ABSTRACTS 2018

ABI-JABER EDUARDO (Université Paris-Dauphine)
Affine Volterra processes

A growing body of empirical research indicates that volatility fluctuates more rapidly than Brownian motion, which is inconsistent with standard semimartingale models. Fractional volatility models and their relatives have emerged as compelling alternatives- however, their non-Markovian structure makes computations more difficult. We show that, for a large class of such models, it is nonetheless possible to compute the characteristic function by solving an integral equation similar to the Riccati equations associated with standard affine processes.
Joint work with Martin Larsson and Sergio Pulido.

ALBOSAILY SAHAR (Université de Rouen)
Optimal investment/consumption

We consider the spread market defined by the Ornstein--Uhlenbeck process. We construct optimal investment/consumption strategy for the power utility function. We study the Hamilton-Jacobie-Bellman equation by the Feynman-Kac method. We study the numeric approximation and establish the convergence rate. It turns out that in this case the convergence rate is super geometrical i.e. more rapid than any geometrical one.

ARARAT CAJIN (Bilkent University)
Systemic, shortfall and market risk measures as quasi-convex compositions

BELOPOLSKAYA YANA (SPbSUACE, POMI RAN)
Nonlinear Markov processes

We consider Markov processes and their multiplicative functionals associated with systems of nonlinear parabolic equations.We treat the corresponding systems as systems of forward or backward Kolmogorov equations and construct probabilistuc representations for generalized solutions of the Cauchy problem for them. As an example we construct a probabilistic representation for a generalized solution of the Cauchy problem for MHD-Burgers system

BEREZOVSKIY ROSTISLAV (HSE)
Introduction to blockchain economy

The talk is devoted to the biggest hype of 2017: blockchain. I shall tell about the following topics: history of Bitcoin from the very beginning in 2009- mining- landscape of the crypto projects with segmentation by sector- regulation initiatives.

BOGUSLAVSKAYA ELENA (Brunel University London)
Appell martingales

BURNAEV EVGENY (Skolkovo Institute of Science and Technology)
Bayesian Test for Multi-Channel Signal Detection Problem

We consider a problem of detection a signal with unknown energy in a multi-channel system, containing a big number of channels.We assume that the signal can appear in the k-th channel with a known small prior probability p_k. Using observations from all channels we would like to detect whether the signal is presented in one of the channels or we observe pure noise. In our work we describe and compare statistical properties of maximum posterior probability test and optimal Bayesian test.In particular, for these tests we obtain limiting distributions of test statistics and define sets of undetectable signals.

CARASSUS LAURENCE (Pôle Universitaire Léonard de Vinci et Université de Reims)
Convergence of utility indifference prices to the superreplication price in a multiple-priors framework

We formulate a utility indifference pricing model for investors trading in a discrete time financial market under non-dominated model uncertainty. The investors preferences are described by strictly increasing concave (possibly) random functions defined on the positive axis. In this multiple-priors framework we prove that the utility indifference price of some contingent claim converges to its superreplication price when the investor absolute risk-aversion tends to infinity. We also revisit the notion of certainty equivalent and establish its relation with the absolute risk aversion.
A joint work with R. Blanchard.

CHO HYE-JIN (University of Paris 1 - Panthéon Sorbonne)
Speculative bubble burst

This study is intended to provide a continuous-time equilibrium model in which overconfidence generates disagreements among two groups regarding asset fundamentals. Every agent in trading wants to sell more than the average stock price in the market. However, the overconfident agent drives a speculative bubble with a false belief that stocks price will tend to move to the average price over time. I represent the difference between a false belief and a stochastic stationary process which does not change when shifted in time. The gap of beliefs shows how to accommodate dynamic fluctuations in parameter values such as the degree of overconfidence or the information content of the signals. By showing how changes in an expectation operator affect the stochastic variance of economic fundamentals, speculative bubbles are revealed at the burst independently from the market.
Keywords: asset fundamentals, speculation, overconfidence, expectation operator, speculative bubble burst.

