2018年第一届
金融数学青年学者学术研讨会

会议手册

华南师范大学数学科学学院

12月5—8号

地址：广东省广州市天河区中山大道西55 邮编：510631

目录

一、会议信息

第一届金融数学青年学者学术研讨会

本次会议旨在讨论由金融理论和实践所驱动的关键数学问题，为国内从事金融数学研究的青年学者提供一个相互了解和交流的平台，扩大相互的影响、了解相互的进展、促进相互的合作。拟于2018年12月6日-8日（报告时间为6日-7日，8日为自由讨论）在广州华南师范大学数学科学学院举办第一届金融数学青年学者学术研讨会，欢迎各位老师前来参会。

1. 会议时间和地点

会议时间：2018年12月6日-8日（12月5日报到，12月6-7日会议，8日为自由讨论）。

会议地点：华南师范大学（广东省、广州市、天河区、中山大道西55号，数学科学学院二楼阶梯会议厅）

会议报道地点：华南师范大学，华师大厦酒店(原华师粤海酒店)大厅

2. 主办单位

华南师范大学数学科学学院

3. 协办单位

广东财经大学统计与数学学院

4. 会议议题

1. 金融数学与金融工程学术研究成果交流主题（但不限于）：金融数学；金融风险管理；资产定价；金融工程；量化投资；金融计算等。

2. 与金融有关的随机控制、随机分析主题。

诚邀与会代表积极报名就以上议题（但不限于上述议题）作报告。

5. 组织机构

1. 学术委员会委员主任：陈增敬（山东大学）

学术委员会委员：（按姓氏拼音排列）

戴民（新加坡国立大学）

郭先平（中山大学）

嵇少林（山东大学）

李娟（山东大学）

黎稳（华南师范大学）

李仲飞（中山大学）

马敬堂（西南财经大学）

汤善健（复旦大学）

王永进（南开大学）

吴臻（山东大学）

夏建明（中国科学院数学与系统科学研究院）

熊捷（南方科技大学）

杨静平 （北京大学）

2．程序委员会委员：（按姓氏拼音排列）

薄立军（中国科技大学）

程雪（北京大学）

邓军（对外经济贸易大学）

杜恺（复旦大学）

郭冬梅（中央财经大学）

韩月才（吉林大学）

胡锋（曲阜师范大学）

胡明尚（山东大学）

李辰旭（北京大学）

林一青（上海交通大学）

宋永生（中国科学院数学与系统科学研究院）

危佳钦（华东师范大学）

吴盼玉（山东大学）

夏建明（中国科学院数学与系统科学研究院）

徐礼虎（澳门大学）

许明宇（中国科学院数学与系统科学研究院）

许左权（香港理工大学）

杨舟（华南师范大学）

于志勇（山东大学）

曾燕（中山大学）

张静（复旦大学）

张奇（复旦大学）

朱庆峰（山东财经大学）

3．组织委员会委员：（按姓氏拼音排列）

陈奇斌（华南师范大学）

王永梅（华南师范大学）

杨舟（华南师范大学）

易建新（华南师范大学）

张艳红（华南师范大学）

6. 联系方式

联系人和手机号码：杨舟（13570545636）

联系地址：广州天河区中山大道西 55 号华南师范大学数学科学学院

邮编：510631

联系电话：020-85216655-415

E-mail：yrm_mf_2018@sina.com

7. 其它事项

1．会议住宿：

（1）华师大厦酒店(原华师粤海酒店)，酒店地址：广州天河区中山大道西 69 号，电话：020-85216888（大家入住时，请告诉服务员早餐要几份/天，直接拿身份证入住）。

