

青年概率学者研讨会

武汉大学 数学与统计学院 5.1-5.4,2015



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主办单位： 武汉大学数学与统计学院

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武汉大学数学与统计学院
协同创新中心

会议秘书： 解龙杰 武汉大学

会议网址： prob.whu.edu.cn

♣ 日程安排

☞ 早晨7:45宾馆楼下集合，由校车统一接送大家到武汉大学数学与统计学院。

◇ 5月1日 (星期五)		
8:30-8:45		开幕式 ~ 数学院报告厅
8:45-9:10		薄立军 Analysis of Systemic Risk in Interbanking Networks: A Weak Convergence Approach
9:10-9:35		陈昕 Intrinsic ultracontractivity for general Lévy processes on bounded open sets
9:35-10:00		何辉 Pruning processes for Galton-Watson trees and Lévy trees
10:00-10:25		茶歇
10:25-10:50		胡二彦 Lower bounds of heat kernels for non-local Dirichlet forms on metric measure spaces
10:50-11:15		胡明尚 Dynamic Programming Principle for Stochastic Recursive Optimal Control Problem under G-framework
11:15-11:40		胡泽春 New results on Hunt's hypothesis (H) for Lévy processes
12:00-13:30		午餐 ~ 君宜王朝-日月潭厅 (校车)
下午报告 ~ 君宜王朝		
14:30-14:55		蒋达权 Cycle renewals and circulation fluctuations of cyclic Markov processes
14:55-15:20		兰小红 球面随机场的谱估计
15:20-15:45		刘俊峰 Central limit theorem for the solution to the heat equation with moving time
15:45-16:10		茶歇
16:10-16:35		刘源 Functional Inequalities under the Lyapunov Condition
16:35-17:00		柳振鑫 Morse decomposition for random dynamical systems
17:00-17:25		申广君 Weak convergence to Rosenblatt sheet in anisotropic Besov spaces
17:25-17:50		朱蓉禅 A Wong-Zakai theorem for Φ_3^4 -model
18:00-19:30		晚餐 ~ 君宜王朝-日月潭厅

↔早晨7:45宾馆楼下集合，由校车统一接送大家到武汉大学数学与统计学院。

◇ 5月2日（星期六）

上午报告 ↔ 数学院报告厅

8:30-8:55	林乾	Dynamic indifference pricing via the G -expectation
8:55-9:20	罗德军	A probabilistic proof of the spectral gap comparison theorem
9:20-9:45	苗雨	Some limit results for autoregressive processes
9:45-10:25	照相+茶歇	
10:25-10:50	宋健	On a class of stochastic partial differential equations
10:50-11:15	宋永生	G-Expectation Weighted Sobolev Spaces, Backward SDE and Path Dependent PDE
11:15-11:40	解龙杰	SDEs driven by multiplicative Lévy noise with singular coefficients
12:00-13:30	午餐 ↔ 君宜王朝-日月潭厅（校车）	
下午报告 ↔ 君宜王朝		
14:30-14:55	徐礼虎	Asymptotics of entropy production rate of OU processes
14:55-15:20	严钧	Deviations of convex and coherent entropic risk measures
15:20-15:45	杨婷	Dirichlet heat kernel estimates for fractional Laplacian under non-local perturbation
15:45-16:10	茶歇	
16:10-16:35	翟建梁	On time regularity of generalized Ornstein-Uhlenbeck processes with Lévy noises in Hilbert spaces
16:35-17:00	张奇	Degenerate Backward SPDE with Singular Terminal Value and Related Applications in Mathematical Finance
17:00-17:25	朱全新	Lévy processes and stochastic stability
17:25-17:50	朱湘禅	Lattice approximations to the Φ_3^4 -model
18:00-19:30	自助餐 ↔ 君宜王朝-日月潭厅	