CHOI YOUNGNA
Ostensible Financial Stability

This presentation investigates ostensible financial stability of the households of an economy caused by wealth inequality. When the households sector is decomposed into two subsectors that possess a severe wealth inequality, the households in entirety can look financially stable while the two subsectors have opposite extreme financially instability, one from excessive equity the other from lack thereof. The unstable subsector can result in further financial distress and even trigger a financial crisis. The market instability indicator, an early warning system proposed by Choi and Douady (2014), is used to analyze the subsectoral financial instability of the households. An extreme case analysis is provided to explain what financial instabilities can arise amid seemingly stable economy and positive outcomes.

CHOULLI TAHIR (University of Alberta)

We consider a market model resulting from progressively enlarging an initial market model with a random time. This random time can model the death time of an investor and/or insured, the default time of a firm, or generally speaking an occurrence time of an event that can impact the market somehow. In this setting, where there are two flows of information, our ultimate goal lies in describing as explicit as possible the impact of the random time on the optimal portfolio as well as on the risk management via the securitization. To this end, thanks to the duality between investment strategies and deflators, a systematic study for deflators in these markets imposes itself. In previous works, we established necessary and sufficient conditions for the existence of these deflators, while herein we are more concerned with their detailed descriptions in order to derive the optimal deflator once an optimization criterion is chosen. This task is fully addressed and solved herein, and is based essentially on a martingales representation result for martingales of the large filtration. This result is elaborated under no mathematical condition at all, and hence extends the representation's theorem of Azema/Jeulin/Knight/Yor, where the authors assume the Brownian framework and the random time avoids stopping times. As direct applications of our novel martingale representation, we describe the dynamics of the longevity bonds price process and the numeraire portfolio for the large filtration.

CONT RAMA (CNRS and Imperial College)
Higher-order Ito calculus

Pathwise integration and higher-order Ito-Follmer calculus for paths with non-zero p-th variation, Follmer (1981) provided, a pathwise proof of the Ito formula for paths with finite quadratic variation. We extend this formula and the associated notion of pathwise integral to irregular paths with non-zero p-th order variation along a sequence of partitions, in a strictly pathwise setting. Our results apply to fractional Brownian motion and fractional processes.
Joint work with Nicolas Perkowski (Berlin).

CREPEY STEPHANE (University of Evry)

CUCHIERO CHRISTA (University of Vienna)
Rough volatility from an affine point of view

We represent Hawkes process and their Volterra long term limits, which have recently been used as rough variance processes, as functionals of infinite-dimensional affine processes.
The talk is based on joint work with Josef Teichmann.

DANILOVA ALBINA (London School of Economics)
Risk aversion of insider

We analyse how the risk aversion of insider affects the equilibrium in insider trading model. In particular, we will consider a static information Kyle-Back model under new assumptions: a) exponential utility preferences of the insider, b) non-Gaussianity of the signal, and c) price set by the market maker being a function of weighted signal which is not necessarily Gaussian either.We will discuss conditions on the weighting and pricing functions which ensure the existence of equilibrium and derive, under afore mentioned conditions, the equilibrium pricing and weighting functions, as well as insider's optimal trading strategy.

DE MARCH HADRIEN (Ecole Polytechnique)
New results about higher degree MOT

We give new results about duality and local structure of MOT.

PAOLO DI TELLA
Martingale representation, BSDEs and logarithmic utility maximization in progressively enlarged Lévy filtrations

We study logarithmic utility maximization on a random time horizon T. The uncertainty on the time horizon is caused by an exogenous risk and therefore T is not a stopping time in the filtration of the market. To include jumps in the model we work in the filtration **G**, the progressive enlargement by T of the filtration generated by an arbitrary Lévy process. We investigate the problem with the help of a martingale optimality principle. To this aim, we study BSDEs in **G**. This requires, as a basic ingredient, a martingale representation theorem in **G**, which we obtain under the assumptions of immersion property and avoidance of stopping times on T.

