CURRICULUM VITAE

PERSONAL INFORMATION

Name: NIKOLAI K. KRIVULIN

Present position: Professor, Department of Statistical Modeling, Faculty of Mathematics and Mechanics, St. Petersburg State University

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Date of birth: November 29, 1958

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zbMATH Author ID: krivulin.nikolai-k
Google Scholar Profile: Nikolai Krivulin
arXiv.org ID: krivulin_n_1

EDUCATION AND DEGREES

- D.Sc., Applied Mathematics, St. Petersburg State University, St. Petersburg, Russia, 2010
- Ph.D., Computational Mathematics, St. Petersburg State University, St. Petersburg, Russia, 1990
- M.Sc., Applied Mathematics and Operations Research, St. Petersburg State University, St. Petersburg, Russia, 1983
- St. Petersburg State University of Telecommunications, St. Petersburg, Russia, 1976-1977

WORK AND ACADEMIC EXPERIENCE

- Professor, Faculty of Mathematics and Mechanics, St. Petersburg State University, 2012-present
- Associate Professor, Faculty of Mathematics and Mechanics, St. Petersburg State University, 1994-2012
- Associate Professor, School of Management, St. Petersburg State University, 1999-2002
- Postdoctoral Research Fellow, Faculty of Mathematics and Mechanics, St. Petersburg State University, 1992-1994
- Associate Professor (half-time position), Faculty of Mathematics and Mechanics, St. Petersburg State University, 1992-1994
- Associate Professor, Faculty of Mathematics and Mechanics, St. Petersburg State University, 1991(fall)
- Assistant Professor, Faculty of Mathematics and Mechanics, St. Petersburg State University, 1987-1991
- Ph.D. Student, Faculty of Mathematics and Mechanics, St. Petersburg State University, 1985-1987
- Software Engineer, Computer Center, St. Petersburg State University, 1983-1985
- Computer Laboratory Assistant, Computer Center, St. Petersburg State University, 1977-1978

ADMINISTRATION EXPERIENCE

- Member of Dissertation Council No. 2.3.5.38, Peter the Great St. Petersburg Polytechnic University, 2021–present
- Chair of Ph.D. Thesis Defense Committees, Faculty of Mathematics and Mechanics, St. Petersburg State University, 2020
- Chair of B.Sc. and M.Sc. Diploma Defense Committees, Institute of Computer Science and Technology, Peter the Great St. Petersburg Polytechnic University, 2018–present
- Member of Dissertation Council No. 212.232.51, Faculty of Mathematics and Mechanics, St. Petersburg State University, 2011-2018
- Department Chair, Department of Information Management, School of Management, St. Petersburg State University, 1999-2002
- Supervisor, Information Technology Management Program, Management Retraining Department, St. Petersburg State University, 2000-2001
- Supervisor, Division of Informatics, Mathematics and Informatics Retraining Department, St. Petersburg State University, 1998-1999
- Deputy Dean, Faculty of Mathematics and Mechanics, St. Petersburg State University, 1997-1999
- Member of Admission Committee, Faculty of Mathematics and Mechanics, St. Petersburg State University, 1996-1997

COURSES TAUGHT

- Models and Methods of Tropical Mathematics (postgraduate course)
- Tropical Optimization (postgraduate course)
- Statistical Methods for Information Processing (postgraduate course)
- Algebraic Methods for System Modeling (undergraduate course)
- Multicriteria Decision Making (undergraduate course)
- Information System Modeling (undergraduate course)
- Methods of Operations Research (introductory course)
- Computer Simulation Languages (undergraduate course)
- Queueing Theory in Management (undergraduate course)
- Information Technology in Management (MBA course)
- Statistical Methods in Psychology (undergraduate course)
- Probability and Statistics in Management (retraining course)

RESEARCH AREAS

- Tropical (idempotent) mathematics, tropical linear algebra, tropical optimization
- Applications of tropical optimization to project scheduling, location analysis, decision making
- Methods of optimization and decision making
- Analysis and performance evaluation of queueing systems and networks
- Computer simulation and Monte Carlo methods
- Parallel and distributed computing
- Applied and computational statistics

RESEARCH SUPPORT

- Russian Foundation for Basic Research, Grant No. 20-010-00145, Models and Methods of Tropical Optimization in Practical Problems of Economics and Management, 2020-2021 (principal investigator)