◇ 5月3日 (星期日) ~ 君宜王朝		
8:30-8:55	褚为娟	分支过程的小值概率
8:55-9:20	郭精军	On Collision Local Time of Two Independent Fractional Ornstein-Uhlenbeck Processes
9:20-9:45	贺鑫	Local Limits of Random Trees
9:45-10:15	茶歇	
10:15-10:40	吕琦	Pontryagin type Stochastic Maximum Principle for Stochastic Partial Differential Equations
10:40-11:05	彭旭辉	Ergodicity of the 2D Navier-Stokes Equations with Degenerate Multiplicative Noise
11:05-11:30	钱斌	Estimates of the constants in some functional inequalities
12:00-13:30	午餐 ~ 君宜王朝-日月潭厅	
14:30-14:55	孙晓斌	Smoothness of density and ergodicity for stochastic differential equations with Markovian switching
14:55-15:20	王冉	A central limit theorem and moderate deviations for 2-D Stochastic Navier-Stokes equations with jumps
15:20-15:45	王宇钊	Entropy formulae and differential Harnack estimates for nonlinear diffusion equations under CD(K,m) condition
15:45-16:10	茶歇	
16:10-16:35	吴波	Functional inequality on free path space over a non-compact Riemannian manifold
16:35-17:00	巫静	On penalization approximation of reflected stochastic differential equations
17:00-17:25	张蕊	Limit Theorems for Some Critical Superprocesses
17:25-17:50	章复熹	排他过程中的特定粒子
18:00-19:30	晚餐 ~ 君宜王朝-日月潭厅	

◇ 5月4日 (星期一) ~ 君宜王朝		
8:30-8:55	鲍建海	Hypercontractivity for Functional Stochastic Partial Differential Equations
8:55-9:20	宋玉林	Density functions of the Supremum of SDEs forced by Lévy noises
9:20-9:45	徐方军	Limit theorems for functionals of two independent fractional Brownian motions
9:45-10:15	茶歇	
10:15-10:40	张登	随机生灭 Q 矩阵的极限谱分布
10:40-11:05	张华	Some refinement analysis of Wiener-Poisson functionals and application
11:05-11:30	张少钦	Weak Poincaré Inequality for Convolution Probability Measures
12:00-13:30	午餐 ~ 君宜王朝-日月潭厅	
下午 ~ 自由活动		

注：报告顺序按照姓氏拼音依次排序，并根据各位老师的到达及离开时间有所调整。不妥之处，还请见谅。

注：宾馆退房可以提前一天到前台办理，以免当天人多时间紧凑。

注：会议期间如有任何问题，请联系：张希承 15327260465
解龙杰 15972154022

*请注意报告地点：

	5月1日	5月2日	5月3日	5月4日
上午	数学院报告厅	数学院报告厅	君宜-报告厅	君宜-报告厅
下午	君宜-报告厅	君宜-报告厅	君宜-报告厅	自由活动

♣ 邀请报告摘要

Hypercontractivity for Functional Stochastic Partial Differential Equations

鲍建海
(中南大学)

Abstract: Explicit sufficient conditions on the hypercontractivity are presented for two classes of functional stochastic partial differential equations driven by, respectively, non-degenerate and degenerate Gaussian noises. Consequently, these conditions imply that the associated Markov semigroup is L^2 -compact and exponentially convergent to the stationary distribution in entropy, variance and total variational norm. To verify the concentration property, we prove a Fernique type inequality for infinite-dimensional Gaussian processes which might be interesting by itself.

Analysis of Systemic Risk in Interbanking Networks: A Weak Convergence Approach

薄立军
(中国科学技术大学)

Abstract: We develop a mean field model of interbanking borrowing and lending activities. Each bank borrows from or lends to other counterparties at an idiosyncratic rate, and is exposed to sudden shocks affecting the level of its monetary reserves. Using weak convergence analysis, we provide an explicit characterization of the measure-valued process associated with a large interbanking system. We use the limit process to construct law of large number approximations for systemic indicators assessing average distance to default and measuring the total volume of interbanking activities. We illustrate the predictive power and accuracy of our framework via a detailed numerical analysis, showing that indicators are sensitive to lending preferences, volatility, and occurrences of negative events. This is a joint work with A. Capponi.

