)			
14:00-14:45	杨宇红 清华大学	Optimal Adversarial Nonparametric Regression: Rates, Adaptation and Damage of Interpolation/Overtraining	刘 志
14:45-15:30	常晋源 西南财经大学	Adapting to noise tails in private linear regression	赵学靖
15:30-16:15	张新雨 中国科学院	Optimal Mixture-of-Experts Model Averaging for Conditional Generative Learning	李 挺
16:15-16:30	茶歇		

16:30-18:10	特邀专题 (大学生活动中心、逸夫科学馆、理工楼)		
特邀报告 1: <i>New statistical methods for event history data and high-dimensional data</i> Organizer: 杜明月 (吉林大学) 地点: 大学生活动中心报告厅			
16:30-16:55	王纯杰 长春工业大学	Regularized matrix-variate Cox regression model with neuroimaging data	杜明月
16:55-17:20	韩东啸 南开大学	Distributed privacy-preserving group inference for high-dimensional generalized linear models	
17:20-17:45	李树威 广州大学	Regression analysis of group-tested multivariate current status data	
17:45-18:10	葛磊 东北师范大学	Simultaneous variable selection and estimation of multivariate panel count data	
特邀报告 2: <i>Statistical Learning under Data Heterogeneity: from Foundation Models to Personalized Inference</i> Organizer: 李赛 (清华大学) 地点: 大学生活动中心 502			
16:30-16:55	陈彦硕 新加坡国立大学	TabPFN: One model to rule them all?	李赛
16:55-17:20	张琼 中国人民大学	TabClustPFN: A prior-fitted network for tabular data clustering	
17:20-17:45	金华清 清华大学	Conformal Inference for Minority Subgroups via Cross-Group Borrowing	
17:45-18:10	李赛 清华大学	Personalizing black-box models for nonparametric regression with minimax optimality	
特邀报告 3: <i>Advances Methods on Complex Data Analysis</i> Organizer: 李扬 (中国人民大学) 地点: 大学生活动中心 506			
16:30-16:55	马晨瑾 北京工业大学	Locally Weighted Accelerated Failure Time Model with Group Penalty: A Pan-Cancer Survival Analysis Framework for Identifying Shared Prognostic Genes in Multiple Genomic Datasets	马晨瑾
16:55-17:20	吴奔 中国人民大学	Singular Value-Based Multiple Change Point Detection in Factor Models	
17:20-17:45	吴梦云 上海财经大学	Sparse Bayesian Deep Functional Learning with Structured Region Selection	

17:45-18:10	解俊山 河南大学	An adaptive test on high-dimensional parameters in single-index models	
特邀报告 4: <i>Statistical Modeling and Inference for Complex and Unstructured Data</i> Organizer: 刘婧媛 (厦门大学) 地点: 大学生活动中心 802			
16:30-16:55	马 莉 厦门大学	Alteration detection of tensor dependence structure via sparsity-exploited reranking algorithm	马 莉
16:55-17:20	万 闯 暨南大学	Conditional Selective Inference for the Selected Groups in Panel Data	
17:20-17:45	曾 浩 南方科技大学	Efficient Reasoning with Statistical Guarantees for Large Language Models	
17:45-18:10	周 玮 西南财经大学	Statistical Inference for Mediation Models with High Dimensional Exposures and Mediators	
特邀报告 5: <i>Statistics for High-Dimensional Complex Data: Methods, Inference and Applications in Health and Genomics</i> Organizer: 平卫英 (南昌大学) 地点: 大学生活动中心 804			
16:30-16:55	李传权 江西财经大学	Generalized trace regression with simultaneously nonconvex nuclear norm and two-dimensional spline lasso	李传权
16:55-17:20	李 丽 江西财经大学	Estimating Endogenous Ordinal Treatment Effects with High-Dimensional Instruments and Covariates	
17:20-17:45	李江豪 江西财经大学	Testing for large cross-covariance matrix: a normal-reference approach	
17:45-18:10	夏新新 江西财经大学	Multi-Level Factorial Designs Under Mixed Parameterization	
特邀报告 6: <i>Statistical Methods for Complex Data: Modeling and Application</i> Organizer: 曲连强 (华中师范大学) 地点: 大学生活动中心 808			
16:30-16:55	王淑芳 华中师范大学	The MLE for sparse Rasch model: Consistency, top-k recovery and Gaussian approximation	王淑芳
16:55-17:20	吕 茏 华中师范大学	Linear spline index regression model: Interpretability, nonlinearity and dimension reduction	
17:20-17:45	宋皓月 华中师范大学	Semiparametric Analysis for Paired Comparisons with Covariates	
17:45-18:10	付连艳 辽宁大学	Graph Neural Networks for Generalized Mundlak Estimator under Network Confounding	

特邀报告 7: <i>Biomedical Statistics and Modeling Methods for Complex High-Dimensional Data</i>			
Organizer: 王纯杰 (长春工业大学) 地点: 大学生活动中心 810			
16:30-16:55	赵 慧 中南财经政法大学	去中心化分布式 Cox 模型的稀疏学习	王纯杰
16:55-17:20	李会琼 云南大学	Variational Bayes for High-Dimensional Multi-Source Heterogeneous Data with Sparse Priors	
17:20-17:45	杜明月 吉林大学	Regression analysis of interval-censored failure time data with change points and a cured subgroup	
17:45-18:10	蒋京京 长春工业大学	A Bayesian Transformation Model for Informative Partly Interval-Censored Data with Covariates Subject to Measurement Error	
特邀报告 8: <i>Statistical Modeling and Inference for Complex Data</i>			
Organizer: 王学军 (安徽大学) 地点: 逸夫科学馆 201			
16:30-16:55	杨文志 安徽大学	Robust CUSUM test of mean change-point for panel data with dependent errors	杨文志
16:55-17:20	贺 磊 安徽师范大学	Optimal designs for active controlled dose-response models with asymmetric errors	
17:20-17:45	庄 丹 福建师范大学	Sparse K-spatial-median for high dimensional clustering problem	
17:45-18:10	吴 捷 安徽大学	Transfer Learning for High-dimensional Accelerated Failure Time Models	
特邀报告 9: <i>Statistical Learning and Inference for Complex Data</i>			
Organizer: 解俊山 (河南大学) 地点: 逸夫科学馆 202			
16:30-16:55	刘中强 河南理工大学	Model-based optimal randomization procedure for treatment-covariate interaction tests	解俊山
16:55-17:20	董 伟 郑州大学	Network alternating direction method of multipliers for ultrahigh-dimensional decentralized federated learning	
17:20-17:45	李灿辉 河南大学	Doubly Robust and Outlier-Resistant Semiparametric Estimation of Optimal Individualized Treatment Regimes	
17:45-18:10	李双双 河南科技大学	Estimation and testing for fixed effects partially linear nonparametric panel regression model with separable spatially and serially correlated error structure	

特邀报告 10: <i>Agentic AI and Multi-Armed Bandit: Advances in Statistical Theory and Application</i>			
Organizer: 严晓东 (西安交通大学) 地点: 逸夫科学馆 203			
16:30-16:55	姜丹丹 西安交通大学	Asymptotic Theory and Sequential Test for General Multi-Armed Bandit Process	严晓东
16:55-17:20	喻达磊 西安交通大学	Semi-supervised learning using copula-based regression and model averaging	
17:20-17:45	张国栋 山东财经大学	Many two-armed bandits-driven Optimization via the strategic law of large numbers	
17:45-18:10	严晓东 西安交通大学	Agentic AI agent Uncertainty Quantification in Infinite horizon	
特邀报告 11: <i>Advances in Statistical Learning, Fuzzy Logic, and Stochastic Dynamics</i>			
Organizer: 杨炜明 (重庆工商大学) 地点: 理工楼 518			
16:30-16:55	鲜思东 重庆邮电大学	基于 χ -语言的中风辅助辨证与诊疗决策	鲜思东
16:55-17:20	齐 凯 重庆师范大学	Intuitionistic proximity-consensus fuzzy geometric twin support vector machine with best subset selection	
17:20-17:45	曹幸运 重庆工商大学	A novel exact confidence interval for the difference of proportions in paired data using a restricted most probable statistic	
17:45-18:10	张 静 重庆工商大学	Strong Feller property and ergodicity of gneralized Ornstein-Uhlenbeck processes	
特邀报告 12: <i>Statistical Process Control: Methodology and Application</i>			
Organizer: 张久军 (辽宁大学) 地点: 理工楼 601			
16:30-16:55	吴纯杰 上海财经大学	Transfer learning-based non-parametric monitoring for the small-sample profile with temporal correlation	吴纯杰
16:55-17:20	李 聪 吉林大学	A study on the performance of matrix control charts based on the normal distribution	
17:20-17:45	宋 贇 沈阳农业大学	Dynamic count time series modeling and anomaly detection for online automotive quality complaints	
17:45-18:10	唐安安 南京邮电大学	A class of distribution-free monitoring schemes for high-dimensional industrial processes via origin and modified interpoint distance based algorithms	

特邀报告 13: <i>Statistical Inference Theory for Covariance Matrix, Partial Correlation and Change-point Detection</i>			
Organizer: 张军舰 (广西师范大学) 地点: 理工楼 631			
16:30-16:55	梁宇莉 广西师范大学	Adaptive Regularization of High-Dimensional Toeplitz Covariance Matrix	张军舰
16:55-17:20	徐 锋 桂林理工大学	A robust diagnostic approach in mean shifts for multivariate statistical process control	
17:20-17:45	林允武 桂林电子科技大学	Projection-based inference for partial correlation in non-sparse high-dimensional settings	
17:45-18:10	张军舰 广西师范大学	Change-point estimation for mixed-regression model	
18:10	晚餐 (丹桂苑二楼)		
6 月 7 日	大会报告: 大学生活动中心 特邀专题: 大学生活动中心、逸夫科学馆、理工楼		
大会报告 (大学生活动中心报告厅)			
时间	报告人	报告题目	主持人
08:00-08:45	马舒洁 美国加州大学河滨分校	Causal Inference on Quantile Dose-response Functions via ReLU Least Squares Weights	郭利苹
08:45-09:30	席瑞斌 北京大学	空间转录组数据的统计分析	胡 江
09:30-10:15	王学钦 中国科学技术大学	Ball Impurity: Measuring Heterogeneity in General Metric Spaces	田波平
10:15-10:30	茶歇		
10:30-12:10	特邀专题 (大学生活动中心、逸夫科学馆、理工楼)		
特邀报告 14: <i>Theory and Application of Medical Imaging and Multi-omics Data Statistics</i>			
Organizer: 郭水霞 (湖南师范大学) 地点: 大学生活动中心报告厅			
10:30-10:55	谌自奇 华东师范大学	Nonlinear Causal Structure Learning: Application to Inferring the Gene Regulatory Network in Breast Cancer	张艺馨
10:55-11:20	张艺馨 中国科学技术大学	Multiple-Imputation-Based Multivariate One-sided Tests for Nonlinear Mixed-Effects Models with Covariate Measurement Error and Left-Censored Responses	

11:20-11:45	康菊姣 湖南师范大学	From Multi-omics to Brain and Behavior: Statistical Integration of Exome Sequencing, Plasma Proteomics, and Neuroimaging in Mental Health Research	
11:45-12:10	毛善骏 湖南大学	Multi-block ADMM for Sparse Gaussian Graphical Models	
特邀报告 15: 复杂数据的异质分析和模型选择 Organizer: 郭旭 (北京师范大学) 地点: 大学生活动中心 502			
10:30-10:55	朱学虎 西安交通大学	Subspace change point detection and Clustering	朱学虎
10:55-11:20	王明秋 曲阜师范大学	Robust Heterogeneous Subgroup Analysis via Composite Quantile Regression with Pairwise Fusion Penalties	
11:20-11:45	孙力喆 山西财经大学	Feature Selection with Annealing for Shallow Neural Networks Using the Multi-Stage Stochastic Algorithm	
11:45-12:10	陈 泽 山东大学	An Efficient Jackknife Model Averaging Method	
特邀报告 16: <i>Advances in Statistical Methods for Complex Health and Genomics Data: Diagnostics, Modeling, Annotation, and Application</i> Organizer: 何剑 (新疆财经大学) 地点: 大学生活动中心 506			
10:30-10:55	孙 毅 新疆财经大学	Collapsibility via Minimal Separators in Contingency Tables	何 剑
10:55-11:20	王芝皓 新疆财经大学	Additive tree latent variable models with applications to insurance loss prediction	
11:20-11:45	李智明 新疆大学	Statistical inferences for uncertain semiparametric model	
11:45-12:10	张兆远 伊犁师范大学	Characterizing Tail Heterogeneity in Continuous Unimodal Asymmetric Distributions via Conditional Moments	
特邀报告 17: <i>Advances in Random Matrix Theory and High-Dimensional Statistical Inference</i> Organizer: 胡江 (东北师范大学) 地点: 大学生活动中心 802			
10:30-10:55	张晓琢 东北师范大学	The asymptotic properties of the extreme eigenvectors of high-dimensional spiked models	胡 江
10:55-11:20	周焕超 湘潭大学	Distribution-sharpened sampling for maximum and minimum entry localization in factorized tensors	

11:20-11:45	田 晔 东北师范大学	Nonlinear Latent Space Estimation and Principal Component Analysis	
11:45-12:10	李玉玲 长春工业大学	Distributed Estimation of Spiked Eigenvalues in Generalized Spiked Population Models	
特邀报告 18: <i>Advance in high-dimensional and complex time series</i> Organizer: 张荣茂 (浙江工商大学) 地点: 大学生活动中心 804			
10:30-10:55	蔡 利 浙江工商大学	Distributed bootstrap global inferences for the cumulative distribution function with large-scale data	张荣茂
10:55-11:20	王励励 浙江工商大学	Spectral Graphical Lasso for High-Dimensional Time Series	
11:20-11:45	张建强 浙江工商大学	Varying-Coefficient Fréchet Regression	
11:45-12:10	吴潇然 香港科技大学	Eigen-transformed Tests for High-dimensional Mean Vectors under Dependence and Heavy Tails	
特邀报告 19: <i>Statistical Modeling and Inference for Complex Data</i> Organizer: 刘鹏飞 (江苏师范大学) 地点: 大学生活动中心 808			
10:30-10:55	李建波 江苏师范大学	Distributed Jackknife Model Averaging for Quantile Regression	李建波
10:55-11:20	刘鹤飞 云南财经大学	概率分布型响应变量的弗雷歇回归模型及其统计推断	
11:20-11:45	陈 慧 江苏师范大学	Robust selection of the number of change-points via FDR control	
11:45-12:10	张宇豪 江苏师范大学	A novel tuning-free estimation for high-dimensional gaussian graphical models	
特邀报告 20: <i>Advances in Statistical Methods for Complex Genomics Data</i> Organizer: 刘旭 (上海财经大学) 地点: 大学生活动中心 810			
10:30-10:55	陈晓平 福建理工大学	脊髓小脑性共济失调第 3 型的脑老化加速及其解剖学结构	刘 旭
10:55-11:20	周慧娟 上海财经大学	QPDA: Quasi-Poisson Compositional Regression for Differential Abundance Analysis	
11:20-11:45	秦 杏 上海对外经贸大学	Structured Factor Regression with High-Dimensional Multimodal Data	

11:45-12:10	张书聪 对外经济贸易大学	BBVEM: Black-Box Variational EM Algorithm for Latent Network Learning and Composition Estimation from Microbiome Data	
特邀报告 21: <i>Recent Developments in Financial Statistics</i> Organizer: 刘志 (澳门大学) 地点: 逸夫科学馆 201			
10:30-10:55	胡建明 海南大学	A novel graph learning framework for interpretable and imbalance financial fraud detection	刘 志
10:55-11:20	黄 磊 西南交通大学	Adaptive sparse regression with dynamic covariance for portfolio optimization	
11:20-11:45	刘广应 南京审计大学	A Variation-Ratio Test for Volatility Jumps Using Noisy High Frequency Data	
11:45-12:10	朱海斌 暨南大学	Fixed-k Inference for Spot R-squared in High-Frequency Factor Models	
特邀报告 22: <i>Advances in Modern Statistical Inference</i> Organizer: 任好洁 (上海交通大学) 地点: 逸夫科学馆 202			
10:30-10:55	周叶青 同济大学	Power Enhancement for Test of Multivariate Independence	周叶青
10:55-11:20	吴瑞佳 上海交通大学	Labels or Preferences? Budget-Constrained Learning with Human Judgments over AI-Generated Outputs	
11:20-11:45	包亚杰 南开大学	Shape-Adaptive Conditional Calibration for Conformal Prediction via Minimax Optimization	
11:45-12:10	张熠凡 上海交通大学	Generalized Boundary FDR Control under Arbitrary Dependence: An Approach on Closure Principle	
特邀报告 23: <i>Frontiers in Modern Statistical Learning</i> Organizer: 杨莹 (复旦大学) 地点: 逸夫科学馆 203			
10:30-10:55	杨 莹 复旦大学	Online Sparse Regression with Expanding Observables	杨 莹
10:55-11:20	贺 莘 上海财经大学	Kernel Ridge Regression with Predicted Feature Inputs	
11:20-11:45	曾宪立 厦门大学	Nonparametric-Based Fairness Auditing	

11:45-12:10	顾 嘉 浙江大学	Learning Sparse Support under Differential Privacy: Minimax Rates and Adaptive Algorithms	
特邀报告 24: <i>Advances in Statistical Methods for High-dimensional Graphs and Survival Analysis</i> Organizer: 张艳青 (云南大学) 地点: 理工楼 518			
10:30-10:55	刘 鑫 上海财经大学	Likelihood Ratio Tests for Poisson Graph with Directed Acyclicity Constraints	刘 鑫
10:55-11:20	丁 杰 大连海事大学	Function-Valued Auxiliary Information Transfer in Survival Analysis	
11:20-11:45	韩 博 云南大学	Quantile regression for censored data with a cure fraction	
11:45-12:10	易凤婷 云南大学	Variational Bayesian Estimation for Joint Models of Longitudinal and Interval-Censored Fairure Time Data with Random Change-Points	
特邀报告 25: <i>Advances in Statistical Causal Inference</i> Organizer: 张政 (中国人民大学) 地点: 理工楼 601			
10:30-10:55	刘 阳 中国人民大学	Statistical Inference with Mixed-Effect Model for Covariate-Adaptive Randomized Experiments	张 政
10:55-11:20	马 维 中国人民大学	Integrating Heterogeneous Information in Randomized Experiments: A Unified Calibration Framework	
11:20-11:45	张宇谦 中国人民大学	Quadruply robust methods for causal mediation analysis	
11:45-12:10	张 政 中国人民大学	Higher-Order Debiased Estimators for General Treatment Models	
特邀报告 26: <i>Modern Statistical Methods in Time Series Analysis, Experimental Design, and Non- Euclidean Data</i> Organizer: 朱复康 (吉林大学) 地点: 理工楼 631			
10:30-10:55	朱复康 吉林大学	Z-valued smooth transition GARCH models: Specification and testing	朱复康
10:55-11:20	庞善起 河南师范大学	正交表的构造及应用	
11:20-11:45	林海明 广东财经大学	因子模型的设定误差及其改进	
11:45-12:10	陈 欣 南方科技大学	Non-Euclidean object filtering for large-scale discriminant analysis with application to abnormal brain connectivity detection	

12:10-14:00	午餐 (丹桂苑二楼)		
14:00-15:40	特邀专题 (大学生活动中心、逸夫科学馆、理工楼)		
特邀报告 27: <i>Advances Methods on Complex Data Analysis</i> Organizer: 刘成 (武汉大学) 地点: 大学生活动中心报告厅			
14:00-14:25	吴 彬 中国科学技术大学	Data Synchronization at High Frequencies	吴 彬
14:25-14:50	邹 丰 中南财经政法大学	Stable Semi-Distance Covariance for Independence Testing: From Low to High Dimensions	
14:50-15:15	贺百花 中国科学技术大学	Combining pre-trained models via localized model averaging	
15:15-15:40	许少华 中南财经政法大学	Minimax Optimality of Hybrid Orthogonal-Uniform Designs	
特邀报告 28: <i>Statistical Methods for Economics: Modeling and Application</i> Organizer: 刘明 (兰州财经大学) 地点: 大学生活动中心 502			
14:00-14:25	孙景云 兰州财经大学	Research on LSTM-A2C Intelligent Futures Pairs Trading Model Integrating Price Spread Features	孙景云
14:25-14:50	朱威伟 甘肃政法大学	Research on the balanced, coordinated and sustainable development of China manufacturing industry	
14:50-15:15	王朝旭 青海师范大学	Double robust small area estimation with γ -divergence	
15:15-15:40	李东升 兰州财经大学	一种融合可解释性信息的集成模型在比特币跳跃波动率预测中的应用	
特邀报告 29: <i>Advances in Statistical Methods for Complex and Large-Scale Data</i> Organizer: 刘耀午 (西南财经大学) 地点: 大学生活动中心 506			
14:00-14:25	张静茹 复旦大学	Harmonizing Longitudinal Physical Activity Data from Heterogeneous Wearable Devices	刘耀午
14:25-14:50	贺志兵 东南大学	Identification of Key Influencers: Design and Analysis of Egocentric Network-based Randomized Studies	
14:50-15:15	凌 星 西南财经大学	Multiple testing in rolling-window analysis via p -value combination	

15:15-15:40	刘耀午 西南财经大学	A Powerful Transformation of Quantitative Responses for Biobank-Scale Association Studies	
特邀报告 30: 统计建模与推断 Organizer: 马少娟 (北方民族大学) 地点: 大学生活动中心 802			
14:00-14:25	杨 叙 北方民族大学	Extinction, explosion and contraction for time-inhomogeneous SDEs with jumps	杨 叙
14:25-14:50	马耀兰 北方民族大学	Conditional Expectile Inference in Predictive Regressions with Infinite-Variance Predictors	
14:50-15:15	马靖瑛 宁夏大学	Edge Modification for Influence Maximization of Competing Opinions in Social Networks	
15:15-15:40	马晓燕 宁夏大学	A doubly robust approach for high-dimensional distributed reduced rank regression	
特邀报告 31: High-Dimensional Statistical Inference: Testing, Spectral Analysis, and Variable Selection Organizer: 潘光明 (新加坡南洋理工大学) 地点: 大学生活动中心 804			
14:00-14:25	王 成 上海交通大学	Spectral analysis of spatial-sign covariance matrices with dependence and weaker moment conditions	王 成
14:25-14:50	姚 驰 安徽大学	On high-dimensional adaptive sign tests	
14:50-15:15	周 佳 合肥工业大学	Uniform knockoff filter for high-dimensional controlled graph recovery	
15:15-15:40	邹婷婷 吉林大学	Spectral Properties of High-dimensional Rescaled Sample Correlation Matrices under Elliptical Distributions	
特邀报告 32: 统计学及交叉研究 Organizer: 田波平 (哈尔滨工业大学) 地点: 大学生活动中心 808			
14:00-14:25	俞童慧 哈尔滨工业大学	Dynamic survival prediction based on multiple intermediate events	田波平
14:25-14:50	孙浩轩 哈尔滨工业大学	Localization Estimator for High Dimensional Tensor Covariance Matrices	
14:50-15:15	安红雨 浪潮数字企业	From Scarcity to Insight: Extreme Events Analysis with a Partially linear single index varying coefficient model in High dimensional settings	
15:15-15:40	梁晓文 天津商业大学	A Dynamic interaction varying index coefficient quantile regression model	

特邀报告 33: <i>Recent Advances in Statistical Learning and Complex Data Analysis</i>			
Organizer: 杨玥含 (中央财经大学) 地点: 大学生活动中心 810			
14:00-14:25	王典朋 北京理工大学	A Nested Singular Value Decomposition-Based Surrogate Model for Spatiotemporal Flows	杨玥含
14:25-14:50	高天辰 北京大学	BASIC: Bipartite Assisted Spectral-clustering for Identifying Communities in Large-scale Networks	
14:50-15:15	夏思薇 成都理工大学	A model-free multivariate non-recursive feature elimination for feature selection on high-dimensional complex multiple response data	
15:15-15:40	杨玥含 中央财经大学	Randomization based sharp bounds and monotonicity for ordinal outcomes in 2^K factorial experiments	
特邀报告 34: <i>Statistical Learning and Inference for Complex, High-Dimensional, and Transfer Learning</i>			
Organizer: 蒋学军 (南方科技大学) 地点: 逸夫科学馆 201			
14:00-14:25	郭精军 兰州财经大学	Statistical inference of the complex fractional Vasicek model with Hurst index $H\in(0,\frac{1}{2})$	蒋学军
14:25-14:50	张美玲 甘肃农业大学	Machine-learning-based simulation of soil organic carbon and total nitrogen in the Qilian Mountain grasslands and analysis of influencing factors	
14:50-15:15	朱素玲 兰州大学	多中心双小样本自适应迁移模型构建及应用研究	
15:15-15:40	蒋学军 南方科技大学	Cross-semantic Transfer Learning for High-dimensional Linear Regression	
特邀报告 35: <i>Advanced Statistical Methods for Multivariate Data, Time Series and Machine Learning</i>			
Organizer: 张志民 (重庆大学) 地点: 逸夫科学馆 202			
14:00-14:25	苏理云 重庆理工大学	CT-DDPM: Anomaly detection of multivariate time series with copula and transformer-based denoising diffusion probabilistic models	苏理云
14:25-14:50	吕 晶 西南大学	Model Averaging of Partially Linear Multinomial Logit Model for Multi-Categorical Data	
14:50-15:15	苏佳骥 重庆大学	Principal Decomposition with Nested Submanifolds	
15:15-15:40	胡 尧 贵州大学	A robust and efficient tail-adaptive approach for change-point detection in semiparametric models	

分组报告 1: *Advances in Reliability Modeling, Dependence Analysis and System Optimization***地点:** 逸夫科学馆 203

14:00-14:25	张建东 西北师范大学	Statistical Modeling and Residual Lifetime Prediction for Fractional Wiener Degradation Processes with Random Effects	张建东
14:25-14:50	李甜甜 西北师范大学	Comparing Relevation Allocations of Series and Parallel Systems with Heterogeneous Components under Copula Dependence	
14:50-15:15	燕一平 西北师范大学	Optimal active redundancy allocation of fail-safe systems with dependent heterogeneous components	
15:15-15:40	雷哲瑞 西北师范大学	Semi-parametric Estimation of Accelerated Failure Time Model under Copula Dependent Censoring	

分组报告 2: *Advances in Robust Learning and Statistical Modeling for Complex Data Analysis***地点:** 理工楼 518

14:00-14:25	何帅达 香港大学	Contamination-Aware Federated LoRA Fine-Tuning via Collaborative Alignment	何帅达
14:25-14:50	林一楠 重庆师范大学	Binary regression and classification with covariates in metric spaces	
14:50-15:15	邓淋穗 香港中文大学（深圳）	A General Framework For Modeling Gaussian Process with Qualitative and Quantitative Factors	
15:15-15:40	刘明睿 中国科学技术大学	基于变分贝叶斯方法同步进行异常值检测与变量选择	

分组报告 3: *Robust Statistical Inference for High-Dimensional, Network and Time Series Data***地点:** 理工楼 601

14:00-14:25	崔 健 东北师范大学	On the rate of convergence in the CLT for LSS of large-dimensional sample covariance matrices	崔 健
14:25-14:50	Haile Tariku Tesfaye 哈尔滨工业大学	Multiscale Mean Shift Detection with Robust Time-varying Variance Estimation	
14:50-15:15	何洪浏 东北师范大学	A Multi-Motif Spectral Goodness-of-Fit Test for Robust Community Detection in Stochastic Block Models	
15:15-15:40	贾雨宁 哈尔滨师范大学	A new time-varying-threshold integer-valued autoregressive model	

分组报告 4: *Advances in Statistical Inference and Dynamic Data Analysis*

地点: 理工楼 631

14:00-14:25	郝程程 上海对外经贸大学	Efficient Estimation of the Tobit Model under a Large-p-Small-n Paradigm	郝程程
14:25-14:50	崔 壮 西北师范大学	Optimal investment strategies and intergenerational risk sharing under dual constraints for target benefit pension plan	
14:50-15:15	娘毛措 青海师范大学	Online change-point detection in dynamic regression models with autocorrelated residuals	
15:15-15:40	牛晓煜 兰州大学	Quantile inference for multivariate response regression in joint modeling of longitudinal and survival data	

报告摘要

大会报告：

Representation-Driven Diffusion for Semi-Supervised Conditional Generation

黄 坚（香港理工大学）

Abstract: Conditional generative modeling remains a challenging problem in semi-supervised settings where labeled data is scarce but unlabeled samples are abundant. To effectively leverage structural information embedded within the unlabeled dataset and compensate for sparse conditioning signals, we propose a semi-supervised framework combining conditional stochastic interpolation with low-dimensional latent representations. RepG decomposes generation into two stages: label-dependent latent sampling and high-dimensional reconstruction. This isolates the supervised learning of conditional dependencies to a low-dimensional space, requiring few labels while utilizing the abundant unlabeled data purely for reconstruction. Theoretically, we establish an error decomposition showing that the Kullback-Leibler divergence of RepG comprises stage-wise estimation errors and a structural bias quantified by conditional mutual information. For deep neural network estimators, we derive non-asymptotic convergence rates proving that RepG significantly improves sample complexity. By confining the supervised estimation burden to the low intrinsic dimension of the latent representation, RepG achieves a strictly faster convergence rate. Complemented by a minimax lower bound, our theoretical results demonstrate that this method effectively mitigates the curse of dimensionality inherent in direct ambient-space generative modeling.

报告人简介: 黄坚现任香港理工大学数据科学及人工智能学系、应用数学系数据科学与分析讲座教授。他的研究领域涵盖统计学、机器学习与生物信息学，当前主要致力于深度学习、生成式学习及表征学习的前沿探索。早期研究则集中于高维统计、半参数模型、生存分析和统计遗传学。黄坚教授是美国统计学会（ASA）及数理统计学会（IMS）会士，曾于 2015-2019 年度入选科睿唯安“高被引学者”，并于 2019-2025 年度连续入选斯坦福大学发布的“全球前 2% 顶尖科学家”榜单。目前，他还担任《美国统计学会会刊》（JASA）、《英国皇家统计学会会刊 B 辑》（JRSS-B）及《国际统计评论》（International Statistical Review）编委。

Personalized Subspace Learning for Multi-view Tensor Observations

孔新兵（东南大学）

Abstract: Driven by the substantial increase in computing capacity, it is increasingly common to observe heterogeneous datasets that are naturally structured as multiple tensor sequences of different shapes and sizes. In this work, we model the observed multi-view tensors by decomposing the underlying signal in each view into two

components: (i) the shared component that captures common dynamics across all views, and (ii) the private component that accounts for view-wise unique variations. To decouple the shared and private components, a novel personalized subspace PCA problem that admits a one-step global optimal solution is proposed. The theoretical analysis reveals that the one-step estimator reaches the minimax lower bound in terms of view-wise tensor decoupling, which means that the proposed personalized subspace PCA problem can serve as an ideal surrogate for the original personalized PCA problem. Extensive numerical experiments are conducted on synthetic and real datasets, demonstrating the potential applicability of our method in fields including finance, macroeconomics, environmental monitoring, and activity recognition.

报告人简介：东南大学统计与数据科学学院教授、副院长。主要研究方向为计量经济学与机器学习。在 AoS, JASA, Biometrika, JoE, JBES 发表论文 20 余篇。主持国家自然科学基金项目 5 项，其中重点专项 1 项。联合主持中钢集团 CAD 对象识别和自动算量系统项目和招商银行南京分行大模型应用项目。获第一届统计科学技术进步奖一等奖，江苏省教育系统先进个人（优秀教师），完成省教育教学改革重点项目 1 项，参编统计学 101 教材《统计机器学习》。担任 JBES 期刊编委。

Statistical Learning for Heterogeneous Multivariate Data

宋心远（香港中文大学）

Abstract: Modern scientific studies routinely generate heterogeneous multivariate data with complex dependence across variables, individuals, and time, posing substantial challenges for statistical learning. In this talk, we propose a unified framework for modeling such data by integrating latent variable models, mixed membership structures, and longitudinal trajectory analysis. We first introduce a mixed membership latent variable model that combines exploratory factor analysis with flexible subpopulation modeling, enabling simultaneous learning of latent factors, factor structures, and profile memberships while capturing individual heterogeneity and addressing multicollinearity. We then present a multi-label growth curve change-point model for multivariate longitudinal data, which accommodates between-individual, between-variable, and within-subject temporal heterogeneity through domain-specific latent classes and subject-specific change points, allowing individuals to exhibit distinct progression patterns across multiple outcome domains. Together, these approaches provide a general paradigm for statistical learning in heterogeneous multivariate data, emphasizing interpretable latent representations, partial memberships, and dynamic structures. Theoretically, we show that the proposed methods accurately recovers the underlying heterogeneity structure. Applications to Parkinson’s disease data demonstrate their ability to uncover meaningful latent traits, domain-specific progression patterns, and refined disease

subtypes, offering valuable insights for complex data analysis and precision medicine.

报告人简介: Xinyuan Song is a Professor in the Department of Statistics and Data Science at The Chinese University of Hong Kong. She is a Changjiang Scholar Chair Professor awarded by the Ministry of Education of China, a Fellow of the Institute of Mathematical Statistics (IMS), and an elected member of the International Statistical Institute (ISI). Her research interests include latent variable models, Bayesian methods, longitudinal data analysis, survival analysis, and statistical computing. She has served, or is currently serving, as an Associate Editor for several leading international journals in statistics and psychometrics, including Journal of the American Statistical Association, Journal of the Royal Statistical Society Series A, Biometrics, Statistics in Medicine, Electronic Journal of Statistics, Psychometrika, and Structural Equation Modeling: A Multidisciplinary Journal.

Optimal Adversarial Nonparametric Regression: Rates, Adaptation and Damage of Interpolation/Overtraining

杨宇红（清华大学）

Abstract: Despite tremendous advancements of machine learning models and algorithms in various application domains, they are known to be vulnerable to subtle, natural or intentionally crafted perturbations in future input data, known as adversarial attacks. While numerous adversarial learning methods have been proposed, fundamental questions about their statistical optimistically in robust loss and damages of overfitting/overtraining remain largely unanswered. In particular, can a DNN with near zero training error be robust against adversarial attacks? Is it possible to have robust procedures under adversarial attacks with unknown attack strength and unknown smoothness of the underlying regression function? Can early stopping help achieve adversarial minimax optimality in the idealized NTK framework? We will provide answers to these questions from several angles, with numerical illustrations as well.

报告人简介: Yuhong Yang received his Ph.D. degree in statistics from Yale University in 1996, and worked as a faculty member at Iowa State University and later at University of Minnesota. Since 2023, he has been with Yau Mathematical Sciences Center at Tsinghua University and also with Beijing Institute of Mathematical Sciences and Applications (BIMSA). His research interests include model selection, model averaging, multi-armed bandit problems, causal inference, high-dimensional data analysis, and machine learning. He has published in journals in several fields including Annals of Statistics, JASA, IEEE Transactions on Information Theory, IEEE Signal Processing Magazine, Journal of Econometrics, Journal of Machine Learning Research, and International Journal of Forecasting. He was a recipient of the US NSF CAREER Award, and is a fellow of the Institute of

Mathematical Statistics and the American Statistical Association as well. He has been included in the list of top 2% of the world's most cited scientists by Stanford University since 2020.

Adapting to noise tails in private linear regression

常晋源（西南财经大学）

Abstract: While the traditional goal of statistics is to infer population parameters, modern practice increasingly demands protection of individual privacy. One way to address this need is to adapt classical statistical procedures into privacy-preserving algorithms. In this paper, we develop differentially private tail-robust methods for linear regression. The trade-off among bias, privacy, and robustness is controlled by a tunable robustification parameter in the Huber loss. We implement noisy clipped gradient descent for low-dimensional settings and noisy iterative hard thresholding for high-dimensional sparse models. Under sub-Gaussian errors, our method achieves near-optimal convergence rates while relaxing several assumptions required in earlier work. For heavy-tailed errors, we explicitly characterize how the non-asymptotic convergence rate depends on the moment index, privacy parameters, sample size, and intrinsic dimension. Our analysis shows how the moment index influences the choice of robustification parameters and, in turn, the resulting statistical error and privacy cost. By quantifying the interplay among bias, privacy, and robustness, we extend classical perspectives on privacy-preserving robust regression. The proposed methods are evaluated through simulations and two real datasets.