（2）汉普敦国际公寓（广州华师地铁站店），酒店地址：广州天河区中山大道

西 61-65 号，电话：020-89289681（房价已经包含早餐）。

八、交通路线：本会议不负责接送服务。

广州白云机场：　（的士费用约 150 元）

机场到华师大厦的机场大巴　（市区 2 号线华师大厦酒店，票价 25 元）

大巴候车地点：　T1A 区　A4 号门附近；　T1B 区　B10 号门附近；

T2 区　50 号门附近

出租车候车地点：　T1A 区　A7 号门附近；　T1B 区　B3 号门附近；

T2 区　50 号门或 53 号门附近

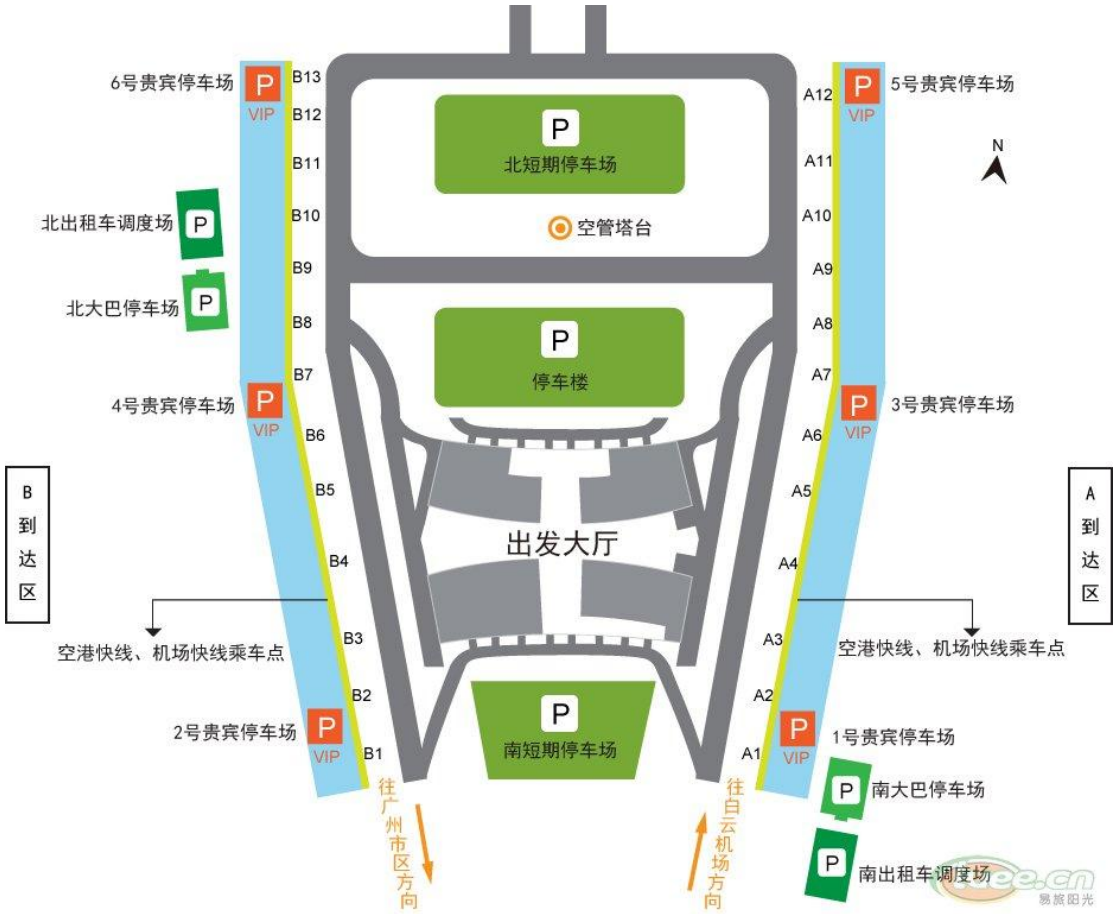


图 1.　T1 的平面图

广州火车南站（火车南站、高铁站）：　（的士费用约 90 元）

地铁 7 号线 → 地铁 3 号线　（票价 7 元）

1.广州火车南站　步行　250 米

2.广州火车南站 上车（7 号线）

3.地铁 7 号线 （大学城南方向）　4 站　汉溪长隆站 下车

4.站内换乘 步行　170 米

5.汉溪长隆站 上车（3 号线）

6.地铁 3 号线 （天河客运站方向）　11 站　华师站（E 出口）下车

7.华南师范大学师西门穿过华南师范大学步行到华师大厦（正门附近）

广州火车东站（火车东站）：　（的士费用约 23 元）

298 路/32 路　（票价 2 元）

1.东站汽车客运站　上车

2. 298 路/32 路 （华景新城总站/华工大总站方向） 5 站

3.师大后门站 下车

4.华南师范大学师西门穿过华南师范大学步行到华师大厦（正门附近）

广州火车站（老火车站）：　（的士费用约 35 元）

b2a 路　　（票价 2 元）

1. 广州火车站总站　上车

2. b2a 路　8 站

3. 师大暨大站 下车　　170 米

4. 过天桥即到华南师范大学正门附近，步行 80 米到华师大厦

二、华南师范大学数学科学学院的简介

华南师范大学数学科学学科创建于 1952 年院系调整时期，2004 年 12 月在原数学系基础上成立了数学科学学院。学院现设数学与应用数学系、金融数学与金融工程系、信息与计算科学系、概率统计系以及数学与应用数学研究所、非线性科学中心、计算数学研究所、组合代数中心、广东省数学与统计实验教学示范中心等教学与科研机构。编辑出版《中学数学研究》（1955 年创刊）刊物。