- Russian Foundation for Basic Research, Grant No. 18-010-00723, Development of Models and Methods of Tropical Mathematics for Practical Problems in Economics and Management, 2018-2019 (principal investigator)
- Russian Foundation for Humanities, Grant No. 16-02-00059, Development of Models and Methods of Tropical Mathematics with Applications to Problems in Economics and Management, 2016-2017 (principal investigator)
- Russian Foundation for Humanities, Grant No. 13-02-00338, Models and Methods of Tropical Mathematics with Applications to Problems in Economics and Management, 2013-2014 (principal investigator)
- Russian Foundation for Basic Research, Grant No. 09-01-00808, An Investigation of Solutions of the Generalized Discrete Bellman Equation in Analysis of Generalized Linear Stochastic Dynamical Systems, 2009-2011 (principal investigator)
- Russian Foundation for Basic Research, Grant No. 06-01-00763, An Investigation of the Stochastic Generalized Bellman Equation in Problems of Generalized Linear Systems Analysis, 2006-2007 (principal investigator)
- Russian Foundation for Basic Research, Grant No. 04-01-00840, An Investigation of the Asymptotic Behaviour of Stochastic Generalized Bellman Equation Solutions and Problems of Queueing System Analysis, 2004-2005 (principal investigator)
- Russian Foundation for Basic Research, Grant No. 00-01-00760, An Investigation of Stochastic Generalized Bellman Equation in Analysis of Queueing Systems, 2000-2001 (principal investigator)
- Russian Foundation for Humanities, Grant No. 00-02-00228, Adaptive Approximation Methods in the Analysis and Forecasting of Economic Processes, 2000-2001 (investigator)
- Russian Federation Ministry of Education Program "The Universities of Russia", Grant No. 4233, Statistical Modeling in Nonlinear Problems and Optimization of Complex Systems, 1998-1999 (investigator)
- Russian Foundation for Humanities, Grant No. 97-02-02223, Statistical Methods and Experimental Design in the Analysis of the Market Price Level Under Product Differentiation, 1997-1998 (investigator)
- Russian Foundation for Basic Research – German Scientific Research Society, Grant No. 96-01-00015, Optimal Experimental Design in Regression Analysis and Approximation Problems, 1996-1997 (investigator)
- International Sciences Foundation, Grant No. NWA000, 1994-1995 (investigator)
- State Committee of Russian Federation for Higher Education, Scientific Program "Mathematical Modeling in Science and Engineering", Grant No. MM2.3, Methods of Mathematical Modeling in Performance Evaluation of Computer Systems and Networks, 1992-1993 (investigator)

SCHOLARSHIPS AND TRAVEL GRANTS

- Visiting Expert, Business Computing Research Laboratory, Herberger College of Business, St. Cloud State University, USA, 2003, 2008
- Visiting Professor, Department of Business Computer Information Systems, Herberger College of Business, St. Cloud State University, USA, 2002-2003
- Visiting Scientist, Department of Computer Science, School of Computing, National University of Singapore, Singapore, 2002
- Visiting Professor, Microcomputer Networking Study Group, Department of Statistics, St. Cloud State University, USA, 2001
- Travel grants from USIA and Eurasia Foundation (USA, 1999-2000), Royal Society (UK, 1996)