报告人简介: 常晋源，西南财经大学光华首席教授、中国科学院数学与系统科学研究院研究员，主要从事大规模复杂数据分析相关的研究，先后担任统计学、计量经济学和运筹优化国际学术期刊 *Statistica Sinica*、*Journal of the Royal Statistical Society Series B*、*Journal of Business & Economic Statistics*、*Journal of the American Statistical Association* 和 *Operations Research* 的副主编，主持了国家自然科学基金重大项目、国家杰出青年科学基金项目等科研项目，获得过国务院政府特殊津贴、霍英东教育基金会高等院校青年科学奖一等奖和青年教师奖一等奖、教育部高等学校科学研究优秀成果奖、四川省青年科技奖等奖励，获四川省基础研究领衔科学家专项资助。

Optimal Mixture-of-Experts Model Averaging for Conditional Generative Learning

张新雨（中国科学院）

Abstract: Learning complex conditioned distributions is essential in modern generative modeling, powering applications from probabilistic prediction to AI-driven image and text synthesis. Different generative models often excel on some conditioning inputs but struggle on others, yet classical ensemble

methods assign fixed weights that ignore this variability. We introduce a statistically principled Optimal Mixture-of-Experts framework that learns input-dependent weights to combine multiple conditional generators dynamically. By extending model averaging theory and using integral probability metrics to align distributions, we prove our adaptive weighting achieves asymptotic optimality under broad conditions. The proposed method can seamlessly incorporate any conditional generator, and can be extended to other probabilistic tasks. Comprehensive simulations and real-world experiments demonstrate that our method consistently outperforms individual models and traditional ensembles. These experiments, such as image generation and text continuation, show its broad effectiveness in other statistic and AI applications.

报告人简介: 张新雨, 中国科学院数学与系统科学研究院研究员。长期从事管理统计和计量经济学理论与应用方面的研究工作, 与合作者解决了模型平均研究中的多个难题, 并将模型平均与迁移学习、随机森林等融合提出了新方法, 同时将所提出的预测方法应用于实际问题为相关部门的决策提供了参考依据。先后主持国家自然科学基金委杰出青年基金及其延续项目等, 曾获中国青年科技奖

Causal Inference on Quantile Dose-response Functions via ReLU Least Squares Weights

马舒洁 (美国加州大学河滨分校)

Abstract: In this talk, I will introduce a new local ReLU network least squares weighting method to estimate quantile dose-response functions. Unlike the conventional inverse propensity weighting (IPW) method, we estimate the weighting function involved in the treatment effect estimator directly through local ReLU least squares optimization. The proposed method takes advantage of ReLU networks to alleviate the dimensionality problem of covariates and local kernel smoothing for the continuous treatment to precisely estimate the quantile dose-response function. Our method enjoys computational convenience and scalability. It improves robustness and numerical stability compared to the conventional IPW method. For the ReLU network approximation, we introduce a mixed fractional Sobolev class and show that the two-layer ReLU networks can break the 'curse of dimensionality' when the weighting function belongs to this function class. We establish the convergence rate for the ReLU network estimator and the asymptotic normality of the proposed estimator for the quantile dose-response function.

报告人简介: Dr. Shujie Ma is a Professor and Graduate Advisor in the Department of Statistics at the University of California, Riverside. Her research interests span statistical methodology, theory, and computation, with an emphasis on modern data science challenges. Her work focuses on deep learning theory and applications, causal

inference, clustering, time series analysis, and network data analysis, with applications in biomedical and econometric studies. Dr. Ma has served on the editorial boards of several leading statistical journals, including the Annals of Statistics, Journal of the American Statistical Association, Journal of Business & Economic Statistics, and Journal of Computational and Graphical Statistics, among others. She is currently a Co-Editor of ASA Discoveries. She is an elected Fellow of the American Statistical Association (ASA) and the Institute of Mathematical Statistics (IMS), and an elected member of the International Statistical Institute (ISI).

空间转录组数据的统计分析

席瑞斌（北京大学）

摘要: 空间转录组技术在保留空间信息的同时可以实现单细胞甚至亚细胞水平的基因表达测量，为生物医学研究提供了强大的技术平台，得到了广泛的应用，产生了大量的数据，然而，这些新型组学大数据的也对统计分析提出了很多挑战。在数据清洗、降维、去噪、数字特征提取、整合分析等方面都亟需发展新的统计方法。在本报告中，我将介绍我们针对空间转录组数据的降维、变异检测等统计计算方法。

报告人简介: 席瑞斌，北京大学博雅特聘教授，主持国家杰出青年基金，入选国家海外高层次人才引进计划青年项目，主要研究方向为生物统计、生物信息、大数据以及生命科学中的人工智能。在 Nature, Nature Genetics, Nature Cell Biology, Nature Communications, Science Translational Medicine, PNAS, Biometrika, AOAS, NeurIPS, ICML 等顶级期刊、会议发表文章 70 余篇，在 Statistical Theory and Related Fields 等杂志担任编委，在现场统计研究会、医学数学专业委员会等学术组织担任秘书长、副会长、常务理事、理事等职务。

Ball Impurity: Measuring Heterogeneity in General Metric Spaces

王学钦（中国科学技术大学）

Abstract: Data in various domains, such as neuroimaging and network data analysis, often come in complex forms without possessing a Hilbert structure. The complexity necessitates innovative approaches for effective analysis. We propose a novel measure of heterogeneity, ball impurity, which is designed to work with complex non-Euclidean objects. Our approach extends the notion of impurity to general metric spaces, providing a versatile tool for feature selection and tree models. The ball impurity measure exhibits desirable properties, such as the triangular inequality, and is computationally tractable, enhancing its practicality and usefulness. Extensive experiments on synthetic data and real data from the UK Biobank validate the efficacy of our approach in capturing data heterogeneity. Remarkably, our results compare favorably with state-of-the-art methods in metric spaces, highlighting the potential of ball impurity as a valuable tool for addressing complex data analysis tasks.

报告人简介：王学钦，中国科学技术大学讲席教授，2003年毕业于宾汉姆顿大学，教育部高层次人才入选者，国际统计学会(ISI)当选会员。现担任教育部高等学校统计学类专业教学指导委员会委员、中国现场统计研究会副理事长、中国现场统计研究会教育统计与管理分会理事长，主要研究方向为大规模复杂数据的统计学理论、方法与算法；统计机器学习；精准医疗；医疗政策；风险管理和政策评估。

特邀专题：

特邀报告 1: *New statistical methods for event history data and high-dimensional data*

Regularized matrix-variate Cox regression model with neuroimaging data

王纯杰（长春工业大学）

Abstract: Neuroimaging studies often involve high-dimensional data comprising both matrix-valued and vector-valued covariates. A key objective is to determine how these measurements are associated with the failure time. To address this issue, we introduce a penalized matrix-variate Cox regression model. Because both the matrix-valued and vector-valued covariates are high-dimensional, sparse estimation is essential. We propose a fusion generalized Lasso approach to reduce the dimensionality of the variables, and develop an Alternating Direction Method of Multipliers (ADMM) algorithm for parameter estimation. In terms of identifying true signals, the proposed method outperforms traditional statistical methods in estimation accuracy and can accurately detect the genuine signals. Simulation studies and an analysis of Attention Deficit Hyperactivity Disorder (ADHD) data demonstrate the advantages of the proposed model.

报告人简介：王纯杰，教授，博士生导师，现任长春工业大学数学与统计学院院长，享受国务院政府特殊津贴专家，“长白英才计划”教育教学领军人才，吉林省第六批拔尖创新人才。研究领域为生存分析，大数据分析，医疗图像分析等，主持国家自然科学基金面上项目 2 项，青年基金项目 1 项，天元基金项目 1 项，吉林省杰出青年基金项目 1 项，吉林省重大汽车专项 1 项，主持和参与各类省部级科研项目 21 项。发表科研论文 134 篇。主持国家级教改项目 1 项，2018 年获吉林省高等教育科研成果奖二等奖，2022 年获吉林省教学成果奖一等奖，2023 年获吉林省自然科学奖二等奖。担任中国现场统计研究会贝叶斯统计分会副理事长，全国工业统计学教学研究会常务理事等。

Distributed privacy-preserving group inference for high-dimensional generalized linear models

韩东啸（南开大学）

Abstract: This article introduces a novel method for distributed, differentially private group inference in the high-dimensional generalized linear model. Each client first constructs a local non-private test statistic based on a weighted quadratic function of the regression sub-vector corresponding to the group, and the debiasing and re-weighting techniques. We then formulate our global differentially private test statistic by using the one-shot method, the Gaussian mechanism, and encryption and decryption procedures. Our proposed approach offers several key advantages: It is capable of handling highly correlated covariates and preserving high power for

identifying dense but weak signals. Unlike conventional methods, it avoids the need to handle the Hessian and precision matrices. Furthermore, the approach incorporates bounded encryption procedures to ensure secure communication and enable precise sensitivity quantification. Moreover, the one-shot aggregation mechanism in our method guarantees high efficiency in both computation and communication. Simulation studies are carried out to examine the finite-sample behaviour of the proposed method. An application to an adult income dataset is provided.

报告人简介: 韩东啸, 南开大学统计与数据科学学院, 副教授。主要研究方向为生存分析、高维统计推断、机器学习理论研究。在统计学国际顶尖期刊“JASA”、机器学习顶级期刊“JMLR”、计量经济学顶级期刊“JOE” 等上发表论文十余篇。主持国家自然科学基金面上项目 1 项、国家自然科学基金青年项目 1 项。

Regression analysis of group-tested multivariate current status data

李树威 (广州大学)

Abstract: In large-scale disease surveillance, group testing, where individual specimens are pooled to test for the presence of a disease, is often used to save the screening time and cost. When group testing with a primary focus on the disease onset time is conducted to monitor multiple diseases simultaneously, group-tested multivariate current status data arise. For analyzing this emerging type of survival data, this work develops an efficient regression methodology with frailty proportional hazards models. By approximating each conditional cumulative baseline hazard function with monotone splines, we propose a sieve maximum likelihood approach and develop a stable EM algorithm to identify the sieve estimators. The asymptotic properties of the resultant estimators are established by utilizing the empirical process and sieve estimation theories in a novel way. The numerical results in the simulation studies demonstrate that the proposed method performs well in finite sample. An application to a sexually transmitted infection data set is provided for an illustration.

报告人简介: 李树威, 统计学博士, 现任广州大学经济与统计学院教授。博士毕业于吉林大学统计系。主要研究方向为生物统计、大数据处理及机器学习, 在 Biometrika、Biometrics、Statistics in Medicine、Statistica Sinica、JCGS 等期刊上发表论文 40 多篇。主持国家自然科学基金面上项目、国家自然科学基金青年项目、广东省自然科学基金面上项目、广州市科技局项目等。

Simultaneous variable selection and estimation of multivariate panel count data

葛磊 (东北师范大学)

Abstract: Panel count data are a general type of data arising from the studies on recurrent events and occur when the observed information on each study subject consists of only the numbers of the occurrences of the recurrent events between successive examinations. It is easy to see that such data can occur in many fields,

including economic studies, medical studies and social sciences. This paper considers regression analysis of multivariate panel count data with the focus on variable selection and estimation of significant covariate effects. For the problem, a minimum information criterion-based method is proposed and an expectation-maximization algorithm is developed for the determination of the proposed estimator. Furthermore, the resulting estimator is shown to have the desirable oracle property and a simulation study is performed and confirms the good finite-sample properties of the proposed method. Finally the method is applied to a set of real data arising from a skin cancer study.

报告人简介: 葛磊, 东北师范大学数学与统计学院博士后。主要研究方向为生物统计、面板计数数据及其在生物医学中的应用。在 *Biometrics*, *Journal of Multivariate Analysis*, *Statistics in Medicine*, *Statistical Methods in Medical Research* 等期刊发表论文 10 余篇。主持国家自然科学基金青年项目(C 类)、吉林省科技厅青年科技人才项目, 中央高校基本科研业务项目等。

特邀报告 2: *Statistical Learning under Data Heterogeneity: from foundation models to personalized inference*

TabPFN: One model to rule them all?

陈彦硕 (新加坡国立大学)

Abstract: A recent study introduced TabPFN, a transformer-based deep learning model for regression and classification on tabular data, which is claimed to outperform all previous methods on datasets with up to 10,000 samples by a wide margin, using substantially less training time. Furthermore, it has called TabPFN a foundation model, as it can support data generation, density estimation, learning reusable embeddings, and fine-tuning. If these statements are well-supported, TabPFN may have the potential to supersede existing modeling approaches on a wide range of statistical tasks, mirroring a similar revolution in other areas of artificial intelligence that began with the advent of large language models. An explanation of how TabPFN works is provided by emphasizing its interpretation as an approximate Bayesian inference. More evidence of its foundation model capabilities is also provided: It is shown that an out-of-the-box application of TabPFN vastly outperforms specialized state-of-the-art methods for semi-supervised parameter estimation, prediction under covariate shift, and heterogeneous treatment effect estimation. It is further shown that TabPFN can outperform LASSO at sparse regression and can break a robustness-efficiency trade-off in classification.

报告人简介: Dr Yan Shuo Tan is an Assistant Professor at the Department of Statistics and Data Science at the National University of Singapore. His research focuses on the theory and methodology of tree-based methods, randomized ensembles, Bayesian tree ensemble modeling, and in-context learning for tabular data. His work

has been published at PNAS, AOS, JRSSB, JMLR, ICML, NeurIPS, AISTATS, COLT, and other venues. He was previously a Neyman Visiting Assistant Professor at UC Berkeley and a PhD student at the University of Michigan.

TabClustPFN: A prior-fitted network for tabular data clustering

张琼（中国人民大学）

Abstract: Clustering tabular data is a fundamental yet challenging problem due to heterogeneous feature types, diverse data-generating mechanisms, and the absence of transferable inductive biases across datasets. Prior-fitted networks (PFNs) have recently demonstrated strong generalization in supervised tabular learning by amortizing Bayesian inference under a broad synthetic prior. Extending this paradigm to clustering is nontrivial: clustering is unsupervised, admits a combinatorial and permutation-invariant output space, and requires inferring the number of clusters. We introduce TabClustPFN, a prior fitted network for tabular data clustering that performs amortized Bayesian inference over both cluster assignments and cluster cardinality. Pretrained on synthetic datasets drawn from a flexible clustering prior, TabClustPFN clusters unseen datasets in a single forward pass, without dataset specific retraining or hyperparameter tuning. The model naturally handles heterogeneous numerical and categorical features and adapts to a wide range of clustering structures. Experiments on synthetic data and curated real-world tabular benchmarks show that TabClustPFN outperforms classical, deep, and amortized clustering baselines, while exhibiting strong robustness in out-of-the-box exploratory settings.

报告人简介: 张琼博士现任中国人民大学统计与大数据研究院助理教授。她于2015年获得中国科学技术大学少年班学院学士学位，2022年获加拿大英属哥伦比亚大学统计学博士学位。其主要研究方向包括表格基础模型，联邦学习，计算机视觉等机器学习领域，相关成果已发表在 JRSSB, JMLR, IEEE Transactions on Information Theory 等顶级期刊，以及 ICLR、NeurIPS, ICCV 等国际权威会议上。

Conformal Inference for Minority Subgroups via Cross-Group Borrowing

金华清（清华大学）

Abstract: Conformal prediction offers a distribution-free framework for constructing prediction sets with guaranteed coverage. However, existing conformal methods often fail to provide reliable inference for underrepresented minority subgroups due to potential heterogeneity across subpopulations. We propose a new framework, termed Subgroup Conformal Prediction (SCP), to improve prediction performance for minority subgroups by borrowing information from other subgroups. This is achieved by framing subgroup heterogeneity as a general dataset shift problem and applying reweighting strategies to approximate the distribution in the minority subgroup. SCP

can be implemented using either a semiparametric exponential tilt model or machine learning classifiers to obtain the weights. We establish theoretical coverage guarantees for both approaches under mild conditions, and show that SCP remains valid even when the working model for the nonconformity score is misspecified. Extensive simulations demonstrate that SCP yields valid and efficient prediction sets, even under substantial sample size imbalance between subgroups. We further evaluate SCP using the Communities and Crimes dataset, focusing on crime rate prediction for African American-majority communities. The results demonstrate that SCP substantially improves prediction performance across multiple crime types, whereas existing conformal methods often fail to achieve nominal coverage.”.

报告人简介：金华清是清华大学统计与数据科学系的助理教授。他于香港大学获得统计学博士学位，随后在加州大学旧金山分校（UCSF）从事博士后研究。其主要研究方向包括高维统计学、变点检测及贝叶斯统计学，特别专注于神经影像数据分析和临床试验等领域的应用。

Personalizing black-box models for nonparametric regression with minimax optimality

李赛（清华大学）

Abstract: Recent advances in large-scale models, including deep neural networks and large language models, have substantially improved performance across a wide range of learning tasks. The widespread availability of such pre-trained models creates new opportunities for data-efficient statistical learning, provided they can be effectively integrated into downstream tasks. Motivated by this setting, we study few-shot personalization, where a pre-trained black-box model is adapted to a target domain using a limited number of samples. We develop a theoretical framework for few-shot personalization in nonparametric regression and propose algorithms that can incorporate a black-box pre-trained model into the regression procedure. We establish the minimax optimal rate for the personalization problem and show that the proposed method attains this rate. Our results quantify the statistical benefits of leveraging pre-trained models under sample scarcity and provide robustness guarantees when the pre-trained model is not informative. We demonstrate the finite-sample performance of the methods through simulations and an application to the California housing dataset with several pre-trained models.

报告人简介：李赛，清华大学统计与数据科学系副教授。2018年毕业于美国罗格斯新泽西州立大学获得统计博士学位，之后于美国宾夕法尼亚大学生物统计系和沃顿商学院统计系担任博士后研究员。目前的研究方向聚焦机器学习、人工智能和生物遗传领域的前沿统计问题，包括迁移学习、领域泛化、因果推断、高维统计等。

特邀报告 3: *Advances Methods on Complex Data Analysis*

Locally Weighted Accelerated Failure Time Model with Group Penalty: A Pan-Cancer Survival Analysis Framework for Identifying Shared Prognostic Genes in Multiple Genomic Datasets

马晨瑾（北京工业大学）

Abstract: High-throughput omics data enable the identification of co-expressed genes, referred to as shared genes, across diverse subtypes or cancer types, providing insights into common biological mechanisms underlying tumor progression, treatment response, and patient outcomes. The mining of shared genes, especially those related to cancer survival outcomes, critically depends on advanced survival analysis methodologies. In this study, we propose a novel locally weighted group AFT-lasso (LWGAL) method that simultaneously borrows information from “surrounding” cancer datasets (to improve estimation accuracy) and identifies consistent model structures across cancer datasets (to find shared genes). Simulation studies demonstrate LWGAL's superior performance in both coefficient estimation and variable selection. Applied to clinical and genomic data from the Molecular Taxonomy of Breast Cancer International Consortium (METABRIC) and The Cancer Genome Atlas (TCGA), LWGAL provides a robust and biologically interpretable framework for the integrative analysis of heterogeneous cancer survival data and facilitates the identification of potential therapeutic targets shared across multiple cancer contexts.

报告人简介: 马晨瑾, 北京工业大学数学统计学与力学学院副教授, 博士生导师。2021年毕业于中国人民大学统计学院, 现任中国现场统计研究会旅游大数据分会常务理事, *Statistical Analysis and Data Mining* 杂志副主编, 国际统计学会推选会员。2024年入选北京工业大学高层次人才“青年优秀人才”计划。主要从事生物医学领域的统计理论与方法及应用研究, 有丰富的多学科研究背景。从2018年至今, 在 *Annals of Applied Statistics*、*Statistics in Medicine* 等统计类杂志和 *BMJ Global Health*、*Briefings in Bioinformatics* 等生物医学杂志发表学术论文 20 余篇。

Singular Value-Based Multiple Change Point Detection in Factor Models

吴奔（中国人民大学）

Abstract: This paper proposes a novel framework to detect multiple change points in high-dimensional factor models, with a particular focus on orthogonal shifts—changes that alter the intrinsic structure of the loading space. Such shifts distort the estimation of factors and loadings, thereby leading to erroneous statistical inference. However, dedicated detection methods for such shifts are lacking in the existing literature. To fill this gap, we propose a detection method based on the singular values of the common component matrix. The key idea is to aggregate observations before and after an underlying change point, construct a concatenated

common component matrix, and diagnose structural instability by comparing its singular values against a data-driven threshold. This procedure is applicable to both the conventional and the quantile factor model, and is agnostic to the specific estimation method for factors and loadings. We establish the consistency in estimating both the number and locations of change points. Simulation studies demonstrate substantial gains over existing methods, especially in quantile factor models and in settings with small structural breaks. Furthermore, empirical applications to U.S. macroeconomic data, global temperature records, and CO2 emissions show that the proposed method uncovers statistically significant and economically interpretable structural changes.

报告人简介: 吴奔, 中国人民大学统计学院副教授, 主要研究兴趣为高维复杂数据的贝叶斯统计、高维时空数据的潜在结构学习、可解释贝叶斯深度学习、多模态神经影像数据分析等。主持国家自然科学基金青年项目, 研究成果在 JASA、JMLR、Biometrics、中国科学(数学)等国内外知名期刊发表。

Sparse Bayesian Deep Functional Learning with Structured Region Selection

吴梦云(上海财经大学)

Abstract: In modern applications such as ECG monitoring, neuroimaging, wearable sensing, and industrial equipment diagnostics, complex and continuously structured data are ubiquitous, presenting both challenges and opportunities for functional data analysis. However, existing methods face a critical trade-off: conventional functional models are limited by linearity, whereas deep learning approaches lack interpretable region selection for sparse effects. To bridge these gaps, we propose a sparse Bayesian functional deep neural network (sBayFDNN). It learns adaptive functional embeddings through a deep Bayesian architecture to capture complex nonlinear relationships, while a structured prior enables interpretable, region-wise selection of influential domains with quantified uncertainty. Theoretically, we establish rigorous approximation error bounds, posterior consistency, and region selection consistency. These results provide the first theoretical guarantees for a Bayesian deep functional model, ensuring its reliability and statistical rigor. Empirically, comprehensive simulations and real-world studies confirm the effectiveness and superiority of sBayFDNN. Crucially, sBayFDNN excels in recognizing intricate dependencies for accurate predictions and more precisely identifies functionally meaningful regions, capabilities fundamentally beyond existing approaches.

报告人简介: 吴梦云, 上海财经大学统计与数据科学学院教授、博士生导师, 中山大学理学博士、耶鲁大学博士后。现任中国优选法统筹法与经济数学研究会数据科学分会副秘书长、中国现场统计研究会生存分析分会常务理事等。主要研究方向为高维数据建模与统计推断方法, 聚焦生物医学领域的交叉应用。研究成果发表于 JASA、AOAS、NeurIPS、Statistica Sinica、Biometrics、Biostatistics、

Genome Biology 等国际权威期刊。主持国家自然科学基金青年项目、面上项目、以及全国统计科学研究重大项目（获评“优秀结项”）等，入选上海市“晨光计划”、“浦江人才计划”、“启明星计划”。

An adaptive test on high-dimensional parameters in single-index models

解俊山（河南大学）

Abstract: In the context of high-dimensional hypothesis test, the adaptive power enhancement test methods that maintain high statistical power across a wide range of alternatives (including sparse and dense cases) have become an important and interesting research topic. We consider the adaptive testing of the regression parameter vector in high-dimensional single-index models. Assuming that the predictor vector follows the elliptical distribution, we investigate a test statistic based on the sum-of-powers on elements of the score vector. We establish the asymptotic null statistical properties of the proposed test statistic and develop an adaptive power enhancement testing procedure by combining P-values from the sum-of-powers type test and the extreme-value-type test is proposed. Simulation results reveal that the proposed test significantly enhances the statistical power while maintaining well-controlled type I error, and it performs powerfully across a spectrum of scenarios.

报告人简介: 解俊山，河南大学教授，博士生导师。美国明尼苏达大学(University of Minnesota, Twin Cities)统计系、香港浸会大学数学系访问学者。主要研究方向为高维统计推断和随机矩阵理论。主持国家自然科学基金、河南省自然科学基金等项目多项。以第一作者（或通讯作者）在 J.Theor. Probab.、J.Multivariate Anal.、Sci.China:Math.等发表 SCI 学术论文 30 余篇。

特邀报告 4: *Statistical Modeling and Inference for Complex and Unstructured Data*

Alteration detection of tensor dependence structure via sparsity-exploited reranking algorithm

马莉（厦门大学）

Abstract: Tensor-valued data arise frequently from a wide variety of scientific applications, and many among them can be translated into an alteration detection problem of tensor dependence structures. In this article, we formulate the problem under the popularly adopted tensor-normal distributions and aim at two-sample correlation/partial correlation comparisons of tensor-valued observations. Through decorrelation and centralization, a separable covariance structure is employed to pool sample information from different tensor modes to enhance the power of the test. Additionally, we propose a novel Sparsity-Exploited Reranking Algorithm (SERA) to further improve the multiple testing efficiency. Such efficiency gain is achieved by

incorporating a carefully constructed auxiliary tensor sequence to rerank the p-values. Besides the tensor framework, SERA is also generally applicable to a wide range of two-sample large-scale inference problems with sparsity structures, and is of independent interest. The asymptotic properties of the proposed test are derived and the algorithm is shown to control the false discovery at the pre-specified level. We demonstrate the efficacy of the proposed method through intensive simulations and two scientific applications.

报告人简介：马莉，现任厦门大学经济学院统计学与数据科学系、王亚南经济研究院助理教授。2024 年于复旦大学获统计学博士学位，获评上海市优秀毕业生。2023—2024 年在加州大学伯克利分校联合培养，2024 年 7 月入职厦门大学。研究方向包括高维统计、大规模多重检验、张量推断，及其在神经科学、基因组学、经济学等领域的应用。目前主持国家自然科学基金青年项目、教育部人文社科青年基金各一项。研究成果发表于 JASA、Statistica Sinica、JMVA 等国际权威期刊。

Conditional Selective Inference for the Selected Groups in Panel Data

万闯（暨南大学）

Abstract: This paper addresses the problem of testing differences in group-specific slopes between clusters identified via k-means clustering in panel data. In this setting, classical Wald-type tests are inherently invalid, as they yield severely inflated Type I error probabilities. This failure stems from "double dipping" - using the same dataset for both group identification and subsequent inference. To resolve this, we propose a valid selective inference approach that conditions on the selection event to account for data-driven clustering. We derive an efficient algorithm to compute exact p-values for k-means outcomes. Our framework is notably flexible: it requires only the asymptotic normality of initial estimators and extends naturally to GMM estimation, making it applicable to dynamic panel models and panel data models with endogenous variables. Simulation studies demonstrate robust finite-sample performance. Applying our method to the global relationship between economic growth and CO2 emissions, we uncover novel evidence of cross-country heterogeneity. We also provide the R package, TestHomoPanel, to facilitate implementation.

报告人简介：万闯，暨南大学经济学院统计与数据科学系助理教授。主要从事高维统计推断、计量经济学等领域的研究，相关研究工作发表在 JoE、JBES、Biometrics 等统计学和计量经济学国际期刊，主持国家自然科学基金青年基金项目（C 类）和博士后面项目。

Efficient Reasoning with Statistical Guarantees for Large Language Models

曾浩（南方科技大学）

Abstract: Large reasoning models (LRMs) excel at complex tasks but are computationally expensive to run. While dynamically switching between high-cost "thinking" and low-cost "non-thinking" modes can improve efficiency, current methods lack guarantees and can introduce errors. To address this, we propose PAC Reasoning, a framework that provides statistical guarantees on performance loss when making such switches. Our method calculates a confidence bound for the potential performance loss based on model uncertainty and uses this to set a switching threshold. This ensures the performance loss remains within a user-specified tolerance. Theoretical analysis proves our approach bounds the performance loss in a distribution-free manner. Experiments on standard benchmarks demonstrate that PAC Reasoning effectively reduces computational costs while reliably controlling the performance loss as specified by the user.

报告人简介: 曾浩, 南方科技大学—新加坡国立大学联合项目博士后。研究方向主要包括无分布预测推断、高维统计与统计机器学习理论, 并关注其在大语言模型、人工智能与计量经济学等领域的应用。以第一作者或通讯作者在 JBES、JSPI、SJS、ICML 等统计与人工智能领域高水平期刊和会议发表或接收多项成果; 另有多篇论文正在 ICML、JMLR、统计研究等期刊与会议投稿与审稿中。

Statistical Inference for Mediation Models with High Dimensional Exposures and Mediators

周玮 (西南财经大学)

Abstract: High-dimensional mediation analysis has gained increasing interest in various fields, particularly in genetic and medical research. Compared with existing works that focus mainly on high-dimensional mediators, this paper advocates a new framework of Partial Regularization-based Inference for Mediation Effects (PRIME) when both exposures and mediators are high-dimensional. Estimated direct and indirect effects are established using a group-wise partially penalized least squares method, incorporating a double-layer latent factor structure. F-type and Wald tests for the high-dimensional direct and indirect effects, respectively, are advocated based on the proposed estimators. Both theoretical and numerical performance of PRIME have been carefully studied. PRIME is also applied to investigating direct effects of genetic variants on Alzheimer's disease (AD) and indirect effects of them mediated by changes in brain activity intensity.

报告人简介: 周玮, 西南财经大学统计与数据科学学院讲师。主要从事因果推断、图模型、高维统计等领域的研究, 相关研究工作发表在 Journal of the American Statistical Association、Journal of Computational and Graphical Statistics 和 Statistica Sinica 等统计学国际期刊, 主持国家自然科学基金青年基金项目 (C 类) 一项。

特邀报告 5: *Statistics for High-Dimensional Complex Data: Methods, Inference and Applications in Health and Genomics*

Generalized trace regression with simultaneously nonconvex nuclear norm and two-dimensional spline lasso

李传权（江西财经大学）

Abstract: Matrix-valued data have found extensive applications in various fields, such as modern biomedical imaging, chemometrics, and economics. In this paper, we address the problem of generalized trace regression involving matrix-valued covariates. To estimate the unknown parameters, we propose a penalty that combines the MCP nuclear norm and two-dimensional spline lasso. This penalty accounts for the potential low-rank and row/column order structures in the matrix-valued covariates. We establish the general theory and explicit statistical convergence rate of the resulting estimator. Through simulations, we demonstrate the advantages of our proposed method compared to other competing methods. Finally, we apply our approach to analyze brain-image datasets related to Alzheimer's disease, identifying several efficient regions that illustrate the mechanism of Alzheimer's.

报告人简介: 江西财经大学统计与数据科学学院/财经数据科学教育部哲学社会科学实验室，副教授，硕士生导师。研究领域包括高维统计，网络数据分析，张量数据分析，降维模型以及海洋大数据。现主持国家自然科学基金青年基金 1 项、江西省自然科学基金青年基金及其他省部级项目 2 项，参与科技部重大研究计划子项目、国家社科重大项目多项。在《Acta Mathematica Sinica》、《Journal of Chemometrics》、《Journal of applied statistics》、《系统科学与数学》等国内外期刊发表论文十余篇。担任《Statistical Theory and Related Fields》、《系统工程理论与实践》、《数理统计与管理》等期刊审稿人，兼任中国现场研究会多元统计分会理事、全国工业统计研究会理事。

Estimating Endogenous Ordinal Treatment Effects with High-Dimensional Instruments and Covariates

李丽（江西财经大学）

Abstract: We propose a novel two-stage approach to estimate the causal effect of an endogenous ordinal treatment variable on an outcome, using high-dimensional instruments and covariates. In the first stage, we apply a penalized proportional odds reduced-form model to estimate the ordinal treatment propensity score and optimal instrument. In the second stage, we substitute ordinal data with predicted values and derive the ordinal logistic instrumental variable estimator (OLIVE) for the endogenous causal effect via least squares regression. Our model allows the number of covariates to exceed the sample size; in such scenarios, we use double selection to identify key controls and introduce the double selection plus ordinal logistic instrumental variable estimator (DS-OLIVE). We prove DS-OLIVE is root n consistent and asymptotically normal. Simulations demonstrate that OLIVE and DS-OLIVE surpass existing methods in bias and mean squared error. Finally, we

apply our method to a case study assessing parental health's impact on children's study performance.

报告人简介: 李丽, 现任职于江西财经大学。主要研究方向为高维统计、复杂数据分析、变点分析、因果推断等。已相继在《数理统计与管理》、《应用概率统计》、《统计与决策》、Statistics and Probability Letters 等国内外统计学相关领域的主流期刊上发表相关学术论文多篇。

Testing for large cross-covariance matrix: a normal-reference approach

李江豪 (江西财经大学)

Abstract: Testing whether a large cross-covariance matrix is zero serves as a fundamental tool for assessing relationships between sets of variables, with applications ranging from genomics to psychology and beyond. Despite a variety of available tests, their performance may be sensitive to violations of underlying assumptions, e.g., the null distribution is skewed or the underlying assumptions are not well matched to the data, which can affect reliability in practice. In this paper, we propose a normal-reference test for zero cross-covariance. Under certain regularity conditions and the null hypothesis, we demonstrate that the proposed test statistic is asymptotically equivalent in distribution to a chi-squared-type mixture. It is then justified to approximate the null distribution of the proposed test statistic using that of the chi-squared-type mixture. To obtain a practically implementable test procedure, we further use a three-cumulant-matched chi-squared-approximation approach to approximate this mixture's distribution. Additionally, we establish the asymptotic power of the proposed test under the local alternatives. Furthermore, we compare the proposed test with existing tests using simulation results, demonstrating that the proposed test exhibits favorable properties in terms of size control, while remaining competitive in power.

报告人简介: 李江豪, 江西财经大学统计与数据科学学院讲师。主要研究方向为高维统计推断。

Multi-Level Factorial Designs Under Mixed Parameterization

夏新新 (江西财经大学)

Abstract: In statistical modeling and inference, the choice of parameterization directly determines the statistical interpretation and estimation efficiency of model parameters. For factorial experiments, this choice has traditionally been made between orthogonal and baseline frameworks. However, practical applications often demand interpreting results within both frameworks simultaneously, leading to the concept of mixed parameterization (MP). This work aims to investigate the construction and theoretical properties of multi-level designs under MP. We first establish the relationships among orthogonal, baseline, and mixed parameterizations.

We then demonstrate that, under MP, an orthogonal array achieves Ds-optimality among all designs and attains As-optimality within the class of balanced designs under the main-effect model. Building on these results, we propose two minimum aberration criteria for multi-level designs and present a search algorithm for constructing optimal designs under MP, thereby offering new methodologies for multi-level experiments.

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特邀报告 6: *Statistical Methods for Complex Data: Modeling and Application*

The MLE for sparse Rasch model: Consistency, top-k recovery and Gaussian approximation

王淑芳 (华中师范大学)

Abstract: In this article, we study the estimation and inference for the Rasch model when the number of individuals and items are both large. In this context, it may be impractical for each of the individuals to provide all possible responses. Therefore, it is desirable to study sparse item response experiments. We consider the Erdős-Rényi random sampling design, where an individual responds to an item with probability $\xi p \xi$. We establish a non-asymptotical upper bound for the maximum likelihood estimator by extending the leave-one-out method for the Rasch model. We then consider the issue of top-k recovery and establish the optimality. We further establish the asymptotical normality of the MLE by using a simple matrix to approximate the inverse of the Fisher information matrix. The theoretical results are corroborated by simulation studies and an analysis of a large item-response dataset.

报告人简介: 王淑芳, 华中师范大学大学在读博士生, 研究方向为网络数据分析。

Linear spline index regression model: Interpretability, nonlinearity and dimension reduction

吕茏 (华中师范大学)

Abstract: Inspired by the complexity of certain real-world datasets, this article introduces a novel flexible linear spline index regression model. The model posits piecewise linear effects of an index on the response, with continuous changes occurring at knots. Significantly, it possesses the interpretability of linear models, captures nonlinear effects similar to nonparametric models, and achieves dimension reduction like single-index regression models. In the model, both the locations and number of knots are unknown. This not only enhances the adaptability of the model in practical applications but also presents challenges in estimating and inferring the

unknown parameters. Here, the knots represent points where the effects of covariates on the response exhibit significant changes while still maintaining continuity. Combining the penalized approach with convolution techniques, we propose a new method to simultaneously estimate the unknown parameters and the number of knots. The proposed method allows the number of knots to diverge with the sample size. We demonstrate that the proposed estimators can identify the number of knots with a probability approaching one and estimate the coefficients as efficiently as if the number of knots is known in advance. We also introduce a procedure to test the presence of knots. Simulation studies and two real datasets are employed to assess the finite sample performance of the proposed method.

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Semiparametric Analysis for Paired Comparisons with Covariates

宋皓月 (华中师范大学)

Abstract: Statistical inference in parametric models (e.g., the Bradley--Terry model and its variants) for paired-comparison data has been explored in the high-dimensional regime, in which the number of items involving in paired comparisons diverges. However, parametric models are highly susceptible to model misspecification. To relax the assumption of known distributions and provide flexibility, we propose a semiparametric framework for modeling the merits of items and covariate effects (e.g., home-field advantage) by introducing latent random variables with unspecified distributions. As the number of parameters increases with the number of items, semiparametric inference is highly nontrivial. To address this issue, we employ a kernel-based least squares approach to estimate all unknown parameters. When each pair of items has a fixed number of comparisons and the number of items tends to infinity, we prove the consistency of all resulting estimators and derive their asymptotic normal distributions. To the best of our knowledge, this is the first study to conduct a semiparametric analysis of paired comparisons with an increasing dimension. We conduct simulations to evaluate the finite-sample performance of the proposed method and illustrate its practical utility by analyzing an NBA dataset.