学院现有专任教师 90 多人，其中教授 31 人，博士生导师 26 人。教师队伍中拥有教育部长江学者特聘教授、国家杰出青年基金获得者、国家级教学名师 1 人，国家“百千万人才工程”第一、二层次入选者 1 人，中组部“青年千人”1 人，教育部新世纪优秀人才 3 人，广东省珠江学者 5 人，广东省特支计划领军人才 1 人，广东省杰出青年基金获得者、广东省特支计划青年拔尖人才 1 人，广东省千百十省级培养对象 6 人，全国百篇优秀博士论文获得者 2 人。

学院具有数学一级学科博士授权点、数学一级学科硕士授权点、学科教学(数学)教育硕士和金融硕士(数量金融与量化投资方向)两个专业学位授权点。设有数学博士后流动站，形成了本科-硕士-博士-博士后完整的人才培养体系。数学与应用数学专业是广东省高等学校名牌专业、国家特色专业和国家专业综合改革建设点，金融数学专业是广东省应用型人才培养示范专业，信息与计算科学专业是广东省专业综合改革建设点。

2015 年获批广东省数据科学工程技术研究中心。2015 年 5 月至今数学学科 ESI 排名稳定位于世界前 1%。2015 年数学与计算机学科群作为学校的六个学科群之一，进入广东省重点大学建设学科群。在 2016 年教育部第四轮学科评估中，华南师范大学数学学科被评为 B+。

近五年来，本院教师在研国家自然科学基金等项目 129 项，各类立项总经费达 3706.5 万元，以第一单位获教育部自然科学奖二等奖两项、广东省科学技术二等奖 3 项。