CONFERENCE PRESENTATIONS AND RESEARCH VISITS

Talks and conference presentations

- International Conference on Polynomial Computer Algebra (PCA 2023), Euler International Mathematical Institute, St. Petersburg, Russia, 2023 (April)
- International Conference on Polynomial Computer Algebra (PCA 2022), Euler International Mathematical Institute, St. Petersburg, Russia, 2022 (May)
- 22nd Conference of the International Federation of Operational Research Societies (IFORS 2021), Hanyang University, Seoul, South Korea (virtual presentation), 2021 (August)
- SIAM Conference on Applied Algebraic Geometry (AG21), Virtual Conference, 2021 (August)
- SIAM Conference on Applied Linear Algebra (LA21), Virtual Conference, 2021 (May)
- 14th Annual International Conference "Polynomial Computer Algebra" (PCA 2021), Euler International Mathematical Institute, St. Petersburg, Russia, 2021 (April)
- 8th International Conference on Matrix Analysis and its Applications (MAT TRIAD 2019), Liblice, Czech Republic, 2019 (September)
- 12th Annual International Conference "Polynomial Computer Algebra" (PCA 2019), Euler International Mathematical Institute, St. Petersburg, Russia, 2019 (April)
- 17th International Conference on Relational and Algebraic Methods in Computer Science (RAMiCS 2018), Groningen, The Netherlands, 2018 (October-November)
- The Modeling and Optimization: Theory and Applications Conference (MOPTA), Lehigh University, Bethlehem, PA, USA, 2018 (August)
- 6th IMA Conference on Numerical Linear Algebra and Optimization, Birmingham, UK, 2018 (June)
- 15th International Conference on Computational Management Science (CMS 2018), Trondheim, Norway, 2018 (May)
- UKSim-AMSS 11th European Modelling Symposium on Mathematical Modelling and Computer Simulation (EMS2017), Manchester, UK, 2017 (November)
- Workshop of the LMS Joint Research Group on Tropical Mathematics and its Applications, Birmingham, UK, 2017 (November), 2012 (June)
- 16th International Conference on Relational and Algebraic Methods in Computer Science (RAMiCS 2017), Lyon, France, 2017 (May)
- SIAM Workshop on Combinatorial Scientific Computing (CSC16), Albuquerque, NM, USA, 2016 (October)
- Annual International Conference of the German Operations Research Society (OR 2016), Hamburg, Germany, 2016 (August-September)
- 7th European Congress of Mathematics (7ECM), Berlin, Germany, 2016 (July)
- 20th International Conference of the International Linear Algebra Society (ILAS 2016), Leuven, Belgium, 2016 (July)
- 28th European Conference on Operational Research (EURO 2016), Poznan, Poland, 2016 (July)
- 6th INFORMS Optimization Society Conference "Optimization and Learning: New Problems, New Challenges" (IOS 2016), Princeton, NJ, USA, 2016 (March)
- 15th International Conference on Relational and Algebraic Methods in Computer Science (RAMiCS 2015), Braga, Portugal, 2015 (September-October)
- Multidisciplinary International Conference on Scheduling: Theory and Applications (MISTA 2015), Prague, Czech Republic, 2015 (August)
- 4th International Conference on Matrix Methods in Mathematics and Applications (MMMA-2015), Moscow, Russia, 2015 (August)
- SIAM Conference on Applied Algebraic Geometry (AG15), Daejeon, South Korea, 2015 (August)

- 13th EUROPT Workshop on Advances in Continuous Optimization (EUROPT 2015), Edinburgh, UK, 2015 (July)
- 12th International Conference on Computational Management Science (CMS 2015), Prague, Czech Republic, 2015 (May)
- 19th International Conference of the International Linear Algebra Society (ILAS 2014), Seoul, South Korea, 2014 (August)
- International Conference "Algebra and Mathematical Logic: Theory and Applications", Kazan, Russia, 2014 (June)
- 14th International Conference on Relational and Algebraic Methods in Computer Science (RAMiCS 2014), Marienstatt im Westerwald, Germany, 2014 (April-May)
- 11th International Conference on Applied Mathematical Optimization and Modelling (APMOD 2014), The University of Warwick, UK, 2014 (April)
- 1st International Conference on Optimization Techniques in Engineering (OTENG '13), Antalya, Turkey, 2013 (October)
- SIAM Conference on Control and Its Applications (CT13), San Diego, USA, 2013 (July)
- 2nd Montreal Workshop on Idempotent and Tropical Mathematics (ITM), Montreal, Canada, 2013 (July)
- 18th Conference of the International Linear Algebra Society (ILAS), Providence, RI, USA, 2013 (June)
- 6th Annual International Conference "Polynomial Computer Algebra '2013", Euler International Mathematical Institute, St. Petersburg, Russia, 2013 (May)
- Workshop on Optimization and Decision Making (ODEMA), University of Hradec Kralove, Czech Republic, 2012 (November)
- 6th WSEAS European Computing Conference (ECC'12), Prague, Czech Republic, 2012 (September)
- International Workshop on Tropical and Idempotent Mathematics, Moscow, Russia, 2012 (August)
- International Conference on Polynomial Computer Algebra '2012, Euler International Mathematical Institute, St. Petersburg, Russia, 2012 (April)
- 12th WSEAS International Conference on Robotics, Control and Manufacturing Technology (ROCOM'12), Rovaniemi, Finland, 2012 (April)
- 11th WSEAS International Conference on Signal Processing, Robotics and Automation (ISPRA'12), Cambridge, UK, 2012 (February)
- International Conference "Mathematics, Economic Sciences, and Management: The Centenary of L.V. Kantorovich", St. Petersburg, Russia, 2012 (February)
- 13th WSEAS International Conference on Mathematical and Computational Methods in Science and Engineering (MACMESE'11), Catania, Sicily, Italy, 2011 (November)
- 6th International Conference on Queueing Theory and Network Applications, Korea University, Seoul, Korea, 2011 (August)
- 2nd International Multimedia Technology Conference, International Workshop on Physics and Mathematics (IWPM 2011), Hangzhou, China, 2011 (July)
- International Conference on Applied and Computational Mathematics (ICACM'11), Lanzarote, Canary Islands, Spain, 2011 (May)
- Annual International Workshop on Advances in Methods of Information and Communication Technology, Petrozavodsk, Russia, 2010 (May)
- 6th St. Petersburg Workshop on Simulation, St. Petersburg, Russia, 2009 (June-July)
- 6th Vienna Conference on Mathematical Modelling, Vienna University of Technology, Austria, 2009 (February)

