Curriculum Vitae

First name:	**Maria**
Last name:	**Filipkovska (Filipkovskaya)**
Citizenship:	Ukraine
E-mail:	maria.filipkovska@fau.de; filipkovskaya@ilt.kharkov.ua;
Academic Degree:	***Ph.D.*** *(Physical and Mathematical Sciences)*

AFFILIATION

First affiliation: Department of Mathematical Physics, Mathematical Division,
B. Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine (B. Verkin ILTPE of NAS of Ukraine), Nauky Avenue 47, 61103 Kharkiv, Ukraine

Second affiliation: Chair for Dynamics, Control, Machine Learning and Numerics — Alexander von Humboldt Professorship, Department of Mathematics,
Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU Erlangen-Nürnberg), Cauerstraße 11, 91058 Erlangen, Germany

EDUCATION

Ph.D. (Candidate of Physical and Mathematical Sciences), School of Mechanics and Mathematics (now, School of Mathematics and Computer Sciences), V.N. Karazin Kharkiv National University, Kharkiv, Ukraine, 2012–2015 (the diploma issued by Kharkiv National University of Radio Electronics in 2016). Thesis: Global solvability of differential-algebraic equations and mathematical modelling of the dynamics of nonlinear radio engineering circuits. Scientific adviser: D.Sc., Prof. A.G. Rutkas. Specialty: Mathematical Modelling and Numerical Methods

Master of Science (Applied Mathematics), School of Mechanics and Mathematics, V.N. Karazin Kharkiv National University, 2007–2012

POSITIONS

- ***Postdoctoral Researcher*** (July 2022 – the present time), Chair for Dynamics, Control, Machine Learning and Numerics, FAU Erlangen-Nürnberg
- *Visiting Scientist* (May 2022 – June 2022), Chair for Dynamics, Control, Machine Learning and Numerics, FAU Erlangen-Nürnberg
- *Senior Research Fellow* (2021 – the present time), Department of Mathematical Physics, B. Verkin ILTPE of NASU
- *Research Fellow* (2017–2021), Department of Mathematical Physics, Mathematical Division, B. Verkin ILTPE of NAS of Ukraine
- *Associate professor* (2018—2019), Department of Electronics and Control Systems, School of Computer Sciences, V.N. Karazin Kharkiv National University
- *Senior Lecturer* (2017—2018; 2019–2020), Department of Electronics and Control Systems, School of Computer Sciences; Department of Higher Mathematics and Computer Sciences, School of Mathematics and Computer Sciences, V.N. Karazin Kharkiv National University
- *Junior Research Fellow* (2016–2017), Department of Mathematical Physics, Mathematical Division, B. Verkin ILTPE of NAS of Ukraine
- *Junior Research Fellow* (2013–2014), *Senior laboratory assistant* (2012), *Laboratory assistant* (2012), Department of Mathematical Modeling and Software, School of Mechanics and Mathematics (now, School of Mathematics and Computer Sciences), V.N. Karazin Kharkiv National University [research work "Analysis of evolution problems with equations of the Sobolev type", State Reg. No. 0111U010369, 2012–2014]

RESEARCH INTERESTS

Differential-algebraic equations (DAEs), partial differential equations (PDEs), PDAEs, descriptor systems, degenerate differential equations: theory (solvability, stability, global dynamics), numerical methods, and applications. Mathematical modelling and control.
Gas networks, neural networks, electrical circuits.
Integrable nonlinear PDEs: inverse scattering transform method, associated matrix Riemann-Hilbert problems, solvability, long-time asymptotics, and applications.

GRANTS, RESEARCH AWARDS AND SCHOLARSHIPS

- Grant from Alexander von Humboldt Foundation to support experienced Ukrainian researcher, 2022–2023
- Scholarship of the Collaborative Research Center TRR154, May 2022 – June 2022
- Grant of the National Academy of Sciences of Ukraine (project "Nonstandard nonlocal and peakon integrable equations: asymptotics and inverse scattering transform", State Reg. No. 0121U111968), 2021–2022, head
- The Ya.S. Pidstryhach Award for young scientists, 2021
- Grant of the National Academy of Sciences of Ukraine (project "Qualitative, asymptotic and numerical analysis of various classes of differential equations and dynamical systems, their classification, and practical application", State Reg. No. 0119U102376), 2019–2020, head
- Grant of the State Fund for Fundamental Research (project "Operator-Differential Equations and Their Applications to Problems of Physics", State Reg. No. 0118U001778), 2018, performer
- Scholarship of the National Academy of Sciences of Ukraine for young scientists, 2017–2018
- Scholarship of the Akhiezer Foundation, 2014 and 2019