EBERLEIN ERNST (University of Freiburg)
Hybrid market models

ENGELBERT HANS-JURGEN (Friedrich-Schiller-University Jena)
On the Entropie Minimal Martingale Measure for Lévy Processes

We consider a geometric Lévy market with asset price $\mathbf{S}t = \mathbf{S}0 \exp(\mathbf{X}t)$, where **X** is a general Lévy process on (**O**,**F, P**), and interest rate equal to zero. As it is well known, except for the cases that **X** is a Brownian motion or a Poisson process, the market is incomplete. Therefore, if the market is arbitrage-free, there are many equivalent martingale measures and the problem arises to choose an appropriate martingale measure for pricing contingent claimes. One way is to choose the equivalent martingale measure **Q** which minimizes

the relative entropy to **P**, if it exists. Another choice is the famous Esscher martingale measure **Q**^E, if it exists. The main objective of the present talk is to discuss a simple and rigorous approach for proving the fact that the entropy minimal martingale measure **Q** and the Esscher martingale measure **Q**^E actually coincide: **Q** = **Q**^E. Our method consists of a suitable aproximation of the physical probability measure **P** by Lévy preserving probability measures **P**_n. This problem was treated in several earlier papers but more heuristally or in a sophisticated way.

FEINBERG EUGENE (Stony Brook University)
Continuity of solutions to minimax equations and robust optimization

This talk describes extentions of Berge's maximum theorem for possibly noncompact action sets and unbounded cost functions to minimax problems and studies applications of these extensions to two-player zero-sum games with possibly noncompact action sets and unbounded payoffs. For games with perfect information, also known under the name of turn-based games and robust optimization problems, the talk presents continuity properties of value functions and solution multifunctions.

GENOLINI CHRISTOPHE (Université de Paris Nanterre)
R++, the Next Step (Description of R++, a high performance statistical analysis software for finance.)

Statistical analysis is usually confronted with three pitfalls: • the quality of the data can lead to costly pre-processing (data management or data consolidation) in terms of human time; • the data are more and more voluminous (big data), which makes it difficult to process; • treatment times are sometimes prohibitive R ++, the Next Step is a new high performance statistical analysis software. It is an easily accessible business software for non-specialist users, integrated in a modern and user-friendly Human Machine Interface (HMI). But it is also an expert software that relies on the latest innovations in terms of parallelism and Big Data. At the HMI level, the research that we carried out in collaboration with the LII team (ENAC) led to the design of a new interface to divide by 3 or 4 the data preparation time. On the “pure performance” side, Proofs of Concept (PoC) have shown that the use of the graphics card (GPU) can speed up calculations by a factor ranging between 100 and 800 times, compared to conventional software R and SAS. 800 times faster means that R++ makes a calculation in two minutes that would have taken 26 hours on another software. Finally, a variant of the "out of core" disk reading allowed us to process on a laptop the same volume of data as the supercomputer of the CERFACS (Météo France computing center) using conventional methods. During this session, we will present the R++ project in its entirety, then we will demonstrate the potential of its HMI.

GRIGOROVA MIRYANA (Bielefeld University)
BSDEs with reection, non-linear optimal stopping and non-linear Dynkin games: beyond right-continuity

In the talk last year, we formulated a notion of Reflected Backward Stochastic Differential Equation (Reflected BSDE) in the case of a completely irregular lower obstacle b. We showed that the solution coincides with the value process of anon-linear optimal stopping problem with **g**- expectation (where **g** is the driver of the Reflected BSDE).
In the present talk, we focus on Doubly Reected BSDE with completely irregular lower and upper barriers b and a. Under a technical assumption (a Mokobodzki-type condition), we show existence and uniqueness of the solution. In the case where b and -a are right upper-semicontinuous, the solution is characterized in terms of the value of a corresponding non-linear E^**g**-Dynkin game, that is, a game problem over stopping times with (non-linear) **g**-expectation, where **g** is the driver of the doubly reflected BSDE. In the general case where the barriers do not satisfyany regularity assumptions, the solution of the Doubly Reected BSDE is related to the value of "an extension" of the previous non-linear game problem over a larger set of "stopping strategies" than the set of stopping times. This characterization proves useful in establishing a comparison result and a priori estimates with universal constants.
Based on a joint work with P. Imkeller, Y. Ouknine, and M.-C. Quenez.