Intrinsic ultracontractivity for general Lévy processes on bounded open sets

陈昕
(复旦大学)

Abstract: We will prove that general (not necessarily symmetric) Lévy process killed on exiting a bounded open set (without regular condition on the boundary) is intrinsically ultracontractive, provided that the Lévy measure satisfies

$$\nu(B(x, r)) > 0, \quad r > 0$$

for any $|x| \leq R_0$ and some $R_0 > 0$. Indeed, for symmetric Lévy process and bounded Hölder domain of order 0, we also obtain the intrinsic ultracontractivity even under much weaker assumption on the Lévy measure.

分支过程的小值概率

褚为娟
(南京大学)

Abstract: 在分支过程的小值概率中已经得到的一些结果, 和现在正在进行中的一些工作。

On Collision Local Time of Two Independent Fractional Ornstein-Uhlenbeck Processes

郭精军
(兰州财经大学)

Abstract: In this paper, we study the existence of collision local time of two independent fractional Ornstein-Uhlenbeck processes $X^{H_1}(t)$ and $X^{H_2}(t)$ with different coefficients $H_i \in (0, 1), i = 1, 2$. Under the canonical framework of white noise analysis, we characterize the collision local time as a Hida distribution and obtain its chaos expansions.

Pruning processes for Galton-Watson trees and Lévy trees

何辉
(北京师范大学)

Abstract: We first introduce the Galton-Watson trees and then show how Lévy trees arise as the scaling limits of Galton-Watson trees. Finally, we give a short introduction on recent results on pruning processes for Galton-Watson trees and Lévy trees.

Local Limits of Random Trees

贺鑫
(北京师范大学)

Abstract: In this talk we review previous results and current progress on local limits of random trees. We begin with an extremely elementary introduction to branching processes and random trees. The main part of this talk is about local limits of Galton-Watson trees, and we discuss two different local limits of GW trees: Kesten's tree and condensation tree. Finally we give a quick introduction to Lévy trees and discuss local limits of Lévy trees.

Lower bounds of heat kernels for non-local Dirichlet forms on metric measure spaces

胡二彦
(北京理工大学)

Abstract: Consider the non-local Dirichlet form $(\mathcal{E}, \mathcal{F})$ with jump kernel J on metric measure spaces. We use purely analytic method to obtain the lower heat kernel estimate of $(\mathcal{E}, \mathcal{F})$ under the condition that $J(x, y) \geq cd(x, y)^{-(\alpha+\beta)}$ and other assumptions, where α is the Hausdorff dimension and β is the walk dimension. In particular, our method applies for the case $\beta \geq 2$. As an application, the sharp lower bounds of heat kernels for non-local Dirichlet form on Sierpinski gasket are obtained.

Dynamic Programming Principle for Stochastic Recursive Optimal Control Problem under G-framework

胡明尚
(山东大学)

Abstract: We study a stochastic recursive optimal control problem in which the cost functional is described by the solution of a backward stochastic differential equation driven by G-Brownian motion. Under standard assumptions, we establish the dynamic programming principle and the related fully nonlinear HJB equation in the framework of G-expectation. Finally, we show that the value function is the viscosity solution of the obtained HJB equation. This is a joint work with Shaolin Ji.

New results on Hunt's hypothesis (H) for Lévy processes

胡泽春
(南京大学)

Abstract: This talk contains three parts. In the first part, we will introduce Hunt's hypothesis (H) and the corresponding Gettoor's conjecture. In the second part, we will recall the progress on Gettoor's conjecture. In the final part, we will present new results on Hunt's hypothesis (H) for Lévy processes obtained by us. The talk is based on joints works with Wei Sun and Jing Zhang.

Cycle renewals and circulation fluctuations of cyclic Markov processes

蒋达权
(北京大学)

Abstract: The trajectories of a recurrent Markov chain constantly form various cycles. In this talk, we present a series of equalities which characterize the symmetry of the forming times of cycles passing through the same set of states (or passing through a common state). We then apply these cycle symmetries to to prove that the sample circulations of a family of cycles passing through a common state satisfy a large deviation principle with a rate function having an interesting symmetry, which implies the fluctuation theorem of Gallavotti-Cohen type for the sample net circulations. We also obtain the transient fluctuation theorem and the integral fluctuation theorem in non-equilibrium statistical physics for sample circulations. Similar results hold for diffusion processes on the circle.

