北师大概率组青年概率学者交流会

线下：北师大后主楼1124　线上：腾讯会议ID 309 1187 8000

2021年11月13日（周六）			
报告时间	**报告人**	**报告题目**	**主持人**
08:20-08:30	**致　辞**		
08:30-09:00	吴　波	Quasi-invariant flows on general Riemannian loop spaces	邵井海
09:00-09:30	邓昌松	Semi-implicit Euler-Maruyama method for time-changed SDEs	
09:30-10:00	陈　昕	Backward stochastic differential equation on a Riemannian manifold	
10:00-10:30	中场休息及交流		
10:30-11:00	高武军	Decay parameter for quadratic Markov branching processes	
11:00-11:30	范锡良	A unified approach to gradient type formulas for BSDEs and some applications	
11:30-12:00	李月爽	Some progress on studying non-symmetric Q-matrix	
12:00-14:30			
报告时间	**报告人**	**报告题目**	**主持人**
14:30-15:00	王玲娣	Estimates for general decay rates for a class of Markov switching diffusion processes	罗德军
15:00-15:30	程丽娟	Calderón-Zygmund inequalities on complete Riemannian manifolds	
15:30-16:00	王　涛	Exponential and strong ergodicity for time-changed symmetric stable processes	
15:35-16:00	中场休息及交流		
16:30-17:00	张少钦	On some uniqueness and non-uniqueness results for stationary distributions of distribution dependent SDEs	
17:00-17:30	黄　兴	Path-distribution dependent stochastic hamiltonian system	
2021年11月14日（周日）			
报告时间	**报告人**	**报告题目**	**主持人**
08:30-09:00	王洁明	Boundary Harnack principle for $\Delta + \Delta^{\alpha/2}$in Lipschitz open sets	王　健
09:00-09:30	李培森	Continuous-state branching processes with immigration and competition	
09:30-10:00	黄璐静	Variational principles of the exit time for Hunt processes generated by semi-Dirihclet forms	
10:00-10:30	中场休息及交流		
10:30-11:00	黎怀谦	On optimal matching of the laguerre model	
11:00-11:30	廖仲威	On Stein's factors for Poisson approximation in Wasserstein distance with non-linear transportation costs	

Quasi-invariant flows on general Riemannian loop spaces

Bo WU *Fudan University*

Abstract: In this talk, we will show that the Cameron-Martin theorem (w.r.t. the Brownian bridge measure) holds for a geometrically and stochastically complete Riemannian manifold; namely, the Brownian bridge measure on the loop space over such a manifold is quasi-invariant under the flow generated by a Cameron-Martin vector field. This is a joint work with Xin Chen and Xue-Mei Li.

Semi-implicit Euler-Maruyama method for time-changed SDEs

Chang-Song DENG *Wuhan University*

Abstract: I will talk about the semi-implicit Euler-Maruyama (EM) method for a class of time-changed SDEs, whose drift coefficient can grow super-linearly and diffusion coefficient obeys the global Lipschitz condition. The strong convergence of the semi-implicit EM is proved and the convergence rate is discussed. When the Bernstein function (Laplace exponent) of the inverse subordinator (time-change) is regularly varying at zero, we establish the mean square polynomial stability of the underlying equations. Numerical simulations are presented to demonstrate the theoretical results. Based on a joint work with Wei Liu (Shanghai Normal Uni).

Backward stochastic differential equation on a Riemannian manifold

Xin CHEN *Shanghai Jiao Tong University*

Abstract: : In this talk, we will introduce some recent results on backward stochastic differential equation on a Riemannian manifold, including the Riemannian-manifold valued BSDE, the probabilistic representation for heat flow of harmonic map, the tensor field valued BSDE. The talk is based on a joint work with Wenjie Ye.

Decay parameter for quadratic Markov branching processes

Wu-Jun GAO *Shenzhen Technology University*

Abstract: For a quadratic Markov branching process (QMBP), we show that the decay parameter is equal to the first eigenvalue of a Sturm-Liouville operator associated with the PDE that the generating function of the transition probability satisfies. The upper and lower bounds of the decay parameter are given by means of a version of Hardy inequality. Two examples are provided to illustrate our results. The Hardy index, which is closely linked with the decay parameter of QMBP, is also investigated and estimated.

A unified approach to gradient type formulas for BSDEs and some applications

Xiliang FAN *Anhui Normal University*

Abstract: In this paper we present a unified approach to establish gradient type formulas and Bismut type formulas for backward stochastic differential equations (BSDEs). This approach relies on a mix of derivative

formulas with respect to the conditional probability of forward SDEs and the expression of the solution of BSDEs. Some concrete examples are given to illustrate the results. As applications, we provide representation formulas for the control solutions to McKean-Vlasov BSDEs and derive gradient estimates for related PDEs.

Some progress on studying non-symmetric Q-matrix

Yueshuang LI *Capital University of Economics and Business*

Abstract: Consider single-birth(death) Q-matrices on finite states. First, a sufficient condition for having real spectrum is given. By dealing with the boundary condition, a fast approximation theorem for the dacay rate is given. Besides, by dealing with the kernal type, different kinds of dual variations for decay rate is presented, furthermore, estimations for the maximal eigenvalue are obtained.