GUEGAN DOMINIQUE (University of Paris 1 - Panthéon Sorbonne LABEX REFI IPAG)

Regulatory Learning: how to supervise machine learning models? An application to credit scoring.

The arrival of big data strategies is threatening the latest trends in financial regulation related to the simplification of models and the enhancement of the comparability of approaches chosen by financial institutions. Indeed, the intrinsic dynamic philosophy of Big Data strategies is almost incompatible with the current legal and regulatory framework as illustrated in this paper. Besides, as presented in our application to credit scoring, the model selection may also evolve dynamically forcing both practitioners and regulators to develop libraries of models, strategies allowing to switch from one to the other as well as supervising approaches allowing financial institutions to innovate in a risk mitigated environment. The purpose of this paper is therefore to analyse the issues related to the Big Data environment and in particular to machine learning models highlighting the issues present in the current framework confronting the data flows, the model selection process and the necessity to generate appropriate outcomes.

GUMBEL SANDRINE

GUSHCHIN ALEXANDER

HAMADENE SAID

HARMS PHILIPP (University of Freiburg)
Weak error rates of SPDEs

In many important SPDEs, including the HJM, Schr\\"-odinger, and KdV equation, the linear part of the drift has noregularizing effect. We prove essentially sharp weak convergence rates for noise discretizations of semilinear SPDEs of this type.

HU KAITONG

IMKELLER PETER (Humboldt-Universität zu Berlin)
Weierstrass curves, dimension

We investigate geometric properties of Weierstrass curves with two components, representing lacunary series based on trigonometric functions.They are seen to be 1/2-Hoelder continuous, do not possess a Lévy area, and are not (para-)controlled with respect to each other in the sense of our recent Fourier analytic approach of rough path analysis. Their graph is represented as an attractor of a smooth random dynamical system in 4-dimensional Euclidean space. Our argument that the curve is space filling (has Hausdorff dimension 2) is in the spirit of Keller's adaptation of Ledrappier-Young's approach for the calculation of the Hausdorff dimension of attractors. This is joint work with G. dos Reis (U Edinburgh) and O. Pamen (U Liverpool and AIMS Ghana).

KALININ ALEXANDER (Imperial College London)
Mild solutions to PPDEs

The recent functional extension of the widely applied Itô formula led to the new exciting class of path-dependent partial differential equations(PPDEs). In relevant publications, the most common approach to construct classical or viscosity solutions to PPDEs is to utilize backward stochastic differential equations (BSDEs). In this talk, we rely instead on Markovian integral equations and present path-dependent diffusions to give a general existence and uniqueness result for mild solutions to semilinear parabolicPPDEs. Moreover, we motivate this solution concept by applications in stochastic optimal control and mathematical finance.

KHALEDIAN ARMAN (Imperial College London)
Chaos expansion with respect to a continuous square-integrable martingale

We use the Functional Ito Calculus to develop a Chaos Expansion for functionals of acontinuous square-integrable martingale. Given a continuous square-integrable martingaleX, we define a scale of Sobolev spaces of functionals using the concepts of (weak) verticaland horizontal derivatives developed in the Functional Ito Calculus. We then show that anyfunctional in these Sobolev spaces may be expanded as a sum of multiple Ito integrals withrespect to X, where the n-th homogeneous chaos corresponds to iterated Ito integrals of X. We show that this chaos expansion is convergent for a class of tempered functionals whichare defined analogously to Schwartz distributions. For such tempered functionals we obtain aseries representation of the vertical derivative through its action on polynomials. Our resultsextend the well-known Wiener chaos expansion to a non-Gaussian setting.