球面随机场的谱估计

兰小红
(中国科学技术大学)

Abstract: 我们分别在球面调和函数和球面小波needlets框架下, 研究球面上各向同性高斯随机场的功率谱的谱指数估计, 及其在高频极限意义下的弱收敛。特别地, 我们介绍了一个Whittle型极大似然估计方法, 并探讨其渐近弱一致性和高斯性。

Central limit theorem for the solution to the heat equation with moving time

刘俊峰
(南京审计学院)

Abstract: We consider the solution to the stochastic heat equation driven by the time-space white noise and we study the asymptotic behavior of its spatial quadratic variations with “moving time”, meaning that the time variable is not fixed and its values are allowed to be very big or very small. We investigate the limit distribution of these variations via Malliavin calculus. This is based on a joint work with Prof. Ciprian A. Tudor (Universite de Lille 1).

Functional Inequalities under the Lyapunov Condition

刘源
(中国科学院)

Abstract: In this talk, we will give a review of some recent work on functional inequalities such as transportation inequality and log-Sobolev inequality, derived from the Lyapunov condition.

Morse decomposition for random dynamical systems

柳振鑫
(大连理工大学)

Abstract: The Morse decomposition theorem states that a compact invariant set of a given flow can be decomposed into finite invariant compact subsets and connecting orbits between them, which is helpful for us to study the inner structure of compact invariant sets. When dynamical systems are randomly perturbed, by real or white noise, what we concern is if we can study the structure of an invariant random compact sets, including global random attractors? We show that for finite and infinite dimensional random dynamical systems, we have the random Morse decomposition; we also construct Lyapunov function for the decomposition. By this, we may introduce the concept of random gradient system as a random semiflow possessing a continuous random Lyapunov function which describes the asymptotic behavior of the system. For deterministic systems, we introduce the concept of natural order to study the relative stability of Morse sets by the stochastic perturbation method. We also investigate the stochastic stability of Morse (invariant) sets under general white noise perturbations when the intensity of noise converges to zero.

Pontryagin type Stochastic Maximum Principle for Stochastic Partial Differential Equations

吕琦
(四川大学)

Abstract: The classical Pontryagin maximum principle (addressed to deterministic finite dimensional control systems) is one of the three milestones in mathematical control theory. The corresponding theory is by now well-developed in the deterministic infinite dimensional setting and for the stochastic differential equations. In this talk, we present some recent results concerning Pontryagin type maximum principle for controlled stochastic (infinite dimensional) evolution equations when the diffusion term contains the control variables, and the control domains are allowed to be non-convex.

A probabilistic proof of the spectral gap comparison theorem

罗德军
(中国科学院)

Abstract: Let $\Omega \subset \mathbb{R}^n$ be a strictly convex domain with smooth boundary and diameter D . The fundamental gap conjecture claims that if $V : \bar{\Omega} \rightarrow \mathbb{R}$ is convex, then the spectral gap of the Schrödinger operator $-\Delta + V$ with Dirichlet boundary condition is greater than $\frac{3\pi^2}{D^2}$. Using analytic methods, Andrews and Clutterbuck recently proved in [J. Amer. Math. Soc. 24 (2011), no. 3, 899–916] a more general spectral gap comparison theorem which implies this conjecture. In this talk, we shall give a probabilistic proof of their result via the coupling by reflection of the diffusion processes.

Some limit results for autoregressive processes

苗雨
(河南师范大学)

Abstract: In this report, we consider the linear autoregressive model

$$X_{k,n} = \theta_n X_{k,n-1} + \xi_k, \quad k = 0, 1, \dots, n, \quad n \geq 1$$

where $\theta_n \in [0, 1)$ is unknown, $(\xi_k)_{k \in \mathbb{Z}}$ is a sequence of centered independent and identically distributed (i.i.d.) random variables representing the noise. When $\theta_n = \theta$ or $\theta_n \rightarrow 1$, the moderate deviation principle for empirical covariance is discussed and as statistical applications we provide the moderate deviation estimates of the least square and the Yule-Walker estimators of the parameter θ_n .