报告人简介: 宋皓月, 华中师范大学大学在读博士生, 研究方向为网络数据分析, 现已在 *Statistica Sinica* 和 *Statistics and Computing* 发表论文 2 篇。

Graph Neural Networks for Generalized Mundlak Estimator under Network Confounding

付连艳 (辽宁大学)

Abstract: This paper proposes a generalized Mundlak estimator based on graph neural networks (GME-GNN). The estimator is designed to mitigate bias arising from

group-level heterogeneity and to accommodate within-group dependence among individuals. Traditional fixed-effects models handle group heterogeneity via group-specific intercepts, but require overly strict linear additivity and intra-group independence assumptions, and are confined to within-group comparisons. Rather than relying on intercepts, GME-GNN uses aggregated group-level balancing statistics to fully control between-group confounding, enabling valid cross-group comparisons and relaxing linearity constraints. It further employs graph neural network message-passing to adaptively learn nonlinear representations and capture intra-group interaction effects. Theoretical analysis shows that the estimator satisfies double robustness and is asymptotically normal. Simulation and empirical studies confirm its performance.

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特邀报告 7: *Biomedical Statistics and Modeling Methods for Complex High-Dimensional Data*

去中心化分布式 Cox 模型的稀疏学习

赵慧 (中南财经政法大学)

摘要: Cox 比例风险模型因其半参数结构灵活、解释性强, 在生存分析与医学统计中得到广泛应用。但在实际的多中心医疗研究中, 患者数据通常分散存储于不同医疗机构, 受隐私保护、伦理合规及数据共享成本等因素的限制, 个体层面的生存时间与协变量信息往往无法跨中心直接共享, 而且 Cox 模型中风险集的不可分、节点间删失机制差异以及基准风险异质等问题给统计建模和推断带来结构性困难。本文在去中心化框架下引入分层 Cox 模型, 在各节点内定义局部风险集并刻画节点间的基准风险差异, 提出去中心化的稀疏估计方法 deCOX, 讨论了近似误差界, 算法收敛速率, 支撑集恢复等理论性质, 并通过数值模拟实验和实际数据分析来说明本文方法的性能表现和应用价值。

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事件数据分析、高维生存数据分析、分布式统计学习等。先后主持国家自然科学基金项目 4 项，发表论文六十余篇，其中部分论文发表在 JASA, Biometrics, Scandinavian J. Stat, Stat. in Med, J. Multivariate Anal., Lifetime Data Anal., Canadian J. Stat., J. Nonparametric Stat, 《中国科学：数学》，《应用数学学报》，《数理统计与管理》等国内外知名统计学术期刊。

Variational Bayes for High-Dimensional Multi-Source Heterogeneous Data with Sparse Priors

李会琼（云南大学）

Abstract: High-dimensional data is becoming increasingly prevalent in scientific fields such as genomics, economics, and medicine. However, recent studies have indicated that such data is often heterogeneous. Most existing research focuses either on high-dimensional multi-source data or on isolated heterogeneous datasets, leaving a significant gap for joint modeling and inference of high-dimensional multi-source heterogeneous data. In this paper, we employ a Bayesian method to address the estimation problem associated with high-dimensional multi-source heterogeneous data, aiming to extract shared features across all subpopulations while also examining the unique heterogeneity within each subpopulation. We introduce a scalable and interpretable Bayesian model for multi-source heterogeneous linear data that employs a sparsity-inducing spike-and-slab prior, featuring a Laplace slab and a Dirac spike. To address the computational challenges associated with the posterior, we implement a mean-field variational approximation that utilizes a factorizable family of spike-and-slab distributions. Our method overcomes the high computational cost of Gibbs sampling while preserving valuable features, providing a posterior distribution for the parameters and offering a natural mechanism for variable selection via posterior inclusion probabilities. Through simulation studies and an application to five cancer datasets in real-world the Cancer Genome Atlas (TCGA), we demonstrate the effectiveness of our variational Bayesian approach. Our results show the advantages of our method in terms of computational efficiency and scalability compared to Gibbs sampling method and penalized frequentist methods for integrative analysis, making it well-suited for analyzing high-dimensional multi-source heterogeneous data. The proposed variational Bayesian algorithms have been implemented in the R package VBMS, which is publicly available on CRAN.

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科研优秀论文奖等多项奖励。指导 3 篇硕士论文获评云南省优秀硕士学位论文。兼任中国现场统计研究会相关分会副理事长、常务理事等学术职务。

Regression Analysis of Interval-Censored Failure Time Data with Change Points and a Cured Subgroup

杜明月（吉林大学）

Abstract: There exists a substantial body of literature that discusses regression analysis of interval-censored failure time data and also many methods have been proposed for handling the presence of a cured subgroup. However, only limited research exists on the problems incorporating change points, with or without a cured subgroup, which can occur in various contexts such as clinical trials where disease risks may shift dramatically when certain biological indicators exceed specific thresholds. To fill this gap, we consider a class of partly linear transformation models within the mixture cure model framework and propose a sieve maximum likelihood estimation approach using Bernstein polynomials and piecewise linear functions for inference. Additionally, we provide a data-driven adaptive procedure to identify the number and locations of change points and establish the asymptotic properties of the proposed method. Extensive simulation studies demonstrate the effectiveness and practical utility of the proposed methods, which are applied to the real data from a breast cancer study that motivated this work.

报告人简介: 杜明月, 吉林大学副教授, 博士生导师, 主要研究方向为复杂删失数据的统计推断研究。目前在 *Journal of the American Statistical Association*、*Annals of Applied Statistics*、*Biometrics*、*Journal of Computational and Graphical Statistics*、*Statistica Sinica*、*Statistical Methods in Medical Research*、*Statistics in Medicine*、*Statistics and Computing* 等期刊发表学术论文 30 余篇。2022 年荣获 ICSA 中国会议青年研究学者奖, 2023 年获得国家天元数学东北中心优秀青年学者奖励和 12 届 ICSA 国际会议青年研究学者奖, 2024 年被评选为 International Statistical Institute 推选会员, 荣获 Institute of Mathematical Statistics 的 Junior Researcher Travel Award。现任 *Journal of Applied Statistics* 和 *Statistics in Biosciences* 期刊编委。

A Bayesian Transformation Model for Informative Partly Interval-Censored Data with Covariates Subject to Measurement Error

蒋京京（长春工业大学）

Abstract: Linear transformation models are one of the commonly used models for regression analysis of failure time data due to their flexibility. Although the existing literature provides many methods for fitting transformation models with fixed covariates and non-informative censoring, extending these methods to scenarios with covariates subject to measurement error and informative censoring remains challenging. As pointed out in the literature, failure to account for covariate

measurement errors or informative censoring may lead to estimation bias or misleading conclusions. Therefore, in this article, we consider a more complicated and general situation where both covariate measurement errors and informative censoring, or more especially informative partly interval censoring, exist. For this problem, we propose a new joint model for regression analysis of such data and present a general Bayesian estimation procedure that can handle both non-informative censoring and informative censoring, using I-splines to approximate unknown functions. To implement this method, we propose a flexible and stable Markov chain Monte Carlo (MCMC) algorithm through a four-stage data augmentation. This method is simple and easy to use. We conduct extensive simulation studies to compare the naive method with the Bayesian method, verifying the effectiveness of the Bayesian method. We also present a practical application to illustrate the proposed method.

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特邀报告 8: *Statistical Modeling and Inference for Complex Data*

Robust CUSUM test of mean change-point for panel data with dependent errors

杨文志 (安徽大学)

Abstract: Change-point detection statistics of mean are commonly constructed using first order moment information, but the existing mean change-point tests often suffer from a low power issue in panel data models. To address this limitation, we develop a robust alternative. By utilizing both first and second order moments, we construct two types of cumulative sum (CUSUM) tests of mean change-point for panel data model with strong mixing errors. For both tests, we derive their limit distributions under the null hypothesis and characterize their limit behavior under the alternative. Based on the threshold of limit distribution, we employ the Bonferroni method to combine the strengths of these two tests into one combined test. Under a range of scenarios featuring mean shifts in panel data, our combined test proves to be a more robust and powerful method for detecting mean change-point than existing approaches. Finally, we illustrate the practical relevance of our methodology through a case study of mean change-point detection using panel data of stock index data.

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Optimal designs for active controlled dose-response models with asymmetric errors

贺磊（安徽师范大学）

Abstract: The optimal design of dose-finding studies with an active control has only been investigated in the literature for regression models that arise from an accurate error distribution. In this paper, we mainly determine optimal designs for estimating the smallest dose achieving the same treatment effect as the active control from the perspective of the second-order least squares estimation (SLSE). This estimation method has been demonstrated to be asymptotically more efficient than the ordinary least squares estimation (OLSE) when the error distribution is asymmetric. More precisely, we develop optimal design theory based on the SLSE, including equivalence theorems for ϕ_p -optimal designs and a geometric characterization of $\tilde{c}$ -optimal designs, which are then illustrated with examples. Furthermore, we investigate the finite sample properties of optimal designs and compare the SLSE with OLSE through simulation, numerical results show that the variance reduction of the SLSE is quite significant when optimal designs based on the SLSE are used for certain situations. Finally, the sensitivity of optimal designs to parameter mis-specifications has also been discussed.

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Sparse K-spatial-median for high dimensional clustering problem

庄丹（福建师范大学）

Abstract: We propose a stable and robust clustering framework for high-dimensional data with heavy tails and the presence of irrelevant variables. The method replaces the mean updates of Lloyd's K -means with spatial medians to enhance robustness. For the assignment step, the framework accommodates either a Euclidean rule for computational simplicity or a robust Mahalanobis metric based on the spatial sign

covariance matrix to account for scale heterogeneity and feature dependence. To handle the $\text{Sp} \setminus \text{gg} \setminus \text{n}$ regime, we further introduce a simple hard feature-exclusion mechanism that removes weakly separating dimensions based on across-center dispersion, with the exclusion threshold selected automatically via a permutation-based Gap criterion. Simulation studies under correlated Gaussian and multivariate St models demonstrate that the proposed approach provides competitive clustering accuracy and improved stability relative to K -means and sparse K -means baselines.

报告人简介：庄丹，福建师范大学数学与统计学院副教授、硕导，2019年毕业于西南财经大学统计学专业获博士学位；2024年出站于福建师范大学数学与统计学院统计学博士后流动站。在国内外统计权威学术期刊 *Computers and Industrial Engineering*、*Journal of Computational and Applied Mathematics*、*Journal of Multivariate Analysis* 等发表论文 10 余篇；主持国家自然科学基金、省自然科学基金、博士后面基金各 1 项，参与国家级、省级及横向等项目多项；授权发明专利 2 项。研究方向为变点检测、高维数据分析及其应用。

Transfer Learning for High-dimensional Accelerated Failure Time Models

吴捷（安徽大学）

Abstract: Transfer learning is a powerful tool to leverage information from different but related source domain to boost performance of the target task. Despite the substantial developments in various high-dimensional data analysis, survival data are insufficiently accounted by current transfer learning approaches. Random censoring mechanism, the population heterogeneity of multiple datasets and high dimensionality of predictors pose major challenges. How to properly conduct transfer learning procedure onto survival datasets to improve the statistical inference at the target and simultaneously guarantee theoretical properties remain unclear. In this paper, we propose a new transfer learning method for the high-dimensional right-censored survival data under accelerated failure time (AFT) model. The proposed method applies mean imputation techniques to adjust for censoring data, thus facilitating the subsequent pooling and debiasing transfer procedures. We show that under mild conditions, the proposed method achieves lower error bounds over the existing non-transfer learning methods even there exists obstacles from censoring. We also develop an algorithm based on sample splitting to detect informative source datasets and prove that the selected informative sources is consistent with the true one. Extensive simulation results and a real data case concerning TCGA micro-array gene expression are reported to support our theoretical claims and to demonstrate the empirical usefulness of the proposed transfer learning method. To the best of our knowledge, this is the first work on transfer learning for high-dimensional accelerated failure time modelling with theoretical guarantees.

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特邀报告 9: *Statistical Learning and Inference for Complex Data*

Model-based optimal randomization procedure for treatment-covariate interaction tests

刘中强（河南理工大学）

Abstract: Linear models are extensively used in the analysis of clinical trials. However, required model assumptions (e.g. homoscedasticity) may not be satisfied in practice, resulting in low power of treatment-covariate interaction tests. Various interaction tests have been proposed to improve the efficiency of detecting differences in treatment-covariate interactions. Aiming to fundamentally improve the power of treatment-covariate interaction tests, for heteroscedasticity of treatment responses, we develop a model-based optimal randomization procedure, referred to as model-based Neyman allocation (MNA) in this article. The derived limiting allocation proportion indicates that the procedure MNA is a generalization of response-adaptive randomization targeting Neyman allocation (RAR-NA). In theory, we demonstrate that the procedure MNA can maximize the power of treatment-covariate interaction tests. The issue of sample size estimation is also addressed. Simulation studies show, in the framework of the heteroscedastic linear model, compared with Pocock and Simon's minimization method and RAR-NA, the procedure MNA has the greatest power of tests for both systematic effects and treatment-covariate interactions, even under model misspecification. Finally, the efficiency of the procedure MNA is illustrated by a hypothetical case study based on a real schizophrenia clinical trial.

报告人简介：刘中强，教授，硕士研究生导师，主要研究方向生物医学统计、临床试验设计。主持国家自然科学基金项目和省部级科研 4 项、教学项目 1 项；参与完成国家自然科学基金面上项目、教育部人文社科统计学研究项目等省部级以上项目 6 项。代表性研究成果发表在 Science China Mathematics、Statistical Methods in Medical Research、Biometrical Journal、Pharmaceutical Statistics、Journal of Statistical Planning and Inference 等国际期刊上。主编《概率论与数理统计》教材 1 部，由高等教育出版社出版。获河南省本科教育线上教学优秀课程《概率论与数理统计》一等奖，2024 年指导研究生参加全国大学生统计建模大赛获“国家二等奖”，并获中国统计教育学会颁发的“优秀指导教师”荣誉。

Network alternating direction method of multipliers for ultrahigh-dimensional decentralized federated learning

董伟（郑州大学）

Abstract: Ultrahigh-dimensional data analysis has received great achievement in recent years. When the data are stored in multiple clients and the clients can be connected only with each other through a network structure, the implementation of ultrahigh-dimensional analysis can be numerically challenging or even infeasible. In this work, we study decentralized federated learning for ultrahigh-dimensional data analysis, where the parameters of interest are estimated via a large amount of devices without data sharing by a network structure. In the local machines, each parallel runs gradient ascent to obtain estimators via the sparsity-restricted constrained methods. Also, we obtain a global model by aggregating each machine's information via an alternating direction method of multipliers (ADMM) using a concave pairwise fusion penalty between different machines through a network structure. The proposed method can mitigate privacy risks from traditional machine learning, recover the sparsity and provide estimates of all regression coefficients simultaneously. Under mild conditions, we show the convergence and estimation consistency of our method. The promising performance of the method is supported by both simulated and real data examples.

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Doubly Robust and Outlier-Resistant Semiparametric Estimation of Optimal Individualized Treatment Regimes

李灿辉（河南大学）

Abstract: A fundamental challenge in precision medicine lies in constructing optimal individualized treatment regimes, as existing estimation methods typically rely heavily on the correct specification of underlying models. Furthermore, most standard approaches employ least-squares type loss functions, rendering the estimated treatment regimes vulnerable to outliers and heavy-tailed errors. To address these issues, we propose a novel doubly robust semiparametric direct learning framework for estimating optimal ITRs. Specifically, we construct a new class of estimating equations that integrates robust score functions, with doubly robust method and a nonparametric covariate-centering projection. Theoretical results establish that the proposed estimator possesses the double robustness property; that is, it yields consistent estimates of the optimal treatment regime parameters provided that either the propensity score model or the baseline outcome regression model is correctly specified. Concurrently, this approach effectively mitigates the impact of extreme

observations, reduces reliance on stringent model assumptions, and preserves the interpretability of linear decision rules.

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Estimation and testing for fixed effects partially linear nonparametric panel regression model with separable spatially and serially correlated error structure

李双双 (河南科技大学)

Abstract: Panel data collected from “locations” may exhibit spatial and serial correlations. In order to study such spatial and serial correlations, and possible existing nonlinear relationships, a fixed effects partially linear nonparametric panel regression model with separable spatially and serially correlated error structure is introduced. We obtain profile quasi-maximum likelihood estimators (PQMLEs) of the unknowns. Furthermore, a generalized F-test called F_{NT} is designed for assessing the reasonability of nonparametric component setting. Asymptotic properties of PQMLEs and F_{NT} are provided under several conditions. Monte Carlo trials imply our estimators and test statistic exhibit good performance in finite samples and model misspecification may lead to substantial influence on the estimates of unknown parameters. The analysis of provincial housing price in China reveals the presence of nonlinear, spatial and serial correlation relationships.

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特邀报告 10: *Agentic AI and Multi-Armed Bandit: Advances in Statistical Theory and Application*

Asymptotic Theory and Sequential Test for General Multi-Armed Bandit Process

姜丹丹 (西安交通大学)

Abstract: Multi-armed bandit (MAB) processes constitute a foundational subclass of reinforcement learning problems and represent a central topic in statistical decision theory, but are limited to simultaneous adaptive allocation and sequential test, because of the absence of asymptotic theory under non-i.i.d. sequence and sublinear information. To address this open challenge, we propose Urn Bandit (UNB) process to integrate the reinforcement mechanism of urn probabilistic models with MAB principles, ensuring almost sure convergence of resource allocation to optimal arms. We establish the joint functional central limit theorem (FCLT) for consistent

estimators of expected rewards under non-i.i.d., non-sub-Gaussian and sublinear reward samples with pairwise correlations across arms. To overcome the limitations of existing methods that focus mainly on cumulative regret, we establish the asymptotic theory along with adaptive allocation that serves powerful sequential test, such as arms comparison, A/B testing, and policy valuation. Simulation studies and real data analysis demonstrate that UNB maintains statistical test performance of equal randomization (ER) design but obtain more average rewards like classical MAB processes.

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Semi-supervised learning using copula-based regression and model averaging

喻达磊 (西安交通大学)

Abstract: The available data in semi-supervised learning usually consists of relatively small sized labeled data and much larger sized unlabeled data. How to effectively exploit unlabeled data is the key issue. In this paper, we write the regression function in the form of a copula and marginal distributions, and the unlabeled data can be exploited to improve the estimation of the marginal distributions. The predictions based on different copulas are weighted, where the weights are obtained by minimizing an asymptotic unbiased estimator of the prediction loss. Error-ambiguity decomposition of the prediction loss is performed such that unlabeled data can be exploited to improve the prediction loss estimation. We demonstrate the asymptotic normality and the nonasymptotic error bounds of copula parameters and regression function estimators of the candidate models under the semi-supervised framework, as well as the asymptotic optimality and weight consistency of the model averaging estimator. By incorporating unlabeled data into the candidate model estimation process, one can achieve a sharper error bound in comparison to the supervised counterpart. In addition, our model averaging estimator achieves faster convergence rates of asymptotic optimality and weight consistency than the supervised counterpart. Extensive simulation experiments and the California housing dataset demonstrate the effectiveness of the proposed method.

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些成果发表在 JRSS-B、JASA、JMLR、JBES 和中国科学：数学等期刊上。先后主持三项国家自然科学基金项目和一项国家重点研发计划项目课题。

Many two-armed bandits-driven Optimization via the strategic law of large numbers

张国栋（山东财经大学）

Abstract: This paper proposes a framework for the global optimization of a possibly multimodal continuous function in a bounded rectangular domain. We first show that global optimization is equivalent to an optimal (sampling) strategy formation in a two-armed decision model with known distributions, based on the strategic law of large numbers we establish. There are many optimal strategies in general. We show that a concrete strategy using the sign of the partial gradient of the unique solution to a parabolic partial differential equation (PDE) is asymptotically optimal. Motivated by these results, we propose a class of Strategic Monte Carlo Optimization (SMCO) algorithms, which uses a simple strategy that makes coordinate-wise two-armed decisions based on the signs of the partial gradient (or practically the first difference) of the objective function, without the need of solving PDEs. Under some sufficient conditions, we establish that our SMCO algorithm converges to a local optimizer from a single starting point, and to a global optimizer under a growing set of starting points. Extensive numerical studies demonstrate the suitability of our SMCO algorithms for global optimization well beyond the theoretical guarantees established herein. For a wide range of deterministic and random test functions with challenging landscapes (multimodal, nondifferentiable, discontinuous), our SMCO algorithms perform robustly well, even in high-dimensional ($d = 200 \sim 1,000$) settings. In fact, our algorithms outperform many state-of-the-art global optimizers, as well as local algorithms (with the same set of starting points as ours).

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Agentic AI agent Uncertainty Quantification in Infinite horizon

严晓东（西安交通大学）

Abstract: This paper develops a rigorous mathematical framework for multi-agent decision systems featuring general task-driven functions. We formalize agents as autonomous decision-making entities operating within interactive environments and establish fundamental limits on the achievable task-driven levels. Beyond the traditional paradigm of reward maximization, the proposed theory accommodates diverse risk preferences by leveraging task-driven-specific value functions, thereby enhancing its adaptability to complex real-world scenarios. The key contributions of

this work are threefold: (1) derivation of utility upper bounds under conditional independence assumptions, (2) construction of optimal policies that attain these theoretical bounds, and (3) development of distributional Bellman operators tailored for multi-agent reinforcement learning. This framework lays a solid theoretical foundation for coordination and optimization in complex multi-agent systems, with promising applications in distributed artificial intelligence and economic decision-making domains.

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特邀报告 11: *Advances in Statistical Learning, Fuzzy Logic, and Stochastic Dynamics*

基于 χ -语言的中风辅助辨证与诊疗决策

鲜思东 (重庆邮电大学)

摘要: 中风病症特征的复杂不确定性, 导致了其诊疗中常常出现“说不清、辨不明、治不准”的痛点。本报告在简单介绍 χ -语言模型的基础上, 结合卒中病症的特征, 建立基于双层最优模糊关联规则时间序列卒中病症预测模型, 然后, 提出了博弈毕达哥拉斯犹豫模糊粗糙模型方法, 将所提出的方法应用于中风病症预测与诊疗决策, 通过比较分析和敏感性测试验证了其可靠性和优越性。

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Intuitionistic proximity-consensus fuzzy geometric twin support vector machine with best subset selection

齐凯 (重庆师范大学)

Abstract: The intuitionistic fuzzy twin support vector machine (IFTSVM) utilizes the class center-based intuitionistic fuzzy set (IFS) to enhance the robustness of twin support vector machine (TSVM). While IFTSVM has successfully mitigated the impact of noise and outliers, significant room for improvement remains: 1) the class

center-based IFS is still sensitive to resampling noise; 2) TSVM cannot achieve feature selection. To address these problems, we propose a novel intuitionistic proximity-consensus fuzzy (IPCF) geometric TSVM with l_0 -norm-based best subset selection to reduce the influence of outliers, resampling noise and noise features, simultaneously. The proposed IPCF is induced by the distance to the hyperplane obtained from the least squares one-class support vector machine, rather than considering the distance to the class center as in IFS. This strategy can effectively alleviate the effects of both outliers and resampling noise. Moreover, by incorporating the l_0 -norm penalty, we can achieve significant feature selection and noise feature reduction at the same time. Inspired by the recently proposed variable sorted active set algorithm, we design an efficient algorithm for optimizing the problem. On both simulating datasets and UCI datasets, the experimental results validate the advantages of the proposed method. Specifically, compared with other state-of-the-art support vector classifiers, ours typically performs optimally on the datasets with redundant features and noise.

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A novel exact confidence interval for the difference of proportions in paired data using a restricted most probable statistic

曹幸运（重庆工商大学）

Abstract: Inference on the difference between two proportions in paired data is a key issue, particularly in biomedical research and clinical trials. Numerous methods exist for constructing confidence intervals for this difference. However, approximate methods that rely on asymptotic normality can be unreliable, underscoring the need for exact confidence intervals to improve reliability. In this paper, we develop a novel interval based on the restricted most probable (RMP) method, which is further optimized using the h-function method to yield an optimal exact interval, ensuring both reliability and precision. We compare the proposed interval with other exact intervals developed through methodologies such as the score method, two Tang methods, the Wang method, the adjusted Wald method, and the score method with continuity correction. Our comparative analysis, utilizing the infimum coverage probability and total interval length as evaluation metrics, demonstrates the uniformly superior performance of the proposed interval. Additionally, an example illustrates its practical application in real-world scenarios.

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Strong Feller property and ergodicity of generalized Ornstein-Uhlenbeck processes

张静 (重庆工商大学)

Abstract: By a coupling method, we prove some upper bound estimates for the variations of the transition probabilities of a generalized Ornstein-Uhlenbeck process driven by a bivariate Lévy process. From those results, we derive the strong Feller property and the exponential ergodicity of the process in Wasserstein distances under conditions given directly by the characteristic triplets of the driving noises.

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特邀报告 12: *Statistical Process Control: Methodology and Application*

Transfer learning-based non-parametric monitoring for the small-sample profile with temporal correlation

吴纯杰 (上海财经大学)

Abstract: With the increasing complexity of modern data in fields such as smart manufacturing and sensor networks, traditional statistical process control methods encounter significant challenges. This paper proposes novel estimation procedures based on transfer learning techniques for the small-sample linear profile. Considering the temporal correlation, the estimated target coefficient sequence is preprocessed by a decorrelation algorithm based on Cholesky decomposition. Since the estimated target coefficient lacks a parametric form, a non-parametric exponentially weighted moving average monitoring scheme based on the empirical distribution function is proposed, which breaks through the distributional limitation, further broadening the applicability of our methods. Numerical simulations and applications to air quality monitoring demonstrate the effectiveness and flexibility of the proposed schemes.

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A study on the performance of matrix control charts based on the normal distribution

李聪（吉林大学）

Abstract: With the explosive growth of data, matrix data has become increasingly common in fields such as genetic engineering, remote sensing satellites, and environmental and atmospheric sciences. Monitoring matrix data has also become increasingly important. Control charts are important tools in the study of statistical process control. Traditional research assumes that the monitored data follows a univariate normal distribution or a vector-valued normal distribution. Matrix sequences can explain the correlations between different row and column variables simultaneously. However, research on the monitoring of such sequences is very limited. In this article, based on the matrix normal distribution, we propose three new matrix control charts. We study the changes in the average run length of three control charts when a matrix normal process shifts. In the application of control charts, the true parameters are rarely known explicitly and are usually obtained through parameter estimation methods. Therefore, estimation errors are inevitable. This article further investigates the effect of parameter estimation errors on control charts. The application of the model and control charts is demonstrated in the example section.

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Dynamic count time series modeling and anomaly detection for online automotive quality complaints

宋赞（沈阳农业大学）

Abstract: Feedback information concerning automotive quality often suffers from significant delays, making online consumer complaints an invaluable real-time source of information for monitoring and assessing product quality. Given that the frequency of online complaints is influenced by numerous factors, such as automobile quality, sales, Internet development, and public awareness of rights protection, it exhibits significant auto-correlation and dynamics. However, the existing modeling methods have been proven to be unreliable in practical applications, because they often assume that in-control (IC) processes remain static and they employ models with fixed parameters. To this end, a dynamic modeling framework that integrates generalized linear regression with an integer-valued auto-regressive (INAR) state space model is proposed to capture the evolving nature of the process. Then, a procedure combining the Extended Kalman Smoothing (EKS) with the Expectation Maximization (EM)

algorithm, referred to as EM-EKS, is used to estimate the model parameters. Furthermore, for online monitoring of any upward shifts in the number of complaints, a control chart (denoted as SDC-INAR(1)-G) with one-step-ahead forecasting value as the plotting statistic is constructed. Simulation studies show that the proposed SDC-INAR(1)-G method consistently exhibits much better performance than three benchmark approaches in different scenarios. Finally, the proposed SDC-INAR(1)-G method is applied to monitor online complaints of the Volkswagen Sagitar, focusing on two specific cases: the stationary process of “brake abnormal noise” and the non-stationary process of “transmission abnormal noise”. The results further demonstrate that the SDC-INAR(1)-G method outperforms the static approaches in both cases. The state-space framework and adaptive EM-EKS parameter estimation of the proposed SDC-INAR(1)-G method ensure robust sensitivities to different shifts, offering reliable monitoring for both stationary and non-stationary data, remaining, at the same time, computationally efficient for real-world applications.

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A class of distribution-free monitoring schemes for high-dimensional industrial processes via origin and modified interpoint distance based algorithms

唐安安 (南京邮电大学)

Abstract: Improvements in measuring devices, the development of sensing technologies, automated record-keeping and cloud storage facilities have offered us a large volume of data streams involving many variables for data-driven decision-making. Consequently, monitoring high-dimensional (HD) processes has become an essential and exciting topic in statistical process monitoring. HD monitoring poses a significant challenge because considerable uncertainty is involved in estimating process parameters when an adequately large reference sample is unavailable before monitoring. Thus, designing an effective, conveniently implementable monitoring scheme for the HD processes remains a challenging task that has yet to be effectively addressed. We develop a class of distribution-free schemes to monitor multivariate and HD processes based on origin and interpoint distances. We offer an improved and general way to achieve conditionally distribution free properties closely. The proposal also combines the advantage of the nonparametric approaches for jointly monitoring the process location and scale

parameters with the better shift detection performance of an EWMA scheme. The new schemes can be easily implemented even when the data dimension is large with a small number of Phase-I samples. Control limits using the median run length as a metric are evaluated and tabulated for some cases to implement the proposed chart quickly. Extensive comparative studies have been conducted to verify the efficacy of the proposed monitoring schemes. Finally, the proposed schemes are illustrated with a real problem of monitoring high-dimensional quality characteristics from semiconductor manufacturing processes.

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特邀报告 13: *Statistical Inference Theory for Covariance Matrix, Partial Correlation and Change-point detection*

Adaptive Regularization of High-Dimensional Toeplitz Covariance Matrix

梁宇莉 (广西师范大学)

Abstract: We propose a Toeplitz covariance estimator using a nonconvex SCAD penalty and smoothing term. An efficient ADMM algorithm with theoretical convergences is investigated. Simulations and real data show its effectiveness for high-dimensional data.

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A robust diagnostic approach in mean shifts for multivariate statistical process control

徐锋 (桂林理工大学)

Abstract: The control chart is very useful and efficient to detect abnormal changes of a process, however it is difficult to identify out-of-control variables that are responsible for the change. Accurate fault diagnosis has become increasingly important, which helps engineer quickly eliminate the root causes of abnormal

changes. However, most of existing diagnostic methods were developed under the assumption of normality, of which the performance is affected by the nonnormality. To overcome these limitations, this paper attempts to combine Bootstrap technique to propose a diagnosis method that is robust to underlying distribution, but also applicable to the case of small out-of-control sample size. Bootstrap technique is used to improve the diagnostic ability of the diagnostic method, which is our first attempt. Compared with the existing procedures, numerical simulations favour the proposed procedure. Finally, an example from a bolt production process is provided to illustrate the implementation of the proposed procedure.

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Projection-based inference for partial correlation in non-sparse high-dimensional settings

林尤武 (桂林电子科技大学)

Abstract: We develop a projection-based framework for the estimation and hypothesis testing of partial correlations in high-dimensional settings. The proposed estimator is asymptotically normal without requiring sparsity assumption, allowing valid inference in dense regimes. Building on this estimator, we construct a test statistic and derive its exact distributions under both the null and alternative hypotheses in closed form. This explicit distributional characterization further yields a power-optimal projection direction, under which the proposed test attains maximal power within a broad class of linear projection methods. Extensive simulation studies demonstrate that the proposed approach achieves accurate estimation and strong testing performance across a range of high-dimensional scenarios.

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Change-point estimation for mixed-regression model

张军舰 (广西师范大学)

Abstract: Change-point problem is widely appeared in many situations such as signal processing, climate, network flow and so on. In this talk, the mixed regression model(including both autoregression and the covariates) is considered . Change-point estimation is investigated by using the penalized least square method, quantile regression method, linear expectile and adaptive LASSO method for the proposed model. The corresponding statistical properties are given. Simulations and real analysis are done to show the advantage of the proposed model and their estimations.。

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特邀报告 14: *Theory and Application of Medical Imaging and Multi-omics Data Statistics*

Nonlinear Causal Structure Learning: Application to Inferring the Gene Regulatory Network in Breast Cancer

谌自奇 (华东师范大学)

Abstract: Breast cancers classified by estrogen receptor status (ER+ vs. ER-) show marked differences in clinical features and prognosis, yet their subtype-specific gene regulatory mechanisms remain unclear. Accurate causal structure learning (CSL) in this context is challenging due to nonlinear dependencies, non-Gaussian noise, and the high dimensionality of genomic data. We propose SR-PC, a novel constraint-based CSL algorithm to address these challenges. SR-PC integrates parallel reverse-pruning PC for skeleton learning, Shapley-independence-based v-structure detection, and a new nonparametric conditional independence test, enhancing both robustness and accuracy in inferring causal structures. After confirming strong nonlinearity and non-Gaussianity in METABRIC data, we applied SR-PC to infer subtype-specific gene regulatory networks (GRNs) for ER+ and ER- breast cancer. The ER+ GRN is highly interconnected, whereas the ER- GRN is more streamlined. This structural contrast is consistent with the well-established clinical characteristics of ER subtypes, with ER+ tumors typically showing higher differentiation and sensitivity to endocrine therapy, and ER- tumors generally exhibiting a more aggressive phenotype. Extensive simulations further validate the substantial performance gains of SR-PC over existing CSL methods, demonstrating its robustness and scalability to complex datasets.

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Multiple-Imputation-Based Multivariate One-sided Tests for Nonlinear Mixed-Effects Models with Covariate Measurement Error and Left-Censored Responses

张艺馨 (中国科学技术大学)

Abstract: Multivariate One-sided hypotheses testing problems arise frequently in practice, which are known to be more powerful than tests ignoring the restrictions. In this article, we consider multivariate one-sided tests for nonlinear mixed effect models with both left-censored response and measurement errors in time-varying covariates. We propose to use a multiple imputation method to address the censoring and measurement errors simultaneously, since such a method allows us to use existing “complete-data” methods for multivariate one-sided tests. Some theoretical results are presented. The proposed methods are illustrated by a HIV real data example and evaluated by simulations. The results show that our proposed multiple imputation based test is more powerful than the unconstrained tests based on naive method and two-step method.

报告人简介: 张艺馨, 中国科学技术大学数学学院副研究员。本科毕业于山东大学, 博士毕业于加拿大约克大学。主要从事复杂数据下的统计推断与生物医学数据分析研究。在 Canadian Journal of statistics、BMC Bioinformatics 等杂志发表多篇论文。

From Multi-omics to Brain and Behavior: Statistical Integration of Exome Sequencing, Plasma Proteomics, and Neuroimaging in Mental Health Research

康菊姣 (湖南师范大学)

Abstract: Mental disorders are complex conditions arising from the interplay of genetic, molecular, neurobiological, and environmental factors. In this talk, I will present a statistical framework for integrating multi-omics and neuroimaging data to investigate the biological mechanisms underlying behavioral and psychiatric outcomes. Using two large-scale UK Biobank studies as examples, I will show how upstream genetic variation and downstream proteomic alterations can be linked to brain structure and mental health. In the first study, whole-exome sequencing analysis

in 304,119 individuals identified rare coding variants and genes associated with alcohol consumption, with several findings further linked to brain-related pathways and white matter integrity. In the second study, a longitudinal plasma proteomics analysis of 46,165 adults identified 157 proteins associated with incident depression over a median follow-up of 14.5 years, and these proteins were further related to brain structure, genetic risk, and stress-related events. Together, these studies highlight the value of advanced statistical methods for integrating genomics, proteomics, and brain imaging to identify biomarkers, uncover disease mechanisms, and support precision medicine in psychiatry.