SELECTED CONFERENCES AND WORKSHOPS. TRAVEL GRANTS

- TRR 154 semi-annual meeting (Berlin, Germany, 2023)
- The Workshop-Summer School "IX Partial differential equations, optimal design and numerics" (Benasque, Spain, 2022)
- The 8th European Congress of Mathematics (8ECM) (Portorož, Slovenia, 2021)
- International Scientific Conference, Dedicated to the 75th Anniversary of the Department of Differential Equations and the 85th Anniversary of M.P. Lenyuk (Chernivtsi, Ukraine, 2021)
- The Conference of Young Scientists "Pidstryhach Readings – 2021" (Lviv, Ukraine, 2021)
- International Conference of Young Mathematicians (Kyiv, Ukraine, 2019, 2021)
- Int. Sci. Conf. "Modern problems of Differential Equations and their application" (Chernivtsi, Ukraine, 2020)
- *Travel Grant:* Int. Conference "Modern Problems of Mathematics and Mechanics" (Baku, Azerbaijan, 2019)
- 6th Ya. B. Lopatynsky International School-Workshop on Differential Equations and Applications (Vinnytsia, Ukraine, 2019)
- *Travel Grant:* 27th International Conference in Operator Theory (Timisoara, Romania, 2018)
- Int. Conf. "Computer modelling in high tech (CMHT-2018)" (Kharkiv, Ukraine, 2018)
- Int. Conference "Differential Equations, Mathematical Physics and Applications" (Cherkasy, Ukraine, 2017)
- Int. conferences "Analysis and Mathematical Physics" (Kharkiv, Ukraine, 2015, 2016, 2017)
- *Travel Grant:* Summer School "Spectral Theory, Differential Equations and Probability" (Mainz, Germany, 2016)
- 5th International Conference for Young Scientists on Differential Equations and Applications dedicated to Yaroslav Lopatynsky (Kyiv, Ukraine, 2016)
- XVII International Symposium "Methods of Discrete Singularities in Problems of Mathematical

Physics" (Sumy, Ukraine, 2015)

- International scientific-practical conference "Information technologies: science, engineering, technology, education, health" (MicroCAD-2015) (Kharkiv, Ukraine, 2015)
- I.I. Lyashko International Scientific Conferences "Computational and Applied Mathematics" (Kyiv, Ukraine, 2013, 2014, 2015)
- Int. conf. "Tarapov readings – 2012", "Tarapov readings – 2013" (Kharkiv, Ukraine, 2012, 2013)

LANGUAGES: *Ukrainian, Russian*: native speaker. *English*: fluent

REFEREE

- Journal of Mathematical Physics
- Visnyk of V.N. Karazin Kharkiv National University

REVIEWER: zbMATH Open

MEMBERSHIPS

- Member of Young Scientists Council of the Department of mathematics of the National Academy of Sciences of Ukraine
- Member of Kharkiv Mathematical Society

PROGRAMMING SKILLS: MATLAB and Simulink; C, C++; Maple

PROFILES IN SCIENTOMETRIC DATABASES

WoS ResearcherID: AAG-6786-2020
Scopus Author ID: 57194334316
zbMATH Open Author ID: filipkovska.maria-s
ORCID ID: https://orcid.org/0000-0002-2266-1243
Google Scholar Profile: https://scholar.google.com.ua/citations?user=RYpOW_kAAAAJ&hl

TOTAL NUMBER OF PUBLICATIONS: 48 (*19 papers*, 29 abstracts)

PUBLICATIONS

Papers

1. Filipkovska M.S. (2022). *Combined numerical methods for solving time-varying semilinear differential-algebraic equations with the use of spectral projectors and recalculation*. https://doi.org/10.48550/arXiv.2212.00012
2. Filipkovska M. (2022). *IBVP for the Maxwell-Bloch equations with an arbitrary inhomogeneous broadening and the periodic boundary function*. https://arxiv.org/abs/2212.04524
3. Filipkovskaya M.S. (2021). *Global solvability of time-varying semilinear differential-algebraic equations, boundedness and stability of their solutions. II*, Differential Equations, Vol. 57, No. 2, pp. 196–209. https://doi.org/10.1134/S0012266121020099
4. Filipkovskaya M.S. (2021). *Global solvability of time-varying semilinear differential-algebraic equations, boundedness and stability of their solutions. I*, Differential Equations, Vol. 57, No. 1, pp. 19–40. https://doi.org/10.1134/S0012266121010031
5. Filipkovska (Filipkovskaya) M. (2020). *Existence, boundedness and stability of solutions of time-varying semilinear differential-algebraic equations*, Global and Stochastic Analysis, Vol. 7, No. 2, pp. 169–195. https://www.mukpublications.com/resources/gsa%207-2-5.pdf
6. Filipkovska M.S., Kotlyarov V.P. (2020). *Propagation of electric field generated by periodic pumping in a stable medium of two-level atoms of the Maxwell-Bloch model*, Journal of Mathematical Physics, Vol. 61, No. 12, pp. 123502-1–123502-31. https://doi.org/10.1063/5.0020071