Ergodicity of the 2D Navier-Stokes Equations with Degenerate Multiplicative Noise

彭旭辉
(湖南师范大学)

Abstract: We consider the two-dimensional, incompressible Navier-Stokes equations on the torus $T^2 = [-\pi, \pi]^2$ driven by a degenerate multiplicative noise. We prove that the semigroup $\{P_t\}_{t \geq 0}$ generated by the solutions to 2D SNS is asymptotically strong Feller. Moreover, we also prove that the semigroup $\{P_t\}_{t \geq 0}$ is exponentially ergodic in some sense. Our result is stronger than the result obtained by C. Odasso in 2008. My report base on the work joint with Zhao Dong.

Estimates of the constants in some functional inequalities

钱斌
(常熟理工大学)

Abstract: In this talk, I will present some results on estimates of the constants in some functional inequalities with Bakry Emery curvature and Spectral gap. Its relation to logarithmic entropy-energy inequality and Phi entropy will be provided.

Dynamic indifference pricing via the G -expectation

林乾
(武汉大学)

Abstract: We study the dynamic indifference pricing with ambiguity preferences. For this, we introduce the dynamic expected utility with ambiguity via the nonlinear expectation- G -expectation, introduced by Peng (2007). We also study the risk aversion and certainty equivalent for the agents with ambiguity. We obtain the dynamic consistency of indifference pricing with ambiguity preferences. Finally, we obtain comparative statics.

Weak convergence to Rosenblatt sheet in anisotropic Besov spaces

申广君
(安徽师范大学)

Abstract: In this paper, we prove the convergence in law of two families of process to the Rosenblatt sheet in the topology of the anisotropic Besov spaces. The first one is constructed from Poisson process in the plane and the second one is defined by the partial sums of two sequences of real independent Rosenblatt processes.

On a class of stochastic partial differential equations

宋健
(香港大学)

Abstract: In this paper, we study the stochastic partial differential equation with multiplicative noise $\partial_t u = \mathcal{L}u + u\dot{W}$, where \mathcal{L} is the generator of a symmetric Lévy process X and W is a Gaussian noise. For the equation in the Stratonovich sense, we show that the solution given by a Feynman-Kac type of representation is a mild solution, and we establish its Hölder continuity and the Feynman-Kac formula for the moments of the solution. For the equation in the Skorohod sense, we obtain the condition for the existence and uniqueness of the mild solution under which we get Feynman-Kac formula for the moments of the solution, and we also investigate the Hölder continuity of the solution. As a byproduct, when $\gamma(x)$ is a nonnegative and nonnegative-definite function, a sufficient and necessary condition for $\int_0^t \int_0^t |r-s|^{-\beta_0} \gamma(X_r - X_s) dr ds$ to be exponentially integrable is obtained.

G-Expectation Weighted Sobolev Spaces, Backward SDE and Path Dependent PDE

宋永生
(中国科学院)

Abstract: We introduce a new notion of G-expectation-weighted Sobolev spaces, or in short, G-Sobolev spaces, and provide a 1-1 correspondence between a type of backward SDEs driven by G-Brownian motion and a type of path dependent PDEs in the corresponding G-Sobolev space.

Density functions of the Supremum of SDEs forced by Lévy noises

宋玉林
(南京大学)

Abstract: By using Bismut's approach to Malliavin calculus for jump processes, we obtained a criterion for the existence of density functions of the supremum of one-dimensional Wiener-Poisson functionals. As an application, the existence of density functions for supremum of SDEs forced by Lévy processes was discussed. This is a joint work with Yingchao Xie and Xicheng Zhang.

Smoothness of density and ergodicity for stochastic differential equations with Markovian switching

孙晓斌
(南开大学)

Abstract: This paper is concerned with a class of stochastic differential equations with Markovian switching. The Malliavin calculus is used to study the smoothness of the density of the solutions under the Hörmander type conditions. Moreover, the strong Feller property of the process is obtained by using the Bismut formula. The irreducibility of the semigroup associated with the equations is discussed under some natural conditions. As a consequence the existence and uniqueness of the invariant measure and then the ergodicity for the equations are also discussed. This is a joint work with Yaozhong Hu, David Nualart and Yingchao Xie.