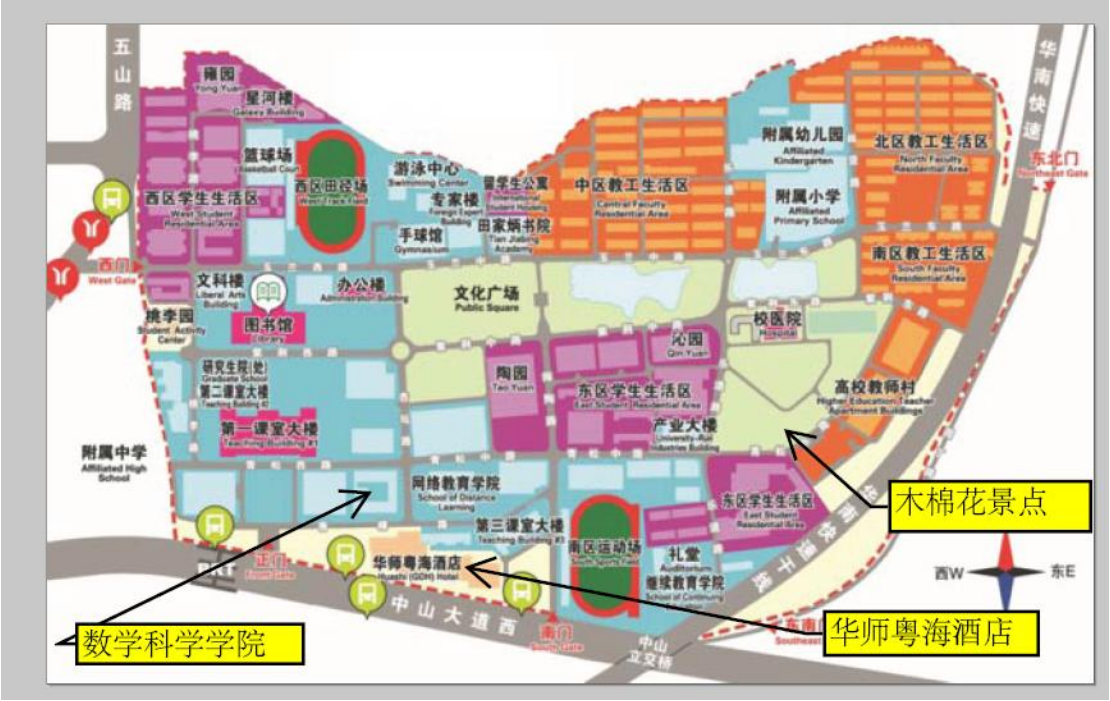
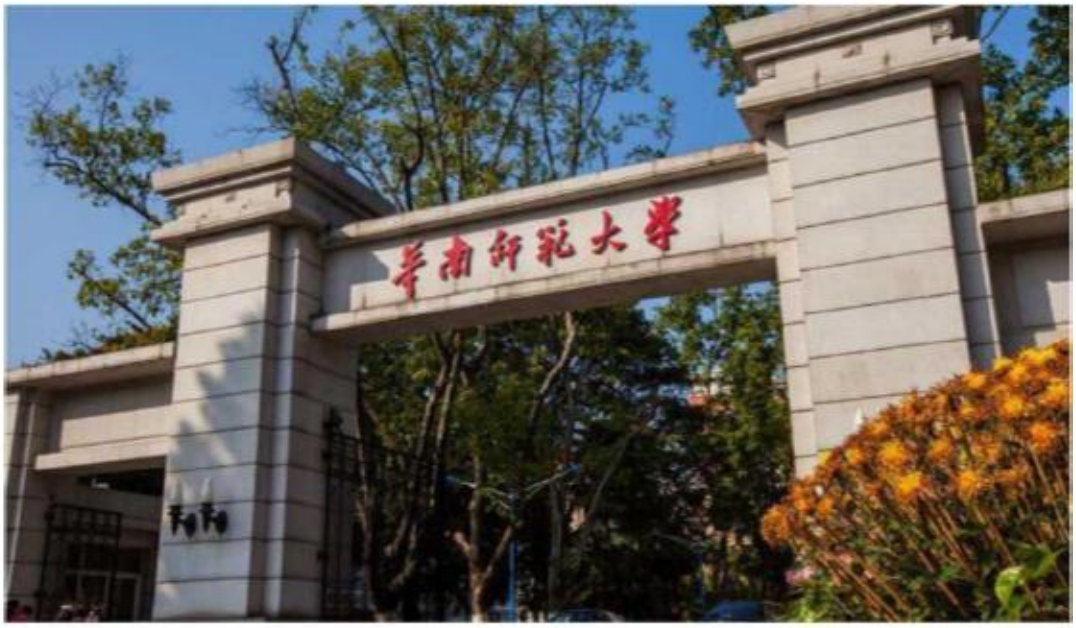
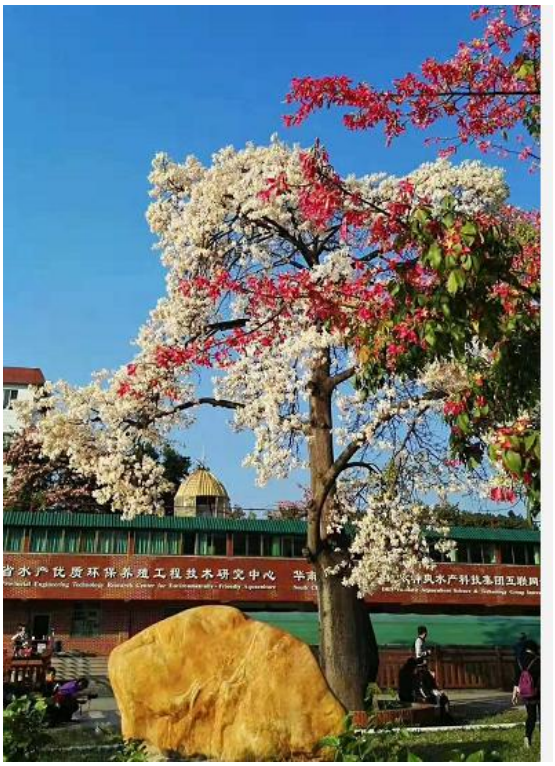


图 2.　华师平面地图

美丽的华南师范大学校园



美丽的华南师范大学校园



三、时间表

时间	12 月 5 日 (星期三)	12 月 6 日 (星期四)	12 月 7 日 (星期五)		12 月 8 日 (星期六)
08:30-8:45		开幕式			
08:45-9:00		集体照	08:45-9:15	王光臣	
09:00-9:45		熊捷	09:15-9:45	于志勇	
09:45-10:15		彭献华	史敬涛		
10:15-10:40		茶歇			
10:40-11:10		薄立军	杜恺		
11:10-11:40		张奇	肖华		
11:40-14:00		午餐			
14:00-14:30	注册	许左权			自由讨论 离会
14:30-15:00		许威	朱庆峰		
14:30-15:30		林祥	张静		
15:30-16:00		曾燕	张伏		
16:00-16:30		茶歇			
16:30-17:00		钱晓松	管崇虎		
17:00-17:30		秦聪	魏庆萌		
17:30-18:00		姚海祥			
18:00-		晚餐			