- International Congress "Nonlinear Dynamical Analysis", St. Petersburg, Russia, 2007 (June)
- NUS-Russia Forum Under the National University of Singapore Eastern Europe Research Scientists and Students (EERSS) Exchange and Collaboration Program, Ioffe Institute, St. Petersburg, Russia, 2003 (December)
- 2nd International Workshop "New Models of Business: Managerial Aspects and Enabling Technology", St. Petersburg, Russia, 2002 (June)
- Price-Babson Symposium for Entrepreneurship Educators, Center for Executive Development, Haas School of Business, University of California at Berkeley, USA, 2002 (January)
- International Workshop "New Models of Business: Managerial Aspects and Enabling Technology", St. Petersburg, Russia, 2001 (June)
- 4th St. Petersburg Workshop on Simulation, St. Petersburg, Russia, 2001 (June)
- 10th INFORMS Applied Probability Conference, University of Ulm, Germany, 1999 (July)
- NATO Advanced Study Institute on Difference Sets, Sequences and Their Correlation Properties, Bad Windsheim, Germany, 1998 (August)
- 3rd St. Petersburg Workshop on Simulation, St. Petersburg, Russia, 1998 (June-July)
- International Conference on Random Dynamical Systems, University of Bremen, Germany, 1997 (April-May)
- International Workshop on Discrete Event Systems, University of Edinburgh, UK, 1996 (August)
- NATO Advanced Study Institute on Nonstandard Analysis and Its Applications, Edinburgh, Scotland, 1996 (June-July)
- 2nd St. Petersburg Workshop on Mathematical Methods in Stochastic Simulation and Experimental Design, St. Petersburg, Russia, 1996 (June)
- NATO Advanced Study Institute "Current Issues and Challenges in the Reliability and Maintenance of Complex Systems", Antalya, Turkey, 1995 (June)
- 15th Nordic Conference on Mathematical Statistics, Lund, Sweden, 1994 (August)
- International Workshop on Mathematical Methods and Tools in Computer Simulation, St. Petersburg, Russia, 1994 (May)
- 10th Symposium on Computational Statistics, Neuchûtel, Switzerland, 1992 (August)
- 3rd International Workshop on Model-Oriented Data Analysis, St. Petersburg, Russia, 1992 (May)

Research visits

- School of Mathematics, University of Birmingham, UK, 2017 (November), 2015 (November)
- Distribution Systems Department (Bild Sales Department), Axel Springer AG, Hamburg, Berlin, Frankfurt, Germany, 2010 (June), 2009 (May, December), 2008 (January, June, September), 2007 (March, July, December), 2006 (March, June, September, December), 2005 (March, June, September, December), 2004 (March-April, June-July, October, December), 2003 (March, May, September, November), 2002 (May, October, December), 2001 (April, June, October, December), 2000 (April, July, November, December), 1999 (April, July, October, December)
- Department of Business Computer Information Systems, Herberger College of Business, St. Cloud State University, USA, 2008 (April-May), 2003 (January-March, October-November), 2002 (April-May)
- Institute for Mathematics I (WE 1), Department of Mathematics and Computer Science, Free University of Berlin, Germany, 2004 (June, October), 2002 (May, December), 2000 (November), 1997 (January, June)
- Department of Computer Science, School of Computing, National University of Singapore, Singapore, 2002 (July-August)