7. Filipkovska (Filipkovskaya) M.S. (2020). *Global boundedness and stability of solutions of nonautonomous degenerate differential equations*, Proceedings of the Institute of Mathematics and Mechanics, National Academy of Sciences of Azerbaijan. Vol. 46, No. 2, pp. 243–271. https://doi.org/10.29228/proc.31
8. Filipkovska M.S. (2022) (2019 – online publication) *Two combined methods for the global solution of implicit semilinear differential equations with the use of spectral projectors and Taylor expansions*, Int. J. of Computing Science and Mathematics. Vol. 15, No. 1, pp. 1–29. http://dx.doi.org/10.1504/IJCSM.2019.10025236
9. Filipkovska (Filipkovskaya) M.S. (2019). *A block form of a singular pencil of operators and a method of obtaining it*, Visnyk of V.N. Karazin Kharkiv National University. Ser. "Mathematics, Applied Mathematics and Mechanics", Vol. 89, pp. 33–58. https://doi.org/10.26565/2221-5646-2019-89-04
10. Filipkovska M.S. (2018). *Lagrange stability of semilinear differential-algebraic equations and application to nonlinear electrical circuits*, Journal of Mathematical Physics, Analysis, Geometry, Vol. 14, No. 2, pp. 169–196. https://doi.org/10.15407/mag14.02.169
11. Filipkovska M.S. (2018). *Lagrange stability and instability of nonregular semilinear differential-algebraic equations and applications*, Ukrainian Mathematical Journal, Vol. 70, No. 6, pp. 947–979. https://doi.org/10.1007/s11253-018-1544-6
12. Filipkovska M.S., Kotlyarov V.P., Melamedova E.A. (2017). *Maxwell-Bloch Equations without Spectral Broadening: gauge equivalence, transformation operators and matrix Riemann-Hilbert problems*, Journal of Mathematical Physics, Analysis, Geometry, Vol. 13, No. 2, pp. 119–153. https://doi.org/10.15407/mag13.02.119
13. Filipkovska M.S. (2015). *Lagrange stability and numerical method for solving semilinear descriptor equations*. Visn. Kharkiv. Nats. Univ. Mat. Model. Inform. Tekh. Avt. Syst. Upr. [Bull. of V. Karazin Kharkiv National University. Series Math. Model. Inform. Tech. Automat. Control Syst.], Vol. 26, No. 1156, pp. 152–167.
14. Filipkovskaya M. (2015). *Global solvability of singular semilinear differential equations and applications to nonlinear radio engineering*, Challenges of modern technology, Vol. 6, No. 1, pp. 3–13.
15. Filipkovskaya M.S. (2014). *The global solvability of the overdetermined singular system of differential-algebraic equations and applications in radiotechnics*, Radioelectronics & Informatics, No. 1(64), pp. 7–16.
16. Filipkovskaya M.S. (2014). *Global solvability of the underdetermined singular system of differential-algebraic equations*, Proceedings of Voronezh State University, Ser.: Physics. Mathematics, No. 3, pp. 168–181. http://www.vestnik.vsu.ru/pdf/physmath/2014/03/2014-03-15.pdf
17. Rutkas A.G., Filipkovskaya M.S. (2013). *Global solvability of the differential-algebraic equations of nonlinear electric circuits*, Zh. Obchysl. Prykl. Mat. [Journal of Computational and Applied Mathematics], No. 4, pp. 131–142. http://nbuv.gov.ua/UJRN/jopm_2013_4_17
18. Rutkas A.G., Filipkovskaya M.S. (2013). *Extension of solutions of one class of differential-algebraic equations*, Zh. Obchysl. Prykl. Mat., No. 1, pp. 135–145. http://nbuv.gov.ua/UJRN/jopm_2013_1_17
19. Filipkovskaya M.S. (2012). *Continuation of solutions of semilinear differential-algebraic equations and applications in nonlinear radiotechnics*, Visn. Kharkiv. Nats. Univ. Mat. Model. Inform. Tekh. Avt. Syst. Upr. [Bull. of V. Karazin Kharkiv National University. Series Math. Model. Inform. Tech. Automat. Control Syst.], Vol. 19, No. 1015, pp. 306–319.