KHOSRAWI-SARDROUDI WAHID
Polynomial Semimartingales

Polynomial Preserving Processes are Markov processes that allow for computation of moments up to arbitrary order in semi-closed form. For example they contain all affine processes satisfying a certain integrability condition. We extend this class to allow for stochastic discontinuities within a semimartingale framework. We establish a relation between the predictable characteristics and the polynomial property and discuss an extension to a non Markov setting.
Joint work with Thorsten Schmidt.

KUTOYANTS YURI (Le Mans University)
Cusp location estimation

We present a survey of some recent results of the cusp location estimation for different models of observations including i.i.d. model, ergodic diffusion process, inhomogeneous Poisson process, dynamical systems with small perurbations. We describe the asymptotic properties of the MLE and bayesian estimators in different asymptotics.

LEE JUNBEOM

LIN YIQING

LYASSOFF ANDREW (Boston University Questrom School of Business)

MARTYNOV GENNADY (IITP RAS, Moscow)
Goodness-of-fit tests

Goodness-of-fit tests with estimated parametersIn this thesis we will present the new class of the parametric distribution families such, thatthe limit distributions of the goodness-of-fit statistics based on the empirical process do notdepend of unknown parameters. This is family R((x/b)^a)), a>0, b>0, x belongs to a subset X of **R**_+ where a and b are unknown parameters. It was consideredthe Pareto and Weibull distribution families. The method was presented for calculation the eigenvalues of the corresponding covariance operator.The work was carried out at IITP RAS and supported by Russian Science Foundation (grant RSF No. 14-50-00150).

MASTROLIA TIBAULT (Ecole polytechique)
Principal Agent problem with common Agency

In this talk, we consider a problem of contract theory in which several Principals hire a common Agent and we study the model in the continuous time setting. We show that optimal contracts should satisfy some equilibrium conditions and we reduce the optimisation problem of the Principals to a system of coupled Hamilton-Jacobi-Bellman (HJB) equations. We provide conditions ensuring that for risk-neutral Principals, the system of coupled HJB equations admits a solution. Further, we apply our study in a more specific linear-quadratic model where two interacting Principals hire one common Agent. In this continuous time model, we

extend the result of Bernheim and Whinston (1986) in which the authors compare the optimal effort of the Agent in a non-cooperative Principals model and that in the aggregate model, by showing that these two optimisations coincide only in the first best case. We also study the sensibility of the optimal effort and the optimal remunerations with respect to appetence parameters and the correlation between the projects. Joint work with Zhenjie Ren.

MAYERHOFER EBERHARD (Mathematics and Statistics Department, University of Limerick)
Options Portfolio Selection

We develop a new method to optimize portfolios of options in a market where European calls and puts are available with many exercise prices for each of several potentially correlated underlying assets. We identify the combination of asset-specific option payoffs that maximizes the Sharpe ratio of the overall portfolio: such payoffs are the unique solution to a system of integral equations, which reduce to a linear matrix equation under suitable representations of the underlying probabilities. Even when implied volatilities are all higher than historical volatilities, it can be optimal to sell options on some assets while buying options on others, as hedging demand outweighs demand for asset-specific returns.

MOKBEL RITA (Franche Comte University)
Bitcoin and Blockchain

A summary on the literature, current status and expectations, available valuation models, open questions, possibilities and improvements.

MOLCHANOV ILYA (University of Bern)
Conditional cores and conditional convex hulls

MUELLER MARVIN (ETH Zurich)
Stochastic Stefan Problems

Stochastic extensions of macroscopic stochastic two-phase systems in with Stefan-type boundary interaction recently came up in applications of modeling of modern financial markets. We discuss approximation results for such classes of stochastic moving boundary problems.

NECHAEV MIKHAIL

NOVELLO STEFANO

OWARI KEITA (Department of Mathematical Sciences, Ritsumeikan University)
On a Komlos-Type Result in a Dual Orlicz Spaces

We give a Komlos type result for bounded sequences in dual Orlicz spaces (i.e. Orlicz spaces which are the duals of Delta_2 Orlicz spaces; e.g. the space of random variables with some exponential moments). Its "utility grade" version asserts that any bounded sequence in such a space has an (a.s. convergent) sequence of forward convex combinations whose supremum remains in the same space. If the probability space is atomless, this type of Komlos theorem characterises the class of dual Orlicz spaces, or their preduals, the Delta_2-Orlicz spaces. Some consequences in convex duality in finance are also given.
Joint work with Freddy Delbaen.

