CURRICULUM VITAE

Dr. **Danil Ivanov** is Senior Researcher at the Keldysh Institute of Applied Mathematics of the Russian Academy of Science, Associate Professor at the Theoretical Mechanics Chair of the Moscow Institute of Physics and Technology.

Area of professional interest comprises spaceflight dynamics, attitude motion, attitude determination, satellite formation flying control algorithms, computer and laboratory methods of simulation of attitude dynamics and formation flying motion.

Profiles links:

Education & Academic Background:

M.Sci.Degree from MIPT, Faculty of Control and Applied Mathematics, dissertation Thesis entitled "Development and Investigation of Satellite Kalman Based Attitude Determination Algorithm" (2010), graduated from MIPT in 2010.

PhD (in Physics and Mathematics), 2013 from the Keldysh Institute of Applied Mathematics of Russian Academy of Sciences – PhD Thesis "Satellite Attitude Determination at Laboratory Facility and On-Board During In-Flight Experiments"

Employment:

(2016-present) Senior Researcher of Keldysh Institute of Applied Mathematics RAS
(2014-2016) Researcher of Keldysh Institute of Applied Mathematics RAS
(2011-2014) Junior Researcher of Keldysh Institute of Applied Mathematics RAS
(2014-present) Associate Professor of the Theoretical Mechanics Chair at the Moscow Institute of Physics and Technology
(2010-2014) Assistant Professor of the Theoretical Mechanics Chair at the Moscow Institute of Physics and Technology
(2010-2013) Post-graduate Student at Keldysh Institute of Applied Mathematics RAS
(2004-2010) Student at Moscow Institute of Physics and Technology

Peer-reviewed journal articles

1. D. Ivanov, U. Monakhova, A. Guerman, M. Ovchinnikov, D. Roldugin. Decentralized Differential Drag Based Control of Nanosatellites Swarm Spatial Distribution Using Magnetorquers// Advances in Space Research – 2020. – V. 67, №11. – p. 3489-3503.
[DOI: 10.1016/j.asr.2020.05.024]
[URL: https://www.sciencedirect.com/science/article/pii/S0273117720303471]

2. Ivanov, D.S., Ivanova, T.A., Ivlev, N.A., Ovchinnikov, M.Y., Roldugin, D.S. Estimation of an Inertia Tensor and Automatic Balancing of a Microsatellite Mockup on an Air-Bearing Testbed // Journal of Computer and Systems Sciences International–2021. –№ 2, pp. 315-332.
[DOI: 10.1134/2FS1064230721020088]
[URL: https://link.springer.com/article/10.1134%2FS1064230721020088]

3. M. Ovchinnikov, D. Ivanov, O. Pansyrnyi, A. Sergeev, I. Fedorov, A. Selivanov, O. Khromov, N. Yudanov. Technological NanoSatellite TNS-0 #2 connected via global communication system // Acta Astronautica – 2020. – V.170. P. 1-5.
[DOI: 10.1016/j.actaastro.2020.01.027]
[URL: https://www.sciencedirect.com/science/article/abs/pii/S0094576520300382]

4. A.D. Guerman, D. Ivanov, D. Roldugin, S. Tkachev, A. Okhitina Orbital and Angular Dynamics Analysis of the Small Satellite SAR Mission INFANTE // Cosmic Research – 2020. – V.58. P. 206-217.
[DOI: 10.1134/S0010952520030016]
[URL: https://link.springer.com/article/10.1134/S0010952520030016]

5. M. Akhloumadi, D. Ivanov. Influence of satellite motion control system parameters on performance of space debris capturing// Aerospace – 2020. – V.7, I.11. P. 1-160.
[DOI: 10.3390/aerospace7110160]
[URL: https://www.mdpi.com/2226-4310/7/11/160]

6. D. Ivanov, U. Monakhova, M. Ovchinnikov. Nanosatellites swarm deployment using decentralized differentional drag-based control with communicational constraints // Acta Astronautica – 2019. – V.159. P. 646-657.
[DOI: 10.1016/j.actaastro.2019.02.006]
[URL: https://www.sciencedirect.com/science/article/pii/S0094576518317090]