四、会议日程

2018 年 12 月 5 日	
会议注册（华师大厦）	
2018 年 12 月 6 日　地点：数学科学学院二楼阶梯会议厅	
8:30--8:45	开幕式
8:45--9:00	集体照
主席：林一青（上海交通大学）	
09:00-9:45	熊捷（Stochastic Linear-Quadratic Optimal Control Problems with Random Coefficients: Closed-Loop Representation of Open-Loop Optimal Controls）
09:45-10:15	彭献华 （Stock Market Spoofing）
10:15-10:40	茶歇
主席：周超（新加坡国立大学）	
10:40-11:10	薄立军（Risk Sensitive Portfolio Optimization with Default Contagion and Regime-Switching）
11:10-11:40	张奇（Robust Consumption Portfolio Optimization with Stochastic Differential Utility）
11:40-14:00	午餐
主席：薄立军（中国科技大学）	
14:00-14:30	许左权 （Recent development of Markowitz's theory）
14:30-15:00	许威（Implied Volatility Surface Construction for Commodity Futures Options in China）
15:00-15:30	林祥 （Optimal investment problem for n interacting agents）
15:30-16:00	曾燕 （预售众筹产品质量夸大行为及其预防措施分析）
16:00-16:30	茶歇
主席：程雪（北京大学）	
16:30-17:00	钱晓松（CDS Pricing in a Markov chain Interacting Intensities model with Contagion）
17:00-17:30	秦聪（On Balanced Growth Path Solutions of a Knowledge Diffusion and Growth Model）
17:30-18:00	姚海祥（Dynamic discrete-time portfolio selection for defined contribution pension funds with inflation risk）

2018 年 12 月 7 日　地点：数学科学学院二楼阶梯会议厅	
主席：孟庆欣（湖州师范学院）	
08:45-9:15	王光臣（An optimal control problem of FBSDE with noisy observation）
09:15-9:45	于志勇（Forward-Backward Stochastic Differential Equations and Linear-Quadratic Generalized Stackelberg Games）
09:45-10:15	史敬涛（Maximum Principle for Risk-Sensitive Stochastic Optimal Control Problem and Applications to Finance）
10:15-10:40	茶歇
主席：赵绪哲（广东外语外贸大学）	
10:40-11:10	杜恺（Optimal gradient estimates of heat kernels of stable-like operators）
11:10-11:40	肖华（A kind of LQ non-zero sum differential game of backward stochastic differential equation with asymmetric information）
11:40-14:30	午餐
主席：谢杰华（江西财经大学）	
14:30-15:00	朱庆峰（Nonzero Sum Differential Game of Backward Doubly Stochastic Systems with Delay）
15:00-15:30	张静（Quasilinear Stochastic PDEs with two obstacles: Probabilistic approach）
15:30-16:00	张伏 （Well-posedness of high dimensional CIR SDEs）
16:00-16:30	茶歇
主席：杨舟（华南师范大学）	
16:30-17:00	管崇虎（On a free boundary problem for an optimal investment problem with different interest ）
17:00-17:30	魏庆萌（Linear Quadratic Stochastic Optimal Control Problems with Operator Coefficients: Open-Loop Solutions）
2018 年 12 月 8 日	
自由讨论（数学科学学院二楼阶梯会议厅）	
2018 年 12 月 9 日	
离会	

五、报告题目和摘要

Stochastic Linear-Quadratic Optimal Control Problems with Random Coefficients: Closed-Loop Representation of Open-Loop Optimal Controls

熊捷（南方科技大学）

This talk is concerned with a stochastic linear-quadratic optimal control problem in a finite time horizon, where the coefficients of the control system and the weighting matrices in the cost functional are all allowed to be random and the latter are even allowed to be indefinite.
Based on a Hilbert space approach, the convexity of the cost functional is shown to be necessary for the existence of an open-loop optimal control, and the uniform convexity, which is slightly stronger than the convexity, is shown to be sufficient. The unique solvability of the associated stochastic Riccati equation is established under the uniform convexity condition, which contains the classical assumption that the weighting matrices in the cost functional are positive definite as a special case. Further, it is shown that the open-loop optimal control admits a closed-loop representation. The paper therefore solves Bismut and Peng's open problem in a general framework. This talk is based on a joint paper with Sun and Yong.

Risk Sensitive Portfolio Optimization with Default Contagion and Regime-Switching

薄立军（中国科技大学）

We study an open problem of risk-sensitive portfolio allocation in a regime-switching credit market with default contagion. The state space of the Markovian regime-switching process is assumed to be a countably infinite set. To characterize the value function of the risk sensitive stochastic control problem, we investigate the corresponding recursive infinite-dimensional nonlinear dynamical programming equations (DPEs) based on default states. We propose to work in the following procedure: Applying the theory of the monotone dynamical system, we first establish the existence and uniqueness of classical solutions to the recursive DPEs by a truncation argument in the finite state space. Moreover, the associated optimal feedback strategy is characterized by developing a rigorous verification theorem. Building upon results in the first stage, we construct a sequence of approximating risk sensitive control problems with finite state space and prove that the resulting smooth value functions will converge to the classical solution of the original system of DPEs. The construction and approximation of the optimal feedback strategy for the original problem are thoroughly discussed.