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Multi-block ADMM for Sparse Gaussian Graphical Models

毛善骏 (湖南大学)

Abstract: Gaussian graphical models (GGM) are widely used to infer conditional independence networks from high-dimensional data, but existing methods often ignore natural block structures (e.g., microbial communities or gene modules) or impose hard block-diagonal constraints that miss weak cross-block interactions. We propose a multi-block alternating direction method of multipliers (ADMM) that jointly estimates a global precision matrix, its diagonal blocks, and auxiliary variables with adaptive sparse penalties, capturing both within-block dense connections and between-block sparse links. Theoretically, we prove that the algorithm converges globally when a strongly convex regularization is added, and we derive an explicit bound on the bias introduced by the regularization. Extensive simulations show that our method consistently outperforms competing approaches (graphical lasso, neighborhood selection, IB-GLasso, BDgraph, BLGGM) in F1 score, recall, and computational efficiency across uniform/non-uniform block sizes, high-dimensional small-sample settings, and misspecified block structures. On single-cell data, an variational EM extension jointly performs cell clustering, gene module inference and cluster-specific network reconstruction, while an auto-learning mode robustly recovers modules even when prior block information is noisy or absent. Our method offers a scalable, theoretically grounded, and practically powerful tool for reconstructing modular biological networks.

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特邀报告 15: 复杂数据的异质分析和模型选择

Subspace change point detection and Clustering

朱学虎 (西安交通大学)

Abstract: This paper develops a method to detect model structural changes by applying a Corrected Kernel Principal Component Analysis (CKPCA) to construct the so-called central distribution deviation subspaces. This approach can efficiently identify the mean and distribution changes in these dimension reduction subspaces. We derive that the locations and number changes in the dimension reduction data subspaces are identical to those in the original data spaces. Meanwhile, we also explain the necessity of using CKPCA as the classical KPCA fails to identify the central distribution deviation subspaces in these problems. Additionally, we extend this approach to clustering by embedding the original data with nonlinear lower dimensional spaces, providing enhanced capabilities for clustering analysis. The numerical studies on synthetic and real data sets suggest that the dimension reduction versions of existing methods for change point detection and clustering significantly improve the performances of existing approaches in finite sample scenarios.

报告人简介: 朱学虎, 博士, 西安交通大学教授, 博士生导师, 主要从事统计学习、高维数据分析及应用统计等领域的研究, 截至目前, 已发表学术论文 40 余篇, 包括 Journal of the American Statistical Association、Journal of Business & Economic Statistics、Science China Mathematics 等期刊以及应用领域权威期刊 IEEE Transactions on Geoscience and Remote Sensing、计算机顶级会议 NeurIPS 等。先后主持科技部重点研发计划子课题、国家自然科学基金面上项目、国家自然科学基金重点项目课题等, 入选陕西省高校青年杰出人才支持计划和仲英青年学者等荣誉。

Robust Heterogeneous Subgroup Analysis via Composite Quantile Regression with Pairwise Fusion Penalties

王明秋 (曲阜师范大学)

Abstract: This paper proposes a robust subgroup analysis method based on composite quantile regression (CQR) and pairwise fusion penalty, aiming to address the statistical identification of treatment effect heterogeneity in precision medicine. Traditional "one-size-fits-all" models lack robustness against non-normal errors and

outliers, while struggling to effectively capture underlying subgroup structures. By integrating information from multiple quantile levels, our approach enhances estimation efficiency while maintaining robustness against heavy-tailed errors and outliers. We construct a penalized CQR objective function capable of simultaneously achieving subgroup identification and variable selection, and design an alternating direction method of multipliers to solve this non-convex optimization problem. Under general regularity conditions, the consistency of this method in variable selection and grouping is theoretically established. Numerical simulations demonstrate the superior performance of the proposed method under various error distributions, while real-data analysis further validates its effectiveness and robustness in practical applications.

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Feature Selection with Annealing for Shallow Neural Networks Using the Multi-Stage Stochastic Algorithm

孙力喆 (山西财经大学)

Abstract: Feature selection is a fundamental challenge in statistics and machine learning, playing a critical role in improving prediction accuracy and enhancing model interpretability. It is widely applied across various scientific and practical domains. However, most existing variable selection methods are developed within the framework of linear and generalized linear models, which limit their applicability to more complex data structures. In this presentation, we introduce two novel nonlinear variable selection approaches that integrate an iterative hard-thresholding operator into stochastic training of shallow neural networks. The proposed methods simultaneously identify relevant features and build a predictive model based on the selected subset using shallow neural networks. Furthermore, we develop a new Bayesian information criterion to facilitate effective model selection in the high-dimensional setting. Extensive numerical experiments on both simulated and real-world datasets demonstrate that the proposed methods achieve competitive performance compared with the classical approaches in the literature.

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Nonparametric Statistics 等国际知名期刊上发表多篇论文,参与国家自然科学基金面上项目 1 项,国家社科重大项目 1 项,主要研究方向为高维数据的统计推断及应用。

An Efficient Jackknife Model Averaging Method

陈泽 (山东大学)

Abstract: Model averaging, an effective method for reducing uncertainty in data modeling and learning, has been widely applied across various fields, including economics, finance, and operations research. The leave-one-out cross-validation (LOOCV) criterion is a widely used technique to choose weights in model averaging. It has achieved great success, but its application is limited by the high computational complexity, especially when the sample size is large. To address this issue, focusing on generalized linear models (GLMs), we propose a computationally efficient and approximate leave-one-out crossvalidation (ALOOCV) weight choice criterion, which no longer suffers from the need to repeatedly solve optimization problems many times. Our theoretical analysis presents the discrepancy between the weight estimators produced by LOOCV and ALOOCV, which has been proven to vanish asymptotically under certain conditions. Moreover, the efficient jackknife model averaging (EJMA) procedure with ALOOCV for GLMs is proposed. The asymptotic optimality under the model misspecification and the convergence rate of the selected weights by ALOOCV are derived, and the over-consistency of the weight estimators and the consistency of averaging coefficient estimators are established if there exists at least one correct model. Additionally, to reduce the computational burden caused by an excessive number of candidate models, we provide a model screening procedure. Numerical experiments show the remarkable computational efficiency exhibited by EJMA relative to the model averaging procedure with LOOCV and the excellent prediction performance of our method over some common model averaging and selection procedures.

报告人简介: 陈泽, 山东大学中泰证券金融研究院博士后, 博士毕业于中国人民大学统计学院, 主要研究方向包括模型平均, 变量重要性度量, 复杂数据分析等, 在 INFORMs Journal on Computing、Statistica Sinica、JCGS 等管理学顶级期刊和统计学权威期刊发表论文多篇, 主持国家自然科学基金青年基金、国家资助博士后研究人员计划以及博士后面等项目。

特邀报告 16: *Advances in Statistical Methods for Complex Health and Genomics Data: Diagnostics, Modeling, Annotation, and Application*

Collapsibility via Minimal Separators in Contingency Tables

孙毅 (新疆财经大学)

Abstract: Collapsibility provides a principled approach for dimension reduction in contingency tables and graphical models. Madigan(1990) pioneered the study of minimal collapsible sets in decomposable models, but existing algorithms for general graphs remain computationally demanding. We show that a model is collapsible onto a target set precisely when that set contains at least one minimal separator between its non-adjacent vertices. This insight motivates the Close Minimal Separator Absorption (CMSA) algorithm, which constructs minimal collapsible sets using only local separator searches at very low costs. Simulations confirm substantial efficiency gains, making collapsibility analysis practical in high-dimensional settings.

报告人简介: 新疆财经大学统计与数据科学学院教授、硕导, 南开大学组合数学中心博士, 东北师范大学统计学博士后。兼任中国现场统计研究会理事、中国人工智能学会因果与不确定性人工智能专委会委员等多个学术职务, 美国数学会评论员及多本国内外知名期刊评审专家。研究方向为概率图模型与因果推理。主持国家自然科学基金 3 项、省部级及教改项目多项, 参与横向课题 4 项。发表论文 40 余篇, 含 *Biometrika*、*JMLR* 等权威期刊。获省级教学成果奖 1 项、校级教学成果奖一等奖 1 项、三等奖 1 项。

Additive tree latent variable models with applications to insurance loss prediction

王芝皓 (新疆财经大学)

Abstract: We consider a specific class of regression models with discrete latent variables, which are commonly used in actuarial science and other fields. When fitting these parametric regression models, regression functions are estimated for both the observed response variable and the latent variable, respectively. Feature engineering, variable selection and model selection become challenging due to the involvement of multiple regression functions and latent variable. To address these challenges, we propose additive tree latent variable models. To calibrate these models, we introduce an iteratively re-weighted gradient boosting (IRGB) algorithm that combines the EM algorithm with the gradient boosting. In each iteration, the IRGB algorithm trains only one weak learner in a stagewise manner. Theoretical analysis demonstrates the monotonic behavior of the likelihood in the IRGB algorithm. We further illustrate the advantages of the proposed nonparametric methods through an empirical example of motor insurance claim counts and a case study on French motor third-party liability insurance pure premiums.

报告人简介: 王芝皓, 副教授, 中国人民大学统计学专业理学博士。主要研究领域包含非参数统计模型、分位数回归、函数型数据分析、高维变量选择等。主持或参与国家级项目 4 项, 省部级项目 5 项, 在《中国科学·数学》、《统计研究》、《Journal of the Royal Statistical Society Series A: Statistics in Society》、《Statistica

Sinica》、《Biometrical Journal》、《Statistical Papers》、《系统科学与数学》、《数理统计与管理》等期刊发表论文 10 余篇。

Statistical inferences for uncertain semiparametric model

李智明（新疆大学）

Abstract: Uncertain regression analysis explores functional relationships in uncertain environments. While existing uncertain statistical models have been widely applied, they often struggle with some complex uncertain phenomena. This paper introduces an uncertain semi-varying coefficient model and derives the parameter vector using the profile least squares method. We provide residual analysis and hypothesis testing to validate the model's fit, and introduce a significance test for constant coefficients. A case study on house prices demonstrates the model's effectiveness, highlighting its potential for real-world applications, such as economic forecasting. Statistical tests indicate that the disturbance term should be characterized as an uncertain variable rather than a random one.

报告人简介: 李智明，女，教授，博士生导师。近年来主要从事试验设计、统计推断、传染病模型等研究。主持各类科研课题 12 项，其中国家自然科学基金地区基金 3 项，新疆战略人才培养计划一流科技领军人才项目 1 项，中央引导地方科技发展项目 1 项，自治区自然科学基金-杰出青年科学基金项目 1 项、天山青年-优秀青年科技人才培养项目 1 项。发表论文 100 余篇，SCI 收录 90 余篇。

Characterizing Tail Heterogeneity in Continuous Unimodal Asymmetric Distributions via Conditional Moments

张兆远（伊犁师范大学）

Abstract: Asymmetric distributions are prevalent in real-world data, and their left and right tails often exhibit distinct characteristics. Traditional kurtosis coefficient formulas, however, fail to differentiate these varying properties of the tails. Consequently, investigating the kurtosis disparity in the tails of asymmetric distributions is essential. This paper introduces a novel method for calculating the kurtosis coefficient of asymmetric distributions. By computing the conditional kurtosis of both tails, it describes the differences between the left and right tails of asymmetric distributions. The effectiveness of this method for continuous unimodal distributions is then demonstrated using the Gamma distribution as an example.

报告人简介: 张兆远，男，博士，副教授，硕士生导师。博士毕业于东北师范大学数学与统计学院统计学专业，研究方向为教育统计与心理测量。现任伊犁师范大学数学与统计学院教师、数据科学与大数据技术专业负责人、概率论与数理统计教研室主任。在国内外期刊发表论文 40 余篇，其中 SCI/SSCI 论文 20 篇。

特邀报告 17: *Advances in Random Matrix Theory and High-Dimensional Statistical Inference*

The asymptotic properties of the extreme eigenvectors of high-dimensional spiked models

张晓琢（东北师范大学）

Abstract: In this talk, we investigate the asymptotic behaviors of the extreme eigenvectors in the general spiked covariance matrix and sample canonical correlation matrix, where the dimension and sample size increase proportionally. We eliminate the restrictive assumption of the block diagonal structure and the 4th moment in the population covariance matrix. As for the SCC matrix, we calculate the asymptotic distribution of inner product of population and sample spiked eigenvectors. Then we also present simulation results to validate the key theoretical findings.

报告人简介: 张晓琢，东北师范大学数学与统计学院副教授。2023 年毕业于东北师范大学，主要从事大维随机矩阵谱理论及其统计推断的研究。入选国家天元数学东北中心 2024 年度优秀青年学者奖励计划，入选国家资助博士后研究人员计划（B 档）。主持国家自然科学基金青年科学基金项目(C 类)及多项省级项目与博士后基金项目。发表论文 9 篇，其中包含 The Annals of Statistics、Bernoulli、Science China Mathematics 等期刊。

Distribution-sharpened sampling for maximum and minimum entry localization in factorized tensors

周焕超（湘潭大学）

Abstract: This talk addresses the problem of locating the maximum or minimum entry of a large-scale factorized tensor, with particular emphasis on tensors represented in tensor-train format. Since explicit reconstruction of the full tensor is often computationally prohibitive, the key challenge is to identify the target entry directly from its compact representation. We present a distribution-sharpened sampling framework that reformulates extremum localization as a statistical mode estimation problem. The original tensor is first shifted and normalized into a probability tensor, so that the desired extremum corresponds to the largest probability mass. A sharpening transformation based on the Hadamard square is then used to amplify the relative dominance of the target entry while preserving its location. Sampling from the resulting high-dimensional discrete distribution is performed through sequential one-dimensional conditional distributions, which can be efficiently computed using tensor contractions. Finally, the target location is estimated from empirical sampling frequencies via a maximum likelihood principle. The talk also discusses convergence, sample complexity, and the role of effective sample size in designing practical stopping criteria for the sharpening procedure.

报告人简介: 周焕超，湘潭大学数学与计算科学学院讲师。博士毕业于东北师范大学统计专业，师从白志东教授；同年加入湘潭大学数学与计算科学学院。他的主要研究兴趣集中在大维随机矩阵的谱性质分析，包括极限谱分布、样本协方差

矩阵的渐近行为等，致力于发展高维统计理论并将其应用于实际数据分析。他在国际期刊上发表相关论文五篇，其中包括 Bernoulli、SCIENTIA SINICA Mathematica 等杂志。

Nonlinear Latent Space Estimation and Principal Component Analysis

田晔（东北师范大学）

Abstract: Identifying low-dimensional latent structures in high-dimensional data is a fundamental problem in statistics and machine learning, with applications in data compression, storage optimization, and efficient transmission. While Principal Component Analysis and its variants are widely used for linear dimension reduction, nonlinear approaches such as autoencoders often require heavy computation and explicit specification of the nonlinear transformation. In this work, we address the problem of latent space learning in the context of nonlinear data reconstruction. We formulate the task as a nonlinear multiple-response regression within the framework of index models and develop two latent-space estimation methods based on the first- and second-order forms of Stein's formula, without requiring prior knowledge of the nonlinear link function. Under Gaussian input distributions, we establish that the first-order Stein's estimator of the low-rank representation matrix coincides with the PCA solution. Moreover, Stein's lemma facilitates explicit estimation of the latent subspace for inputs following general distributions, offering significant computational benefits over nonlinear methods such as autoencoders. Experimental results on MNIST handwritten digit reconstruction reveal that the proposed approaches can equal or surpass the performance of autoencoders, demonstrating their effectiveness for scalable nonlinear representation learning.

报告人简介: 田晔，东北师范大学数学与统计学院，讲师。2024 年毕业于罗格斯新泽西州立大学统计系，2025 年于香港大学从事博士后研究。主要研究方向为统计学习，研究成果发表于 Statistica Sinica, JSPI 等统计期刊以及 ICLR 等会议上。

Distributed Estimation of Spiked Eigenvalues in Generalized Spiked Population Models

李玉玲（长春工业大学）

Abstract: High-dimensional data are increasingly generated and stored across decentralized systems, where communication bottlenecks and data privacy constraints often make centralized statistical inference infeasible. This paper studies the estimation of spiked eigenvalues, which represent latent low-rank signals, in generalized spiked population models under a distributed architecture. We propose a Communication-Efficient Distributed Estimator (CEDE) that extends the Stieltjes-transform-based spectral estimator to individual nodes and aggregates the

resulting local estimators using an asymptotically optimal weighted fusion rule. The proposed estimator achieves the same first-order convergence rate $\mathcal{O}_p(n^{-1/2})$ and asymptotic normality as its centralized counterpart, while replacing the transmission of full local covariance matrices, of order $\mathcal{O}(mp^2)$, by low-dimensional spectral summaries. When only the M local spike estimates and a fixed number of auxiliary scalar quantities are communicated, the communication cost is of order $\mathcal{O}(mM)$. We establish consistency and a central limit theorem for the aggregated estimator. We further derive an asymptotic statistical error bound governed by the effective information size $\sum_{\ell=1}^m n_{\ell}/\sigma_{\ell}^2$, together with a sub-Gaussian strengthening under an additional node-wise concentration condition. The optimal weighting strategy is asymptotically mean-square-error optimal among linear aggregations and improves over naive uniform averaging when local sample sizes or local variances differ. Monte Carlo experiments and a real data analysis corroborate the theory, showing that CEDE attains accuracy and spectral stability close to centralized estimation with substantially lower communication cost.

报告人简介：李玉玲，长春工业大学数学与统计学院博士后。2024年毕业于东北师范大学数学与统计学院，现任中国现场统计研究会随机矩阵理论与应用分会理事。主要从事大维随机矩阵理论研究。

特邀报告 18: *Advance in high-dimensional and complex time series*

Distributed bootstrap global inferences for the cumulative distribution function with large-scale data

蔡利（浙江工商大学）

Abstract: The cumulative distribution function (CDF) is a fundamental statistical tool for characterizing random variables. Determining whether data is normal or heavy-tailed is critical for guiding analytical choices and ensuring the reliability of subsequent inferences. This paper proposes a novel bootstrap-based global inference method for the CDF under general conditions. We establish rigorous uniform convergence properties for the proposed statistic. In contrast to conventional methods that depend on the limiting Kolmogorov distribution, the bootstrap approach is fully data-driven, substantially improves accuracy, and straightforward to implement. To address the challenges arising from large-scale or multi-source data, we further develop distributed and pseudo-distributed bootstrap inference schemes and provide their corresponding theoretical support. Both proposed schemes outperform the distributed methods based on the limiting Kolmogorov distribution. The pseudo-distributed bootstrap is particularly advantageous for extremely large datasets, as it directly resamples subset-level statistics and operates under weaker assumptions. Extensive simulation studies confirm the theoretical findings and demonstrate the

superior performance of our methods. As an illustration, we apply the proposed global inferences method to two real datasets: the CardioGoodFitness retail data and developer productivity with AI and burnout data.

报告人简介: 浙江工商大学副教授、硕士生导师。主要从事非参数与半参数统计推断方法及其极值分布理论在复杂数据（如函数型数据、纵向数据、缺失数据等）中的应用研究，相关成果发表于 *Sinica*、*TEST*、*Statistics in Medicine*、*Statistics in Computing*、*CSDA*、*Journal of Nonparametric Statistics* 等期刊。

Spectral Graphical Lasso for High-Dimensional Time Series

王励励（浙江工商大学）

Abstract: The spectral density matrix and its inverse, the spectral precision matrix, are fundamental to analyzing high-dimensional time series in the frequency domain, as they characterize the marginal and conditional linear dependencies that vary across frequencies. In this work, we develop estimation procedures for these matrices in high-dimensional settings. Specifically, we apply the kernel-smoothed periodogram to estimate spectral density matrices, and propose the Spectral Graphical Lasso (SGLASSO) to recover sparse spectral precision matrices. Under the functional dependence framework, we establish uniform non-asymptotic bounds for the kernel-smoothed periodogram and derive convergence rates for SGLASSO in element-wise, Frobenius and spectral norms. Numerical simulations demonstrate the favorable finite-sample performance of SGLASSO. Applied to EEG motor imagery data, our approach reveals task-specific functional connectivity patterns consistent with established neuroscientific findings.

报告人简介: 王励励，浙江工商大学统计与数据科学学院副教授，管理统计研究所副所长，浙江省领军人才培养计划青年优秀人才。主要从事随机矩阵理论及其在高维统计分析中的应用研究，有多篇论文在统计学权威期刊 *Bernoulli*、*Statistica Sinica*, *Journal of Multivariate Analysis*、*Electronic Journal of Statistics* 等杂志发表。在科研项目方面，主持国家自然科学基金项目 2 项、教育部人文社科基金 1 项、博士后面基金 1 项，作为课程负责人获批 2022 年浙江省一流本科国际化课程 *Statistics*。

Varying-Coefficient Fréchet Regression

张建强（浙江工商大学）

Abstract: As a growing number of problems involve variables that are random objects, the development of models for such data has become increasingly important. This paper introduces a novel varying-coefficient Fréchet regression model that extends the classical varying-coefficient framework to accommodate random objects as responses. The proposed model provides a unified methodology for analyzing both Euclidean and non-Euclidean response variables. We develop a comprehensive

estimation procedure that accommodates diverse predictor settings. Specifically, the model allows the effect-modifier variable U to be either Euclidean or non-Euclidean, while the predictors X are assumed to be Euclidean. Tailored estimation methods are provided for each scenario. To examine the asymptotic properties of the estimators, we introduce a smoothed version of the model and establish convergence rates through separate theoretical analyses of the bias and stochastic terms. The effectiveness and practical utility of the proposed methodology are demonstrated through extensive simulation studies and a real-data application.

报告人简介: 张建强, 山东临沂人, 2024 年博士毕业于中国人民大学统计学院, 现任浙江工商大学统计与数学学院讲师。主要研究领域为模型平均、组合预测、非参数估计等。相关成果发表在 *Journal of the Royal Statistical Society Series C: Applied Statistics*、*中国科学: 数学*、*Statistica Sinica* 等。

Eigen-transformed Tests for High-dimensional Mean Vectors under Dependence and Heavy Tails

吴潇然 (香港科技大学)

Abstract: Testing high-dimensional means has garnered significant interest in the era of big data. Conventional methods for this problem typically require bounded fourth moments and temporal independence, which are violated by time series or heavy-tailed data. In this paper, we propose an eigen-transform test and its winsorized counterpart. For data with finite variance, our approach involves projecting the data onto several mutually independent directions by eigenvectors of the long-run covariance matrix, followed by conducting a sum-of-absolute-values type statistic. For more extreme heavy-tailed data, a winsorization procedure is introduced first. We provide theoretical results on the asymptotic properties of the statistic under both the null and local alternative hypotheses. Finite sample performances are illustrated via various simulations. We also apply the proposed test to analyze ADR premiums in stock markets and to provide early diagnosis of Alzheimer's disease, highlighting the robustness and efficiency of our approaches.

报告人简介: 吴潇然, 就职于香港科技大学数学系, 任博士后研究员, 此前于浙江大学获得统计学学士与理学博士学位, 主要研究领域为高维时间序列与计量经济学, 包括高维因子模型, 高维时间序列的降维检验与多重假设检验, 厚尾序列的统计推断等。相关研究成果发表在 *Statistica Sinica*, *中国科学: 数学* 等期刊

特邀报告 19: *Statistical Modeling and Inference for Complex Data*

Distributed Jackknife Model Averaging for Quantile Regression

李建波 (江苏师范大学)

Abstract: Quantile regression is a powerful tool for analyzing heterogeneous data, but its application to distributed big data faces two critical challenges: model

uncertainty and computational/storage bottlenecks. To address these issues, we propose a Distributed Jackknife Model Averaging (DJMA-QR) framework for quantile regression, leveraging the divide-and-conquer strategy. Specifically, we first train multiple nested quantile regression models locally on each distributed node, then optimize model weights via a node-adaptive Jackknife criterion, and finally aggregate local results using two scalable strategies. Under mild regularity conditions, we establish the L2-convergence of the aggregated weights to the theoretically optimal weights, the asymptotic normality of the proposed estimators, and the minimax optimal convergence rate—all valid for diverging covariate dimensions and number of candidate models. Extensive numerical studies demonstrate that DJMA-QR outperforms distributed single-model quantile regression.

报告人简介：江苏师范大学数学与统计学院教授、硕士生导师、副院长，中国现场统计研究会大数据分会常务理事、江苏省概率统计学会常务理事、全国工业统计学教学研究会理事；2011 年博士毕业于香港中文大学统计系，2008 年硕士毕业于华东师范大学统计学院（原统计系）；先后入选江苏高校“青蓝工程”优秀教学团队、中青年学术带头人、优秀青年骨干教师，江苏省“六大人才高峰”人才，江苏省“333 工程”第三层次人才；主要研究领域包括复杂数据分析、生存分析、高维数据分析等，主持完成国家自然科学基金项目 3 项，教育部人文社科项目 1 项，发表 SCI 学术论文 30 余篇。

概率分布型响应变量的弗雷歇回归模型及其统计推断

刘鹤飞（云南财经大学）

摘要：随着数据科学的发展，数据分析中“数据”的类型越来越宽泛。如何对于非欧氏空间中广义的数据类型进行建模和推断，是当前统计学研究的前沿领域之一。本研究从线性回归模型的原理入手，结合弗雷歇回归的思想，推导并提出了概率分布型响应变量的弗雷歇回归模型。同时，从理论上证明了模型估计的相合性，并用模拟实验展示了模型良好的估计效果。最后，本研究从独特的宏观视角，分析了我国居民总体收入概率分布的影响因素。

报告人简介：刘鹤飞，云南财经大学统计与数学学院教授、硕士研究生导师。云南省兴滇英才支持计划青年人才，云南省应用统计学会常务理事。研究方向为弗雷歇回归模型、贝叶斯分析、非欧统计推断。主持在研国家自然科学基金地区项目 1 项，主持完成云南省科技厅科研项目 1 项。在《Structural Equation Modeling: A Multidisciplinary Journal》、《Econometric and Statistics》、《Statistical Method in Medical Research》、《Computational Statistics and Data Analysis》、《统计研究》等学术期刊发表论文十余篇。

Robust selection of the number of change-points via FDR control

陈慧（江苏师范大学）

Abstract: Robust quantification of uncertainty regarding the number of change-points presents a significant challenge in data analysis, particularly when employing false discovery rate (FDR) control techniques. Emphasizing the detection of genuine signals while controlling false positives is crucial, especially for identifying shifts in location parameters within flexible distributions. Traditional parametric methods often exhibit sensitivity to outliers and heavy-tailed data. Addressing this limitation, a robust method accommodating diverse data structures is proposed. The approach constructs component-wise sign-based statistics. Leveraging the global symmetry inherent in these statistics enables the derivation of data-driven thresholds suitable for multiple testing scenarios. Method development occurs within the framework of U-statistics, which naturally encompasses existing cumulative sum-based procedures. Theoretical guarantees establish FDR control for the component-wise sign-based method under mild assumptions. Demonstrations of effectiveness utilize simulations with synthetic data and analyses of real data.

报告人简介: 陈慧, 江苏师范大学数学与统计学院副教授, 博士毕业于南开大学, 师从邹长亮教授。曾在南开大学从事博士后研究工作。主要研究方向包括变点分析、高维统计推断和稳健统计方法等, 相关学术成果发表于 JASA、JMVA、CSDA 等统计学期刊以及人工智能顶会 AAAI 论文集。

A novel tuning-free estimation for high-dimensional gaussian graphical models 张宇豪 (江苏师范大学)

Abstract: Gaussian graphical models have been widely used to describe conditional dependence structures among different variables, but current methods either claim to be tuning-free in the asymptotic sense — yet still require practical adjustment — or depend on computationally demanding techniques, such as cross-validation, to determine the appropriate level of regularization. In this paper, we propose a new estimation for Gaussian graphical models leveraging convoluted rank loss, which is tuning-free and computationally efficient. Furthermore, we derive efficient algorithms to solve the formulated optimization problem. In theory, we provide convergence rates for the proposed estimator with ℓ_1 penalty under various norms. In addition, we establish the strong oracle property of the proposed method with folded concave penalty. Simulation studies and an application to a human gene expression dataset are conducted to demonstrate the superiority of the proposed method, even when the Gaussian assumption is violated.

报告人简介: 张宇豪, 江苏师范大学。本科和博士毕业于南开大学, 师从王兆军、邹长亮教授。主要研究领域为高维数据统计推断, 相关成果发表在 CSDA、JSPI、JSCS、JSSC、SII 等期刊。

特邀报告 20: *Advances in Statistical Methods for Complex Genomics Data*

脊髓小脑性共济失调第 3 型的脑老化加速及其解剖学结构

陈晓平（福建理工大学）

摘要：脑龄是神经系统健康有价值的生物标记物，已被广泛用于各种脑部疾病的研究。然而，其在脊髓小脑性共济失调 3 型（spinocerebellar ataxia type 3, SCA3）中的具体特征尚不清楚。研究 SCA3 患者是否存在加速脑老化，评估其与临床和遗传学特征的关系，并确定 SCA3 脑老化的神经解剖学相关因素。我们开发了一个基于 xgboost 的模型，利用结构 MRI 的灰质特征来估计大脑年龄。

报告人简介：陈晓平，教授，博士生导师。研究领域为统计机器学习、生存分析、医学统计等。主要社会兼职有中国商业统计学会常务理事；中国现场统计研究会旅游大数据学会常务理事；中国优选法统筹法与经济数学研究会数据科学分会理事等。以第一作者或通讯作者在 Science China-Mathematics、BMC Cancer、Frontiers in Cellular and Infection Microbiology、数理统计与管理等杂志发表论文 30 多篇。主持国家自然科学基金、福建省自然科学基金、福建省卫生健康委员会重大科研专项子课题等 20 个项目。

QPDA: Quasi-Poisson Compositional Regression for Differential Abundance Analysis

周慧娟（上海财经大学）

Abstract: Differential abundance (DA) analysis for microbiome sequencing data is complicated by compositional constraints and pervasive overdispersion. LinDA addresses compositionality by working with CLR-transformed counts, but its Gaussian working model can be suboptimal for sparse count data. In this paper, we develop a count-regression alternative that directly models taxon-level compositional rates through a softmax link, motivated by profiling out sample-specific intercepts in a Poisson model. To handle extra-Poisson variability, we introduce Quasi-Poisson Differential Abundance (QPDA), which preserves the compositional mean structure while allowing a taxon-specific dispersion. QPDA is fitted by a simple iterative procedure that alternates between updating a sample-level compositional offset and fitting marginal quasi-Poisson regressions for each taxon. To resolve the inherent location non-identifiability of softmax models, we apply a sparsity-motivated bias correction (median correction) to recover interpretable effect estimates for DA testing. The resulting procedure provides a scalable, regression-based framework for DA analysis with covariate adjustment and improved robustness to overdispersion.

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Structured Factor Regression with High-Dimensional Multimodal Data

秦杏（上海对外经贸大学）

Abstract: Integrative analysis of multimodal data is crucial for characterizing complex systems. Compared with single-modality analysis, multimodal supervised learning is substantially more challenging due to the multilayered structure of multimodal data, where shared low-rank components encode cross-modality dependencies and modality-specific factors capture within-modality correlations. These intricate dependencies pose significant challenges to standard high-dimensional estimation and inference methods. Factor analysis can be employed to mitigate these issues. However, existing factor-based methods typically consider only across-modality shared or modality-specific factors, but not both, and often neglect idiosyncratic residual signals that may encode additional relevant information. In this study, we introduce an integrative framework that simultaneously models three components derived from multimodal data: structured modality-shared effects, modality-specific components, and idiosyncratic residual signals. We develop an inference procedure that systematically evaluates the contribution of each component, providing principled insights into complex multimodal dependencies and improving interpretability and predictive accuracy. Extensive numerical experiments on both synthetic and TCGA data demonstrate the superiority of the proposed approach over existing alternatives.

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BBVEM: Black-Box Variational EM Algorithm for Latent Network Learning and Composition Estimation from Microbiome Data

张书聪 (对外经济贸易大学)

Abstract: Metagenomics sequencing is routinely applied to quantify bacterial abundances in microbiome studies, with the bacterial composition being estimated from the sequencing read counts. However, the presence of zero-inflation and over-dispersion in count data can distort downstream analyses. In this article, we introduce a Zero-Inflated Logistic Normal Multinomial (ZILNM) model, which provides a flexible and efficient framework for handling zero-inflation, overdispersion, and complex dependence structures in microbiome data. To overcome the computational difficulties in high dimensions, we develop a black-box variational EM algorithm for scalable parameter estimation in the ZILNM model. The advantages of the proposed methods are illustrated through extensive simulations and gut microbiome studies.

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特邀报告 21: *Recent Developments in Financial Statistics*

A novel graph learning framework for interpretable and imbalance financial fraud detection

胡建明（海南大学）

Abstract: Financial fraud poses a severe threat to modern financial systems, making accurate detection crucial. Detecting financial fraud remains highly challenging in real-world systems due to the extreme scarcity of fraudulent activities and adversarial behaviors such as transaction splitting and structural camouflage. These factors lead to class imbalance and graph noise, which pose critical obstacles to the deployment of reliable artificial intelligence-based solutions in high-stakes financial applications. Many existing methods lack interpretability, further restricting their practical applicability. To address these challenges, we propose the imbalance-aware interpretable financial fraud detector, a novel spectral graph learning framework tailored for imbalanced and adversarial financial scenarios. The framework integrates a learnable multi-order, node adaptive spectral filter that dynamically modulates frequency responses, enabling the model to detect subtle local perturbations while preserving global interpretability. To better represent minority-class nodes, a dynamic neighborhood sampling strategy adaptively reweights neighboring information based on label distribution, structural centrality, and feature relevance. Additionally, we introduce a clustering-aware, self-supervised contrastive learning module that enhances the robustness and discriminability of node embeddings by aligning users with similar behavioral patterns. Experiments on three public financial fraud datasets demonstrate that this model outperforms 12 advanced models and provides multiple built-in interpretability forms, including spectral response analysis, node feature importance, and spatial-spectral theoretical consistency.

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Adaptive sparse regression with dynamic covariance for portfolio optimization

黄磊（西南交通大学）

Abstract: The mean-variance framework is a cornerstone of modern portfolio theory; however, its implementation in high-dimensional settings is challenged by the difficulty of accurately estimating large covariance matrices. Sparse regression approaches, notably the maximum-Sharpe-ratio estimated and sparse regression method (MAXSER), provide an alternative formulation but rely on the assumption of a constant covariance structure, which fails to account for time-varying dependence. To address this limitation, we integrate the MAXSER framework with a Dynamic Conditional Correlation GARCH (DCC-GARCH) model, incorporating one-step-ahead covariance forecasts into the regression-based portfolio construction. The proposed DG-MAXSER method accommodates time-varying volatility in a high-dimensional setting. We establish the asymptotic consistency of the dynamic covariance forecasts, portfolio weights, and implied portfolio moments, and characterize their convergence rates. Simulation studies and empirical analyses demonstrate that DG-MAXSER outperforms the classical mean-variance model and the standard MAXSER approach in terms of Sharpe ratio and risk control. These findings highlight the effectiveness of combining dynamic covariance modeling with sparse regression for large-scale portfolio optimization.

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A Variation-Ratio Test for Volatility Jumps Using Noisy High Frequency Data

刘广应（南京审计大学）

Abstract: This paper proposes a novel variation-ratio test for the presence of volatility jumps using high frequency data with microstructure noise. Under the null hypothesis that the volatility process is a continuous semi-martingale, the test statistic is asymptotically normal. Under the alternative hypothesis that the volatility process jumps, the test statistic diverges at a rate $(n^{1/4-\iota})$ for arbitrarily small $\iota > 0$ faster than the best rate close to $n^{1/8}$ in the semi-martingale setup available in the literature. Simulation results corroborate our theoretical findings. Empirical results show that our test fails to reject the null hypothesis for most of the ninety US stocks studied.

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Fixed-k Inference for Spot R-squared in High-Frequency Factor Models

朱海斌 (暨南大学)

Abstract: We introduce a novel econometric framework to conduct nonparametric inference on the instantaneous coefficient of determination, the spot R-squared, in continuous time factor models. Traditional high-frequency estimators require the local estimation window to expand. While this achieves asymptotic normality, it smooths over short-lived market events and relies on unstable nuisance parameters. To capture truly instantaneous dynamics, we develop a fixed-k approach that maintains a finite, constant number of local observations. In this setting, we map the local regression to a finite-sample Gaussian limit experiment, showing that the spot R-squared estimator converges to a hierarchical noncentral F distribution. This limit theory yields exact local inference that is completely free of nuisance parameters and asymptotically Uniformly Most Powerful Invariant (UMPI). We also establish uniform confidence bands for the entire spot R-squared trajectory using extreme value theory. Applying this framework to a high frequency Regression Discontinuity Design (RDD), we document abrupt, market-wide algorithmic herding triggered directly by FOMC announcements

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特邀报告 22: *Advances in Modern Statistical Inference*

Power Enhancement for Test of Multivariate Independence

周叶青 (同济大学)

Abstract: Testing for independence between two random vectors is a fundamental problem in statistics. It is observed from empirical studies that many existing omnibus consistent tests may not perform well for some strongly nonmonotonic and nonlinear dependence. To get insights into this issue, this paper reveals that a class of existing

multivariate independence tests may lose their power due to cancellation of positive and negative terms in dependence metrics. The cancellation leads to the sum of these terms very close to zero. Motivated by this finding, we propose a class of consistent metrics indexed by a positive integer γ to characterize independence. We further prove that the metrics with even or infinity γ can effectively avoid the cancellation, and have better powers under the alternatives in which two mean differences offset each other. In practice, it is desirable to target at a wide range of dependence scenarios. Thus, we further advocate to combine the p-values of test statistics with different γ 's. The advantages of the newly proposed tests are illustrated by numerical studies.