Estimates for general decay rates for a class of Markov switching diffusion processes

Lingdi WANG *School of Mathematics and Statistics, Henan University*

Abstract: We focus on the almost surely stable with a general decay rate for a class of Markov switching diffusion processes in the paper. By using principal eigenvalue methods, some sufficient conditions and quantitative estimates of the rate for the almost surely stable of the process are obtained. A kind of examples are investigated.

Calderón-Zygmund inequalities on complete Riemannian manifolds

Li-Juan CHENG *Zhejiang University of Technology*

Abstract: We address some fundamental questions concerning geometric analysis on Riemannian manifolds. It has been asked whether the L^p-Calderón-Zygmund inequalities extend to a reasonable class of non-compact Riemannian manifolds without the assumption of a positive injectivity radius. In this talk, we give a positive answer for $1 < p < 2$ under the natural assumption of a lower bound on the Ricci curvature. For $p > 2$, we complement the study in Güneysu-Pigola (2015) and derive sufficient geometric criteria for the validity of the Calderón-Zygmund inequality by adding Kato class bounds on the Riemann curvature tensor and the covariant derivative of Ricci curvature. Probabilistic tools, like Hessian formulas and Bismut type representations for heat semigroups, play a significant role throughout the proofs.

Exponential and strong ergodicity for time-changed symmetric stable processes

Tao WANG *Beijing Normal University*

Abstract: We obtain explicit criteria for both exponential ergodicity and strong ergodicity for time-changed symmetric stable processes with $\alpha \in (1, 2)$. Explicit lower bounds for ergodic convergence rates are given.

On some uniqueness and non-uniqueness results for stationary distributions of distribution dependent SDEs

Shao-Qin ZHANG *Central University of Finance and Economics*

Abstract: The existence of stationary distributions for distribution dependent stochastic differential equations is investigated by using the ergodicity of the associated decoupled equation and the Schauder fixed point theorem. Then the uniqueness and non-uniqueness of stationary distributions are considered. Concrete examples such as McKean-Vlasov stochastic equations with the quadratic interaction are presented to illustrate our results.

Path-distribution dependent stochastic hamiltonian system

Xing Huang *Tianjin University*

Abstract: By investigating the estimate of the relative entropy and using the existing log-Harnack inequality for distribution independent degenerate functional SDEs, the log-Harnack inequality is derived for path-distribution dependent stochastic Hamiltonian systems. As an application, the exponential ergodicity in Wasserstein distance and in relative entropy are obtained by combining with transportation inequality. In addition, when the drift is Hölder continuous, the propagation of chaos is proved by Zvonkin's transform..

Boundary Harnack principle for $\Delta + \Delta^{\alpha/2}$ in Lipschitz open sets

Jie-Ming Wang *Beijing Institute of Technology*

Abstract: A necessary and sufficient condition is established for the scale invariant boundary Harnack principle for the operator $Ł = \Delta + \Delta^{\alpha/2}$ in Lipschitz open sets in R^n. Furthermore, we prove that the scale invariant boundary Harnack principle holds for Ł in Lipschitz domains with interior cone condition with common angle $\theta \in (\cos^{-1}(1/\sqrt{n}), \pi)$ and fails in the truncated cone with the angle $\theta \in (0, \cos^{-1}(1/\sqrt{n}))$.

Continuous-state branching processes with immigration and competition

Pei-Sen LI *Being Institute of Technology*

Abstract: To model stationary population dynamics with competitions between individuals, we include immigration structure into branching processes with competition introduced by Berestycki et al. (2018). We first introduce such processes as pathwise unique solutions of stochastic integral equations driven by Brownian motions and Poisson random measures. By constructing novel test functions and coupling techniques, we then present sufficient conditions for the exponential ergodicity both in the Wasserstein distance and the weighted total variation distance.

Variational principles of the exit time for Hunt processes generated by semi-Dirihclet forms

Lujing HUANG *Fujian Normal University*

Abstract: We give the variational principles of the exit time from an open set of the Hunt process generated by a regular lower bounded semi-Dirichlet form. For symmetric Markov processes, variational formulas for exponential moments of exit time are also presented. As applications, we provide some comparison theorems and quantitative relations of the exponential moments and Poincaré inequalities. This talk is based on a work with Kyung-Youn Kim, Yong-Hua Mao and Tao Wang.

On optimal matching of the laguerre model

Huaiqian LI *Tianjin University*

Abstract: We talk about rates of convergence in Kantorovich distance for empirical measures of the Laguerre model.

On Stein's factors for Poisson approximation in Wasserstein distance with non-linear transportation costs

Zhong-Wei Liao *Beijing Normal University at Zhuhai*

Abstract: We establish various bounds on the solutions to a Stein equation for Poisson approximation in the Wasserstein distance with non-linear transportation costs. The proofs are a refinement of those in [Barbour and Xia (2006)] using the results in [Liu and Ma (2009)]. As a corollary, we obtain an estimate of Poisson approximation error measured in the L^2-Wasserstein distance. This work was done in cooperation with Professors Yutao Ma and Aihua Xia.