Optimal gradient estimates of heat kernels of stable-like operators

杜恺（复旦大学）

In this talk we show the optimal gradient estimate for heat kernels of stable-like

operators by providing a counterexample. This talk is based on a joint work with Xicheng Zhang.

On a free boundary problem for an optimal investment problem with different interest rates

管崇虎（嘉应学院）

This paper discusses an investment problem for a single agent with higher borrowing interest rate than lending in the market. The objective is to maximize the expected discounted utility of terminal wealth by choosing portfolio of one risk asset and the bank account. The objective function is the solution of a free boundary problem with two nonlinear equations and one linear equation. The main contribution is that the existence of free boundary lines is proved in all situations and the design methods can be generally applied to other similar problem.

Optimal investment problem for n interacting agents

林祥（浙江工商大学）

We investigate the optimal investment problem for n interacting agents in a continuous time framework. Agents can invest their wealth in a simplified financial market consisting of a bank account and n correlated risky stocks. While we allow all agents to invest freely in the bank account, only one of the n risky stocks is available to each agent. Agents are heterogeneous, so there are two utility functions which depend on n agents' wealth processes. Every agent chooses a dynamic portfolio strategy in order to maximize his expected terminal wealth utility, while the other agents acts simultaneously by choosing a dynamic portfolio strategy so as to maximize his expected terminal wealth utility. By invoking the use of the dynamic programming principle, we obtain closed-form expressions of the Nash equilibrium investment strategy and the value function for each agent under the case of each agent with an exponential utility function. We give the condition under which diversification can improve agent's expected terminal wealth utility. Numerical examples are also provided to illustrate how the Nash equilibrium investment strategy and the utility profit change when some model parameters vary.

Stock Market Spoofing

彭献华（北大汇丰商学院）

We use a unique trading data set of one week from a stock exchange to analyze the prevalence and profitability of spoofing. About 16% of institutional traders use a spoofing type trading strategy. The p-value for testing if all this behavior is a random event and, thus, unintentional is extremely small, equal to the probability of observing a 65-standard deviation event. We also test if the occurrence of this behavior is more often than that of the matched spoofing behavior, which is a proxy

of the frequency of market making. The p-value of the test is also small, equal to the probability of a 13-standard deviation event. On average, spoofing raises the return of a one-hour trade by 4.9 basis points and decreases the return of a 2.7-hour trade against spoofers by 6.4 basis points.

CDS Pricing in a Markov chain Interacting Intensities model with Contagion

钱晓松（苏州大学）

We analyze kth-to-default credit default swaps (CDS) with counterparty risk using a markov chain interacting intensities with contagion model. We assume the default intensities of the protection seller and the references are affected by an external shock event and the default intensity of reference entities jump upward when other reference default, The arrival of the shock event is a Cox process whose stochastic intensity is an affine diffusion process with jumps. We examine how the correlated default risks between the protection seller and the underlying entity may affect the credit default premium in a kth-to-default CDS.

On Balanced Growth Path Solutions of a Knowledge Diffusion and Growth Model

秦聪（苏州大学）

In this talk, we study a Boltzmann-type Mean Field Game model proposed in Achdou et al. (2014) for knowledge diffusion and economic growth, where knowledge diffusion results from imitation by searching and learning and from innovation subject to Brownian noises. Largely inspired by Dai et al. (2009), where the marginal value function has been used directly to study portfolio selection with transaction costs, we transform the original partial integro-differential equation system into an equivalent one by also studying a representative agent's marginal value function. We show a necessary condition to generate a sustained growth is that innovation cannot dominate imitation. In particular, when learning technology is sufficiently inefficient or discount rate is sufficiently low, either of which leads individuals to put no effort in imitation, sustained economic growth then disappears. Further, if there exists a balanced growth path solution, a continuum of such solutions indeed exist and there is a special one with the form conjectured in Achdou et al. (2014). Finally, we propose a new method to conduct an extensive numerical analysis.

