KIRILL ZAKHAROV

AI Researcher, Applied Mathematician, Data Scientist

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ResearchGate GitHub Google Scholar Orcid Habr

EXPERIENCE

- AI Researcher
  ITMO University, Russia
  2022 – present

PROJECTS

- Development of synthetic time series generation method
  Sber bank
  2022 – 2023
- Development of synthetic transaction generation method
  Sber bank
  2024 – 2025
- Jump diffusion stochastic processes modelling based on neural stochastic differential equations in financial tasks
  Sber bank
  2023 – 2024
- Deposit duration forecasting
  BSPB
  2023 – 2024

SKILLS

- Classical and Advanced ML
- Deep Learning (Pytorch)
- Generative models: GANs, Normalizing Flows, Diffusion Models, VAEs, Neural SDE Flows
- Physics-Informed AI: PINNs, NeuralODEs, NeuralSDEs
- Dynamical Systems, Complex Systems, Operator Theory
- Stochastic Calculus and Measure Theory in Finance and AI (SDEs, stochastic integrals, stochastic processes, Itô calculus)
- Derivative Pricing (forwards, options pricing, measure change, binomial model, computational finance)
- Optimization methods and numerical analysis (NN training algorithms, numerical derivative pricing, linear programming, portfolio optimization)
- Programming languages: Python, Wolfram Mathematica, C
- Academic writing (Journal Articles, Conference Proceedings)

EDUCATION

Bachelor of Science in Applied Mathematics and Informatics
SPbSUE
Sept 2018 – June 2022

Master of Science in Financial Technologies of Big Data
ITMO
Sept 2022 – June 2024

PhD in Artificial Intelligence and Machine Learning

ITMO

Sept 2024 – present

PUBLICATIONS

[1] Kirill Zakharov. “Multivariate Time Series Modelling with Neural SDE Driven by Jump Diffusion”. In: *International Conference on Computational Science*. Springer. 2024, pp. 213–221.

[2] Kirill Zakharov, Anton Kovantsev, and Alexander Boukhanovsky. “Coupling of Lagrangian Mechanics and Physics-Informed Neural Networks for the Identification of Migration Dynamics”. In: *Smart Cities* 8.2 (2025), p. 42.

[3] Kirill Zakharov and Elizaveta Stavinova. “Time-dependent differential privacy for enhanced data protection in synthetic transaction generation”. In: *Proceedings of the 2024 13th International Conference on Software and Computer Applications*. 2024, pp. 112–117.

[4] Kirill Zakharov, Elizaveta Stavinova, and Alexander Boukhanovsky. “Synthetic financial time series generation with regime clustering”. In: *J. Adv. Inf. Technol* 14.6 (2023).

[5] Kirill Zakharov, Elizaveta Stavinova, and Anton Lysenko. “TRGAN: A Time-Dependent Generative Adversarial Network for Synthetic Transactional Data Generation”. In: *Proceedings of the 2023 7th International Conference on Software and e-Business*. 2023, pp. 1–8.

[6] Kirill Zakharov et al. “Forecasting Population Migration in Small Settlements Using Generative Models under Conditions of Data Scarcity”. In: *Smart Cities* 7.5 (2024), pp. 2495–2513.

PREPRINTS AND OTHER MATERIALS

- Mathematical analysis of break-even points and return bounds for option strategies, 2024, doi: 10.13140/RG.2.2.15945.76649
- Optimisation methods. Theorems, 2023, doi: 10.13140/RG.2.2.36071.01440
- Option pricing modelling based on stochastic differential equations, 2022, doi: 10.13140/RG.2.2.13255.37280
- Spherical and Elliptical distributions, 2021, doi: 10.13140/RG.2.2.15639.24484

CONFERENCES

- ICCS, Málaga, Spain, 2024
- ICSCA, Bali, Indonesia, 2024
- ICCSIT, Paris, France, 2023
- ICSeB, Osaka, Japan, 2023
- CMY, Saint Petersburg, Russia, 2023
- CMY, Saint Petersburg, Russia, 2024

COURSES

- Pricing Options with Mathematical Models, Caltech – Coursera, 2022
- Stochastic Processes, HSE – Coursera, 2022
- Probability Theory, CSC – Stepik, 2022
- AI Frontiers, Saint Petersburg, 2023

COMPETITIONS

- 1th place – ITMO HACK FinTech case, 2022
- 5th place – Rosneft Hackathon, 2022
- 3th place – GPN CUP Data Science, 2021