7. I.V. Belokonov, D.S.Ivanov, M.Yu.Ovchinnikov, V.I. Penkov. Passive system for the angular damping of the SamSat-QB50 Nanosatellite // Journal of Computer and Systems Sciences International. –2019. –№ 5, pp. 774-785.
[doi: 10.1134/S1064230719050046]
[URL: https://link.springer.com/article/10.1134/S1064230719050046]

8. D.S.Ivanov, M.Yu.Ovchinnikov, O. A. Pantsyrnyi, A. S. Selivanov, A.S. Sergeev, I. O. Fedorov, O. E. Khromov, N. A. Yudanov. Angular Motion of the TNS-0 #2 Nanosatellite after Launch from the ISS // Cosmic Research. – 2019. – V. 57, № 4, pp. 272-288.
[doi: 10.1134/S0010952519040038]
[URL: https://link.springer.com/article/10.1134/S0010952519040038]

9. U. Monakhova, D. Ivanov. Joining a formation flying of small satellites up using a magnetic orientation system for control using aerodynamic forces // AIP Conference Proceedings – 2019. – V.2171. I. 1. P. 060013-6.
[DOI: 10.1063/1.5133211]
[URL: https://aip.scitation.org/doi/10.1063/1.5133211]

10. M. Akhloumadi, D. Ivanov. Satellite relative motion SDRE-based control for capturing a noncooperative tumbling object // Proceedings of 9th International Conference on Recent Advances in Space Technologies – 2019. – P. 253-260.
[DOI: 10.1109/RAST.2019.8767449]
[URL: https://ieeexplore.ieee.org/document/8767449]

11. D. Ivanov, D. Roldugin. Nanosatellite three-axis attitude control and determination using two magnetorquers only // Proceedings of 9th International Conference on Recent Advances in Space Technologies – 2019. – P. 761-768.
[DOI: 10.1109/RAST.2019.8767828]

[URL: https://ieeexplore.ieee.org/document/8767828]

12. D. Ivanov, M. Kushniruk, M. Ovchinnikov. Study of satellite formation flying control using differential lift and drag // Acta Astronautica – 2018. In Press. 13p.
[DOI: 10.1016/j.actaastro.2018.07.047]
[URL: https://www.sciencedirect.com/science/article/pii/S009457651830540X]

13. D. Ivanov, M. Ovhinnikov. M. Sakovich. Relative Pose and Inertia Determination of Unknown Satellite Using Monocular Vision// International Journal of Aerospace Engineering. 2018. In Press. 16 p.
[DOI: 10.1155/2018/9731512]
[URL: https://www.hindawi.com/journals/ijae/aip/9731512/]

14. D. Ivanov, D. Roldugin, M. Ovchinnikov. Three-Axis Attitude Determination Using Magnetorquers// Journal of Guidance, Control, and Dynamics. 2018. In Press. 8p.
[DOI: 10.2514/1.G003698]
[URL: https://arc.aiaa.org/doi/abs/10.2514/1.G003698]

15. D. Ivanov, M. Koptev, M. Ovchinnikov, N. Proshunin, S. Tkachev, M. Shachkov. Flexible Microsatellite Mock-Up Docking with Non-Cooperative Target on Planar Air Bearing Test Bed // Acta Astronautica – 2018.
[DOI: 10.1016/j.actaastro.2018.01.054]
[URL: https://www.sciencedirect.com/science/article/pii/S009457651731370X]

16. D. Ivanov, M. Koptev, Y. Mashtakov, M. Ovchinnikov, N. Proshunin, S. Tkachev, A. Fedoseev, M. Shachkov. Determination of Disturbances Acting on Small Satellite Mock-Up on Air Bearing Table // Acta Astronautica – 2018. – V.142. P. 265-276.
[DOI: 10.1016/j.actaastro.2017.11.010]
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17. D.S.Ivanov, M.D.Koptev, Y.V.Mashtakov, M.Yu.Ovchinnikov, N.N.Proshunin, S.S.Tkachev, A.I.Fedoseev, M.O.Shachkov. Laboratory Facility for Microsatellite Mock-up Motion Simulation // Journal of Computer and Systems Sciences International, 2018, № 1, pp. 117-132.
[doi: 10.1134/S1064230717060077]
[URL: https://link.springer.com/article/10.1134/S1064230717060077]