秦聪，目前为苏州大学金融工程研究中心讲师（校优秀青年项目）。苏州大学与美国匹兹堡大学联合培养博士，2015年1月至2018年2月在新加坡国立大学从事博士后研究工作。研究方向为经济金融数学及其应用，主要在随机控制框架下利用偏微分方程方法来研究相应的经济金融问题。最近的主要研究课题为不可再生资源最优开采问题、行波解在经济增长理论中的应用以及金融科技尤其是区块链技术相关的建模与应用。

Maximum Principle for Risk-Sensitive Stochastic Optimal Control Problem and Applications to Finance

史敬涛（山东大学）

This talk is concerned with a risk-sensitive stochastic optimal control problem, motivated by a kind of optimal portfolio choice problem in the financial market. The maximum principle for this kind of problem is obtained, which is similar in form to its risk-neutral counterpart. But the adjoint equations and maximum condition heavily depend on the risk-sensitive parameter. This result is used to solve a kind of optimal portfolio choice problem and the optimal portfolio choice strategy is obtained. Computational results and figures explicitly illustrate the optimal solution and the sensitivity to the volatility rate parameter. (Joint work with Professor Zhen Wu.)

An optimal control problem of FBSDE with noisy observation

王光臣（山东大学）

In this talk, we consider an optimal control problem driven by FBSDE, in which the system noise is correlated to the observation noise, and the coefficient of observation equation is unnecessarily bounded with respect to the state variable. This results in state equation and adjoint equation with unbounded stochastic coefficient, whose well-posedness and high-order moment estimates are obtained. By virtue of these estimates, a maximum principle for optimal control is established. This result improves that of Wang, Wu and Xiong [SIAM J. Control Optim., 51 (2013), pp. 491-524].

Linear Quadratic Stochastic Optimal Control Problems with Operator Coefficients: Open-Loop Solutions

魏庆萌（东北师范大学）

An optimal control problem is considered for linear stochastic differential equations with quadratic cost functional. The coefficients of the state equation and the weights in the cost functional are bounded operators on the spaces of square integrable random variables. The main motivation of our study is linear quadratic (LQ, for short) optimal control problems for mean-field stochastic differential equations. Open-loop solvability of the problem is characterized as the solvability of a system of linear coupled forward-backward stochastic differential equations (FBSDE, for short) with operator coefficients, together with a convexity condition for the cost functional. Under proper conditions, the well-posedness of such an FBSDE, which leads to the existence of an open-loop optimal control, is established. Finally, as applications of our main results, a general mean-field LQ control problem and a concrete mean-variance portfolio selection problem in the open-loop case are solved.

魏庆萌，东北师范大学副教授，2013年博士毕业于山东大学，博士毕业论文被评为山东省优秀博士学位论文。获得国家自然科学青年基金资助，2016年国家公派访问学者，访问雍炯敏教授。

A kind of LQ non-zero sum differential game of backward stochastic differential equation with asymmetric information

肖华（山东大学威海分校）

This talk focuses on a kind of LQ non-zero sum differential game driven by backward stochastic differential equation with asymmetric information, which is a natural continuation of Wand and Yu [IEEE TAC, 2010; Automatica 2012]. Different from Wand and Yu [IEEE TAC, 2010; Automatica 2012], a realistic motivation for studying this kind of game is provided, and some feedback Nash equilibrium points are uniquely obtained by forward-backward stochastic differential equations, their filters and the corresponding Riccati equations with Markovian setting.

Implied Volatility Surface Construction for Commodity Futures Options in China

许威（同济大学）

An option has become a popular derivative instrument to hedge price risk on commodities in China. However, the implied volatility, as an important factor for market expectation of futures price, is not available because of the American style in the option and mean reverting property in the spot prices. We propose an efficient willow tree method to resolve a problem of calibrating implied volatility. The proposed tree structure can handle the American style option easily and efficiently. The proposed willow tree construction is independent of the volatility itself so that the tree reconstruction is minor during the calibration. We apply the proposed method on calibrating the implied volatilities of sugar and soybean meal options. We use the daily closing prices to construct an implied volatility surface. Both seasonality and Samuelson effect can be observed. Moreover, based on the implied volatility distortion close to the option maturity observed in our empirical results, we suggest a detailed minimum tick price scheme to avoid a distortion and decrease of hedging costs for practitioners.

Recent development of Markowitz's theory

许左权（香港理工大学）

In this talk, I will introduce two continuous-time mean-variance models. The first one studies constraints on the wealth process and trading strategies simultaneously, which is solved by stochastic control theory as well as matrix optimization techniques; while the other one takes background risk into consideration (formulating a robust model) and then is tackled by quantile optimization techniques.