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Labels or Preferences? Budget-Constrained Learning with Human Judgments over AI-Generated Outputs

吴瑞佳 (上海交通大学)

Abstract: The increasing reliance on human preference feedback to judge AI-generated pseudo labels has created a pressing need for principled, budget-conscious data acquisition strategies. We address the crucial question of how to optimally allocate a fixed annotation budget between ground-truth labels and pairwise preferences in AI. Our solution, grounded in semi-parametric inference, casts the budget allocation problem as a monotone missing data framework. Building on this formulation, we introduce Preference-Calibrated Active Learning (PCAL), a novel method that learns the optimal data acquisition strategy and develops a statistically efficient estimator for functionals of the data distribution. Theoretically, we prove the asymptotic optimality of our PCAL estimator and establish a key robustness guarantee that ensures robust performance even with poorly estimated nuisance models. Our flexible framework applies to a general class of problems, by directly optimizing the estimator's variance instead of requiring a closed-form solution. This work provides a principled and statistically efficient approach for budget-constrained learning in modern AI.

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Shape-Adaptive Conditional Calibration for Conformal Prediction via Minimax Optimization

包亚杰（南开大学）

Abstract: Achieving valid conditional coverage in conformal prediction is challenging due to the theoretical difficulty of satisfying pointwise constraints in finite samples. Building upon the characterization of conditional coverage through marginal moment restrictions, we introduce Minimax Optimization Predictive Inference (MOPI), a framework that generalizes prior work by optimizing over a flexible class of set-valued mappings during the calibration phase, rather than simply calibrating a fixed sublevel set. This minimax formulation effectively circumvents the structural constraints of predefined score functions, achieving superior shape adaptivity while maintaining a principled connection to the minimization of mean squared coverage error. Theoretically, we provide non-asymptotic oracle inequalities and show that the convergence rate of the coverage error attains the optimal order under regular conditions. The MOPI also enables valid inference conditional on sensitive attributes that are available during calibration but unobserved at test time. Empirical results on complex, non-standard conditional distributions demonstrate that MOPI produces more efficient prediction sets than existing baselines.

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Generalized Boundary FDR Control under Arbitrary Dependence: An Approach on Closure Principle

张熠凡（上海交通大学）

Abstract: False discovery rate (FDR) is a cornerstone of modern multiple testing. However, it often fails to guarantee the reliability of “marginal” discoveries that lie at the boundary of the rejection set, which are often crucial in high-precision applications. While recent works (Soloff et al., 2024; Xiang et al., 2025) introduced the boundary false discovery rate (bFDR) to control the error probability at the marginal discovery, their method relies on restrictive assumptions such as independence or specific prior distributions. In this paper, we first propose -bFDR, a novel generalization that controls the error probability of the least significant discoveries. We then provide a systematic investigation into the theoretical relationship between -bFDR and existing error metrics. Furthermore, building upon the closure principle, we develop Domino, a unified framework that guarantees -bFDR control under arbitrary dependence, applicable for both p-values and e-values. We prove the theoretical validity of the proposed Domino algorithm and demonstrate through extensive numerical experiments that it consistently achieves rigorous -bFDR control while identifying trustworthy marginal discoveries. Analyses of real data

reveal that -bFDR control yields higher-quality rejection sets with greater practical significance.

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特邀报告 23: *Frontiers in Modern Statistical Learning*

Online Sparse Regression with Expanding Observables

杨莹 (复旦大学)

Abstract: Online high-dimensional regression has gained increasing attention in recent years, yet existing methods typically assume that all candidate features, including important ones, are observed from the outset of data collection. This assumption is often violated in real-world scenarios, where new variables become available gradually as data accumulate. To address this gap, we introduce a novel framework, Recurrent Adaptive Variable Selection (RAVAS), for online regression with expanding observability. RAVAS employs a recurrent procedure that dynamically updates feature selection as both the sample size and the observable feature set grow. The algorithm is designed to be computationally efficient and memory-light, relying only on low-dimensional sufficient statistics that are updated online. A key advantage of the method lies in its ability to detect and incorporate important variables that emerge later, thereby mitigating the effect of early-stage missingness. We establish theoretical guarantees on model selection, estimation error, and feature coverage, and develop an adaptive online tuning strategy. Extensive simulations and real-world experiments verify the effectiveness of RAVAS for high-dimensional streaming data.

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Kernel Ridge Regression with Predicted Feature Inputs

贺莘 (上海财经大学)

Abstract: Kernel methods, particularly kernel ridge regression (KRR), are time-proven, powerful nonparametric regression techniques known for their rich capacity, analytical simplicity, and computational tractability. The analysis of their predictive performance has received continuous attention for more than two decades. However, in many modern regression problems where the feature inputs used in KRR cannot be directly observed and must instead be inferred from other measurements, the theoretical foundations of KRR remain largely unexplored. In this talk, we introduce a novel approach for analyzing KRR with latent feature inputs, and we also apply our general results to some applications. Our theoretical findings are further

corroborated by simulation studies and real-data analyses using pretrained LLM embeddings for the downstream prediction task.

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Nonparametric-Based Fairness Auditing

曾宪立 (厦门大学)

Abstract: Machine learning models used in high-stakes settings, such as recidivism prediction and hiring, may exhibit substantial disparities across sensitive groups. Fairness auditing seeks to address this issue through two main tasks: certification, which tests whether a model satisfies a fairness criterion, and flagging, which identifies subpopulations experiencing unfair treatment. Existing methods often rely on restrictive assumptions, are computationally expensive, or mainly focus on discrete protected attributes. In this talk, I will present two statistical frameworks for fairness auditing. The first approach is based on empirical likelihood. It is computationally efficient, supported by asymptotic theory for valid inference, and enables both fairness certification and subgroup discovery. The second approach is designed for settings with continuous protected attributes, where standard methods may fail to identify unfair intervals. This framework applies nonparametric techniques to estimate disparity as a function of the protected attribute, based on which we design a test with valid size control. Applications to the COMPAS dataset show that these methods can reveal both intersectional and age-related disparities that may be missed by standard approaches.

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Learning Sparse Support under Differential Privacy: Minimax Rates and Adaptive Algorithms

顾嘉 (浙江大学)

Abstract: Support recovery, or variable selection, is a fundamental problem in statistics and machine learning. Although minimax optimal procedures have been developed in classical contexts, modern data analysis has witnessed an increasing demand for privacy protection before releasing statistical results, which introduces new complexities to the classical problem. This paper establishes minimax optimal

rates of the minimal signal strength for differentially private support recovery across representative sparse high-dimensional models: the Gaussian location model, linear regression with independent design, and notably, linear regression with the general sub-Gaussian design. For each model, we characterize the sensitivity of the marginal statistics used for variable selection and establish minimax rates for the signal strength required to achieve exact support recovery with high probability. We then propose computationally efficient, differentially private algorithms that attain these optimal rates up to logarithmic factors. In addition, we develop rate-optimal adaptive algorithms that do not require prior knowledge of the sparsity level, which is typically unknown in practice. The empirical performance of the proposed methods is demonstrated through simulation studies and two real-data applications.

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特邀报告 24: *Advances in Statistical Methods for High-dimensional Graphs and Survival Analysis*

Likelihood Ratio Tests for Poisson Graph with Directed Acyclicity Constraints

刘鑫(上海财经大学)

Abstract: Count-valued data are pervasive in modern applications, such as sequencing reads, incident tallies, and traffic flows, yet most procedures for learning directed acyclic graphs (DAGs) remain tailored to Gaussian or otherwise continuous measurements. We develop a Poisson DAG framework that models conditional intensities via Poisson regressions and enforces acyclicity through a tractable non-convex constraint. Building on this estimator, we introduce two likelihood-ratio tests: a linkage test for the presence of directed edges and a pathway test for sets of edges. We derive the sampling distributions of the proposed statistics under both the null and alternative hypotheses. When the number of edges tested is fixed, the statistic is asymptotically χ^2 ; when the dimension grows, a normal approximation applies. We also present an alternating-direction algorithm with closed-form updates that scales to high-dimensional graphs. In simulations across diverse graph topologies and signal regimes, the procedure recovers directions accurately and controls type-I error. Analyses of real count data further demonstrate the ability of the proposed

method to uncover interpretable linkages and pathways. Together, these contributions provide a principled and practical toolkit for causal discovery with count data.

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Function-Valued Auxiliary Information Transfer in Survival Analysis

丁杰 (大连海事大学)

Abstract: Transfer learning is promising in enhancing statistical performance of target tasks by fusing related auxiliary information. We address the challenge of fitting survival models with scarce target time-to-event data in the presence of auxiliary information that is function-valued, as opposed to Euclidean statistics or individual-level records from sources that dominate existing literature. A novel methodology that transfers function-valued auxiliary information, like the widespread model-free estimators for survival functions across multiple subgroups, is developed to improve the statistical inference on target parameters of interest. The bridge between target and auxiliary information is constructed through asymptotically vanishing elements, which are further linked to the target-only estimator via data-driven sieve-approximated leveraging factors. Our asymptotic analysis clarifies when and how significantly auxiliary information improves target estimation, and explicitly demonstrates that our estimator achieves greater asymptotic efficiency than conventional methods. Extensive simulations support these findings and a case study highlights the practical feasibility.

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Quantile regression for censored data with a cure fraction

韩博 (云南大学)

Abstract: Quantile regression is emerging as a valuable statistical tool for exploring complete information on the exposure-outcome relationship. This paper investigates a novel inference procedure for quantile regression models to analyze survival data with a cure fraction. A twocomponent mixture cure model is used, in which the cure fraction follows a logistic model and the uncured individuals follow a linear quantile regression model. Our main interest lies in the estimation of regression coefficients in

the latter model. This is achieved by minimizing a loss function that has three building blocks: (1) the check function, commonly used in quantile regression, (2) a first weight function that redistributes the weight of censored observations, and (3) a second weight function that accounts for the latent cure status. The minimization of this loss function leads to a computationally simple estimation procedure for quantile regression parameters. The approach of dimension reduction is employed to circumvent the curse of dimensionality. Asymptotic properties of the resulting estimators are established, including the consistency and weak convergence. Simulation studies, including homogeneous and heterogeneous error cases, demonstrate the advantageous empirical performance of the proposed method. The analysis of a breast cancer study illustrates the practical utility of our cure rate quantile regression.

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Variational Bayesian Estimation for Joint Models of Longitudinal and Interval-Censored Failure Time Data with Random Change-Points

易凤婷 (云南大学)

Abstract: In clinical follow-up studies, survival outcomes are often interval-censored, and covariate effects may exhibit abrupt changes across latent thresholds, reflecting heterogeneous disease progression. These features pose substantial challenges for statistical inference due to the intractable likelihood induced by interval censoring and the nonregularity introduced by random change-points. We develop a variational Bayesian approach for estimating random change-points in covariate effects within a joint modeling framework for longitudinal and survival data. The proposed method accommodates interval-censored event times and captures subject-specific change-points in the survival component while accounting for dependence through shared random effects. To address the resulting non-conjugacy, we consider both a non-conjugate variational Laplace approximation and a reparameterization-based gradient estimator for efficient posterior approximation. Simulation studies demonstrate that the proposed methods yield accurate estimation under a range of sample sizes and censoring levels, with the gradient-based approach offering notable computational advantages. An application to Alzheimer's disease data illustrates the ability to identify individualized change-points in the effect of APOE4 on disease progression.

报告人简介: 易凤婷, 云南大学数学与统计学院讲师, 主要从事纵向数据分析、生存数据分析、大规模数据分析与网络数据分析等方面的研究。长期聚焦复杂数

据结构下的统计建模与推断问题，在纵向数据与区间删失生存数据联合建模、时间相依协变量回归分析以及差分隐私网络模型估计等方向取得了一系列研究成果。相关研究发表于 *The Annals of Statistics*、*Biometrics*、*Computational Statistics and Data Analysis* 等国际统计学重要期刊。她先后主持国家自然科学基金青年项目、云南省基础研究专项青年项目、中国博士后科学基金项目等多项科研课题。2023 年入选云南省“兴滇英才支持计划”青年人才，并担任中国现场统计研究会经济与金融统计分会理事、全国工业统计学教学研究会青年统计学家协会理事。

特邀报告 25: *Advances in Statistical Causal Inference*

Statistical Inference with Mixed-Effect Model for Covariate-Adaptive Randomized Experiments

刘阳（中国人民大学）

Abstract: Recent clinical studies increasingly involve a long factor with many levels, e.g., investigation sites, resulting in a large number of strata that must be accounted for either through design or subsequent analysis. This complication has raised concerns by the U.S. Food and Drug Administration (FDA, 2023) regarding the adequacy of standard statistical methods, whose performance may deteriorate, and their properties become unclear when the number of strata is relatively large. In this work, we offer a first-time rigorous solution by employing mixed-effect models in covariate-adaptive randomized experiments. We show that the mixed-effect estimate achieves lower variance in treatment effect estimation than its fixed-effect counterpart in the presence of the long factor with many levels. This variance reduction is attributable to marginal imbalances induced by the randomization procedure, suggesting that designs promoting finer covariate balance lead to more efficient inference and increased statistical power. Furthermore, we demonstrate that, as the sample size grows, the mixed- and fixed-effect estimators become asymptotically equivalent. Our theoretical findings are validated through simulations and a clinical trial case study, and provide new insights on the design and analysis of clinical trials in the presence of a large number of strata.

报告人简介: 刘阳，中国人民大学统计与大数据研究院助理教授，于 2022 年获乔治华盛顿大学统计学博士学位，随后加入中国人民大学统计与大数据研究院。刘阳博士的研究兴趣为临床试验与 A/B 试验中的自适应试验设计与数据分析，目前已有多篇论文发表于 *The Annals of Statistics*, *Journal of American Statistical Association*, *Journal of Machine Learning Research*, *Biometrics*, 以及 *AISTAT* 等国际一流学术刊物与会议上。

Integrating Heterogeneous Information in Randomized Experiments: A Unified Calibration Framework

马维（中国人民大学）

Abstract: In modern randomized experiments, large-scale data collection increasingly yields rich baseline covariates and auxiliary information from multiple sources. Such information offers opportunities for more precise treatment effect estimation, but it also raises the challenge of integrating heterogeneous information coherently without compromising validity. Covariate-adaptive randomization (CAR) is widely used to improve covariate balance at the design stage, but it typically balances only a small set of covariates used to form strata, making covariate adjustment at the analysis stage essential for more efficient estimation of treatment effects. Beyond standard covariate adjustment, it is often desirable to incorporate auxiliary information, including cross-stratum information, predictions from various machine learning models, and external data from historical trials or real-world sources. While this auxiliary information is widely available, existing covariate adjustment methods under CAR primarily exploit within-stratum covariates and do not provide a coherent mechanism for integrating it. We propose a unified calibration framework that integrates such information through an information proxy vector and calibration weights defined by a convex optimization problem. The resulting estimator recovers many recent covariate adjustment procedures as special cases while providing a systematic mechanism for both internal and external information borrowing within a single framework. We establish large-sample validity and a no-harm efficiency guarantee, showing that incorporating additional information sources cannot increase asymptotic variance, and we extend the theory to settings in which both the number of strata and the number of information sources grow with the sample size.

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Quadruply robust methods for causal mediation analysis

张宇谦 (中国人民大学)

Abstract: Estimating natural effects is a core task in causal mediation analysis. Existing triply robust (TR) frameworks (Tchetgen Tchetgen & Shpitser 2012) and their extensions have been developed to estimate the natural effects. In this work, we introduce a new quadruply robust (QR) framework that enlarges the model class for unbiased identification. We study two modeling strategies. The first is a nonparametric modeling approach, under which we propose a general QR estimator that supports the use of machine learning methods for nuisance estimation. We also

study high-dimensional settings, where the dimensions of covariates and mediators may both be large. In these settings, we adopt a parametric modeling strategy and develop a model quadruply robust (MQR) estimator to limit the impact of model misspecification. Simulation studies and a real data application demonstrate the finite-sample performance of the proposed methods.

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Higher-Order Debiased Estimators for General Treatment Models

张政（中国人民大学）

Abstract: We have witnessed tremendous progress in developing the foundation for econometrics and causal inference in the past decades. The most popular paradigm in the current literature is the classical (first-order) semiparametric theory, in which a key building block is the (first-order) influence functions. However, it is now well known that estimators based on influence functions can be sub-optimal in terms of convergence rates in various settings. To address this issue, higher-order influence functions (HOIF) are developed, generalizing the classical semiparametric theory. However, most existing results in this regard focus on treatment effect parameters in explicit forms, such as average treatment effects (ATE). In applications, economists are often confronted with tasks of inferring more complex parameters, such as quantile treatment effects (QTE) or effects of complicated treatment regimes/policy. These more complex parameters can often only be implicitly defined as the solution to nonlinear estimating equations, which correspond to M/Z -estimation problems. Our current understanding of these problems is limited to the classical semiparametric theory. Given the foundational role of HOIF for estimating explicit parameters such as ATE, a modest step toward enriching the statistical foundation of econometrics and causal inference is to develop the corresponding higher-order estimators for those more complex parameters. To this end, we consider parameters of a class of non-separable structural models in the econometrics literature and develop a class of higher-order estimators for the target parameters. Statistical properties of these higher-order estimators are derived by leveraging recent advances in U -processes theory. Our proposed higher-order estimators relax complexity-reducing assumptions, quantified via Ψ -smoothness, on the nuisance parameters, compared to existing estimators for many important parameters in this class, including QTE and quantile dose-response functions. Numerical experiments, including simulation

studies and a real data analysis, are also conducted to corroborate our theoretical claims and illustrate how higher-order estimators can be used in practice.

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特邀报告 26: *Modern Statistical Methods in Time Series Analysis, Experimental Design, and Non-Euclidean Data*

Z-valued smooth transition GARCH models: Specification and testing

朱复康 (吉林大学)

Abstract: We introduce a new class of nonlinear models known as the Z-valued smooth transition GARCH model, designed to accommodate Z-valued time series that display asymmetric, nonlinear and highly persistent volatility. The article outlines the maximum likelihood estimation procedure and establishes its consistency and asymptotic normality of the estimated parameters. Three types of tests are studied, including sup-type linearity test, score-based goodness-of-fit test, and residual-based mixed portmanteau diagnostic checking test. The asymptotic properties of these three test statistics are established. To address the computationally complex problems of estimation, the parameterization of the smooth transition function and the optimization algorithm for the estimation procedure in numerical simulations are discussed. The effectiveness of the tests is demonstrated through numerical simulations, and crime and exchange rate datasets are analyzed to showcase the superior performance of the proposed model.

报告人简介: 朱复康, 吉林大学数学学院教授、博士生导师。2008 年博士毕业, 2013 年破格晋升教授。主要从事时间序列分析和金融统计的研究, 已经在 Journal of the American Statistical Association、Annals of Applied Statistics、Journal of Business & Economic Statistics、Statistica Sinica、Scandinavian Journal of Statistics、Journal of Time Series Analysis、中国科学-数学等期刊上发表论文多篇, 主持国家自然科学基金面上项目 3 项和青年基金 1 项。曾获教育部自然科学奖二等奖、吉林省科学技术奖二等奖等奖励, 入选吉林省享受省政府津贴专家、长春市有突出贡献专家, 连续三年(2023-2025)入选美国斯坦福大学发布的全球前 2% 顶尖科学家榜单, 获 Journal of Time Series Analysis 期刊杰出作者奖。现任教育部统计学类专业教学指导委员会委员, 吉林省现场统计研究会副理事长, 中国现场统计研究会、全国工业统计学教学研究会、中国数学会概率统计分会等学会的理事或常务理事。现任 SCI 期刊 Statistical Papers、Journal of Statistical Computation and Simulation、Methodology and Computing in Applied Probability 的副主编, 是 JASA、

JRSSB、JBES、AoAS 等多个 SCI 期刊的匿名审稿人。指导的研究生 1 人获得吉林省优秀博士学位论文、3 人获得吉林省优秀硕士学位论文。

正交表的构造及应用 庞善起（河南师范大学）

摘要：正交表在统计学中主要用于各种试验设计问题，这就意味着它们在人类研究的各个领域都非常重要。而正交表的构造被称为 21 世纪极具挑战性的公开问题，在实际应用中，往往还需要具有某些性质或者特定结构的正交表即特殊正交表。本报告主要介绍高强度普通正交表和特殊正交表的构造方法例如正交分划方法和乘法等。

报告人简介：庞善起，现任河南师范大学二级教授，博士生导师，统计学一级学科博士点学科带头人；中国现场统计研究会常务理事、多元分析应用专业委员会副理事长和试验设计分会常务理事；河南省密码学重点学科带头人。主要从事试验设计的理论和应用研究，我们提出了一些正交表的构造方法，构造的大量新的正交表特别是混合正交表出现在南开大学和美国 ATT 和 SAS 网站上。已在 AOS, JASA, Nature 子刊 npj Quantum Information 等 SCI 及国内外期刊上发表论文 100 余篇，一些研究成果被美国著名统计学家 Hedayat, Sloane, Stufken 的专著全文引用，主持国家自然科学基金面上项目 5 项。

因子模型的设定误差及其改进 林海明（广东财经大学）

摘要：因子分析(Factor Analysis, FA)是应用广泛的降维方法，但经典因子模型(Factor Model, FM)存在固有缺陷，鉴此，本研究旨在：1)识别 FM 的设定误差；2)修正 FM 并构建改进的因子最小误差模型(Error-Minimized Factor Model, EMFM)。研究方法：标准化主成分变换，多变量分块相关性条件。研究发现：1)FM 的三类设定误差：含结构过度的特殊因子，含可忽略的公共因子，缺失误差项，导致 FM 的参数估计与假设检验失效；2)EMFM 及其显式解，因子可识别。研究创新：EMFM 满足 Johnson & Wichern 所提 FA 最好方法的条件，剖析了 EMFM 的五点创新，给出了 FM 与 EMFM 的关系与本质区别，回应了已有文献的质疑，并通过实例表明了 EMFM 的优点。

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第一作者身份发表论文《主成分分析综合评价应该注意的问题》，迄今引用达 1034 次以上，现列权威期刊《统计研究》第 6 名。

Non-Euclidean object filtering for large-scale discriminant analysis with application to abnormal brain connectivity detection

陈欣（南方科技大学）

Abstract: Classification with features represented by random objects in metric spaces has received increasing attention. However, the complexity of such non-Euclidean data often limits existing methods to handling only a few features, restricting their practical applicability. To address this, we propose a data-adaptive filtering procedure that uses a Kolmogorov--Smirnov type statistic defined on the metric space to identify informative features from a large collection of random objects. The proposed method is applicable to data in general metric spaces with binary labels and is highly flexible. It is model-free, in the sense that it does not depend on any specific classifier class. Theoretically, it guarantees strong selective consistency. In the numerical study, when combined with appropriate metrics such as the Wasserstein metric, it demonstrates superior performance compared to Euclidean benchmarks across various settings. We further conduct a complete study on autism data to identify significant brain regions associated with the disease. Our method reveals distinct interaction patterns among brain regions in individuals with and without autism by filtering hundreds of thousands of covariance matrices representing diverse brain connectivities.

报告人简介：陈欣博士，南方科技大学统计与数据科学系副教授、博士生导师。长期从事统计学理论与前沿交叉应用研究，主要研究方向包括高维数据降维、非欧复杂数据分析，生物统计，曾先后在美国雪城大学、新加坡国立大学从事教学与科研工作，在 *Annals of Statistics*、*Biometrika*、*JASA* 等国际顶级统计期刊发表多篇学术论文。曾任生物统计领域权威期刊 *Biometrics* 副主编，现任 JCR 一区期刊 *Statistics & Computing* 副主编。

特邀报告 27: *Advances Methods on Complex Data Analysis*

Data Synchronization at High Frequencies

吴彬（中国科学技术大学）

Abstract: Asynchronous trading in high-frequency financial markets introduces significant biases into econometric analysis, distorting risk estimates and leading to suboptimal portfolio decisions. Existing synchronization methods, such as the previous-tick approach, suffer from information loss and create artificial price staleness. We introduce a novel framework that recasts the data synchronization challenge as a constrained matrix completion problem. Our approach recovers the potential matrix of high-frequency price increments by minimizing its nuclear norm—

capturing the underlying low-rank factor structure — subject to a large-scale linear system derived from observed, asynchronous price changes. Theoretically, we prove the existence and uniqueness of our estimator and establish its convergence rate. A key theoretical insight is that our method accurately and robustly leverages information from both frequently and infrequently traded assets, overcoming a critical difficulty of efficiency loss in traditional methods. Numerically, using a large panel of S&P 500 stocks and extensive simulations, we demonstrate that our method substantially outperforms established benchmarks. It not only achieves significantly lower synchronization errors, but also corrects the bias in systematic risk estimates (i.e., eigenvalues) and the estimate of betas caused by stale prices. Crucially, portfolios constructed using our synchronized data yield consistently and economically significant higher out-of-sample Sharpe ratios. Our framework provides a powerful tool for uncovering the true dynamics of asset prices, with direct implications for high-frequency risk management, algorithmic trading, and econometric inference.

报告人简介: 吴彬, 中国科学技术大学特任副研究员, 研究方向为高频数据分析、因子模型、金融资产定价、生成式扩散模型、因果推断、大规模数据填补等, 相关论文成果发表在 JASA 等期刊上, 主持基金委青年基金 C 类、省青年基金 C 类等。

Stable Semi-Distance Covariance for Independence Testing: From Low to High Dimensions

邹丰 (中南财经政法大学)

Abstract: This paper introduces a Stable Semi-Distance Covariance (SSDCov) index to test the independence between a continuous random vector $\mathbf{x} \in \mathbb{R}^p$ ($p \geq 1$) and a categorical variable Y . The SSDCov index is defined as the weighted integral of the squared difference between the conditional characteristic function of $\mathbf{x}$ given Y and its marginal counterpart, utilizing the probability density function of a symmetric α -stable distribution as the weight. Theoretically, SSDCov provides a generalized metric family that encompasses the existing semi-distance covariance (SDCov) as an asymptotic special case (when the bandwidth parameter $\sigma \rightarrow +\infty$) while significantly relaxing finite moment assumptions. A key property is that $\mathrm{SSDCov}(\mathbf{x}, Y) \geq 0$, with equality holding if and only if $\mathbf{x}$ and Y are independent. We establish the asymptotic distributions of the proposed test statistic under both the null and alternative hypotheses across two distinct regimes: the classical low-dimensional setting ($n \rightarrow \infty$ with fixed p) and the challenging high-dimensional setting ($p \rightarrow \infty$ with fixed n). To optimize testing performance, we further propose a data-driven bandwidth selection method via the

median heuristic and establish its theoretical validity. Simulations demonstrate the robust power and stability of the proposed test over existing methods, especially for heavy-tailed data. Finally, the practical utility of our method is illustrated through a real data application.

报告人简介: 邹丰, 中南财经政法大学准聘副教授, 主要从事非参数估计、测量误差以及高维检验等领域的研究, 相关论文发表在 SCM, AIMS, SPL, 中国科学(数学)等统计期刊, 主持青年基金、中国博士后面项目等项目。

Combining pre-trained models via localized model averaging

贺百花 (中国科学技术大学)

Abstract: Many pre-trained models (PTMs) are available in modern applications. Because different PTMs are often trained on different datasets, their performances can vary substantially for different new tasks, and the ranking of the candidates may depend heavily on the input. Motivated by this, we propose a localized model averaging method with weights modeled as functions of the covariates, making it substantially more versatile than existing model averaging methods. This formulation allows the model averaging procedure to adaptively capture the varying relative advantages of different PTMs across heterogeneous contexts. Specifically, we learn flexible local weights under a general loss framework that accommodates a broad class of prediction tasks. We further establish the asymptotic optimality of the proposed method for both in-sample and out-of-sample risks, as well as the consistency of the estimated weights. Extensive numerical experiments further demonstrate the effectiveness of the proposed method.

报告人简介: 贺百花, 中国科学技术大学特任副教授, 主要从事模型平均以及多源域学习等领域的研究, 相关论文发表在 JASA, JMLR, IJOC 等统计和机器学习期刊, 主持青年基金以及参与国家自然科学基金重大项目和科技部重点研发计划, 入选省部级人才计划支持。

Minimax Optimality of Hybrid Orthogonal-Uniform Designs

许少华 (中南财经政法大学)

Abstract: Misspecified linear models are ubiquitous in scientific and engineering applications. Existing random minimax designs (RMDs), which are constructed based on Monte Carlo sampling, tend to yield relatively large prediction errors under model misspecification. To mitigate this issue, we propose a novel class of robust designs, namely quasi-random minimax designs (QRMDs), by embedding quasi-Monte Carlo techniques into the minimax design framework. Specifically, for multiple linear regression without interactions defined over $[0, 1]^d$, the resulting QRMDs possess a hybrid orthogonal-uniform structure, and exact n -point QRMDs are further constructed via the inverse Rosenblatt transformation. From the Neyman - Pearson

perspective, we establish two adaptive criteria to determine the optimal mixing weight, enabling a flexible trade-off between model bias and estimation variance. Both theoretical analysis and numerical simulations verify that QRMDs uniformly dominate classical RMDs in terms of prediction accuracy, and such performance superiority becomes increasingly prominent as the degree of model misspecification aggravates.

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特邀报告 28: *Statistical Methods for Economics: Modeling and Application*

Research on LSTM-A2C Intelligent Futures Pairs Trading Model Integrating Price Spread Features

孙景云（兰州财经大学）

Abstract: Pairs trading, a market-neutral statistical arbitrage strategy, faces limitations in traditional approaches, including subjective pair selection and rigid trading rules. This paper develops an intelligent futures pairs trading framework integrating system clustering, deep learning prediction, and reinforcement learning (RL) decision-making. First, we propose a novel Dynamic Cointegration (DC) distance measure that combines Dynamic Time Warping (DTW) for short-term similarity with cointegration testing for long-term stability, and employs system clustering algorithm for intelligent pair selection. Second, a multi-dimensional technical indicator system covering trend, volatility, and volume-price metrics is built and fused with Long Short-Term Memory (LSTM) networks to forecast price spreads. Finally, an RL module based on the Advantage Actor-Critic (A2C) algorithm incorporates spread predictions into the state space and employs a diversified reward function to learn optimal trading strategies. Empirical analysis results indicate: (1) DC clustering effectively identifies stable pairs like rebar-hot-rolled coil and coking coal-coke; (2) The LSTM-A2C model with spread features yields strong risk-adjusted returns; (3) It outperforms baseline A2C and traditional 1.5 SD strategies in profitability, robustness, and efficiency.

报告人简介：孙景云，兰州财经大学统计学专业博士生导师，教授、科技处副处长，甘肃省飞天学者特聘教授，目前担任中国现场统计研究会大数据统计分会常务理事，中国优选法统筹法与经济数学研究会量化金融与保险分会理事。在国内外重要期刊发表论文 30 余篇，先后主持 2 项国家自然科学基金项目，2 项甘肃省自然科学基金项目，1 项甘肃省教育厅项目及甘肃省陇原青年创新创业项目等多项科研项目。

Research on the balanced, coordinated and sustainable development of China manufacturing industry

朱威伟（甘肃政法大学）

Abstract: China's manufacturing industry faces the multiple goals of balanced, coordinated and sustainable development. This paper clarifies the connotation of balanced, coordinated and sustainable development of the manufacturing industry from regional structure, industrial structure and development structure. The level of balanced, coordinated and sustainable development of the manufacturing industry is measured using various methods such as index construction model, coupled coordination model and objective assignment method. The temporal and spatial evolution characteristics of the balanced, coordinated and sustainable development of the manufacturing industry are analysed. The following conclusions were obtained: the overall level of manufacturing equilibrium in the east is high, and the level of manufacturing equilibrium in the west and northeast is low. Therefore, it is necessary to promote the level of manufacturing development in the central and western regions through industrial transfer and other means. The overall coordination level of manufacturing industry shows a clear upward trend. The coordination level of manufacturing industry in the east ranks first among the four regions, and the coordination level of manufacturing industry in the west has made the most obvious progress. The overall level of sustainable development of the manufacturing industry is on an upward trend, with the highest level of sustainable development of the manufacturing industry in the east and a relatively low level of sustainable development in the west. There is a need to achieve sustainable development of the manufacturing industry by promoting the integration and development of the digital economy and the manufacturing industry.

报告人简介: 朱威伟，男，甘肃平凉人，甘肃政法大学副教授，统计学博士。主要研究方向为空间计量经济学等。曾在《软科学》《贵州社会科学》《PLOS ONE》《Heliyon》等期刊发表多篇论文。参与国家社科基金一般项目、甘肃省软科学项目、甘肃省哲学社会科学规划项目等多项课题，主持省级科研项目 1 项。

Double robust small area estimation with γ -divergence

王朝旭（青海师范大学）

Abstract: Robustness against model misspecification and robustness against outliers are two important aspects of robust estimation in small area estimation (SAE). In this paper, we propose a SAE method that is doubly robust. The proposed method combines the observed best prediction (OBP) approach which is more robust to model misspecification than the empirical best linear unbiased prediction (EBLUP), with the γ -divergence approach which is more robust to outliers than EBLUP. The double robust predictor based on gamma divergence(γ -DRP) has good statistical properties

under both normal and normal mixture sampling error structures for both area-level and unit-level models. We also study how to construct small area confidence intervals using the γ -DRP approach, where an optimal selection method for the tuning parameter in γ -divergence is obtained by minimizing the length of the interval. A theoretical justification is provided for the proposed methods. Extensive simulation studies are conducted to compare the robust performance of the proposed γ -DRP with existing ones including EBLUP, OBP, robustified versions of EBLUP and DPD-based predictors. Applications to real data are also presented.

报告人简介：王朝旭，男，讲师，博士，硕士研究生导师，青海省“昆仑英才·高端创新创业人才”项目拔尖人才。主要研究方向为小域估计、参数估计等。已先后参与国家自然科学基金 3 项，国家社科重点项目 1 项，发表科研论文 10 余篇。负责组织本校大学生参与统计建模、数学建模、市场调查与分析大赛等国家级比赛，近三年指导学生获国家级二等奖两项，三等奖 5 项，省级奖励 20 余项。

一种融合可解释性信息的集成模型在比特币跳跃波动率预测中的应用

李东升（兰州财经大学）

摘要：比特币市场具有强烈的波动聚集性和高度非线性特征，而价格又伴随着跳跃和噪声，这进一步加大了波动率估计与建模难度，使得单一预测模型难以准确捕捉其变化规律。为此，本文提出一种融合可解释性信息的集成学习模型，通过整合不同基学习器的可解释性预测信息，依托特征重要性加权机制拓展元学习器特征空间，实现多源特征的有效融合。基于比特币高频数据，以传统计量经济学模型、机器学习和深度学习模型为基准，采用六种误差评价指标及 DM、MCS 和 SPA 检验进行全面评估。实证结果表明，该模型在波动率预测方面显著优于各基准模型，并且模型的可解释性提供了关于特征贡献与决策路径的透明见解，在高性能与模型透明性并重的场景中兼具实用性与可扩展性。

报告人简介：李东升，兰州财经大学统计与数据科学学院在读博士生，主要研究方向为机器学习、深度学习及金融统计。

特邀报告 29: *Advances in Statistical Methods for Complex and Large-Scale Data*

Harmonizing Longitudinal Physical Activity Data from Heterogeneous Wearable Devices

张静茹（复旦大学）

Abstract: Classical goodness-of-fit tests answer whether a benchmark distribution is misspecified, but provide limited guidance on where the departure occurs. We address this problem by constructing local randomized binomial tests over a prespecified support grid and recasting goodness-of-fit assessment as a structured multiple-testing problem. We combine the resulting local p-values through the harmonic mean p-value to obtain a global goodness-of-fit test and develop a recursive dyadic procedure for hierarchical localization. We establish asymptotic null validity and power for both the

local building blocks and the combined test. The framework applies to continuous, discrete, and mixed benchmark distributions. Simulations show good size control, competitive or superior power relative to classical benchmarks, and accurate localization of the regions where the benchmark fails. In an application to S&P500 returns, the method rejects normality and localizes the departure to the left tail and interior quantiles.