A central limit theorem and moderate deviations for 2-D Stochastic Navier-Stokes equations with jumps

王冉
(中国科学技术大学)

Abstract: In this paper, we study the small noise asymptotics for two-dimensional Navier-Stokes equations driven both by Brownian motion and by Poisson point processes. We prove a central limit theorem for the stochastic Navier-Stokes equations driven by multiplicative noise. While in the additive noise case, we also study the moderate deviations by the generalized contraction principle. This is a joint work with Jianliang Zhai.

Entropy formulae and differential Harnack estimates for nonlinear diffusion equations under $CD(K, m)$ condition

王宇钊
(中国科学院)

Abstract: We obtain Perelman type entropy formulae for weighed doubly nonlinear diffusion equation on smooth metric measure space under $CD(K, m)$ condition, which are even new for porous medium equation and parabolic p-Laplacian equation. Moreover, we prove various global differential Harnack estimates for positive solutions to weighed doubly nonlinear diffusion equation on smooth metric measure space with m-Bakry-Emery Ricci curvature bound. Harnack inequalities and weighted p-Laplacian estimates are derived as applications.

Functional inequality on free path space over a non-compact Riemannian manifold

吴波
(复旦大学)

Abstract: In this talk we construct a large class of quasi-regular local Dirichlet forms with unbounded random diffusion coefficients on free path space over a general non-compact manifold for initial distributions with densities in $W_{loc}^{2,1}$. Moreover, We show a weighted log-Sobolev inequality for the O-U Dirichlet form and the (standard) log-Sobolev inequality for the damped O-U Dirichlet form under some initial distributions conditions. In particular, the Poincaré inequality (and the super Poincaré inequality) can be established for the O-U Dirichlet form on path space over a class of Riemannian manifolds with unbounded Ricci curvatures.

On penalization approximation of reflected stochastic differential equations

巫静
(中山大学)

Abstract: Penalization approximations have been well studied for stochastic differential equations reflected in smooth and convex domains. But reflected diffusions have been constructed in domains much wider than convex and smooth. In this paper we study the penalization approximation for stochastic differential equations reflected in domains satisfying Lions-Sznitman's conditions and prove that the strong convergence holds.

Limit theorems for functionals of two independent fractional Brownian motions

徐方军
(华东师范大学)

Abstract: We prove limit theorems for functionals of two independent fractional Brownian motions with the same Hurst index H in $(2/d + 2, 2/d]$ using the method of moments.

SDEs driven by multiplicative Lévy noise with singular coefficients

解龙杰
(武汉大学)

Abstract: We prove the pathwise uniqueness of strong solution to stochastic differential equation driven by multiplicative Lévy noise with Sobolev diffusion coefficients and integrability drift coefficient. Moreover, we also obtain the Sobolev differentiability of strong solution with respect to the initial point.

Asymptotic of entropy production rate of OU processes

徐礼虎
(澳门大学)

Abstract: In the context of non-equilibrium statistical physics, the entropy production rate is an important concept to describe how far a specific state of a system is from its equilibrium state. In this paper, we establish a central limit theorem and a moderate deviation principle for the entropy production rate of d -dimensional Ornstein-Uhlenbeck processes, by the techniques of functional inequalities such as Poincaré inequality and log-Sobolev inequality. As an application, we obtain a law of iterated logarithm for the entropy production rate. This is the joint work with Prof. Ran Wang (USTC).

Deviations of convex and coherent entropic risk measures

严钧
(扬州大学)

Abstract: In this article, we establish several deviations for convex and coherent entropic risk measures. Firstly, we provide several deviations for the two risk measures with respect to relative entropy. Secondly, we provide several deviations for the two risk measures with respect to parameters. Thirdly, we study the continuity properties of the two risk measures with respect to the random variables under several norms. Finally, we establish an application of our main results.