- Institute of Management, Innovation and Organization, Haas School of Business, University of California at Berkeley, USA, 2002 (January), 2000 (March)
- Microcomputer Networking Study Group, Department of Statistics, St. Cloud State University, USA, 2001 (January-March)
- Stockholm School of Economics, Sweden, 2000 (January-February)
- Division of Automatic Control, Department of Electrical Engineering, Linköping University, Sweden, 1997 (January-February)
- The Center for Economic Research (CentER), Tilburg University, The Netherlands, 1995 (March-April)

Ph.D. STUDENTS SUPERVISED

- Gubanov S. A., Solution of Minimax Problems of Optimal Project Scheduling Using Idempotent Algebra Methods, St. Petersburg State University, graduated 2023
- Plotnikov P. V., Solution of Minimax Location Problems on the Plane with Rectilinear Metric by Using Methods of Idempotent Algebra, St. Petersburg State University, graduated 2018
- Sorokin V. N., Development of Methods and Algorithms for Solving Multidimensional Minimax Problems of Tropical Optimization, St. Petersburg State University, graduated 2018
- Milov D. S., Methods of Idempotent Algebra and Analysis in Investigation of Queueing Networks, St. Petersburg State University, graduated 2000

OTHER PROFESSIONAL ACTIVITIES

Conference organization

- 5th Workshop on Simulation, St. Petersburg, Russia, 2005, Program Committee (member)
- IEEE International Conference on Networks (ICON2004), Singapore, 2004, Technical Program Committee (member)
- 2nd International Workshop "New Models of Business: Managerial Aspects and Enabling Technology", St. Petersburg, Russia, 2002, Program Committee and Organizing Committee (chairman)
- International Workshop "New Models of Business: Managerial Aspects and Enabling Technology", St. Petersburg, Russia, 2001, Program Committee and Organizing Committee (chairman)
- 4th St. Petersburg Workshop on Simulation (Simulation 2001), St. Petersburg, Russia, 2001, Program Committee (member)
- 4th World Multiconference "Circuits, Systems, Communications and Computers" (CSCC'2000), Athens, Greece, 2000, International Scientific Committee (member)
- 3rd International IMACS Multiconference "Circuits, Systems, Communications and Computers" (CSCC'99), Athens, Greece, 1999, International Scientific Committee (member)
- 3rd St. Petersburg Workshop on Simulation, St. Petersburg, Russia, 1998, Program Committee (member)
- 2nd St. Petersburg Workshop on Mathematical Methods in Stochastic Simulation and Experimental Design, St. Petersburg, Russia, 1996, Program Committee (member)
- 1994 International Workshop on Mathematical Methods and Tools in Computer Simulation, St. Petersburg, Russia, Program Committee and Local Organizing Committee (member)
- 3rd International Workshop on Model-Oriented Data Analysis (MODA-3), St. Petersburg, Russia, 1992, Local Organizing Committee (member)

Refereeing and reviewing

- Journal referee: Algorithms, Annals of Operations Research, Applied Sciences, Automatika, Computational Management Science, Czechoslovak Mathematical Journal, Discrete Event Dynamic Systems, Electronic Journal of Applied Statistical Analysis, Electronic Journal of Linear Algebra, European Journal of Operational Research, Expert Systems With Applications, Fuzzy Sets and Systems, IEEE Transactions on Cybernetics, Journal of Industrial and Management Optimization, Kybernetika, Linear Algebra and Its Applications, Mathematical Methods of Operations Research, Mathematics, Omega, Optimization, Rendiconti del Circolo Matematico di Palermo Series 2, Soft Computing, Vestnik St. Petersburg University Mathematics
- Article reviewer: Mathematical Reviews

Membership of editorial boards

- Electronic Journal of Applied Statistical Analysis
- Mathematics

Membership of professional societies

- St. Petersburg Mathematical Society
- American Mathematical Society
- Society for Industrial and Applied Mathematics
- International Linear Algebra Society
- European Mathematical Society

SELECTED LIST OF PUBLICATIONS

Refereed journal articles

[1] N. Krivulin. Algebraic solution of tropical best approximation problems. *Mathematics*, 11(18):3949, Sep 2023.