报告人简介：张静茹是复旦大学大数据学院的青年副研究员，2019 年获得北京大学博士学位，之后在美国宾夕法尼亚大学从事博士后研究工作。她的主要研究方向包括复杂对象数据的统计方法、移动健康数据分析，以及统计学习在医学健康领域的应用。

Identification of Key Influencers: Design and Analysis of Egocentric Network-based Randomized Studies

贺志兵（东南大学）

Abstract: Behavioral health interventions, such as trainings or incentives, are commonly implemented in settings where individuals are interconnected, and the intervention assigned to some individuals may also affect others within their network. Evaluating such interventions requires assessing both the effect on those who receive them and the spillover effect on those connected to treated individuals. With behavioral interventions, spillover effects can be heterogeneous in that certain individuals, due to their social connectedness and individual characteristics, are more likely to respond to the intervention and influence their peers' behaviors. Focusing interventions on these individuals can improve the effectiveness of interventions in the population. In this paper, we focus on an Egocentric Network-based Randomized Trial (ENRT) design, where a set of index participants is recruited and randomly assigned to the treatment, while concurrently collecting outcome data on their nominated network members, who remain untreated. In such a design, the spillover effects on network members may vary depending on the characteristics of the index participant. In this paper, we develop a testing method, Multiple Comparison with Best (MCB), to identify subgroups of index participants who, if treated, would exhibit the largest spillover effect on their network members.

报告人简介：贺志兵，现任东南大学统计与数据科学学院助理教授、博士生导师。2022 年毕业于亚利桑那州立大学，获统计学博士学位，后于耶鲁大学生物统计系从事博士后研究。主要研究方向为因果推断、网络数据分析与时序数据变点检测，在统计领域重要期刊如 JASA、Statistica Sinica、EJS 等发表多篇论文。

Multiple testing in rolling-window analysis via $\$p\$-value combination$

凌星（西南财经大学）

Abstract: Rolling-window methods are widely used to explore time variation in economic relationships. Testing across overlapping windows induces a multiple-testing problem and can inflate the familywise error rate. Existing corrections are often either overly conservative or computationally intensive. We propose a harmonic mean p-value procedure that provides a global test together with window-level diagnostics. We establish asymptotic familywise error rate control for small significance levels under conditions that allow dependence induced by overlapping windows. Simulations using several standard time-series tests show accurate size, higher power, and substantially lower computational cost than bootstrap-based extreme-statistic procedures.

报告人简介: 凌星, 西南财经大学统计与数据科学学院讲师。主要研究方向为统计推断与多重检验, 近期关注拟合优度检验与时间序列滚动窗口分析中的统计方法问题。

A Powerful Transformation of Quantitative Responses for Biobank-Scale Association Studies

刘耀午 (西南财经大学)

Abstract: In linear regression models with non-Gaussian errors, transformations of the response variable are widely used in a broad range of applications. Motivated by various genetic association studies, transformation methods for hypothesis testing have received substantial interest. In recent years, the rise of biobank-scale genetic studies, which feature a vast number of participants that could be around half a million, spurred the need for new transformation methods that are both powerful for detecting weak genetic signals and computationally efficient for large-scale data. In this work, we propose a novel transformation method that leverages the information of the error density. This transformation leads to locally most powerful tests and therefore has strong power for detecting weak signals. To make the computation scalable to biobank-scale studies, we harnessed the nature of weak genetic signals and proposed a consistent and computationally efficient estimator of the transformation function. Through extensive simulations and a gene-based analysis of spirometry traits from the UK Biobank, we validate that our approach maintains stringent control over Type I error rates and significantly enhances statistical power over existing methods.

报告人简介: 刘耀午, 西南财经大学统计学院教授。他的研究兴趣包括大规模假设检验, 统计遗传学, 健康大数据分析等。相关成果发表于 JASA, JRSSB, American Journal of Human Genetics 等统计学和遗传学知名期刊, 其中关于整合 p 值的代表性成果在 Google Scholar 上已获得 1000 余次引用。

特邀报告 30: 统计建模与推断

Extinction, explosion and contraction for time-inhomogeneous SDEs with jumps

杨叙（北方民族大学）

Abstract: For a class of time-inhomogeneous SDEs with jumps, we establish criteria for the existence and uniqueness of the nonnegative solutions, and examine the extinction, the explosion together with the contractivity of the solutions, which generalize and improve upon earlier results in the literature. As an application, we study the aforementioned properties for a class of mean field SDEs. This talk is based on a joint work with Xu Yang and Xiaowen Zhou.

报告人简介: 杨叙, 北方民族大学数学与信息科学学院教授, 博士生导师, 主要从事随机分析方面的研究工作, 主持或完成国家自然科学基金面上项目 2 项及青年项目和地区项目各 1 项, 在《Annals of Applied Probability》、《Bernoulli》、《Stochastic Processes and their Applications》和《Journal of Differential Equations》等期刊上发表过多篇学术论文。

Conditional Expectile Inference in Predictive Regressions with Infinite-Variance Predictors

马耀兰（北方民族大学）

Abstract: This paper develops inference for conditional expectiles in linear predictive regressions when some predictors may have infinite variance. Heavy-tailed predictors affect both the least-squares component and the residual-based expectile estimator, making conventional plug-in variance inference difficult. We propose a residual-based estimator that combines ordinary least squares with the sample expectile of fitted residuals, and establish its large-sample distribution under infinite-variance predictor conditions. For feasible interval estimation, we develop a weighted profile empirical likelihood procedure under independent errors. The weighting scheme controls the influence of heavy-tailed predictors in the estimating equations, and the resulting profile empirical likelihood ratio has a Wilks-type chi-square limit. Monte Carlo experiments show that the proposed methods perform well across heavy-tailed, GARCH-type, and finite-variance predictor designs.

报告人简介: 马耀兰, 北方民族大学数学与信息科学学院副教授, 硕士生导师, 博士毕业于浙江大学。主要研究方向为时间序列分析、金融计量经济学、机器学习。研究成果发表于 *Econometric Theory*、*Statistica Sinica*、*Journal of Time Series Analysis*、*Journal of Financial Econometrics*、*Journal of Economic Dynamics and Control* 等国际权威期刊上。主持国家自然科学基金地区项目 1 项、完成宁夏自然科学基金项目 4 项。

Edge Modification for Influence Maximization of Competing Opinions in Social Networks

马婧瑛（宁夏大学）

Abstract: The competitive spread of opposing opinions and information on social networks has recently become a popular research topic with wide real-world relevance. We propose an algorithm for maximizing the influence of a target opinion when two competing alternatives propagate through a social network that exhibits community structure. To drive a winner-takes-all outcome of one opinion, our algorithm strategically rewires inter-community edges, amplifying the cross-group reach of the favored opinion and accelerating its victory. Numerical experiments verify the algorithm's effectiveness for large-scale social networks.

报告人简介: 马婧瑛, 博士, 副教授, 硕士研究生导师。研究方向为复杂系统建模于分析。美国加州大学圣芭芭拉分校访问学者。获宁夏自然科学优秀论文一等奖 1 项, 二等奖 1 项。美国 Mathematical Reviews 评论员。主要从事网络化系统的协调与控制、复杂系统建模与控制、复杂网络上的博弈论领域的研究工作。主持完成国家自然科学基金项目 1 项、教育部“春晖计划”基金项目 1 项、宁夏自然科学基金项目 1 项, 主持在研国家自然科学基金项目 1 项、宁夏自然科学基金项目 1 项。发表 SCI 论文 11 篇, 2 篇论文入选 ESI 高被引论文, 1 篇论文入选 ESI 热点论文。

A doubly robust approach for high-dimensional distributed reduced rank regression

马晓燕 (宁夏大学)

Abstract: This paper considers high-dimensional reduced-rank regression with heavy-tailed noises and predictors in a distributed setting. By combining the singular value soft-thresholding operator with an accelerated gradient algorithm, we solve the formulated optimization problem in a communication-efficient and iterative way, which enhances statistical accuracy and computational efficiency simultaneously. The usage of a doubly robust loss function based on the shrinkage principle helps to achieve the double robustness of the proposed estimator for both the heavy-tailed response variables and predictors. Theoretically, we derive the nonasymptotic error bounds for the proposed distributed estimator. Empirically, numerical simulations and an application to a dataset about community crime rates corroborate the superiority of the proposed method. The complete code supporting this study can be downloaded from <https://github.com/nxuxiaoyan/2RD3R>.

报告人简介: 马晓燕, 统计学博士, 宁夏大学数学统计学院教师。研究方向为高维数据统计推断, 相关成果发表于 Journal of Systems Science and Complexity、Journal of Statistical Planning and Inference 等期刊。主持国家自然科学基金青年项目和省级科研项目。

特邀报告 31: *High-Dimensional Statistical Inference: Testing, Spectral Analysis, and Variable Selection*

Spectral analysis of spatial-sign covariance matrices with dependence and weaker moment conditions

王成（上海交通大学）

Abstract: This talk investigates the spectral properties of spatial-sign covariance matrices, a self-normalized version of sample covariance matrices, for data from α -regularly varying populations with general covariance structures. By exploiting the elegant properties of self-normalized random variables, we establish the limiting spectral distribution and a central limit theorem for linear spectral statistics. We demonstrate that the Marcenko-Pastur equation holds under the condition $\alpha \geq 2$, while the central limit theorem for linear spectral statistics is valid for $\alpha > 4$, which are shown to be nearly the weakest possible conditions for spatial-sign covariance matrices from heavy-tailed data in the presence of dependence.

报告人简介: 王成，上海交通大学数学科学学院院长聘副教授，博士生导师。2013年博士毕业于中国科学技术大学，主要研究方向为随机矩阵理论及应用、高维数据分析等。在统计领域核心期刊 *Statistica Sinica*, *Science China Mathematics* 等发表学术论文三十余篇。先后主持国家自然科学基金青年基金、面上项目 2 项、上海市科研项目 2 项，参与国家自然科学基金重大项目和重点项目。

On high-dimensional adaptive sign tests

姚驰（安徽大学）

Abstract: This paper proposes a novel high-dimensional adaptive sign test featuring a data-adaptive weighting scheme. By assigning exponentially larger weights to significantly correlated lags, this approach effectively isolates informative signals from pervasive noise. Theoretically, we establish a central limit theorem for the proposed adaptive weighted statistic under the high-dimensional regime by allowing for a general population covariance matrix, flexible innovation distributions, and a maximum lag m that diverges to infinity at a certain rate. Furthermore, we develop a consistent estimator for the asymptotic variance, enabling practical implementation. Extensive simulations confirm that our adaptive test accurately controls empirical size and achieves significantly greater power against both sparse and dense dependence structures compared to existing methods.

报告人简介: 姚驰，安徽大学大数据与统计学院讲师。安徽大学理学博士，新加坡南洋理工大学博士后研究员。研究方向包括高维时间序列分析、高维统计推断、随机矩阵理论以及多元回归分析等。已在 *Journal of Multivariate Analysis* 等期刊发表论文数篇。

Uniform knockoff filter for high-dimensional controlled graph recovery

周佳（合肥工业大学）

Abstract: Reproducible learning of high-dimensional graphical structures is fundamentally important in numerous contemporary applications, as it visually reveals the underlying conditional dependencies among complex network data. In this paper, we introduce a novel procedure called the uniform graphical knockoff filter, which controls the overall false discovery rate (FDR) in Gaussian graph recovery by utilizing knockoff variables and a uniform threshold. Compared to existing methods, it is more robust to varying levels of sparsity in the true graph. We provide theoretical justifications for the procedure, demonstrating that the FDR can be asymptotically controlled and that the power is asymptotically one under mild conditions. Extensive numerical studies confirm the robust and competitive finite-sample performance of the proposed method.

报告人简介: 周佳, 中国科学技术大学博士, 南洋理工大学博士后, 现任合肥工业大学经济学院讲师。主要从事高维统计推断、复杂数据分析与机器学习等领域的研究。已在 *Statistica Sinica*、*Journal of Multivariate Analysis*、*Statistics & Probability Letters* 等统计学重要期刊发表多篇学术论文。主持国家自然科学基金数学天元青年项目、安徽省自然科学基金青年项目各一项。

Spectral Properties of High-dimensional Rescaled Sample Correlation Matrices under Elliptical Distributions

邹婷婷 (吉林大学)

Abstract: Under the convergence regime that the data dimension and sample size tend to infinity proportionally, we establish the joint central limit theorem for the linear spectral statistics of the rescaled sample correlation matrices when the population follows an elliptical distribution. This general theoretical result has wide applications. As an illustration, we consider testing whether a high-dimensional correlation matrix equals to a prespecified matrix. We first propose three test statistics based on the quadratic norm and then derive their limiting distributions. To enable the practical applications of the proposed tests, we also develop a numerical approach for computing the asymptotic variances and covariances in the central limit theorem. Furthermore, extensive simulation studies are systematically conducted to evaluate the finite sample performance of the proposed testing procedures.

报告人简介: 邹婷婷, 吉林大学数学学院讲师, 博士毕业于东北师范大学。主要研究方向为大维随机矩阵理论与高维统计推断, 现主持国家自然科学基金青年项目 C 类, 成果发表于 *Bernoulli*, *Statistica Sinica*, *CSDA* 等期刊, 现为 JMVA 的 Early Career Advisory Board 成员。

特邀报告 32: 统计学及交叉研究

Dynamic survival prediction based on multiple intermediate events

俞童慧 (哈尔滨工业大学)

Abstract: In many follow-up studies, the onset of intermediate events is crucial for predicting the overall terminal event. However, these intermediate events may be potentially associated, exhibit partial-order relations and suffer from informative censoring caused by the terminal event, posing challenges for both modelling and inference. We propose a novel joint modeling framework to build dependence among multiple correlated marginal components. Under this framework, we develop a novel algorithm and a renewable risk assessment method for dynamic survival prediction, leveraging the available information of intermediate events and the maximum follow-up time.

报告人简介: 俞童慧, 哈尔滨工业大学副教授。研究方向 primarily focuses on biostatistical methodology and its applications in biomedicine. She has developed several semi-parametric models and estimation methods tailored for complex survival data, including those with censored covariates, high-dimensional data, and semi-competing risks, among others. Additionally, she has been exploring the applications of causal inference and machine learning techniques to predict treatment responses in cancer patients. 她 2019 年博士毕业于南洋理工大学, 本科毕业于厦门大学应用数学专业, 曾经在新加坡国立大学从事博士后研究 2 年和南洋理工大学博士后两年, 曾任合肥工业大学讲师两年。曾获 ICSA student paper award 2018 和 WiEST Development Grant Award, NTU 2024. Outstanding Method Award, Third Prize (National Level) for 2022 China National Statistical Modeling Contest for College Students, 参与专著编写三部。其研究成果以第一或合作者身份发表于《Biometrics》, 《Journal of the Royal Statistical Society - Series C: Applied Statistics》, 《Statistica Sinica》, 《Biometrical Journal》, 《Japanese Journal of Statistics and Data Science》和《Statistics in Medicine》等统计与交叉学科期刊近 10 余篇。

Localization Estimator for High Dimensional Tensor Covariance Matrices

孙浩轩 (哈尔滨工业大学)

Abstract: This paper considers covariance matrix estimation of tensor data under high dimensionality. A multi-bandable covariance class is established to accommodate the need for complex covariance structures of multi-layer lattices and general covariance decay patterns. We propose a high dimensional covariance localization estimator for tensor data, which regulates the sample covariance matrix through a localization function. The statistical properties of the proposed estimator are studied by deriving the minimax rates of convergence under the spectral and the Frobenius norms. Numerical experiments and real data analysis on ocean eddy data are carried out to illustrate the utility of the proposed method in practice.

报告人简介: 孙浩轩, 哈尔滨工业大学预聘副教授, 神舟青年学者。研究方向为高维统计推断、数据同化及其在海洋科学中的应用。在此之前, 他 2025 年博士

毕业于北京大学前沿交叉学科研究院大数据科学研究中心，本科毕业于北京大学数学科学学院。他参与多项统计学与大气科学、流行病学和海洋科学的交叉研究项目，其研究成果以第一或共同第一作者身份发表于《Quarterly Journal of the Royal Meteorological Society》，《Proceedings of the Royal Society A》和《Journal of Data Science》等统计与交叉学科期刊。

From Scarcity to Insight: Extreme Events Analysis with a Partially linear single index varying coefficient model in High dimensional settings

安红雨（浪潮数字企业）

Abstract: Analysing the causes of extreme events holds paramount importance across diverse domains. However, conventional models with asymptotic theory often exhibit limitations in flexibly capturing the intricate dependence structure in extreme events. Additionally, the scarcity of data on extreme events further complicates the nonparametric estimation of high-dimensional covariates, giving rise to the challenge known as the 'dimensional curse.' In order to address these challenges, we propose a flexible model that combines a partially linear single-index varying-coefficient model with extreme value theory, and it effectively avoids the curse of dimensionality while providing a strong interpretative ability and high flexibility. Consistency and oracle properties of estimators are established. The Monte Carlo simulation results confirm the finite sample properties of the estimators. Furthermore, the application to a real-world example involving network analysis of sector index risk in financial markets and valuable insights into risk drivers are obtained.

报告人简介: 安红雨，浪潮数字企业和浪潮澳林大数据算法工程师，研究方向为：极值理论中尾部指数回归模型研究及其在金融中的应用、高维统计、大数据分析 & 人工智能应用等。2024 年博士毕业于哈尔滨工业大学统计学专业。研究成果以第一作者身份发表于《Computational Economics》，《Journal of Nonparametric Statistics》，《Mathematics》及两次在国际会议 ICCMB '22 (U.S.A) 和 PCMA&LICAS 2024 (HARBIN) 上做学术报告，第一身份获发明专利两项，曾获国际美国大学生数学建模竞赛 Meritorious Winner 奖、全国大学生市场调查与分析大赛二等奖、亚太区数学建模竞赛一等奖等国际和国家建模竞赛一等奖或二等奖近 10 余项。

A Dynamic interaction varying index coefficient quantile regression mode

梁晓文（天津商业大学）

Abstract: In this paper, we propose a functional varying index coefficient quantile regression model, which can not only characterize the nonlinear interactions among a set of covariates and their influence on the response but also capture the time-dynamic features of functional/longitudinal data. Most existing semiparametric quantile regression models are special cases of the model we propose. We first develop a

profile estimation method based on tensor product B-splines and establish the asymptotic properties of the profile estimators. Then, an improved estimate of the nonparametric coefficient functions is derived through spline-backfitted local linear smoothing, and its asymptotic normality is obtained. In addition, we provide a bootstrap-based testing procedure to test for the existence of interaction among covariates. The finite sample performance of the proposed method is illustrated through Monte Carlo simulations and an empirical data analysis.

报告人简介: 梁晓文, 天津商业大学讲师。研究方向为, 分位数回归, 复杂数据分析, 亚组分析。2025 年博士毕业于哈尔滨工业大学统计学专业。研究成果以第一作者身份发表于 *Statistical Papers*, *Metrika*, *Journal of the Korean Statistical Society* 等统计学期刊。

特邀报告 33: *Recent Advances in Statistical Learning and Complex Data Analysis*

A Nested Singular Value Decomposition-Based Surrogate Model for Spatiotemporal Flows

王典朋 (北京理工大学)

Abstract: High-fidelity simulators serve as effective alternatives to physical experiments for understanding complex dynamics, which are often computationally expensive. While surrogate models enable rapid simulations, they typically fail to capture dynamic information from high-dimensional spatiotemporal flow fields. To address this, we propose a tailored multi-output Gaussian process (MOGP) surrogate model for spatiotemporal emulation, incorporating uncertainty quantification. Our approach leverages singular value decomposition to project high-dimensional spatiotemporal data into a low-dimensional latent space, with explicit analysis of decomposition errors. This reformulates the MOGP as a linear combination of independent Gaussian processes, each modeling the relationship between projection coefficients and simulator inputs. The resulting surrogate achieves reliable prediction of unobserved fluid dynamics while significantly accelerating computation, facilitating efficient design exploration. Validation through numerical experiments and real-data case studies demonstrates superior accuracy and efficiency over existing methods.

报告人简介: 王典朋, 北京理工大学研究员、博导。长期从事复杂系统建模仿真及不确定性量化、大数据分析、试验设计与可靠性优化等相关领域的科学研究。以第一作者/通讯作者在相关领域发表论文三十余篇, 分别发表于质量科学与管理重要权威期刊 *Technometrics*、*Journal of Quality Technology*、*Reliability Engineering and System Safety* 以及统计学重要权威期刊 *Statistica Sinica*、*Applied Mathematical Modeling*、*Statistics and Computing* 等, 主持了国家自然科学基金委青年科学基金项目 1 项、面上项目 2 项, 国家国防科技工业局国防特色学科基础

研究专项 1 项、先进星箭共性专业技术 1 项，173 领域基金 1 项，申请国家发明专利 5 项。

BASIC: Bipartite Assisted Spectral-clustering for Identifying Communities in Large-scale Networks

高天辰（北京大学）

Abstract: Community structure learning is a fundamental task in network analysis, yet it becomes challenging and unstable under weak community signals, which are typical in real-world networks. Motivated by a newly collected large-scale academic network from Web of Science that intrinsically contains multi-layer information, we propose a new method, named Bipartite-Assisted Spectral-clustering method for Identifying Communities (BASIC), to address this weak-signal issue by leveraging bipartite network information. To the best of our knowledge, BASIC is the first work to integrate auxiliary bipartite information for community detection of the primary network. We thoroughly analyze the new statistical academic collaboration network data using BASIC, and observe that the bipartite network information from author-paper, author-institution, and author-region relationships significantly enhance the identification of interpretable communities of the collaboration network. Extensive simulations validate the empirical performance of BASIC. Theoretically, under a degree-corrected stochastic block model framework, we prove that BASIC provides superior accuracy and stability, achieving a tighter upper error bound than methods using only the primary network, especially in weak-signal regimes.

报告人简介: Tianchen Gao received his Ph.D. in Statistics from Xiamen University in 2025, advised by Prof. Jingyuan Liu. He has been a visiting scholar at Department of Statistics, Harvard University. He is currently a Boya Postdoctoral Fellow at the Beijing International Center for Mathematical Research, Peking University. His research interests include statistical modeling of complex network data, biostatistics, and large language models. His research has been published in journals such as The American Statistician, Journal of the Royal Statistical Society: Series C (Applied Statistics), Expert Systems with Applications, and Physics of Life Reviews. He currently serves as a Young Editorial Board Member of the journal Statistics Innovation.

A model-free multivariate non-recursive feature elimination for feature selection on high-dimensional complex multiple response data

夏思薇（成都理工大学）

Abstract: For high-dimensional complex multiple response problems, the inherent complexity of predictors and responses is often difficult to anticipate in advance. This paper proposes a model-free multivariate feature selection technique that does not rely on a specific model to address the challenges. The proposed method effectively

handles various types of multiple response datasets, such as continuous and categorical data, and allows for sparsity in both the responses and predictors. We prove that the proposed method achieves selection consistency under mild regularity conditions. We validate the performance of our method through simulations and applications on various datasets, including those generated by generalized linear models and binary classification models with multiple responses. The proposed method consistently outperforms comparative methods in terms of selection accuracy and model complexity.

报告人简介：夏思薇，成都理工大学数学科学学院讲师。2021 年博士毕业于重庆大学数学与统计学院。主要研究方向包括模型选择、特征选择、无模型方法和迁移学习。文章发表于 Knowledge-Based Systems、Applied Mathematics and Computation 等期刊。

Randomization based sharp bounds and monotonicity for ordinal outcomes in 2^K factorial experiments

杨玥含（中央财经大学）

Abstract: Randomized 2^K factorial experiments with ordinal outcomes are common in economics, biomedical research, and behavioral studies, where multiple interventions may jointly affect an ordered response. Within the potential outcomes framework, factorial effects are often defined through linear contrasts of average potential outcomes, but such contrasts can be difficult to interpret when outcome categories have a natural ordering. To address this, we propose a novel framework that generalizes traditional factorial designs to incorporate ordinal outcomes, and define probability-based main and interaction effects. Because these estimands depend on the unobserved joint distribution of potential outcomes, they are generally not point-identified. We derive closed-form bounds through partial identification, relying solely on the observable marginal distributions, without imposing parametric models or distributional assumptions. In particular, we obtain sharp bounds for main effects and valid, typically non-sharp bounds for interaction effects, where excluding 0 yields a robust conclusion on the interaction direction. Our framework allows the single factor as a special case and is applicable to both binary and multicategory outcomes. Considering the wide application of monotonicity in practice, we derive its testable equivalent form, which can yield tighter identification intervals for the factorial effects. For inference, we construct nonparametric bootstrap confidence intervals and evaluate the finite sample performance of the proposed procedures through simulation and two empirical applications.

报告人简介：杨玥含，中央财经大学统计与数学学院教授，博导，北京大学博士。中央财经大学青年英才、龙马学者青年学者。主要从事因果推断、迁移学习、复

杂数据分析等研究。在 JASA、Biometrika、JBES、JCGS、Pattern Recognition、《中国科学：数学》等国内外期刊发表论文 40 余篇。

特邀报告 34: *Statistical Learning and Inference for Complex, High-Dimensional, and Transfer Learning*

Statistical inference of the complex fractional Vasicek model with Hurst index $H \in (0, \frac{1}{2})$

郭精军（兰州财经大学）

Abstract: This paper investigates a statistical inference issue concerning two drift parameter estimators in the complex-valued Vasicek model influenced by fractional Brownian motion. We develop the moment estimator specifically for mean-reversion parameter and also construct the least squares estimators for two drift parameters. Furthermore, these estimators are demonstrated to be of strongly consistent and asymptotically normal. This extends the findings in Shen et al. \cite{Shen} to the case of Hurst index $H \in (\frac{1}{4}, \frac{1}{2})$, as well as the results of Alazemi et al. \cite{Alazemi} from Ornstein-Uhlenbeck process to Vasicek model. The key way of our computations is a novel inner product formula on a reproducing kernel Hilbert space about fractional Brownian motion for bounded variation functions, which is presented in Alazemi et al. \cite{Alazemi} and $H \in (0, \frac{1}{2})$. The main results involve the utilization of complex fourth moment theorems and the Garsia-Rodemich-Rumsey inequality.

报告人简介: 郭精军，男，兰州财经大学二级教授，华中科技大学理学博士。博士生导师，博士后合作导师。担任国家自然科学基金项目和教育部项目评审专家。现担任甘肃经济发展数量分析研究中心主任和统计与数据科学学院副院长。担任中国优选法统筹法与经济数学研究会数据科学分会常务理事等。入选国家留学基金委西部地区人才培养特别项目，入选甘肃省省级重点人才项目和甘肃省飞天学者。省级一流本科课程和省级教学团队负责人。研究兴趣：随机分析、金融统计与风险管理、应用数理统计等。主持国家自然科学基金项目 3 项、省部级项目 6 项。在《Resources Policy》《Acta Mathematica Scientia》《数学学报》等期刊上发表学术论文 50 余篇。出版学术著作 2 部，出版教材 4 部。2 次获甘肃省优秀硕士学位论文指导教师称号。获得甘肃省研究生教育优秀导师称号。

Machine-learning-based simulation of soil organic carbon and total nitrogen in the Qilian Mountain grasslands and analysis of influencing factors

张美玲（甘肃农业大学）

Abstract: Investigating the spatial differentiation characteristics of soil organic carbon (SOC) and total nitrogen (TN) in the Qilian Mountains grasslands and their driving mechanisms is of great significance for understanding carbon and nitrogen cycles in alpine ecosystems. This study integrated meteorological data, soil

physicochemical properties, topographic factors, and vegetation indices to construct six machine learning models. Cross-validation and Bayesian optimization were employed for hyperparameter tuning and select the optimal model. This was further combined with Monte Carlo simulations to evaluate the response characteristics of the model outputs to input perturbations, analyzing the error distribution and systematic bias between predicted and measured values. To quantify the contribution of each environmental factor, SHAP was employed to calculate key variables and their effect directions. The SHAP values were then coupled with Generalized Additive Models for nonlinear fitting to characterize the response curves of the primary driving factors and identify threshold intervals. Bivariate Partial Dependence Plots were introduced to analyze the synergistic effects of key factor combinations on SOC and TN. Simultaneously, a multi-factor interaction network was calculated and constructed to quantify the interaction strength among variables. Combined with interaction effect dependence plots, this approach elucidated the coupling mechanisms among soil physicochemical properties, topography, and vegetation factors.

报告人简介：张美玲，甘肃农业大学理学院教授，博士研究生导师。甘肃农业大学应用统计学科和应用统计团队负责人，数量生物研究中心主任。美国俄亥俄州立大学访问学者，美国科罗拉多州立大学访问学者。Verra 模型评估师。中国现场统计研究会大数据统计分会常务理事，多元分析应用专业委员会理事，统计交叉科学研究分会理事，全国工业统计学教学研究会地学数据分会理事。主要从事环境与生态统计、空间统计、生态模型和大数据分析等研究工作。国家自然科学基金函评专家，教育部学位论文评阅专家。主持国家自然科学基金、科技部高端外国专家引进计划等项目 10 余项。荣获甘肃省自然科学奖 2 项、全国应用统计专业学位研究生教育教学成果一等奖 1 项、三等奖 1 项。被评为第十四届全国大学生电子商务“创新、创意及创业”挑战赛优秀指导教师。在国内外学术刊物上发表论文 70 余篇。主编专著 1 部、副主编教材 1 部。担任国内外众多期刊审稿人。

多中心双小样本自适应迁移模型构建及应用研究

朱素玲（兰州大学）

摘要：本文提出一种面向跨区域双小样本场景、融合地域加权与分层最优传输的多中心自适应迁移学习框架。该框架首先对输入特征进行解耦，分离低维地域特征与高维生理特征；在特征维度，基于域间地理特征差异构建自适应衰减权重，抑制环境分布噪声并完成特征重构；在样本维度，通过中位数掩码实现非对称反向重加权，动态校准源域样本贡献度。针对小样本高维数据易引发维度灾难问题，引入 LASSO 正则化实现高效特征降维，并结合关键特征保护机制避免重要信息丢失。在分布适配层面，提出类别感知分层最优传输策略，分别对健康与患病类别进行 Wasserstein 距离对齐并融合，经由 Sigmoid 映射生成全局自适应迁移系数，构建端到端双小样本跨域优化目标。该方法为高异质、小样本条件下的

多中心迁移学习提供了稳健的算法范式,可为跨区域健康风险智能预警与精准防控提供可靠 AI 技术支撑。

报告人简介: 朱素玲,毕业于兰州大学,曾赴美国明尼苏达大学联合培养,现为兰州大学公共卫生学院副教授、硕士生导师,主要从事人工智能及医学应用、政策效应评价等研究,以第一 / 通讯作者发表高水平论文 20 余篇, Web of Science 核心合集总被引 700 余次, H 指数 11, 主持国家社科基金等国家级项目 2 项、省部级项目 2 项及中央高校基金、横向课题多项,主讲《卫生统计学》《医用统计学》《现代高级医学统计学》《医学大数据 AI 研究方法与科研实践》等课程,荣获甘肃省、兰州大学优秀硕士学位论文指导教师称号,指导学生多次斩获全国研究生数学建模、大学生统计建模等赛事国家级奖项。

Cross-semantic Transfer Learning for High-dimensional Linear Regression

蒋学军 (南方科技大学)

Abstract: Current transfer learning methods for high-dimensional linear regression assume feature alignment across domains, restricting their applicability to semantically matched features. In many real-world scenarios, however, distinct features in the target and source domains can play similar predictive roles, creating a form of cross-semantic similarity. To leverage this broader transferability, we propose the Cross-Semantic Transfer Learning (CSTL) framework. It captures potential relationships by comparing each target coefficient with all source coefficients through a weighted fusion penalty. The weights are derived from the derivative of the SCAD penalty, effectively approximating an ideal weighting scheme that preserves transferable signals while filtering out source-specific noise. For computational efficiency, we implement CSTL using the Alternating Direction Method of Multipliers (ADMM). Theoretically, we establish that under mild conditions, CSTL achieves the oracle estimator with overwhelming probability. Empirical results from simulations and a real-data application confirm that CSTL outperforms existing methods in both cross-semantic and partial signal similarity settings.

报告人简介: 蒋学军,南方科技大学统计与数据科学系负责人&系副主任,研究员、博士生导师,2009 年博士毕业于香港中文大学统计系,2009-2010 在港中文从事博士后研究,2010-2013 任中南财经政法大学副教授,2013 年 07 月加入南方科技大学,入选深圳市海外高层次人才孔雀计划(2016),深圳市优秀教师(2018),主持和完成国家(广东省)自然科学基金、深圳市基础研究面上项目等 10 余项。其研究方向和兴趣涉及大规模复杂数据统计分析、高维统计推断,金融/应用统计,迁移学习及表征学习,辅助学习等,已在统计学顶级期刊 Biometrika 及 Bernoulli, Statistica Sinica, The Econometrics Journal, JBES, Financial Innovation, Science China-Mathematics, 中国科学等统计学及计量经济学国内外一流学术期刊上发表 SCI&SSCI 论文 60 余篇,授权专利 2 项及出版英文教材一部。

国内学会任职主要有中国现场统计研究会-教育统计与管理分会副理事长，多元分析应用专业委员会秘书长等。

特邀报告 35: *Advanced Statistical Methods for Multivariate Data, Time Series and Machine Learning*

CT-DDPM: Anomaly detection of multivariate time series with copula and transformer-based denoising diffusion probabilistic models

苏理云（重庆理工大学）

Abstract: One of the most challenging issues in industrial applications is unsupervised anomaly detection in multivariate time series data. In continuous time series, it is still crucial to distinguish between normal and anomalous distributions with accuracy and efficacy. Notwithstanding the considerable advances that have been made in anomaly detection, certain constraints remain, particularly about the precise delineation of patterns characterizing normal and abnormal distributions, and the incorporation of multivariate joint distributions and correlations within time series. This study proposes an innovative paradigm for multivariate time series anomaly identification. A solution to the problem is the CT-DDPM framework, which models the data distribution and uses a diffusion model's denoising process for detecting anomalies. The framework incorporates a Gaussian Copula to simulate noise in the joint distribution, thereby enhancing the robustness and generalization of the inverse denoising process. Moreover, the conventional DDPM foundation, UNet, is substituted with the Anomaly Transformer, a sophisticated architectural construct devised to discern discrepancies and dependencies in time series. Furthermore, diffusion information is integrated into the self-attention mechanism to effectively represent the distribution of the diffusion process at various temporal stages, consequently enhancing detection efficacy for a range of anomaly types. The CT-DDPM model demonstrates superior performance on four realworld datasets, exhibiting an average F1-Score enhancement of 12.26%, 1.71%, and 0.95% when compared to the OmniAnomaly, VAEAT, and Anomaly Transformer models, respectively.

报告人简介: 苏理云，重庆理工大学统计与数据科学系主任、教授，重庆市学术技术带头人，2025 全国高被引学者 TOP5%，校级教学名师，丹麦奥尔堡大学访问学者。已在《Expert Systems With Applications》《Humanities and Social Sciences Communications》《Applied Soft Computing》《Information Sciences》《Computers & Mathematics with Applications》等 SCI 期刊发表论文 40 余篇。主持国家社科基金、教育部人文社科基金、重庆市教委重点项目等省部级及以上项目 10 余项。曾获重庆市社会科学优秀成果二等奖、川渝科技学术大会优秀论文二等奖、全国

应用统计教指委优秀教学成果二等奖等，主持重庆市教育教学改革重大项目 1 项。

Model Averaging of Partially Linear Multinomial Logit Model for Multi-Categorical Data

吕晶（西南大学）

Abstract: Model averaging for categorical response variable has gained a lot of attention in recent years, to further improve the prediction accuracy, we present a partially linear multinomial logit model averaging (PLMLMA) technique. Its candidate model is built by picking a single continuous covariate in turn as the index variable of the nonparametric function, avoiding both the artificial selection of index variables and the curse of dimensionality in estimation. The model averaging weights are determined by minimizing the Kullback-Leibler (KL) loss, we are able to show the asymptotically optimal by demonstrating that the KL loss between the true model and the model where the log odds ratio is estimated by the "working" log odds ratio is asymptotically identical to that by the best but impractical model averaging estimator. Furthermore, we also gives the convergence rate of model weight estimator, without assuming there is a true model among the candidate models.

