Alexey Podobryaev

Date of birth: 06.07.1978. Citizenship: Russia. Languages: Русский, English, Türkçe.

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Research interests

Geometric control theory, sub-Riemannian geometry, sub-Lorentzian geometry

Education

2020 PhD Steklov Mathematical Institute of RAS, Moscow,
thesis: *Symmetries and optimal synthesis in left-invariant optimal control problems*,
adviser: prof. Yu. L. Sachkov,
referees: prof. A. G. Kushner, prof. L. A. Manita, prof. V. N. Berestovskii.

2001 MSc Lomonosov Moscow State University, diploma with honor,
thesis: *Invariant algebras of functions on spherical homogeneous spaces of compact simple Lie groups*,
adviser: prof. È. B. Vinberg, referee: prof. I. V. Arzhantsev.

Professional experience

since 2009 A. K. Ailamazyan Program Systems Institute of RAS, Pereslavl-Zalesskiy, Russia,
junior researcher, senior researcher.

2001–2009 Parascript L.L.C., Advanced R&D,
researcher and software engineer in pattern recognition, machine learning.

2000–2001 Moscow Center of Continuous Mathematical Education,
Laboratory for Pattern Recognition, researcher.

Teaching experience

2024–2025 Pereslavl school math club,

2009–2017 University of Pereslavl, Russia,
Lecturer: algebra, linear algebra and geometry, theory of recursive functions.

1997–2002 Moscow School #1543, math teacher,
geometry, special course of mathematics for gifted students.

Reviewer

Journal of Dynamical and Control Systems,
Transformation Groups,
Regular and Chaotic Dynamics,
Analysis and Mathematical Physics,
Journal of Geometry and Physics,
Theoretical and Applied Mechanics,
Int. J. of Geometric Methods in Modern Physics,
MathSciNet.

Sbornik: Mathematics,
Mathematical Notes,
Proceedings of the Steklov Institute of Mathematics,
Journal of the Korean Mathematical Society,
Instruments and Experimental Techniques,
Journal of Computational and Applied Mathematics,
Program Systems: Theory and Applications,

Grants

Russian Foundation for Basic Research	19-07-00991 A, 19-07-00779 A, 15-07-05277 A, 13-07-00307 A, 12-07-31101 mol_a.
Russian Science Foundation	25-21-00681, 22-11-00140, 22-21-00877, 17-11-01387-P, 17-11-01387.

Programming skills

Wolfram Mathematica, C++, Python.

Publications

PREPRINTS

[P1] A. V. Podobryaev. *Cut loci and diameters of the Berger lens spaces* // arXiv:2603.27769

[P2] A. V. Podobryaev. *Cut loci of Berger type Lorentzian structures* // arXiv:2505.03514

ACCEPTED

[A1] A. V. Podobryaev. *Existence of the longest arcs for left-invariant three-dimensional contact sub-Lorentzian structures* // arXiv:2603.07262, accepted in Proceedings of the Steklov Institute of Mathematics.

PUBLISHED

[1] A. V. Podobryaev. *One-parametric series of* $\mathrm{SO}_{1,1}$*-symmetric (sub-)Lorentzian structures on the universal covering of* $\mathrm{SL}_2(\mathbb{R})$ // Journal of Geometry and Physics. 227, 105875, 22p. (2026) arXiv:2603.07259

[2] A. Podobryaev. *Extremal trajectories of left-invariant affine control systems and sub-Riemannian geodesics* // Journal of Mathematical Sciences. 295, 3, 325-333 (2025)

[3] D. Stepanov, A. Podobryaev. *Numerical Solution of a Left-Invariant Sub-Riemannian Problem on the Group* SO(3) // Rus. J. Nonlin. Dyn. 20, 4, 635–670 (2024) download

[4] A. V. Podobryaev. *Sub-Lorentzian extremals defined by an antinorm* // Differential Equations. 60, 3, 361–373 (2024) arXiv:2402.04687

[5] L. V. Lokutsievskiy, A. V. Podobryaev. *Existence theorem for sub-Lorentzian problems* // Journal of Dynamical and Control Systems. 30, 10 (2024) arXiv:2401.07975

[6] A. V. Podobryaev. *Homogeneous geodesics in sub-Riemannian geometry* // ESAIM: Control, Optimisation and Calculus of Variations. 29, 11 (2023) download arXiv:2202.09085

[7] A. Podobryaev. *Attainable set for rank* 3 *step* 2 *free Carnot group with positive controls* // 16th International Conference on Stability and Oscillations of Nonlinear Control Systems (Pyatnitskiy's Conference). 1–4, DOI: 10.1109/STAB54858.2022.9807600, IEEE (2022) arXiv:2203.02267

[8] A. Mashtakov, A. Podobryaev. *Geodesic flow of the sub-Riemannian structure of Engel type with strictly abnormal extremals* // 16th International Conference on Stability and Oscillations of Nonlinear Control Systems (Pyatnitskiy's Conference), 1–3, DOI: 10.1109/STAB54858.2022.9807528, IEEE (2022)

[9] A. V. Podobryaev. *Construction of Maxwell points in left-invariant optimal control problems* // Proceedings of the Steklov Institute of Mathematics. 315, 190–197 (2021)

[10] A. V. Podobryaev. *Casimir functions of free nilpotent Lie groups of steps three and four* // Journal of Dynamical and Control Systems. 27, 625–644 (2021) arXiv:2006.00224

[11] A. V. Podobryaev. *Coadjoint orbits of three-step free nilpotent Lie groups and time-optimal control problem* // Doklady Mathematics. 102, 1, 293–295 (2020)

[12] A. V. Podobryaev. *Symmetries in left-invariant optimal control problems* // Sbornik: Mathematics. 211, 2, 275–290 (2020) arxiv:1807.09145

[13] A. V. Podobryaev. *Symmetric extremal trajectories in left-invariant optimal control problems* // Russian Journal of Nonlinear Dynamics. 15, 4, 569–575 (2019) download

[14] A. V. Podobryaev. *Antipodal points and diameter of a sphere* // Russian Journal of Nonlinear Dynamics. 14, 4, 579–581 (2018) download

[15] A. V. Podobryaev. *Diameter of the Berger Sphere* // Mathematical Notes. 103, 5, 846–851 (2018) arXiv:1710.02945

[16] A. V. Podobryaev, Yu. L. Sachkov. *Symmetric Riemannian Problem on the Group of Proper Isometries of Hyperbolic Plane* // Journal of Dynamical and Control Systems. 24, 3, 391–423 (2018) arXiv:1701.00825

[17] A. V. Podobryaev, Yu. L. Sachkov. *Left-Invariant Riemannian Problems on the Groups of Proper Motions of Hyperbolic Plane and Sphere* // Doklady Mathematics. 95, 2, 176–177 (2017)

[18] A. V. Podobryaev, Yu. L. Sachkov. *Cut locus of a left invariant Riemannian metric on SO(3) in the axisymmetric case* // Journal of Geometry and Physics. 110, 436–453 (2016) arXiv:1504.05472