

David Mikheev

Curriculum Vitae

✉ me@davidmiheev.life

Education

2016–2022 **Specialist degree in Mathematics**, *Faculty of Mechanics and Mathematics*, Lomonosov Moscow State University, Moscow.

Course papers In the course papers, I had been working on both pure mathematics topics (LS category, nilmanifolds, homological algebra) and applied topics (topological data analysis). My course papers: The Lusternik-Schnirelmann category of nilmanifolds and applications, Persistent homology and topological data analysis, Persistent homology and persistent data analysis: theory and practice

Thesis

Title *Invariants of matroids defined by the action of a torus*

Advisors Associate Professor [A. A. Ayzenberg](#) & Professor [V. M. Buchstaber](#)

Description This thesis is an attempt to reveal interconnections between some algebraic invariants of matroids and toric topology

Scientific Interests

GKM-theory, Combinatorial commutative algebra and various connections with algebraic geometry and algebraic topology. Geometric and algebraic combinatorics. Also, I possess some interest in data science: geometrical methods such as topological data analysis. Various possible applications of it in mathematics, biology, physics and astronomy.

Experience

2021– 2022 **Intern**, *ATA Laboratory of the CS Faculty*, HSE University, Tech Stack: Python, GUDHI, Astropy.

Have developed the package for topological data analysis on astronomical data (observations of galaxies). Development of this package continues as an open source project by me and students of the CS faculty of HSE (under my supervision), see [GalaxyWitness](#)

2016 – 2018 **Tutor**, *Math Circles for high school and middle school*, Lomonosov Moscow State University.

Was preparing lessons and materials. My goal in these lessons was to discuss with students the interconnections of advanced mathematics and more elementary mathematics to demonstrate the beauty of this science.

Awards

2017, 2018 Academic scholarship for successful students

My Talks

- 2022, October Toric topology, combinatorics and data analysis, Leonhard Euler International Mathematical Institute in Saint Petersburg, Online, "Topological data analysis and big data"
- 2021, November Toric topology and combinatorics, Sirius University, Sochi, "Following June Huh's dissertation"
- 2021, May Graduate Seminar on geometry and topology, Moscow State University, "Persistent homologies: theoretical basis and applications"
- 2019, October Graduate Seminar on geometry and topology, Moscow State University, "Around homology theory: fixed points, Hex, Nash equilibrium"
- 2019, May Graduate Seminar on geometry and topology, Moscow State University, "LS category of nilmanifolds"

Conferences, Schools and Lectures

- 2021, February Contemporary stochastic financial mathematics, Sochi
- 2020 – 2021 Math-Science Literature Lectures Series, Harvard University, Online
- 2020, May Workshop on Torus Actions in Topology, Fields Institute for Research in Mathematical Sciences, Online
- 2019, September Geometry, topology and mathematical physics, Landau Institute for Theoretical Physics, Chernogolovka
- 2018, November Geometry, topology and mathematical physics, Landau Institute for Theoretical Physics, Chernogolovka
- 2016, July Summer school "Contemporary Mathematics", Dubna

Tech Skills

- Languages PYTHON, C/C++, RUBY
- Machine learning and data analysis I used to conduct some experiments (in which I had experience with GUDHI, SCIKIT-LEARN, SCIPY, TORCH and JAX)
- Tools L^AT_EX, OBSIDIAN, SPHINX
- Other DOCKER, GIT, RUBY ON RAILS, HTML

Languages

- Russian **Native**
- English **Upper Intermediate** (→ *Advanced*)
- Français **Basic**