Dirichlet heat kernel estimates for fractional Laplacian under non-local perturbation

杨婷
(北京理工大学)

Abstract: For $d \geq 2$ and $0 < \beta < \alpha < 2$, consider a family of non-local operators $\mathcal{L}^b = \Delta^{\alpha/2} + \mathcal{S}^b$ on \mathbb{R}^d , where

$$\mathcal{S}^b f(x) := \lim_{\varepsilon \rightarrow 0} \mathcal{A}(d, -\beta) \int_{\{z \in \mathbb{R}^d: |z| > \varepsilon\}} (f(x+z) - f(x)) \frac{b(x, z)}{|z|^{d+\beta}} dz,$$

and $b(x, z)$ is a bounded measurable function on $\mathbb{R}^d \times \mathbb{R}^d$ with $b(x, z) = b(x, -z)$ for every $x, z \in \mathbb{R}^d$. Here $\mathcal{A}(d, -\beta)$ is a normalizing constant so that $\mathcal{S}^b = -(-\Delta)^{\beta/2}$ when $b(x, z) \equiv 1$. It was recently shown in Chen and Wang [arXiv:1312.7594 [math.PR]] that when $b(x, z) \geq -\frac{\mathcal{A}(d, -\alpha)}{\mathcal{A}(d, -\beta)} |z|^{\beta-\alpha}$, then \mathcal{L}^b admits a unique fundamental solution $q^b(t, x, y)$ which is strictly positive and continuous. The kernel $q^b(t, x, y)$ uniquely determines a conservative Feller process X^b , which has strong Feller property. The Feller process X^b is also the unique solution to the martingale problem of $(\mathcal{L}^b, \mathcal{S}(\mathbb{R}^d))$, where $\mathcal{S}(\mathbb{R}^d)$ denotes the space of tempered functions on \mathbb{R}^d . In this paper, we are concerned with the subprocess $X^{b,D}$ of X^b killed upon leaving a bounded $C^{1,1}$ open set $D \subset \mathbb{R}^d$. We establish explicit sharp two-sided estimates for the transition density function of $X^{b,D}$.

On time regularity of generalized Ornstein-Uhlenbeck processes with Lévy noises in Hilbert spaces

翟建梁
(中国科学技术大学)

Abstract: In this paper, at first, we obtain a necessary condition of H -càdlàg modification and H -weakly càdlàg modification of generalized Ornstein-Uhlenbeck processes with Lévy noises in Hilbert spaces H . And then, we give a necessary and sufficient condition of H -càdlàg modification and H -weakly càdlàg modification of Ornstein-Uhlenbeck

processes driven by cylindrical α -semi-stable processes. Secondly, we investigate the properties of cylindrical càdlàg modification and V -cylindrical càdlàg modification. Applying the obtained results to the diagonal Ornstein-Uhlenbeck processes with α -stable noises, we show a necessary and sufficient condition of cylindrical càdlàg modification and V -cylindrical càdlàg modification in symmetric case for $\alpha \in (0, 1)$, and give a sufficient condition in general case for $\alpha \in (0, 2)$. Some examples illustrate the relations among the concepts of various càdlàg modification.

随机生灭 Q 矩阵的极限谱分布

张登
(上海交通大学)

Abstract: 在严平稳遍历的情形下,我们证明随机生灭 Q 矩阵的经验谱分布弱收敛于某非随机概率分布。进一步,在非严平稳遍历情形下,我们研究了比Beta-Hermite 系综更广的一类随机矩阵模型,建立了与之相应的随机生灭 Q 矩阵的极限谱分布存在性,并且证明它的极限谱分布具有卷积表达式。特别的,与Beta-Hermite 系综对应的随机生灭 Q 矩阵的极限谱分布是经典半圆率与Dirac 测度 δ_2 的卷积。

Some refinement analysis of Wiener-Poisson functionals and application

张华
(江西财经大学)

Abstract: In this talk, we introduce analysis of Wiener-Poisson functionals which is established by Ishikawa and Kunita, then we give some precise results of Wiener-Poisson functionals, finally we localize some of Ishikawa-Kunita's results of Wiener-Poisson functionals and use them to give a precise estimate of the difference between two Donsker's delta functionals.

Degenerate Backward SPDE with Singular Terminal Value and Related Applications in Mathematical Finance

张奇
(复旦大学)

Abstract: We study the degenerate backward stochastic partial differential equation with singular terminal value, and prove the existence and uniqueness of its non-negative solution by the comparison theorem and the gradient estimate of solution. This kind of equation has an application in the portfolio liquidation problem.