18. D. Roldugin, M. Ovchinnikov, D. Ivanov, M. Shachkov, M. Koptev, O. Pantsyrnyi, I. Fedorov. Saving mission yet to be launched: Tight schedule for an unexpected project // Advances in Astronautical Sciences - 2018. – V. 163. P. 377-391.
[URL: http://www.univelt.com/linkedfiles/v163%20Contents.pdf]

19. D. Ivanov, D. Roldugin, M. Ovchinnikov, M. Shachkov. Microsatellite mock-up control using reinforcement learning technique // Advances in Astronautical Sciences - 2018. – V. 163. P. 377-391.
[URL: http://www.univelt.com/linkedfiles/v163%20Contents.pdf]

20. D. Ivanov, M. Ovchinnikov. Microsatellite Attitude Motion Determination Using Measurements of Electromotive Force in Magnetic Torquers // Advances in Astronautical Sciences – 2017. – V. 161. P. 963 - 977.
[URL: http://www.univelt.com/book=6373]

21. D.S. Ivanov, M.Yu. Ovchinnikov, V.I. Penkov, D.S. Roldugin, D.M. Doronin, A.V. Ovchinnikov. Advanced Numerical Study of the Three-axis Magnetic Attitude Control and Determination with Uncertainties // Acta Astronautica. – 2017 – V. 132, – P. 103-110.
[DOI: 10.1016/j.actaastro.2016.11.045]
[URL: https://www.sciencedirect.com/science/article/pii/S009457651630371X]

22. D.S. Ivanov, S.V. Meus, A.V. Ovchinnikov, M.Yu. Ovchinnikov, S.A. Shestakov, E.N. Yakimov. Methods for the Vibtration Determination and Parameter Identification of the Spacecraft with Flexible Structures// Journal Of Computer And Systems Sciences International. – 2017. –V. 56, № 2. – P. 311-327.
[DOI: 10.1134/S1064230717010087]
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23. D. Ivanov, N. Ivlev, S. Karpenko, M.Ovchinnikov. Analytical study of microsatellite attitude determination algorithms // Acta Astronautica. – 2015 – V. 116, – P. 339-348.
[DOI: 10.1016/j.actaastro.2015.07.001]
[URL: https://www.sciencedirect.com/science/article/pii/S0094576515002714]

24. D. Ivanov, N. Ivlev, S. Karpenko, M.Ovchinnikov. Advanced Technique for Kalman Filter Adjustment and Its Implementation Onboard of "TabletSat" Microsatellite Series// Advances in Astronautical Sciences. – 2015 – V. 153. – P. 1055-1072.
[URL: http://www.univelt.com/linkedfiles/v153%20Contents.pdf]

25. S. Shestakov, D. Ivanov, M. Ovchinnikov. Formation Flying Momentum Exchange Control by Separate Mass// Journal of Guidance, Control, and Dynamics. – 2015 – V. 38, № 8. – P. 1534-1543.
[DOI: 10.2514/1.G001137]
[URL: https://arc.aiaa.org/doi/10.2514/1.G001137]

26. D. Ovchinnikov, D. Roldugin, D. Ivanov, V. Penkov. Choosing control parameters for three axis magnetic stabilization in orbital frame // Acta Astronautica – 2015. – V.116. P. 74-77.
[DOI: 10.2514/1.G001137]
[URL: https://www.sciencedirect.com/science/article/pii/S0094576515002611]

27. D. Ivanov, S. Shestakov, M. Ovchinnikov. Satellite Formation Flying Control by Mass Exchange//Acta Astronautica - 2014. - V. 102. - P. -392-401.
[DOI: 10.1016/j.actaastro.2014.02.028]
[URL: https://www.sciencedirect.com/science/article/pii/S009457651400085X]