报告人简介: 吕晶，西南大学副教授，硕士生导师。目前主要从事超高维统计和模型平均研究，已在统计学领域公开发表三十余篇学术论文，部分结果发表于《J. Royal Statist. Soc., Ser. B》、《J. Amer. Statist. Assoc.》、《Statist. Sinica》、《Comput. Statist. Data Anal.》、《Statist.& Comput.》、《J. Royal Statist. Soc., Ser. C》、《数学学报》等。主持国家自然科学基金面上项目和青年项目各 1 项、重庆市面上项目 2 项、2020 重庆市留学人员回国创新支持计划 1 项。

Principal Decomposition with Nested Submanifolds

苏佳骥（重庆大学）

Abstract: Over the past decades, the increasing dimensionality of data has increased the need for effective data decomposition methods. Existing approaches, however, often rely on linear models or lack sufficient interpretability or flexibility. To address this issue, we introduce a novel nonlinear decomposition technique called the principal nested submanifolds, which builds on the foundational concepts of principal component analysis. This method exploits the local geometric information of data sets by projecting samples onto a series of nested principal submanifolds with progressively decreasing dimensions. It effectively isolates complex information within the data in a backward stepwise manner by targeting variations associated with smaller eigenvalues in local covariance matrices. Unlike previous methods, the resulting subspaces are smooth manifolds, not merely linear spaces or special shape spaces. Validated through extensive simulation studies and applied to real-world RNA

sequencing data, our approach surpasses existing models in delineating intricate nonlinear structures. It provides more flexible subspace constraints that improve the extraction of significant data components and facilitate noise reduction. This innovative approach not only advances the non-Euclidean statistical analysis of data with low-dimensional intrinsic structure within Euclidean spaces, but also offers new perspectives for dealing with high-dimensional noisy data sets in fields such as bioinformatics and machine learning.

报告人简介: 苏佳骥, 重庆大学数学与统计学院弘深青年教师, 2024 年于新加坡国立大学统计与数据科学系获统计学博士学位。研究方向为几何、统计与机器学习交叉领域, 主要关注流形拟合、低维结构学习及其在生物医学数据分析中的应用。近年来围绕 UK Biobank 多组学数据与生物序列嵌入开展研究, 致力于从高维复杂数据中提取具有解释性的几何结构, 并服务于风险评估与统计学习任务, 相关成果发表于 PNAS、AOAS 等期刊。

A robust and efficient tail-adaptive approach for change-point detection in semiparametric models

胡尧 (贵州大学)

Abstract: Structural breaks frequently arise in economic policy evaluation, biomedical monitoring, and other dynamic systems, posing substantial challenges for partially linear models (PLMs) that contain nonparametric nuisance components. This paper develops a unified tail-adaptive CUSUM framework for structural break testing and estimation in PLMs. The proposed methodology integrates cross-fitted semiparametric composite quantile regression with a weighted CUSUM process, allowing robust inference under heterogeneous and heavy-tailed error distributions. A key theoretical contribution is the establishment of a uniform oracle equivalence result, showing that the feasible plug-in CUSUM process converges uniformly to its oracle linear-model counterpart over the time index. This equivalence provides the theoretical foundation for valid tail-adaptive testing and multiplier bootstrap inference in high-dimensional settings. We further establish non-asymptotic localization bounds, showing that the proposed estimator attains the optimal rate up to logarithmic factors. The procedure is implemented within a seeded binary segmentation scheme to accommodate multiple change-points. Simulation studies and an empirical application to energy policy data demonstrate the effectiveness and robustness of the proposed method.

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分组报告 1: *Advances in Reliability Modeling, Dependence Analysis and System Optimization*

Statistical Modeling and Residual Lifetime Prediction for Fractional Wiener Degradation Processes with Random Effects

张建东（西北师范大学）

Abstract: This talk presents a fractional Wiener process model with random effects. A normal distribution is introduced to characterize individual differences in the drift rate, while an inverse Gaussian distribution is used to describe the stochastic fluctuation of the diffusion coefficient. Leveraging the fractional Wiener process, the model captures the temporal memory effect of the degradation process, thereby enabling joint statistical modeling of heterogeneity and long-range dependence within a unified framework. A hybrid optimization estimation algorithm combining particle swarm optimization for global search and sequential quadratic programming for local refinement is developed, and the Markov Chain Monte Carlo algorithm is employed for comparative analysis. Furthermore, two interval estimation methods—the asymptotic variance method and the parametric bootstrap method—are constructed to quantify the uncertainty in parameter estimation. Based on the model results, reliability prediction of the remaining useful life is further carried out, realizing a complete statistical inference workflow from model parameter estimation to engineering lifetime prediction.

Comparing Relevation Allocations of Series and Parallel Systems with Heterogeneous Components under Copula Dependence

李甜甜（西北师范大学）

Abstract: This paper investigates the optimal allocation of relevation redundancies in series and parallel systems under copula dependence. We employ a survival copula framework to characterize the complex stochastic dependence between the primary components and their relevation redundancies. Sufficient conditions, based on copula properties and marginal distributions, are derived to compare the reliability of various relevation allocation systems in terms of stochastic orders. The developed results provide a rigorous and flexible framework for assessing the reliability of systems with relevation redundancy in dependent environments. Finally, several important copula families and numerical examples are provided to illustrate the availability of the theoretical findings.

Optimal active redundancy allocation of fail-safe systems with dependent heterogeneous components

燕一平（西北师范大学）

Abstract: Redundancy allocation is widely used to enhance the reliability of engineering systems. This paper investigates optimal allocation policies for active redundancies in fail-safe systems with heterogeneous and dependent components. Three dependence structures are characterized by copulas. Sufficient conditions are established for comparing different allocation policies involving one or two active redundancies in the usual stochastic order. The results extend existing redundancy allocation principles from independent and classical coherent systems to dependent fail-safe systems. In particular, the findings show that the principle of allocating stronger redundancies to weaker components may remain valid under the proposed conditions. Several survival copula families, including the Clayton, Gumbel, Frank, and FGM copulas, are verified to satisfy the required conditions. Numerical examples and a real-data application based on Alpine disk failure events are provided to demonstrate the applicability of the theoretical findings.

Semi-parametric Estimation of Accelerated Failure Time Model under Copula Dependent Censoring

雷哲瑞（西北师范大学）

Abstract: In survival analysis, right censoring is an inherent feature of such data. When handling such data, previous studies have typically assumed independence between the survival time and the censoring time. However, this assumption is rarely met in practice. Consequently, some researchers have considered modeling the dependence between them using copula structures with known parameters. Nevertheless, prior knowledge of the dependence parameter is often unavailable in practice. Motivated by this limitation, we propose a new model that does not require the copula to be specified in advance. The model is based on a parametric copula model to describe the dependence between the survival time (T) and the censoring time (C), while the marginal distribution of T follows a semiparametric accelerated failure time (AFT) model and that of C is specified parametrically. We establish the identifiability of the model and develop estimators for both the nonparametric error distribution and the finite-dimensional parameters. We further evaluate the performance of the proposed method through finite-sample simulation studies. Finally, we apply our proposed model to the AFTG175 dataset.

分组报告 2: *Advances in Robust Learning and Statistical Modeling for Complex Data Analysis*

Contamination-Aware Federated LoRA Fine-Tuning via Collaborative Alignment

何帅达（香港大学）

Abstract: Federated low-rank adaptation (LoRA) enables parameter-efficient collaborative fine-tuning, but its statistical behavior remains poorly understood under client heterogeneity, contamination, and an unobserved common backbone. We propose Collaborative Low-rank Alignment and Identifiable Recovery (CLAIR), a contamination-aware framework using only preliminary local estimators. CLAIR recovers the shared LoRA subspace and detects contaminated clients through a structured low-rank plus block-sparse decomposition. We prove exact noiseless recovery of the shared subspace projector, stable recovery under preliminary estimation error, and consistent collaborative-set recovery under mild separation conditions. We further quantify the mean-squared error gain of CLAIR, showing that refinement improves over local fine-tuning when the oracle reduction in orthogonal-complement error dominates subspace-estimation and heterogeneity costs. Simulations and controlled Transformer LoRA experiments support the theory, demonstrating accurate contamination detection and improved benign-client performance over local fine-tuning and non-robust federated averaging.

Binary regression and classification with covariates in metric spaces

林一楠（重庆师范大学）

Abstract: Inspired by logistic regression, we introduce a regression model for data tuples consisting of a binary response and a set of covariates residing in a metric space without vector structures. Based on the proposed model, we also develop a binary classifier for metric-space valued data. We propose a maximum likelihood estimator for the metric-space valued regression coefficient in the model, and provide upper bounds on the estimation error under various metric entropy conditions that quantify complexity of the underlying metric space. Matching lower bounds are derived for the important metric spaces commonly seen in statistics, establishing optimality of the proposed estimator in such spaces. A finer upper bound and a matching lower bound, and thus optimality of the proposed classifier, are established for Riemannian manifolds. To the best of our knowledge, the proposed regression model and the above minimax bounds are the first of their kind for analyzing a binary response with covariates residing in general metric spaces. We illustrate practical merits of the proposed estimator and classifier via an application to task-related fMRI data. Finally, we briefly discuss how the proposed regression framework can be extended to off-policy evaluation and inference in reinforcement learning with metric-space valued states.

A General Framework For Modeling Gaussian Process with Qualitative and Quantitative Factors

邓淋穗（香港中文大学（深圳））

Abstract: Computer experiments involving both qualitative and quantitative (QQ) factors have attracted increasing attention. Gaussian process (GP) models have proven effective in this context by choosing specialized covariance functions for QQ factors. In this work, we extend the latent variable-based GP approach, which maps qualitative factors into a continuous latent space, by establishing a general framework to apply standard kernel functions to continuous latent variables. This approach provides a novel perspective for interpreting some existing GP models for QQ factors and introduces new covariance structures in some situations. The ordinal structure can be incorporated naturally and seamlessly in this framework. Furthermore, the Bayesian information criterion and leave-one-out cross-validation are employed for model selection and model averaging. The performance of the proposed method is comprehensively studied on several examples.

基于变分贝叶斯方法同步进行异常值检测与变量选择

刘明睿（中国科学技术大学）

摘要: 异常值检测与变量选择是统计分析中的两个关键问题，两者均已被多种方法广泛研究。我们利用变分贝叶斯工具，为均值漂移回归模型开发了一种同步进行异常值检测与变量选择的方法。在该模型中，我们采用数据点具有非零值的均值漂移参数来表示异常值；随后提出一个基于正态-逆伽马-伽马先验分布的分层模型，该模型能够将无系数收缩至零。基于此分层模型，我们建立了均值场变分贝叶斯方法，用于推导具有明确均值和方差的参数近似后验分布。

分组报告 3: *Robust Statistical Inference for High-Dimensional, Network and Time Series Data*

On the rate of convergence in the CLT for LSS of large-dimensional sample covariance matrices

崔健（东北师范大学）

Abstract: The convergence rate is a nature probability problem after the establishment of CLT. A direct issue when applying the CLT is controlling the empirical size given sample size n , which requires convergence rates to quantify the discrepancy between the true and limiting distributions. Let $\mathbf{B}_n = \frac{1}{n} \sum_{i=1}^n \mathbf{X}_i \mathbf{X}_i^* \mathbf{T}_p^{1/2}$, where $\mathbf{X}_n = (\mathbf{x}_{ij})_{1 \leq j \leq p}$ is a $n \times p$ matrix with independent and identically distributed real or complex entries, $\mathbf{T}_p$ is a $p \times p$ nonrandom Hermitian nonnegative definite matrix with spectral norm uniformly bounded in p . In this paper, based on Stein's method, we establish that if $\mathbb{E} |x_{ij}|^4 < \infty$ and $p/n \rightarrow y > 0$ as $n \rightarrow \infty$, the rate of the normalized linear spectral statistics of the sample covariance matrices $\mathbf{B}_n$ converging in distribution to the standard normal distribution is

$\xi O(n^{-1/2+\kappa})$ for any fixed $\kappa > 0$. Further, we obtain the same result for non-analytic test functions and in the case where the fourth moments do not match the Gaussian moments.

Multiscale Mean Shift Detection with Robust Time-varying Variance Estimation

Haile Tariku Tesfaye (哈尔滨工业大学)

Abstract: Many economic and financial time series exhibit concurrent changes in level and variability. Thus, when detecting mean shifts in time series, it is essential to account for the changing or smoothly evolving variability, as it confounds the detection ability of the methods. In this study, we introduce a scale-dependent, robust time-varying time-average variance constant (TAVC) estimator integrated with a multiscale moving sum (MOSUM) procedure for detecting mean shifts in time series data. We establish consistency of the time-varying TAVC estimator under mild regularity conditions, such as smoothly varying variance, heavy-tailed, and serially dependent errors. Furthermore, we derive the asymptotic distribution and detection accuracy of MOSUM procedure integrated with TAVC under both the null and alternative hypotheses. Extensive simulation studies show that the proposed method outperforms existing approaches in terms of location accuracy, false discovery control, and correct estimation of the number of change points across diverse noise structures. Empirical applications to U.S. gross national product growth and crude oil return series highlight its ability to uncover economically meaningful structural shifts, such as recession-expansion transitions, market shocks, and geopolitical crises. By combining statistical rigor with computational efficiency, the method offers a practical tool for structural change analysis in macroeconomic and financial data.

A Multi-Motif Spectral Goodness-of-Fit Test for Robust Community Detection in Stochastic Block Models

何洪浏 (东北师范大学)

Abstract: Community detection in networks is a fundamental task with broad applications. The Stochastic Block Model (SBM) and its degree-corrected extension (DCSBM) are cornerstone frameworks for this task, yet determining the true number of communities remains a key challenge. Existing spectral goodness-of-fit tests, often sensitive to a single type of cyclic motif (e.g., triangles, hexagons), may exhibit unstable performance under diverse network conditions. To enhance robustness, we propose a novel test statistic based on linear spectral statistics of the normalized adjacency matrix. This statistic is uniquely designed to leverage the collective strength of multiple cyclic motifs by combining specific matrix traces. Under the null hypothesis, the statistic is proven to converge asymptotically to a standard normal distribution. Numerical simulations demonstrate its superior statistical power,

showing significant improvements over existing methods, especially in scenarios with low community separability. Applications to real-world datasets further confirm the method's practical effectiveness.

A new time-varying-threshold integer-valued autoregressive model

贾雨宁（哈尔滨师范大学）

Abstract: The threshold value in the fixed threshold model remains constant. However, if the data-generating process evolves over time, a fixed threshold will be unable to adapt to such changes, causing the model to quickly become ineffective. To address the aforementioned limitation in flexibility, this paper proposes an interpretable and operationally convenient threshold for integer-valued autoregressive models by introducing the time-varying empirical quantile threshold. The statistical properties of the process are discussed. Conditional least squares estimation and conditional maximum likelihood estimation are applied to the parameter estimation of the model, and the asymptotic properties of the obtained estimators are presented. The simulation study is conducted to evaluate the performance. Furthermore, two real data examples show its applicability in practical scenarios.

分组报告 4: *Advances in Statistical Inferencen and Dynamic Data Analysis*

Efficient Estimation of the Tobit Model under a Large-p-Small-n Paradigm

郝程程（上海对外经贸大学）

Abstract: This paper proposes a computationally efficient approach for estimating high dimensional Tobit models with censored outcomes, based on ordinary least squares (OLS) and Lasso regularization. Under a subgaussian and linearity condition on the covariates, which is mild in ultrahigh-dimensional settings, we derive non-asymptotic error bounds for both the Tobit OLS and Lasso estimators. When the subgaussian condition does not hold, we apply a Gaussianization technique to the covariates and show that the resulting Lasso estimator attains a comparable error bound, supporting the applicability of our method across diverse data distributions. Extensive numerical studies confirm the computational efficiency and estimation accuracy of the proposed approach. The empirical application shows that our approach consistently achieves a parsimonious model with rapid computation.

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Optimal investment strategies and intergenerational risk sharing under dual constraints for target benefit pension plan

崔壮（西北师范大学）

Abstract: This paper studies optimal investment and benefit payment strategies for a target benefit pension plan under loss aversion. The plan manager maximizes discounted S-shaped utility from benefit payments, subject to a downside constraint. The target benefit is determined by an actuarial equivalence condition linking contributions and benefits, while deviations from the target reflect intergenerational risk sharing. The pension fund invests in a risk-free asset and multiple risky assets. Using the martingale approach, we derive explicit solutions for the optimal investment and benefit payment strategies. Numerical illustrations and sensitivity analyses highlight the effects of key market parameters on the optimal policies.

Online change-point detection in dynamic regression models with autocorrelated residuals

娘毛措（青海师范大学）

Abstract: This study addresses the problem of online change-point detection in time-dependent linear regression models that incorporate autoregressive terms in both the response variable and the residuals. We refer to this framework as the dynamic regression model with autoregressive residuals (DREGAR). We propose a vector-valued CUSUM statistic based on the adaptive LASSO (ALASSO) algorithm to detect coefficient changes in the DREGAR model. For the proposed statistic, we establish its asymptotic distribution under the null hypothesis and demonstrate its divergence under the alternative hypotheses. Through simulations, we show that our method significantly outperforms classical CUSUM-based methods in terms of detection powers and mean detection delay. Furthermore, it exhibits superior performance compared to the existing recursive residual based vector-valued CUSUM method. Finally, the practical utility of the proposed method is demonstrated through empirical studies on long-term residential electricity consumption data and international financial markets.

Quantile inference for multivariate response regression in joint modeling of longitudinal and survival data

牛晓煜（兰州大学）

Abstract: Quantile regression (QR) offers a robust framework for analyzing covariate effects across the outcome distribution, particularly when the response variable exhibits skewness or heavy tails. To jointly model multivariate longitudinal biomarkers and a time-to-event outcome, we propose a novel joint model based on linear QR mixed models. The longitudinal submodel accounts for associations among multivariate responses by assuming a multivariate asymmetric Laplace distribution

for the errors, utilizing its location-scale mixture representation for computational efficiency. For the event-time process, a Cox proportional hazards model is employed, which incorporates shared random effects from the longitudinal submodel to link the two processes. Estimation is performed using a Monte Carlo Expectation-Maximization algorithm, with Metropolis-Hastings sampling to approximate the E-step. Comprehensive simulations under various quantile levels, censoring rates, error distributions, and correlation structures demonstrate that the proposed method yields accurate estimates for the regression parameters in both the longitudinal and survival submodels.

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323	苗雨萌	兰州大学	硕士	miaoym2024@lzu.edu.cn
324	彭 楚	兰州大学	硕士	jokerpc1209@163.com
325	乔 磊	兰州大学	硕士	jkloiu8197@qq.com
326	师贝贝	兰州大学	硕士	shibb2025@lzu.edu.cn

(注：依姓氏字母顺序排列)

会议指南

A. 乘车路线:

线路 1: 兰州中川国际机场→兰州长城建国饭店

(1) 可乘坐机场巴士 1 号线, 到东方大酒店站 (兰州大学正门对面), 约 65 分钟, 票价为 30 元/人, 从东方大酒店站下车后可乘坐出租车或网约车到达兰州长城建国饭店, 约 5 分钟, 出租车费用为 10 元; 或可从东方大酒店步行约 1.2 公里到达兰州长城建国饭店, 约 17 分钟。

(2) 可在 12306 网或中川机场自助购票机上购买城际列车票, 乘车区间: 中川机场东站-兰州站, 约 50 分钟, 票价约 20 元/人。出站后建议乘坐出租车或网约车到达兰州长城建国饭店, 约 5 分钟, 出租车费用为 10 元。

(3) 可从中川机场乘坐出租车或网约车到达兰州长城建国饭店, 约 65 分钟, 费用约 200 元。

线路 2: 兰州站→兰州长城建国饭店

建议乘坐出租车或网约车, 约 5 分钟, 出租车费用为 10 元。

线路 3: 兰州西站 (高铁站) →兰州长城建国饭店

(1) 可在兰州西站乘坐轨道交通 1 号线至兰州大学, 乘车区间: 兰州西站北广场-兰州大学, 约 20 分钟, 票价为 4 元/人。D 口出站后建议乘坐出租车或网约车到达兰州长城建国饭店, 约 5 分钟, 出租车费用为 10 元。

(2) 可乘坐出租车或网约车到达兰州长城建国饭店, 约 40 分钟, 费用约 30 元。

B. 会务组安排会议期间的午、晚餐, 早餐需自理, 以下建议供代表参考:

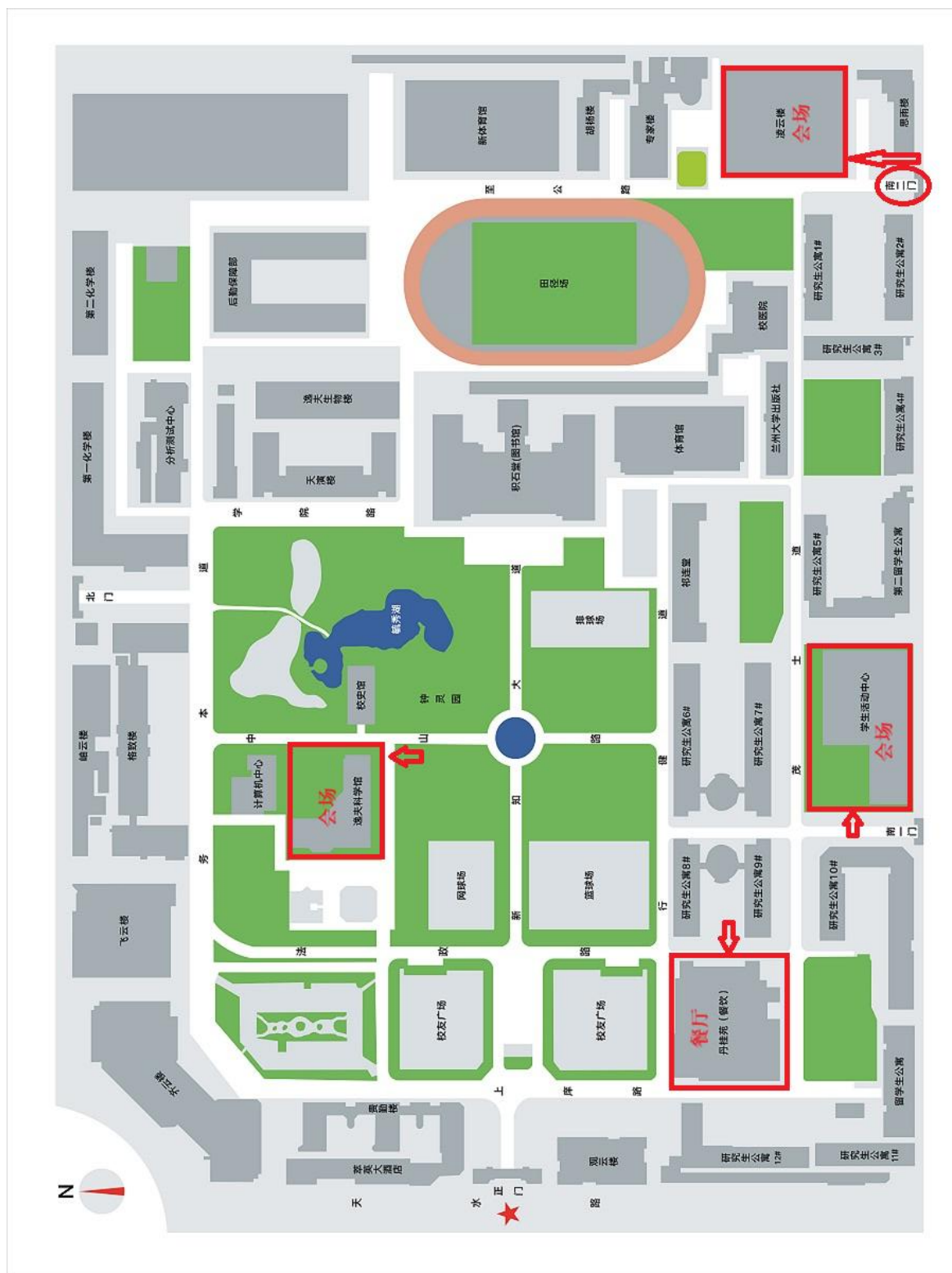
(1) 兰大正门对面甘南路 (过马路约 50 米) 有几家牛肉面馆, 如, 君乐、舌尖尖等, 可选择牛肉面;

(2) 兰大丹桂苑餐厅一楼提供早餐, 种类较多;

(3) 酒店提供早餐。

C. 请与会代表在会议期间注意安全, 外出前, 请将您的去向和返回时间告知同伴或会务组。

兰州大学校园（本部校区）



交通示意图





兰州大学简介

兰州大学是教育部直属全国重点综合性大学，在国家高等教育格局中具有重要战略地位，在国内外具有重要影响和良好声誉。

学校创建于 1909 年，始为甘肃法政学堂，是中国西北地区第一个具有现代意义的高等学校。1928 年，扩建为兰州中山大学。1946 年，更名为国立兰州大学。新中国成立后，在高等学校院系调整中，被确定为国家 14 所综合性大学之一。改革开放以来，先后入选“211 工程”“985 工程”建设高校，2002 年和 2004 年，甘肃省草原生态研究所、兰州医学院先后并入和回归兰州大学。2017 年，入选世界一流大学建设高校（A 类）。学校现有城关、榆中 2 个校区。在 110 多年的办学历程中，学校坚守在西部、奋斗为国家，走出了在经济待发达地区创办中国特色、世界一流大学的奋进之路，创造了化学“一门九院士”、地学“师生三代勇闯地球三极”、中科院“兰大军团”、隆基兰大合伙人等享誉国内外的“兰大现象”。

学校按照“兴文、厚理、拓工、精农、强医”的学科发展思路，着力构建“结构优化、布局合理、优势明显、特色突出”的学科体系和新型学科生态。是我国首批具有学士、硕士、博士学位授予权，首批建立博士后科研流动站的高校。现有 31 个博士学位授权一级学科，44 个硕士学位授权一级学科，7 个博士专业学位授权类别，29 个硕士专业学位授权类别，涵盖 13 个学科门类，是学位授权自主审核单位之一。有 23 个博士后科研流动站。有 8 个国家重点学科，2 个国家重点（培育）学科。化学、大气科学、生态学、草学 4 个学科入选世界一流学科建设名单。18 个学科进入 ESI 全球前 1%，其中化学、环境科学与生态学、农业科学 3 个学科进入 ESI 全球前 1‰。

学校坚持“近者悦、远者来”的人才工作理念，构建“稳培引用”有机结合的工作机制。现有专、兼职教学科研人员 3365 人，其中，教授、研究员 1510

人，副教授、副研究员 891 人；研究生导师 2700 人；在站博士后 475 人。有两院院士（含兼职）22 人；“国家高层次人才特殊支持计划”领军人才、教学名师 29 人；“长江学者奖励计划”特聘教授 30 人；国家青年科学基金项目（A 类）、国家杰出青年科学基金项目获得者 32 人；全国文化名家暨“四个一批”人才工程入选者 4 人；国家文化英才 1 人；百千万人才工程国家级人选 9 人；教育部“高等学校教学名师奖”获得者 4 人；科技部创新人才推进计划入选者 10 人；“国家高层次人才特殊支持计划”青年拔尖人才 30 人；“长江学者奖励计划”青年学者 31 人；国家青年科学基金项目（B 类）、国家优秀青年科学基金项目获得者 42 人；神农青年英才 3 人；青年文化英才 1 人；新世纪优秀人才支持计划（含跨世纪）入选者 100 人；中国青年科技奖 8 人；中国女科学家奖 4 人。

学校落实立德树人根本任务，弘扬“勤奋、求实、团结、进取”的优良学风，深入推进教育教学改革，不断完善人才培养体系，不懈提高人才培养质量。是我国首批设置文、理科国家基础科学研究与教学人才培养基地，首批入选国家大学生创新性实验计划的高校，是我国实施基础学科拔尖学生培养试验计划的 19 所高校之一。截止目前，现有本科生 21291 人，硕士研究生 15494 人，博士研究生 5899 人。有 96 个本科专业，16 个国家级特色专业。有 10 个国家级教学团队，6 个国家级人才培养基地，52 个国家级一流本科专业建设点，6 个国家级实验教学示范中心和 1 个国家级虚拟仿真实验教学中心，2 个国家级人才培养模式创新实验区，4 个国家级基础学科拔尖学生培养计划 2.0 基地，8 个强基计划招生专业，2 门课程获评国家级课程思政示范课程。56 万余名校友以浓郁的家国情怀、独特的坚守奋斗，赢得了“基础扎实、知识面宽、勤奋实干”的美誉。改革开放以来，毕业生荣膺两院院士、获得国家杰出青年科学基金者数量均名列全国高校前茅。

学校秉持“顶天立地”的科研观，坚持基础研究和应用研究并重，将地域的比较劣势转化为基于自然禀赋的比较优势，推动西部经济社会发展的重大问题上升为国家战略甚至国际科学问题，在 4 个一流建设学科以及磁学、核学、细胞活动与逆境适应、青藏高原、冰川冻土、风沙治理、多肽药物、西部高发疾病、敦煌学、民族学、马克思主义中国化、中亚问题、政府绩效治理、应急管理、区域

经济学等方面研究成果显著。围绕国家重大战略和重点领域，紧盯“大平台、大团队、大项目、大成果”，成立了一批创新研究机构，服务国家战略和地方经济社会发展的能力显著增强。现有国家自然科学基金委创新研究群体6个，教育部创新团队8个，自然科学类重点研究基地225个，全国重点实验室5个（含共建3个），国家大学科技园1个，国家野外科学观测研究站2个，“一带一路”联合实验室2个（含共建1个），教育部前沿科学中心1个，教育部重点实验室7个，教育部工程研究中心6个，省部共建协同创新中心1个。人文社会科学国家级重大研究基地2个，教育部人文社会科学重点研究基地2个，四部委铸牢中华民族共同体意识研究基地1个，教育部国别和区域研究培育基地1个，教育部联合研究院1个，教育部高校思想政治工作创新发展中心1个，国家语委国家语言文字推广基地1个，中央有关部门智库平台1个，教育部国别和区域研究中心（备案）4个，国家民委“一带一路”国别和区域研究中心1个，教育部哲学社会科学创新团队1个。

学校坚持开放办学，积极开展对外交流与合作，先后与世界59个国家和地区的339所高校及科研机构建立交流合作关系；牵头成立的“一带一路”高校联盟，成员总数达197个；建有3所孔子学院；与英国威尔士三一圣大卫大学合作举办兰州大学威尔士学院中外合作办学机构，与美国德雷塞尔大学合作举办计算机科学与技术专业本科中外合作办学项目，与澳大利亚南昆士兰大学合作举办生物制药专业本科中外合作办学项目。

学校第一医院、第二医院是集医疗、教学、科研、预防、保健、康复、急救为一体的大型综合性三级甲等医院，是甘肃省乃至西北地区具有重要影响的医疗机构，在区域医疗和医学人才培养方面发挥着重要作用。口腔医院是三级甲等口腔专科医院。

面向未来，兰州大学坚持以习近平新时代中国特色社会主义思想为指导，以建成中国特色、世界一流大学为目标，发扬“自强不息、独树一帜”的校训精神，不忘初心、牢记使命、坚守奋斗，致力于在中国西部大地书写建设教育强国的时代答卷，为以中国式现代化全面推进强国建设、民族复兴伟业作出新的更大贡献。



兰州大学 数学与统计学院

SCHOOL OF MATHEMATICS AND STATISTICS LANZHOU UNIVERSITY

兰州大学数学与统计学院简介

兰州大学数学学科点创建于 1946 年、形成于 20 世纪 50 年代，以陈文塬教授、陈庆益教授和郭聿琦教授等为学科带头人，在非线性泛函分析、偏微分方程和代数学等三个方向开展研究，形成了优势和特色，并于 1984 年获得了基础数学博士授权点。期间，兰州大学数学学科以基础数学博士点为依托，在持续保持上述三个传统方向优势和特色的基础上，通过多年的艰苦努力和奋斗，在科学研究、人才培养、学科建设和服务经济社会发展等方面取得了突出成绩，发展形成了非局部发展方程、无穷维动力系统、图论及其应用、偏微分方程及应用、科学与工程计算方法、概率统计等学科方向，产生了一批年轻有为的学术带头人，在国内外产生了重要的影响。2001 年获准设立了数学博士后科研流动站，2003 年获得应用数学博士点，2005 年获准建立了数学一级学科博士学位授权点。现已具有国务院学位委员会批准的数学一级学科博士点（基础数学、计算数学、概率论与数理统计、应用数学），数学学科博士后流动站，数学一级硕士学位授权点，应用统计专业硕士学位授权点，以及甘肃省数学一级重点学科。

设有“数学与应用数学”、“信息与计算科学”及“统计学”三个本科专业，另设有基础理论班、强基计划班及数学萃英班各 1 个。其中“数学与应用数学”是教育部新批准的高等学校特色专业。“数学与应用数学”2020 年入选国家一流本科专业、数学专业 2020 年入选首批强基计划，即基础学科招生改革试点专业。2021 年数学专业获批基础学科拔尖学生培养计划 2.0 基地。“信息与计算科学”2022 年入选国家一流本科专业。

培养高水平研究型和应用型人才、建设世界一流数学学科，是我们一直追求的目标。进入本世纪以来，数学学科发展迅速，在队伍建设、科学研究、人才培养、国际合作与交流等方面取得了很大的成绩。在队伍建设方面，形成了结构合理、创新意识和科研攻关能力强、在诸多领域有重要影响的学术团队。截止 2024

年 11 月，学院现有教职工 92 人（教师 82 人，教学辅助人员 14 人），其中博士生导师 27 人、硕士生导师 52 人；教授 31 人、副教授 35 人。国家杰出青年基金获得者 1 人、国家优秀青年基金获得者 1 人、国家人才计划（青年学者）2 人，享受国务院政府津贴 3 人，“教育部高校青年教师奖”获得者 2 人，教育部新世纪人才计划获得者 6 人，宝钢教育基金优秀教师奖获得者 5 人，“甘肃省领军人才”获得者 7 人，甘肃省“飞天学者”特聘教授 1 人、青年学者 2 人，甘肃省教学名师 1 人。甘肃省 333 科技人才 1 人，甘肃省 555 创新人才 4 人。

在科学研究与平台建设方面，瞄准国内外学术前沿和地方发展需求，不断提升高水平研究数量和质量，产生了一批有重要影响的高水平的科研成果。获甘肃省自然科学一等奖 2 项，二等奖 6 项，三等奖 1 项，甘肃省科技进步奖二等奖 1 项，三等奖 4 项，教育部高校自然科学二等奖 1 项。根据 2018 年 5 月基本科学指标（ESI）数据，近 10 年兰州大学数学学科发表论文 1071 篇，被引用 7251 次，全球排第 82 名（全球 2.35 万个单位），全国高校排第 2 位；篇均被引次数为 6.77，全球排第 63 名，国内排第 2 名，有 19 篇论文入选 ESI 高引用论文。1 篇论文入选 2008 年“中国百篇最具影响的国际学术论文”，1 篇论文入选 2015 年“中国百篇最具影响的国际学术论文”。积极主动承担国家重点项目和人才项目，2008 年张和平教授主持的“应用图论”项目获准为国家自然科学基金重点项目，2010 年有 2 人参与的国家自然科学基金重点项目“非线性泛函分析与无穷维动力系统中相关理论及应用问题研究”获准立项，2015 年孙春友教授获得国家自然科学基金委优秀青年基金，2017 年李万同教授主持的《非局部动力系统及应用》项目获准为国家自然科学基金重点项目，2019 耿俊教授入选国家人才计划（青年学者）项目，2020 年王跃循教授入选国家人才计划（青年学者）项目，2022 年邓伟华教授获批国家自然科学基金杰出青年基金。大力加快平台建设，2014 批准建立了“甘肃省高校应用数学与复杂系统省级重点实验室”，为应用数学与复杂系统团队的发展提供了有力的支撑。2015 年建立了“兰州大学大数据科学研究中心”。2017 年与西交大等 10 所高校合建“国家天元数学西北中心”。2020 年获批“甘肃应用数学中心”。

在人才培养方面，始终将人才培养和提高质量视为根本任务，不断优化和完善人才培养方案，加强培养环节的监管，为全国特别是为西部地区和甘肃省培养了大批数学高级专门人才。培养的学生中有 8 人获得杰出青年基金，大多数已经成为本行业的业务骨干或学术带头人，对西北地区特别是甘肃省的高等数学教育和发展发挥了不可替代的作用，为其他学科的发展提供了强有力的支撑。在国际合作与交流方面，数学学科发展迅速、交流活跃，目前在岗的 76 位教师中，83 % 的教师有一年以上的国外学习和交流经历，每年邀请 180 余名国内外专家学者来校讲学，100 余人次参加国内国际学术会议或讲学，近五年主办或承办国际学术会议 15 次，特别是李万同教授于 2013 年 7 月在台湾举办的第六届华人数学家大会上作了邀请报告，耿俊教授于 2022 年 8 月在南京举办的第九届世界华人数学家大会上作邀请报告。

今后，兰州大学数学学科将继续坚持“培养高水平研究型和应用型人才、建设世界一流数学学科”的目标，在巩固保持已有优势与特色的基础上奋勇前行，力争在队伍建设和科研水平上取得新突破，在优势学科方向产生若干有国际影响力的学术团队、一批特色研究课题和相关领域的国际知名领军人物，产生一批有国际影响力的高质量科研成果，形成结构合理、整体实力强、创新意识强、科研攻关能力强的学术队伍，不断提高人才培养质量，努力培养拔尖创新人才，早日实现国际一流学科的目标。