Limit Theorems for Some Critical Superprocesses

张蕊
(北京大学)

Abstract: Let $X = \{X_t, t \geq 0; \mathbb{P}_\mu\}$ be a critical superprocess starting from a finite measure μ . Under some conditions, we first prove that $\lim_{t \rightarrow \infty} t\mathbb{P}_\mu(\|X_t\| \neq 0) = \nu^{-1}\langle \phi_0, \mu \rangle$, where ϕ_0 is the eigenfunction corresponding to the first eigenvalue of the infinitesimal generator L of the mean semigroup of X , and ν is a positive constant. Then we show that, for a large class of functions f , conditioning on $\|X_t\| \neq 0$, $t^{-1}\langle f, X_t \rangle$ converges in distribution to $\langle f, \psi_0 \rangle_m W$, where W is an exponential random variable, and ψ_0 is the eigenfunction corresponding to the first eigenvalue of the dual of L . Finally, if $\langle f, \psi_0 \rangle_m = 0$, we prove that, conditioning on $\|X_t\| \neq 0$, $(t^{-1}\langle \phi_0, X_t \rangle, t^{-1/2}\langle f, X_t \rangle)$ converges in distribution to $(W, G(f)\sqrt{W})$, where $G(f) \sim N(0, \sigma_f^2)$ is a normal random variable, and W and $G(f)$ are independent.

Weak Poincaré Inequality for Convolution Probability Measures

张少钦
(中央财经大学)

Abstract: Weak Poincaré inequalities are established for convolution measures by using Lyapunov conditions, and new Lyapunov function is constructed. The stability for weak Poincaré inequalities under convolution with compactly supported probability measures are discussed. Detailed examples are included to show the power of the main result. (Joint work with Li-Juan Cheng)

排他过程中的特定粒子

章复熹
(北京大学)

Abstract: 我们研究整数格点上的排他过程. 考虑两个系统. 一、平移不变系统, 其中我们考虑带搅拌的排他过程模型和有限个平行格点的模型, 证明了系统中的某个特定粒子的位移满足强大数定律和中心极限定理. 二、一维紧邻可逆系统. 假设单个粒子往右跳的速率为 p , 往左跳的速率为 $1-p$, 我们证明当 p 趋于 $1/2$ 时, 所有特定粒子在平衡态下的位置都依分布收敛. 此外, 我们还证明了该系统的粒子密度在适当的尺度变换下收敛到一个光滑函数.

Lévy processes and stochastic stability

朱全新
(南京师范大学)

Abstract: In this talk, we first introduce the background of Lévy processes, and then present a class of stochastic models driven by Lévy processes. In comparison to the standard Gaussian noise, Lévy noise has more versatile and interesting with a wider range of applications. However, Lévy noise makes the analysis more difficult owing to the discontinuity of its sample paths. We attempt to overcome this difficulty and discuss the existence and uniqueness of the solution as well as several stochastic stability criteria, etc.

A Wong-Zakai theorem for Φ_3^4 -model

朱蓉禅
(北京理工大学)

Abstract: We prove a version of the Wong-Zakai theorem for the dynamical Φ_3^4 -model driven by space-time white noise on \mathbb{T}^3 . Compared to the results in [Hai14] we consider the piecewise linear approximations to the space-time white noise and prove that the solutions to the model driven by the piecewise linear approximations converge to the solution to the Φ_3^4 -model.

Lattice approximations to the Φ_3^4 -model

朱湘禅
(北京交通大学)

Abstract: We study the lattice approximations to the dynamical Φ_3^4 -model by para-controlled distribution proposed in [GIP13]. We prove that the solutions to the lattice systems converge to the solution to the Φ_3^4 -model in probability locally in time. In three spatial dimensions Φ_3^4 -model, are not well defined in the classical sense. Renormalisation has to be performed in order to define the non-linear term. Formally, this renormalisation corresponds to adding an infinite mass term to the equation which leads to adding a drift term in the lattice systems.

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