28. D. Ivanov, M. Ovchinnikov, S. Karpenko, M. Sakovich. Satellite relative motion determination during separation using image processing// International Journal of Space Science and Engineering - 2014 - V.2, № 4 - P.365-379.
[DOI: 10.1504/IJSPACESE.2014.066963]
[URL: http://www.inderscience.com/info/inarticle.php?artid=66963]

29. D. Ivanov, N. Ivlev, S. Karpenko, D. Roldugin, M.Ovchinnikov, S. Tkachev. The results of Flight Tests of an Attitude Control System for the Chibis-M Microsatellite //Cosmic Research. – 2014 – V. 52., №3. – P. 205-215.
[DOI:10.1134/S0010952514020038]
[URL: https://link.springer.com/article/10.1134/S0010952514020038]

30. D. Ivanov, M. Ovchinnikov. Approach to Study of Satellite Attitude Determination Algorithm// Acta Astronautica. - 2014. - V. 98. - P. 133-137.
[DOI:10.1016/j.actaastro.2014.01.024]
[URL: https://www.sciencedirect.com/science/article/pii/S009457651400037X]

31. M.Ovchinnikov, D. Ivanov, N. Ivlev, S. Karpenko, D. Roldugin, S. Tkachev. Development, integrated investigation, laboratory and in-flight testing of Chibis-M microsatellite ADCS// Acta Astronautica. - 2014. - V. 93. - P. 23-33.
[DOI:10.1016/j.actaastro.2013.06.030]
[URL: https://www.sciencedirect.com/science/article/pii/S0094576513002312]

32. D. Ivanov, M. Ovchinnikov, V. Penkov. Laboratory study of magnetic properties of hysteresis rods for attitude control systems of minisatellites // Journal Of Computer And Systems Sciences International. – 2013. – V. 52, № 1. P. 145-164.
[DOI:10.1134/S1064230712060032]
[URL: https://link.springer.com/article/10.1134/S1064230712060032]

33. D. Ivanov, S. Karpenko, M.Ovchinnikov, D. Roldugin, S. Tkachev. Testing of attitude control algorithms for microsatellite "Chibis-M" at laboratory facility // Journal Of Computer And Systems Sciences International. – 2012. – V. 51, № 1. – P. 106-125.
[DOI:10.1134/S1064230711060104]
[URL: https://link.springer.com/article/10.1134/S1064230711060104]

34. D. Ivanov, M.Ovchinnikov, S. Tkachev. Attitude control of a rigid body suspended by string with the use of ventilator engines // Journal Of Computer And Systems Sciences International. – 2011. –V. 50, № 1. – P. 104-116.
[DOI:10.1134/S1064230711010114]
[URL: https://link.springer.com/article/10.1134/S1064230711010114]

35. D. Ivanov, Z. Ming, T. Walter, I. Zaramenskikh. Laboratory Facility for Simulation and Verification of Formation Motion Control Algorithms // Small Satellite Missions For Earth Observation: New Developments And Trends. – 2010. – P. 267-277.
[DOI:10.1007/978-3-642-03501-2_25]
[URL: https://www.springerprofessional.de/en/laboratory-facility-for-simulation-and-verification-of-formation/3157872]

36. M.Yu. Ovchinnikov, D. Bindel, D.S. Ivanov, G.V. Smirnov, S. Theil, I.E. Zaramenskikh. Development and Laboratory Verification of Control Algorithms for Formation Flying Configuration with a Single-input Control // Acta Astronautica, v. 67, 2010. P. 1157–1163.
[DOI: 10.1016/j.actaastro.2010.06.035]
[URL: https://www.sciencedirect.com/science/article/pii/S0094576510002262]

37. D. Bindel, I.E. Zaramenskikh, D.S. Ivanov, M.Yu. Ovchinnikov, N.G. Proncheva. A Laboratory Facility for Verification Of Control Algorithms For a Group of Satellites // Journal Of Computer And Systems Sciences International
[DOI:10.1134/S1064230709050128]
[URL: https://link.springer.com/article/10.1134/S1064230709050128]

Grants and Research Projects:

- (2020-2021) Grant N 20-01-01 “Study of small satellite formation flying dynamics and control", of the Moscow Center for Fundamental and Applied Mathematics (PI)
- (2018-2020) Grant N 18-31-20014 “Investigation of the Satellite Controlled Motion during the Rendezvous and Grabbing of the Noncooperaticve Object", of the Russian Basic Research Foundation (PI)
- (2017-2020) Grant N 17-71-20117 "New Methods for Small Satellites Attitude Control Under Restrictions", of the Russian Science Foundation (I)
- (2017-2019) Grant N 17-01-00449_a "Investigation of orbital and angular motion of satellite formation flying", of the Russian Basic Research Foundation (PI)
- (2016-2018) Government Agreement N 14.607.21.0144 “Methods and Facilities Development for the Laboratory Verification of Orbital and Angular Motion Algorithms for Satellites of the New Generation”, (I)
- (2016-2018) Grant N 16-01-00634_a "Modeling and control of the movement of the elastic extended space structures", of the Russian Basic Research Foundation (I)
- (2014-2016) Grant N 14-11-00621 “New mathematical models and control algorithms for angular and orbital motion of small satellites for Moon and minor Solar system bodies investigation” of Russian Scientific Foundation (I)
- (2014-2015) Grant N 14-01-31313 “Small Satellites Formation Flying Relative Motion Investigation and Algorithms Development for Perspective Control Systems With Minimal Fuel Consumption” of the Russian Basic Research Foundation (PI)
- (2012-2013) Grant N 14.132.21.1588 ”Controllable small satellite attitude motion in the magnetic field” of the Ministry of Education and Science of Russian Federation (I)
- (2012-2013) State contract no. 8281 “Research and Development of the economy de-orbiting methods for small satellites from typical Earth orbits” (I)
- (2013-2015) Grant N 13-01-00665 “Motion study and control algorithms development for dynamic reconfiguration of the microsatellite formation including its de-orbiting” of the Russian Basic Research Foundation (I)
- (2012-2014) Grant N СП-384.2012.3, Scholarship of the Russian Federation President (PI)
- (2010-2012) State contract no. 02.740.11.0860, “Design and research of the controllable orbit and attitude motion for the small spacecrafts in formation flying with the usage of the new generation engines” of the Ministry of Education and Science of Russian Federation (I)
- (2009-2011) Grant N 09-01-00431 “Dynamics and Control of Multi-Element Mobile Formation under Limitation for Measuring and Control” of the Russian Basic Research Foundation (I)
- (2007-2009) Grant N 07-01-92001 “Magnetic Attitude Control Systems for Small Satellites” of the Russian Basic Research Foundation and Taiwan National Council (I)
- (2007) Project DAAD “Magnetic Satellite Attitude Control” in framework of Leonhard Euler Program (Referat № 325)
- (2008-2009) Grant N NSh-1123.2008.1 “Support of Leading Scientific Schools of Russia” by President of Russia (I)
- (2006-2008) Grant N 06-01-00389 “Guarantee of the motion of small satellites and miniature flight vehicles at incomplete measurements and limited control” of the Russian Basic Research Foundation (I)
- (2006-2008) Project N 6827 “High school scientific potential elaboration” of the Ministry of Education and Science of Russian Federation (I)
- (2006-2007) Grant N NSh-2448.2006.1 “Support of Leading Scientific Schools of Russia” by President of Russia (I)
- (2012) Grant N 12-01-09203 to attend 1st IAA Conference on Dynamics and Control of Space Systems in Porto, Portugal

- (2008-2011) Project HPH.com N 218862 in Seventh Framework Program (FP7)

Industrial contracts:

– (2020-2021) Contract with “Sputnix” Ltd, (I);
– (2018-2019) Contract with “Sputnix” Ltd, (I);
– (2018-2019) Contract University Beira Interior, (I);
– (2017-2018) Contract with RSC Energia Enterprise, (I);
– (2017-2019) Contract with JSC “Information Satellite Systems” named after Reshetnev; (PI);
– (2017-2018) Contract with RSS Ltd, (PI);
– (2016-2017) Contract with “Sputnix” Ltd, (PI);
– (2015) Contract with the Samara State Aerospace University named after acad. S. Korolev, (PI);
– (2014-2015) Contract with JSC NIIEM; (I);
– (2014-2015) Contract with JSC “Information Satellite Systems” named after Reshetnev; (PI);
– (2014-2015) Contract with JSC “Information Satellite Systems” named after Reshetnev; (I);
– (2014) Contract with NSPO, Taiwan; (I);
– (2014) Contract R&DC Rezonans Ltd, (PI);
– (2013) Contract with the National Space Organization,Taiwan, (I);
– (2013) Contract with “Sputnix” Ltd, (I);
– (2011-2012) Contract with “Sputnix” Ltd, (I);
– (2009) Customer JSC «Gasprom Space Systems», (I).

Educational experience:

Associate professor of the Theoretical Mechanics Chair and Numerical Modelling and Applied Mathematics Chair of the Moscow Institute of Physics and Technology (MIPT), Moscow, Russia.

Leads laboratory works in the framework of the special course "Dynamics and control of complex mechanical systems" in the Innovation laboratory "Control and dynamics of complex intelligential mechanical systems" created at MIPT if the frame of Inovation eduacational program "High technology and innovation economics" (http://teormech.mipt.ru/laboratory/).

Supervises four bachalor and master students at Applied Mathematics Chair of the Moscow Institute of Physics and Technology.

In 2013 produced tutorial "Mesuarements processing methods" together with prof. Platonov A.K. In 2009-2012 produced two laboratory works tutorial for special course "Dynamics and control of complex mechanical systems".

As a Visiting Professor gave lectures about motion determination at 8th International Workshop and Advanced School "Spacecraft Dynamics and Control", Faculty of Sciences of Lisbon University, March 11-12, 2013, Lisbon, Portugal; and at VII International scientific summer school "Computer Technologies of Engineering Mechanical Problems", Moscow State University, July 1-30, 2013, Moscow.

Participated in organization and task designing for All-Russian student Olympiads of mechanics and mathematical simulations at MIPT in 2011-2013 years. Was a chief of MIPT student team at international Olympiads of theoretical mechanics in Gomel, Belarus in 2011-2012 years.

Lecturer of advance training course "Measurements processing methods" in 2014 year for specialists from ISS Resented company

Awards:

– Top 10 reviewers award of Advances in Space Research Journal (The Editors of ASR, 2020);

– Young scientist award of Moscow Government in nomination "Mathematics, Mechanics and Computer Science" with work "New Approaches to Motion Control of Modern Russian Satellites " (Moscow Government, 2015);

– Certificate of outstanding contribution in reviewing for journal Acta Astronautica (The Editors of Acta Astronautica, 2014);

– Young scientists grant of the Russian Federation President for challenging scientific investigations and developments of Russian economics priority branches in 2012-2014 years, 2015-2017 years and 2018-2020 years;

– Young scientists paper competition award at 7th International Workshop on Satellite Constellations and Formation Flying, Lisbon, Portugal, 2013 with work «Investigation of the Possibility of Formation Flying Control by Mass Exchange» (International Academy of Astronautics, 2013);

– Young scientists award at the contest dedicated to the Keldysh Institute of Applied Mathematics of RAS 60-years anniversary with work «Investigation, Development and Flight Testing of Chibis-M Scientific Satellite Attitude Control System» (KIAM RAS, 2013).

– Young scientists award at the contest dedicated to M.V. Keldysh 100-years anniversary with work «Small Satellites Attitude and Relative Orbital Motion Control with Geomagnetic Field Use» (KIAM RAS, 2011);

– Young scientists award at exhibition "Youth Scientific and Technological Creation-2011" with work «Laboratory Investigation of Chibis-M Attitude Control System». (Ministry of education and science of RF, 2011);

– Student paper competition award at 7th International Academy of Astronautics Symposium on Small Satellites for Earth Observation, Berlin, Germany, 2009 with work «Laboratory Facility for Simulation and Verification of Formation Motion Algorithms» (International Academy of Astronautics, 2009);

Trainings:

- There were trainings in 2008-2010 years during one month in each year at ZARM "Center of Applied Space Technology and Microgravity", Bremen University, Germany.

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