兰州大学数学与统计学院人才招聘启事（长期有效）

兰州大学是教育部直属的全国重点综合性大学，也是国家“双一流”、“985工程”、“211工程”重点建设高校之一。在国家高等教育格局中具有重要战略地位，在国内外具有重要影响和良好声誉。

兰州大学数学与统计学院始于1946年国立兰州大学建立的数学系。1978年开始招收研究生，1981年基础数学成为首批硕士授权点，1984年获得基础数学博士授权点，2001年被批准设立数学博士后流动站，2003年获得应用数学博士授权点，2005年获得数学一级学科博士授权点，2010年获得应用统计专业硕士学位授权点。2020年获批建设甘肃应用数学中心。数学学科现为省级重点一级学科。学院设有“数学与应用数学”、“信息与计算科学”及“统计学”三个本科专业，另设有基础理论班、强基计划班及数学萃英班各1个。其中“数学与应用数学”是教育部新批准的高等学校特色专业。“数学与应用数学”2020年入选国家一流本科专业、数学专业2020年入选首批强基计划，即基础学科招生改革试点专业。2021年数学专业获批基础学科拔尖学生培养计划2.0基地。“信息与计算科学”2022年入选国家一流本科专业。

学院现有专任教师82人，其中教授31人、副教授36人；博士生导师27人、硕士生导师52人。国家杰出青年基金获得者1人、国家优秀青年基金获得者1人、国家人才计划（青年学者）2人，享受国务院政府津贴4人，“教育部高校青年教师奖”获得者2人，教育部新世纪人才计划获得者6人，宝钢教育基金优秀教师奖获得者5人，“甘肃省领军人才”获得者8人，甘肃省杰青2人，甘肃省“飞天学者”特聘教授2人、青年学者2人，甘肃省陇原人才3人，甘肃省教学名师1人。甘肃省333科技人才1人，甘肃省555创新人才4人。

培养高水平研究和应用型人才、建设一流数学学科，是我们一直追求的目标。学院瞄准国内外学术前沿，产生了一批有重要影响的高水平的科研成果。近五年获批国家自然科学基金杰出青年基金1项，国家自然科学基金项目37项，国际合作交流项目5项，甘肃省科技计划项目23项，横向项目24项。累计到账科研总经费3652万元，发表高水平学术论文703篇，出版科研专著2部。获得教育

部自然科学二等奖 1 项，甘肃省自然科学一等奖 1 项，甘肃省自然科学二等奖 4 项。

现面向海内外诚邀各类英才加盟兰州大学数学与统计学院！

一、招聘岗位

1. 萃英学者
2. 海外优秀青年人才
3. 教授/研究员
4. 副教授/副研究员
5. 青年研究员
6. 外籍教师
7. 萃英博士后、博士后

二、相关待遇

1. 萃英学者：“萃英学者”为兰州大学重大人才支持计划，设置一级岗、二级岗、三级岗和四级岗。“萃英学者”一级岗为院士、一级教授及相当层次人才；二级岗为国家级人才计划领军人才；三级岗为“四青”人才，或依托我校申报“四青”并具有相当竞争力的海内外人才；四级岗为已取得重要学术影响、产出标志性研究成果，具有冲击“四青”潜力的优秀青年人才。

入选“萃英学者”后全职来校工作，学校聘为教授或研究员，并给予重点支持，提供有竞争力的薪酬待遇、住房补贴安家费和科研启动经费，可申请租住校内周转公寓，开通医疗保健绿色通道，安排子女入学、入园。

2. 海外优秀青年人才：提供具有竞争力的薪酬；住房补贴、安家费 110 万元；在国家自然科学基金委资助经费基础上，学校提供 1:1 配套科研启动费；支持人才根据学科特点和发展需要，组建学术创新团队，在人才引进、博士后选聘方面给予倾斜。

3. 教授/研究员：提供 50-300 万元科研启动经费；提供 50-90 万元住房补贴、安家费；可申请租住校内周转公寓；安排子女入学、入园。

4. 副教授/副研究员：提供 50-100 万元科研启动经费；40 万元住房补贴、安家费；可申请租住校内周转公寓；安排子女入学、入园。

5. 青年研究员：提供税前每年 34 万元年薪(含租房补贴 4 万元)；提供 50-150 万元科研启动经费；可申请租住校内周转公寓；安排子女入学、入园。5 年聘期考核合格的，可按程序聘为四级教授、博士生导师；转入事业编制；提供住房补贴安家费。

6. 外籍教师：按国际标准提供优厚薪酬待遇；提供相应层次人员的科研启动费；提供相应层次人员的安家费；可申请租住校内周转公寓。

7. 萃英博士后、博士后：“萃英博士后”学校薪酬 30-40 万元/年；普通博士后合计薪酬可达 16.2+万元/年；享受甘肃省博士后津贴相关政策支持；按照国家规定缴存社会保险及住房公积金。入选国家“博士后创新人才支持计划”、“博士后国际交流计划”等人才支持计划的，可直接选聘为“萃英博士后”，并提供如下支持：

① 延期支持：资助期满但仍在合同期内且表现优秀者，学校可继续提供薪酬直至聘期结束。

② 全额支持：提前出站者，国家提供的日常经费剩余部分出站时一次性发放给本人。

晋升通道：在站期间，可申请获得职称任职资格；考核合格并且表现优异的博士后，可按人才引进条件和程序申请校内相应岗位，并享受住房补贴安家费、科研启动经费等待遇。

三、人才保障

1. 提供具有竞争力的薪酬，为潜心教学科研保驾护航。
2. 三所三甲医院，高层次人才医疗保健“绿色通道”，优质医疗服务。
3. 附属幼儿园、小学、中学，优质的子女基础教育资源。
4. 可申请租住校内人才周转公寓，拎包入住，温馨家园。

四、应聘材料

1. 本人简历（从大学至今，附有照片）；

2. 求职意愿信；

3. 近 5 年发表的学术论文、著作及其他科研成果列表；

4. 过去的研究工作总结及未来的研究计划；

5. 本领域三位正高级职称专家推荐信（由推荐专家向指定邮箱提供电子版推荐信），其中至少 2 封来自兰州大学校外专家；近期毕业博士应有本人博士生导师、硕士生导师的推荐信；近期出站博士后应有博士后合作导师、博士生导师的推荐信；有过工作经历的，原则上要提供最近一个工作岗位的直接领导的推荐信；

6. 学历学位证书、博士阶段成绩单、英语水平证明、奖励证书、专业技术职称证明等重要材料复印件。

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五、联系方式

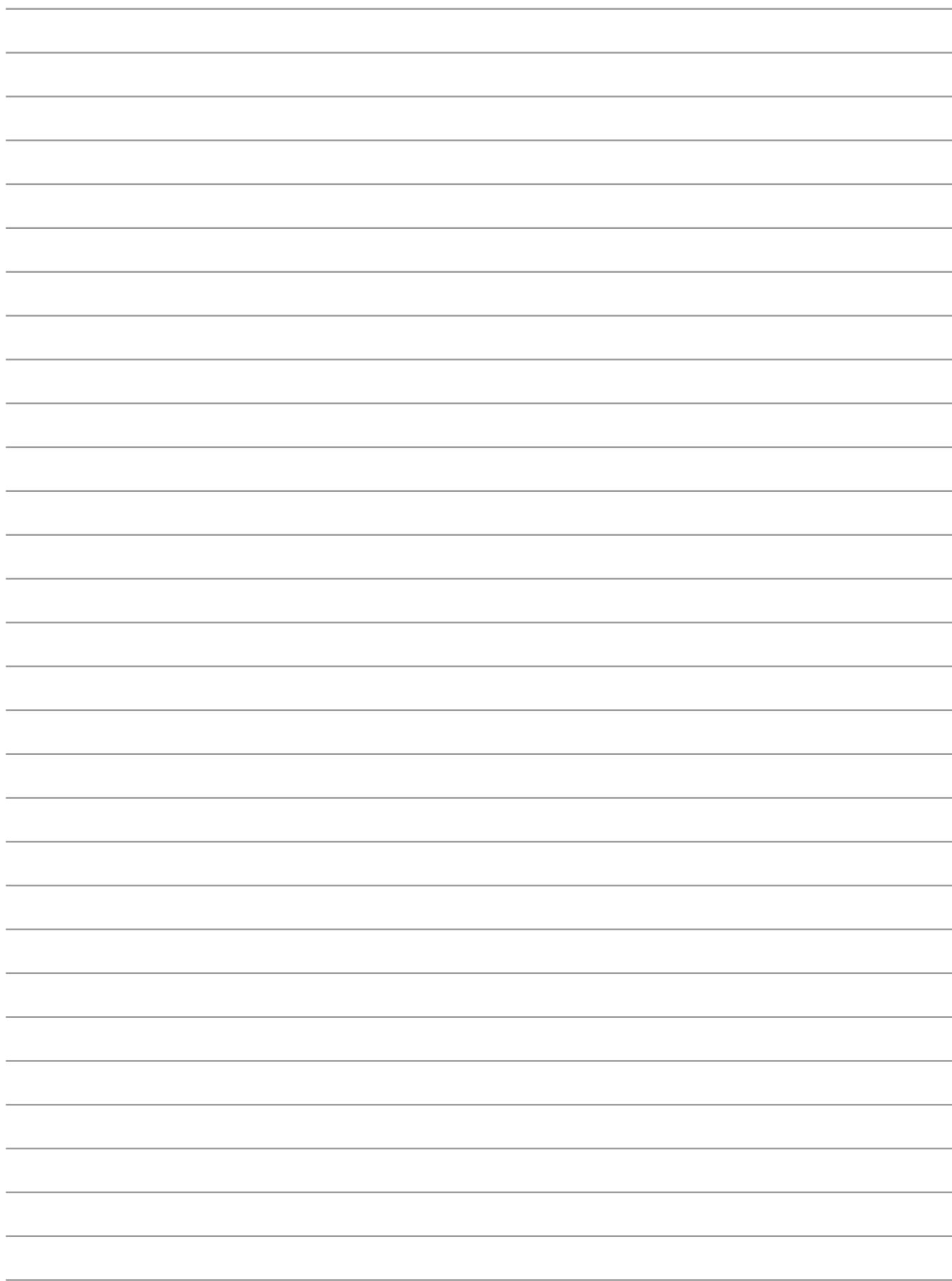
联系人：刘海娟 电话：0931-8912483

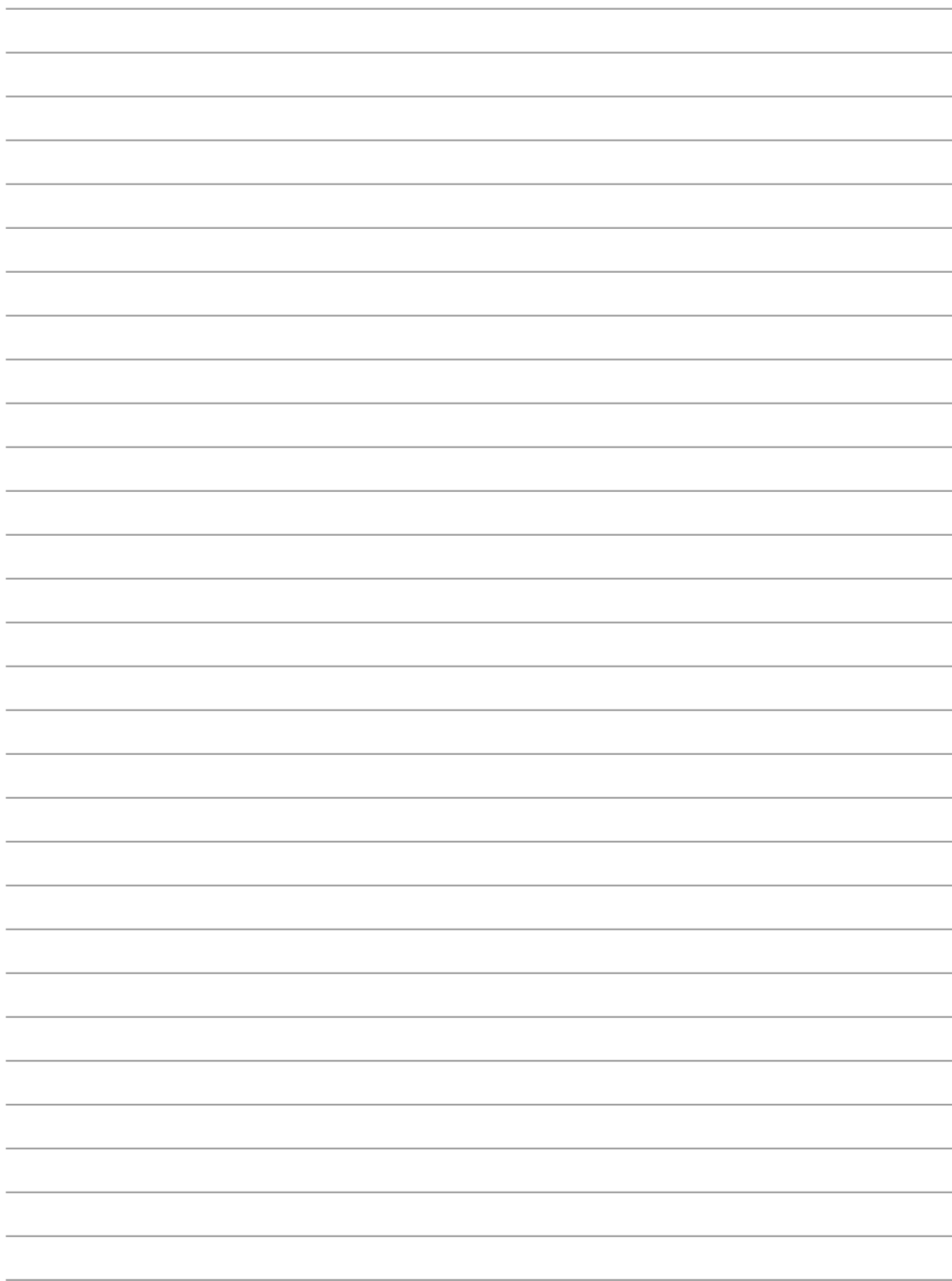
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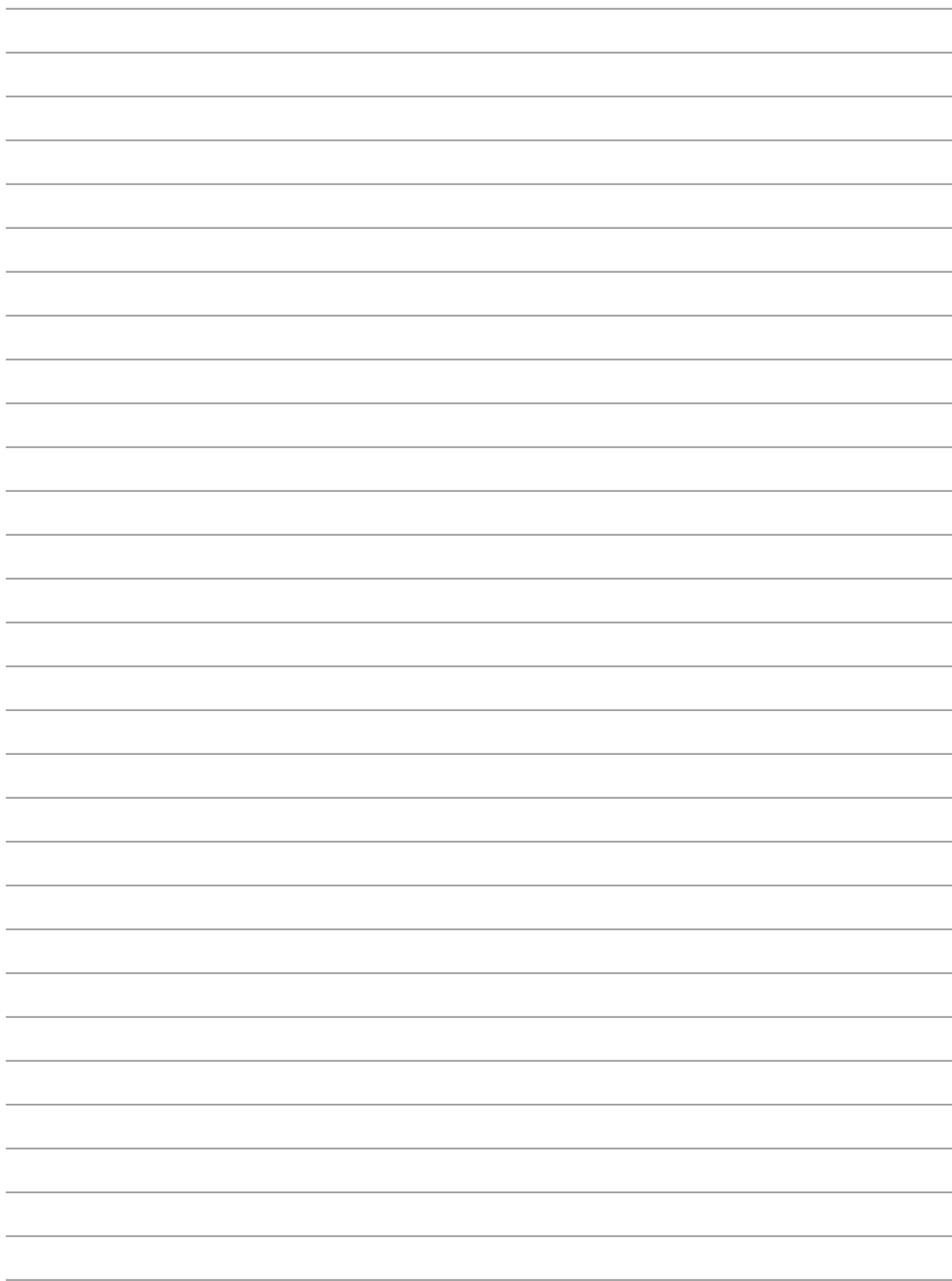
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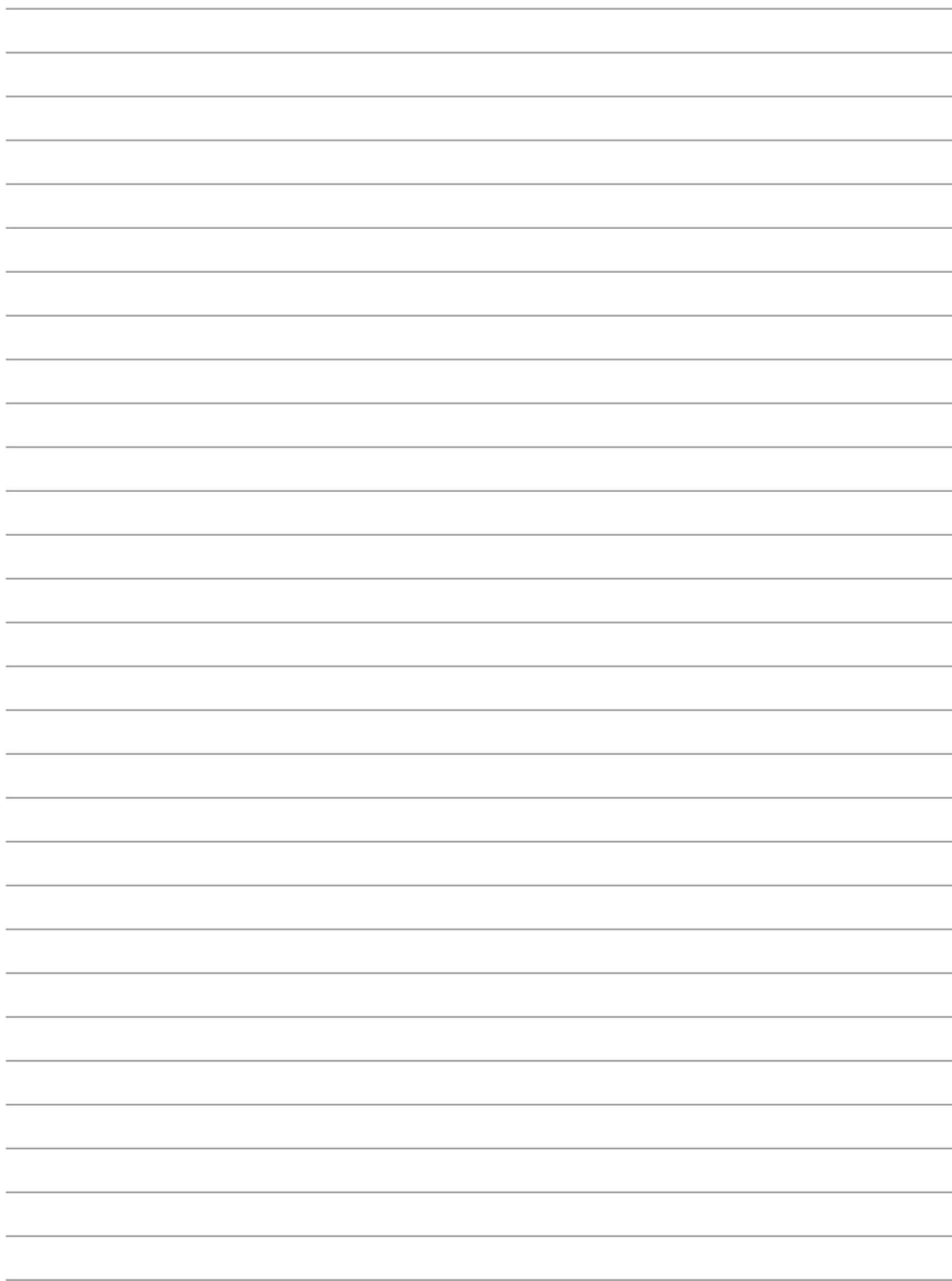
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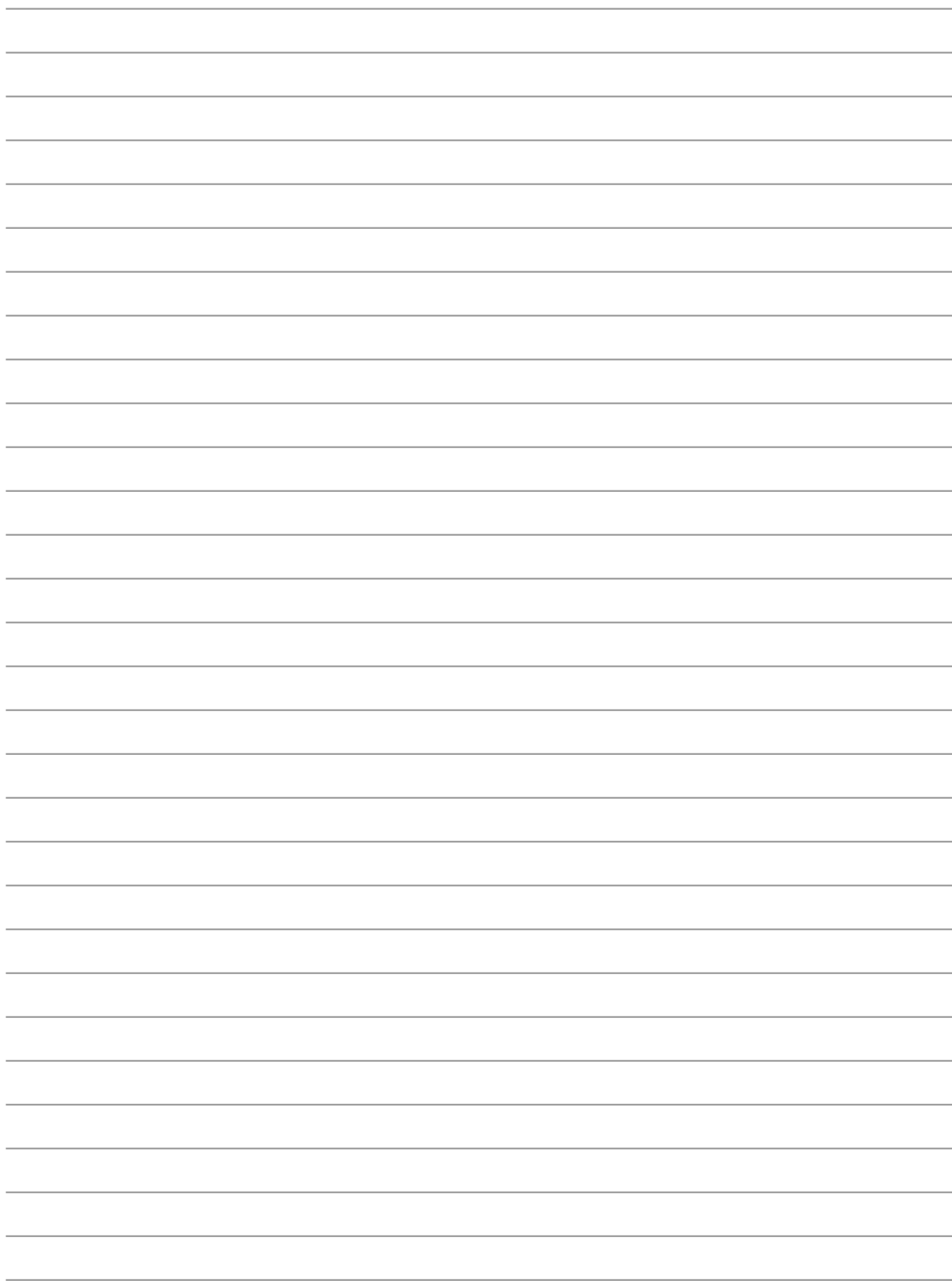
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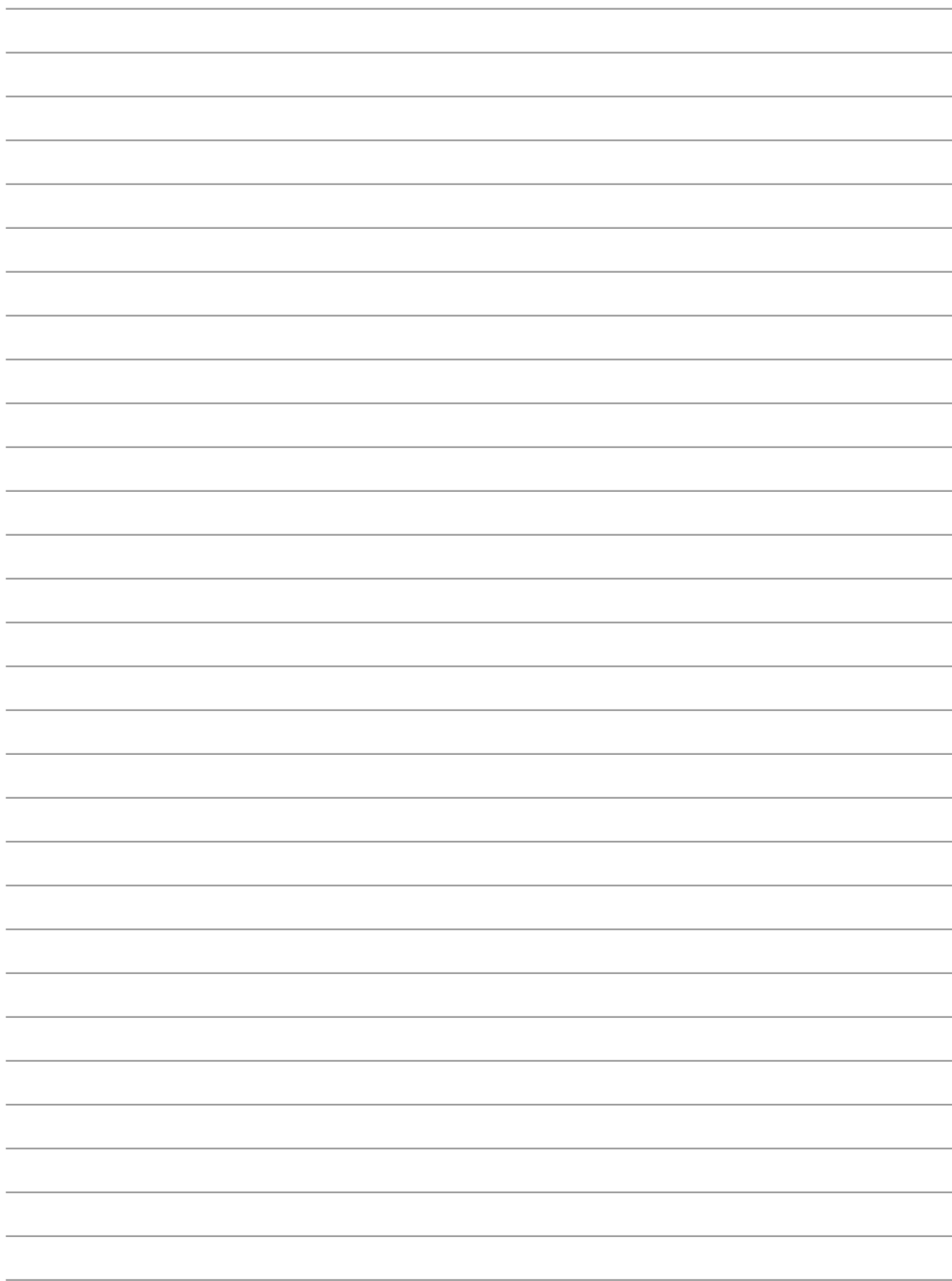


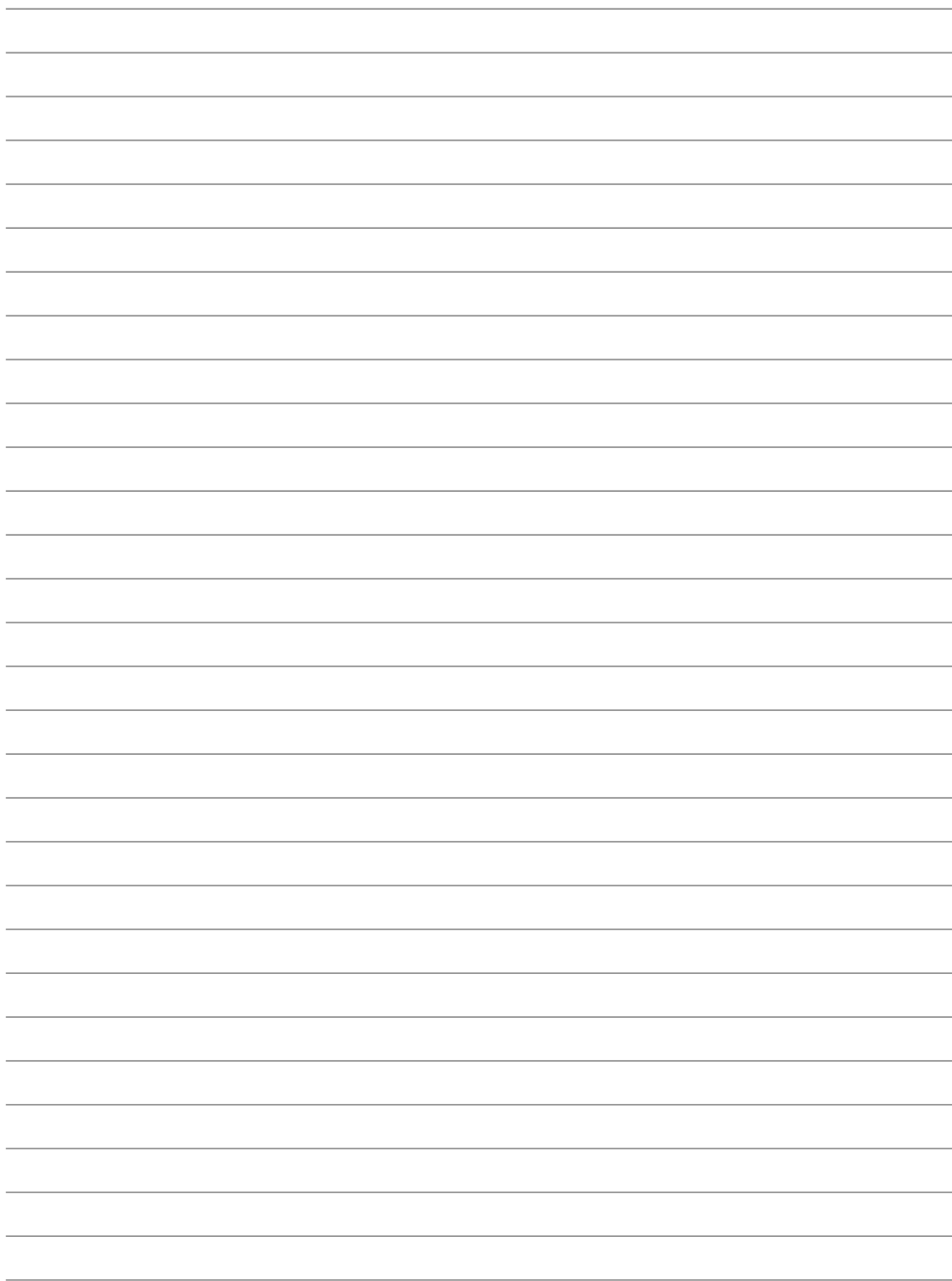


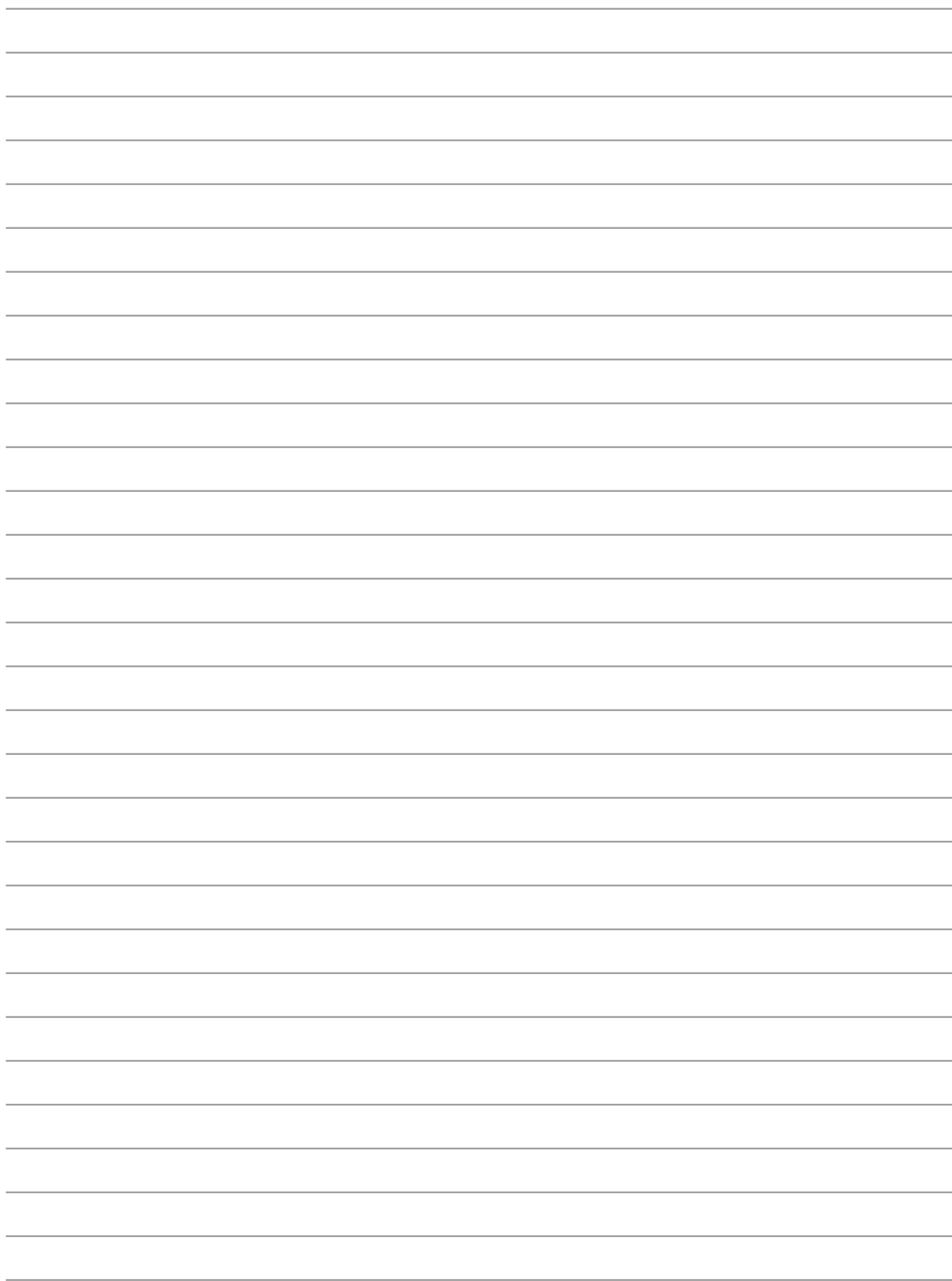












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