Dynamic discrete-time portfolio selection for defined contribution pension funds with inflation risk

姚海祥（广东外语外贸大学）

This paper investigates a multi-period asset allocation problem for a defined contribution (DC) pension fund facing stochastic inflation under the Markowitz mean-variance criterion. The stochastic inflation rate is described by a discrete-time version of the Ornstein-Uhlenbeck process. To the best of our knowledge, the literature along the line of dynamic portfolio selection under inflation is dominated by continuous-time models, we are the first to investigate the problem in a discrete time setting. Using the techniques of state variable transformation, matrix theory and dynamic programming, we derive the analytical expressions for the efficient investment strategy and efficient frontier. Moreover, several special cases of our model are discussed indicating that our results are consistent with the existing literature. Then our results are examined through empirical studies based on the data from Australia, which has a typical DC pension system. The impacts of inflation, investment horizon, estimation error and superannuation guarantee rate on the efficient frontier are illustrated. Finally, out-of-sample analyses depict the dynamic processes of the optimal investment strategy and the fund wealth. A pension fund investor using our model can achieve his or her objective in advance and even obtain a higher terminal wealth than expected.

Forward-Backward Stochastic Differential Equations and Linear-Quadratic Generalized Stackelberg Games

于志勇（山东大学）

A multi-level self-similar domination-monotonicity structure is proposed, and a kind of coupled forward-backward stochastic differential equations (FBSDEs) with such structure is proved to be uniquely solvable. Then, this kind of FBSDEs is used to characterize the unique equilibrium of a linear-quadratic generalized Stackelberg game with multi-level hierarchy in a closed form. This talk is based on a joint work with Dr. Na Li.

预售众筹产品质量夸大行为及其预防措施分析

曾燕（中山大学）

本文运用理论模型分析了预售众筹中创业者夸大产品质量的行为及其预防措施. 首先，构建了预售众筹发起阶段与销售阶段的理论决策模型；其次，求解模型得到了创业者的最优众筹价格及向投资者承诺的产品质量，分析了创业者夸大产品质量的动机；再次，在此基础上设计了由保证金与信用约束组成的预防措施，分析了预防措施对创业者夸大产品质量行为的预防效果. 研究结果表明：在无预防措施情形下，创业者会向投资者夸大产品质量以获得众筹成功与追求收益最大化；众筹平台收取保证金虽能对创业者夸大产品质量行

为起到预防作用，但预防效果有限；增加信用约束能弥补保证金措施的缺点，提高预防措施的预防效果. 最后，本文通过数值算例进一步阐述了理论模型所得到的相关结论.

Well-posedness of high dimensional CIR SDEs

张伏（上海理工大学）

We consider the diffusion process described by CIR(Cox－Ingersoll－Ross) SDE. We prove uniqueness and existence of the martingale problem related to this degenerate SDEs under suitable nonnegativity and regularity conditions on the coefficients. Applying martingale problem theory of Stroock and Varadhan, we turn the uniqueness problem of the SDE to the well-posedness of a kind of degenerate PDE with Neumann boundary condition defined on first quadrant. The difficulties for solvability of the problem mainly come from the degeneration of the operator, domain with corner, and corelation of different components of the SDE. The Schauder estimate for the degenerate PDE is given. We first estimate the mixed second order derivatives, and then utilize the perturbation method and the Schauder estimation for diagonal form to deal with the second order derivatives of normal direction on the corner boundary. This is a joint work with Kai Du.

Quasilinear Stochastic PDEs with two obstacles: Probabilistic approach

张静（复旦大学）

We prove an existence and uniqueness result for quasilinear Stochastic PDEs with two obstacles (DOSPDEs for short). The method is based on the probabilistic interpretation of the solution by using the backward doubly stochastic differential equations (BDSDEs for short). Joint work with Laurent Denis and Anis Matoussi.

Robust Consumption Portfolio Optimization with Stochastic Differential Utility

张奇（复旦大学）

We study a continuous time intertemporal consumption and portfolio choice problem with a stochastic differential utility preference of Epstein-Zin type for a robust investor, who worries about model misspecification and seeks robust decision rules. The verification theorem which formulates the Hamilton-Jacobi-Bellman-Isaacs equation under a non-Lipschitz condition is provided. Then with the verification theorem, the explicit closed-form optimal robust consumption and portfolio solutions to an Heston model are given. This is a jonit work with Jiangyan Pu.

Nonzero Sum Differential Game of Backward Doubly Stochastic Systems with Delay

朱庆峰（山东财经大学）

This paper is concerned with a kind of nonzero sum differential game of backward

doubly stochastic system with delay, in which the state dynamics follows a backward doubly stochastic differential equation with delay. We establish a necessary condition in the form of maximum principle with Pontryagin's type for open-loop Nash equilibrium point of this type of game, and then give a verification theorem which is a sufficient condition for Nash equilibrium point. The theoretical results are applied to study a nonzero sum differential game of linear-quadratic backward doubly stochastic system with delay.

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