

Dr. Alexander Kalinin**Work address**

Department of Mathematics
Ludwig-Maximilians-Universität München
Theresienstr. 39, 80333 Munich
kalinin@math.lmu.de

Academic occupations

- 2019 - today Postdoc and academic advisor at LMU Munich
in the work group *Financial and Insurance Mathematics*
- 2017 - 2019 Chapman fellow at Imperial College London
in the *Mathematical Finance Section*
- 2013 - 2017 Research associate at the University of Mannheim
and associate member of the research training group
Statistical Modelling of Complex Systems and Processes

Education

- 2013 - 2017 Doctorate in mathematics, University of Mannheim
Dissertation: *Markovian Integral Equations and
Path-Dependent Partial Differential Equations*
Supervisor: Prof. Dr. Alexander Schied
- 2011 - 2013 Mathematics in Business and Economics M.Sc.,
University of Mannheim
Master's thesis: *Viscosity Solutions of the Log-Laplace
Equation of a Superprocess*
- 2008 - 2011 Mathematics in Business and Economics B.Sc.,
University of Mannheim
Bachelor's thesis: *Stability of Competitive Equilibrium
with Liapunov's Second Method*

Research interests

Stochastic analysis and stochastic processes

- Stochastic Volterra integral equations
- Markov processes on Polish spaces

Mathematical finance

- Valuation of option prices
- Stochastic volatility models

Published articles

3. *Support characterization for regular path-dependent stochastic Volterra integral equations*, A. Kalinin, Electronic Journal of Probability, 2021 ([link](#)).

Short abstract: We consider a stochastic Volterra integral equation with regular path-dependent coefficients in a multidimensional setting. Under an absolute continuity condition, the unique solution is a semimartingale that admits almost surely Hölder continuous paths. We prove that the support of its law can be described by a flow of mild solutions to ordinary integro-differential equations.

2. *On the support of solutions to SDEs with path-dependent coefficients*, R. Cont and A. Kalinin, Stochastic Processes and their Applications, 2020 ([link](#)).

Short abstract: Given a path-dependent SDE driven by a multidimensional Brownian motion, we show that the support of the law of the solution can be represented by the image of the Cameron-Martin space under the flow of mild solutions to a system of path-dependent ordinary differential equations. Our result extends the Stroock-Varadhan support theorem for diffusion processes to the path-dependent case.

1. *Markovian integral equations*, A. Kalinin, Annales de l'Institut Henri Poincaré, 2020 ([link](#)).

Short abstract: This paper analyzes multidimensional integral equations that are formulated with a Markov process. In the case of a path process of a diffusion, the solutions lead to the concept of mild solutions to path-dependent PDEs. Uniqueness, stability and non-extendibility within a class of solutions is established. Moreover, a multidimensional Feynman-Kac formula and a one-dimensional global existence- and uniqueness result are provided.

Articles on arXiv

2. *Stability, uniqueness and existence of solutions to McKean-Vlasov SDEs: a multidimensional Yamada-Watanabe approach*, A. Kalinin, T. Meyer-Brandis and F. Proske, arXiv preprint, 2021 ([link](#)).

Short abstract: We establish stability and pathwise uniqueness of solutions to Wiener noise driven McKean-Vlasov equations with random coefficients, which are allowed to be non-Lipschitz continuous. In the deterministic case we also derive unique strong solutions. By using our approach, which is based on an extension of the Yamada-Watanabe ansatz to the multidimensional setting, we prove first moment and pathwise exponential stability of solutions. Furthermore, we are able to compute Lyapunov exponents explicitly.

1. *Mild and viscosity solutions to semilinear parabolic path-dependent PDEs*, A. Kalinin and A. Schied, arXiv preprint, 2018 ([link](#)).

Short abstract: We study and compare mild and viscosity solutions to semilinear parabolic path-dependent PDEs. The aim is to show that right-continuous mild solutions are also viscosity solutions. Since unique mild solutions exist under weak condition, we obtain a general existence result for viscosity solutions to semilinear parabolic path-dependent PDEs.

Dissertation

Markovian Integral Equations and Path-Dependent PDEs,
University of Mannheim, 2017 ([link](#)).

Short abstract: The thesis provides a construction of solutions to Markovian integral equations. By introducing path-dependent diffusion processes, this yields a general existence and uniqueness result for mild solutions to semilinear parabolic path-dependent PDEs. In this connection, it can be verified that mild solutions are also solutions in a viscosity sense.

Conferences with contributed talks

- 15th *German Probability and Statistics Days* (online),
University of Mannheim, September 27 - 30, 2021.
- 14th *Bachelier Colloquium on Mathematical Finance and Stochastic Calculus*, Métabief in France, January 13 - 16, 2020.
- 2nd *Imperial-CUHK Workshop on Quantitative Finance*
Hong Kong, May 21 - 22, 2019.
- 13th *Bachelier Colloquium on Mathematical Finance and Stochastic Calculus*, Métabief in France, January 8 - 10, 2019.
- 10th *World Congress of the Bachelier Finance Society*,
Trinity College Dublin, July 16 - 20, 2018.
- *Imperial-ETH Workshop on Mathematical Finance*,
ETH Zurich, April 4 - 6, 2018.
- 13th *German Probability and Statistics Days*,
University of Freiburg, February 27 - March 2, 2018.
- 12th *Bachelier Colloquium on Mathematical Finance and Stochastic Calculus*, Métabief in France, January 15 - 20, 2018.
- *Workshop on Pathwise Methods, Functional Calculus and Applications in Mathematical Finance*, Wolfgang Pauli Institute in Vienna, April 4 - 6, 2016.

Seminar talks

- *Financial and Actuarial Mathematics Seminar*,
Technical University of Munich, November 11, 2019.
- *Seminar of the Stochastic Analysis Group*,
University of Oxford, March 4, 2019.
- *Imperial Stochastics Day*,
Imperial College London, October 3, 2017.
- *Colloquium of the School of Business Informatics and Mathematics*,
University of Mannheim, December 14, 2015.

Reviewing

- *Applied Probability Journals*
- *Journal of Theoretical Probability*
- *Asia-Pacific Financial Markets*
- *Stochastic Processes and their Applications*
- *SIAM Journal on Control and Optimization*
- *Applied Mathematics and Optimization*

Experience abroad

- | | |
|------|---|
| 2016 | Five-week research visit at the University of Waterloo |
| 2014 | <i>European Summer School in Financial Mathematics</i>
at the University of Oxford |
| 2011 | Semester abroad at the University of California, Berkeley |

Teaching experience

- | | |
|-------------|--|
| 2021 | Lecturing at LMU Munich in <ul style="list-style-type: none">■ <i>Financial Modelling with Stochastic Partial Differential Equations</i> (master) |
| 2019 - 2021 | Teaching assistant at LMU in <ul style="list-style-type: none">■ <i>Multivariate Calculus</i> (bachelor)■ <i>Probability Theory</i> (bachelor)■ <i>Stochastics</i> (bachelor) |
| 2018 - 2019 | Lecturing at Imperial College London on <ul style="list-style-type: none">■ <i>Path-Dependent Partial Differential Equations</i> (master, 2 terms) |
| 2013 - 2017 | Teaching assistant at the University of Mannheim in <ul style="list-style-type: none">■ <i>Mathematical Finance</i> (bachelor)■ <i>Continuous-Time Finance</i> (bachelor)■ <i>Modelling, Measuring and Managing Risk</i> (master)■ <i>Advanced Mathematical Finance</i> (master)■ <i>Stochastic Analysis</i> (master)■ <i>Risk Measurement and Risk Management</i> (master) |