PERGAMENSHCHIKOV SERGUEI (University of Rouen)
Minimax quickest changepoint detection for dependent data

We consider the quickest change-point detection problem in pointwise and minimax settings for general dependent data models. Two new classes of sequential detection procedures associated with the maximal ``local'' probability of a false alarm within a period of some fixed length are introduced. For these classes of detection procedures, we consider two popular risks: the expected positive part of the delay to detection and the conditional delay to detection. Under very general conditions for the observations, we show that the popular Shiryaev--Roberts procedure is asymptotically optimal, as the local probability of false alarm goes to zero, with respect to both these risks pointwise (uniformly for every possible point of change) and in the minimax sense (with respect to maximal over point of change expected detection delays). The conditions are formulated in terms of the rate of convergence in the strong law of large numbers for the log-likelihood ratios between the ``change'' and ``no-change'' hypotheses, specifically as a uniform complete convergence of the normalized log-likelihood ratio to a positive and finite number. We also develop tools and a set of sufficient conditions for verification of the uniform complete convergence for a class of Markov processes. These tools are based on concentration inequalities for functions of Markov processes and the Meyn--Tweedie geometric ergodic theory. Finally, we check these sufficient conditions for a number of challenging examples (time series) frequently arising in applications, such as autoregression, autoregressive GARCH, etc.
Joint work with A. Tartakovsky.

SABBAGH WISSAL (University of Evry- Paris Saclay)
The XVA Equations and Aanticipated BSDE

Economic capital (EC) can be used as a funding source by banks, at a risk-free cost instead of the additional credit spread of the bank in the case of unsecured borrowing. This results in a significant reduction of funding costs and an FVA (funding valuation adjustment) ignoring it would be grossly overestimated.Mathematically the intertwining of EC and FVA leads to an anticipated BSDE (ABSDE) for the FVA, with coefficient entailing a conditional risk measure of the one-year-ahead increment of the martingale part of the FVA itself. Accounting further for the KVA (capital valuation adjustment) component of economic capital, with the ensuing feedback condition that EC must be greater than KVA, yields a system of ABSDEs for the FVA and the KVA processes.In this talk we show that the (FVA, KVA) system of ABSDEs is well-posed and we establish the convergence of a Picard approximation scheme. This is first done for a bank without debt. In the realistic case of a defaultable bank, the resulting ABSDEs, which are stopped before the default of the bank, are solved by reduction to a reference filtration.

SCHMIDT THORSTEN (University of Freiburg)
Non-linear Markov processes

We introduce a new class of non-linear Markov processes to capture model risk. By dynamic programming we are able to obtain a non-linear Kolmogorov equation. Non-linear affine processes are a special case, where we are able to obtain explicit results by numerical methods.

SCHWEIZER MARTIN

SHIRYAEV ALBERT (Steklov Mathematical Institute)
Analysis of the Cameron-Martin/Girsanov theorem

From point of view of the financial mathematics the Cameron-Martin/Girsanov theorem
shows how to convert the physical measure of an underlying instrument (the share price) to a
risk-neutral measure which gives a tool for pricing derivatives. We give a transparent proof for Brownian motion with drift and well known stochastic exponential (without of Ito formula) and give simple proofs of the results that expectation of stochastic exponential is equal to one (results of Liptser-Shiryaev, Novikov, Krylov).

SHISHKOVA ALENA

TAN XIAOLU (Université Paris Dauphine)
Super-replication with proportional transaction cost under model uncertainty

We consider a discrete time financial market with proportional transaction cost under model uncertainty, and study a super-replication problem. We recover the duality results that are well known in the classical dominated context. Our key argument consists in using a randomization technique together with the minimax theorem to convert the initial problem to a frictionless problem set on an enlarged space. This allows us to appeal to the techniques and results of Bouchard and Nutz (2015) to obtain the duality result.

TEICHMANN JOSEF (ETH Zurich)
Affine Filtering

We present high dimensional tractable filters of affine signals and applications to modelling stochastic covariances (joint work with Lukas Gonon).

TIZIANO VARGIOLU (University of Padova)
Stochastic impulse games

Nonzero-sum stochastic differential games with impulse controls: a verification theorem with applicationsWe consider a general nonzero-sum impulse game with two players. The main mathematical contribution of the paper is a verification theorem which provides, under some regularity conditions, a suitable system of quasi-variational inequalities for the value functions and the optimal strategies of the two players. As an application, we study an impulse game with a one-dimensional state variable, following a real-valued scaled Brownian motion, and two players with linear and symmetric running payoffs. We fully characterize a Nash equilibrium and provide explicit expressions for the optimal strategies and the value functions. We also prove some asymptotic results with respect to the intervention costs. Finally, we consider two further non-symmetric examples where a Nash equilibrium is found numerically.

WEI XIAOLI (University Paris Diderot-LPMA)
Robust mean-variance portoflio

WIESEL JOHANNES

YANG JUNJIAN (Ecole polytechnique)
On L^1 solutions of BSDEs

We consider the existence and uniqueness of L^1 solutions of BSDEs and reflected BSDEs. It was shown that if the generator f is of sublinear growth with respect to z, there exists a solution for $\\xi\\in L^1$. Here, we show the existence and uniqueness of solutions of a linearly growing BSDE under an integrability condition on $\\xi$ and f_s^0 uniformly with respect to a family of probability measures

YAROVAYA ELENA (Lomonosov Moscow State University)
Branching Walks on Lattices

We present results for continuous-time symmetric branching random walks on multidimensional lattices with a finite number of particle generation centers called branching sources. For such branching random walks, phase transitions are revealed in the supercritical case, what differ significantly from the case with a single branching source. The effects associated with the rejection of the finiteness of a variance of jumps of an underlying random walk, which lead to transient random walk, even on one- and two-dimensional lattices, will also be discussed. For the location of sources at which the distances between them tend to infinity

pairwise, the effect of "limiting coalescence" of the eigenvalues of the evolution operator of the mean particle numbers is observed. A number of results will be formulated on the behavior of the transition probabilities of a branching random walk with the simultaneous growth of spatial coordinates and time. These results are important for studying large deviations of branching random walks, in particular, for studying the front of a population of particle. The work is supported by the grant RFBR 17-01-00468.

ZERVOS MIHAIL (London School of Economics)
Renegotiation-proof financial contracting

We consider a dynamic renegotiation-proof financial contracting problem that arises when an entrepreneur seeks funding for a project whose cashflows are privately observed. We determine an optimal contract that induces truthful reporting, while leaving no scope for mutually beneficial ex post renegotiation. The contract involves the use of randomized liquidation if and only if the optimal `full-commitment' contract a la DeMarzo & Sannikov (2006) is not renegotiation-proof. In this case, the entrepreneur's continuation payoff, or promise, evolves between two boundary points as a reflected process. After good reported performance, the entrepreneur's promise may reach an upper bound where he becomes sole claimant to the project cashflows. On the other hand, after poor reported performance, his promise may reach a lower bound where the project is randomly liquidated.

ZHITLUKHIN MIKHAIL (Steklov Mathematical Institute, Moscow)
A sequential test for the drift of a fractional Brownian motion

We'll consider a problem of sequentially testing the hypothesis about the sign of the drift of a fractional Brownian motion in a Bayesian setting. The main result shows that this problem can be reduced to an optimal stopping problem for a standard Brownian motion with a non-linear observation cost. We'll discuss a method how it can be solved, speak about qualitative properties of the solution, and show numerical results. Joint work with Alexey Muravlev.

ZHOU CHAO