[2] N. K. Krivulin. On the solution of a two-sided vector equation in tropical algebra. *Vestnik St. Petersburg Univ. Math.*, 56(2):172–181, Jun 2023. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 10(2):236-248.

[3] N. K. Krivulin and M. A. Bryushinin. Solution of a two-facility location problem in a space with Chebyshev distance. *Vestnik St. Petersburg Univ. Math.*, 55(4):406–413, Dec 2022. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 9(4):625-635.

[4] N. Krivulin and S. Sergeev. Minimizing maximum lateness in two-stage projects by tropical optimization. *Kybernetika*, 58(5):816–841, Dec 2022.

[5] N. Krivulin. Algebraic solution to box-constrained bi-criteria problem of rating alternatives through pairwise comparisons. *Kybernetika*, 58(5):665–690, Dec 2022.

[6] N. Krivulin, A. Prinkov, and I. Gladkikh. Using pairwise comparisons to determine consumer preferences in hotel selection. *Mathematics*, 10(5):730, Mar 2022.

[7] N. Krivulin. Algebraic solution of tropical polynomial optimization problems. *Mathematics*, 9(19):2472, Oct 2021.

[8] N. Krivulin. Algebraic solution to constrained bi-criteria decision problem of rating alternatives through pairwise comparisons. *Mathematics*, 9(4):303, Feb 2021.

[9] N. K. Krivulin and S. A. Gubanov. Algebraic solution of a problem of optimal project scheduling in project management. *Vestnik St. Petersburg Univ. Math.*, 54(1):58–68, Jan 2021. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 8(1):73-87.

[10] N. Krivulin. Using parameter elimination to solve discrete linear Chebyshev approximation problems. *Mathematics*, 8(12):2210, Dec 2020.

[11] N. Krivulin. Complete solution of tropical vector inequalities using matrix sparsification. *Appl. Math.*, 65(6):755–775, Dec 2020.

[12] N. Krivulin. Algebraic solution of minimax single-facility constrained location problems with Chebyshev and rectilinear distances. *J. Log. Algebr. Methods Program.*, 115:100578, Oct 2020.

[13] N. Krivulin. Tropical optimization technique in bi-objective project scheduling under temporal constraints. *Comput. Manag. Sci.*, 17(3):437–464, Jun 2020.

[14] N. Krivulin. Using tropical optimization techniques in bi-criteria decision problems. *Comput. Manag. Sci.*, 17(1):79–104, Jan 2020.

[15] N. Krivulin and S. Sergeev. Tropical implementation of the Analytical Hierarchy Process decision method. *Fuzzy Sets and Systems*, 377:31–51, Dec 2019.

[16] N. K. Krivulin and U. L. Basko. Solving a tropical optimization problem with application to optimal scheduling. *Vestnik St. Petersburg Univ. Math.*, 52(3):293–300, Jul 2019. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 6(3):440-451.

[17] N. K. Krivulin and E. Yu. Romanova. On the rank-one approximation of positive matrices using tropical optimization methods. *Vestnik St. Petersburg Univ. Math.*, 52(2):145–153, Apr 2019. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 6(2):208-220.

[18] N. Krivulin. Complete algebraic solution of multidimensional optimization problems in tropical semifield. *J. Log. Algebr. Methods Program.*, 99:26–40, Oct 2018.

[19] N. K. Krivulin and E. Yu. Romanova. Rank-one approximation of positive matrices based on methods of tropical mathematics. *Vestnik St. Petersburg Univ. Math.*, 51(2):133–143, Apr 2018. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 5(2):256-269.

[20] N. K. Krivulin and V. N. Sorokin. Solution of a multidimensional tropical optimization problem using matrix sparsification. *Vestnik St. Petersburg Univ. Math.*, 51(1):66–76, Jan 2018. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 5(1):91-104.

[21] N. Krivulin. Using tropical optimization to solve constrained minimax single-facility location problems with rectilinear distance. *Comput. Manag. Sci.*, 14(4):493–518, Sep 2017.

[22] N. Krivulin. Tropical optimization problems with application to project scheduling with minimum makespan. *Ann. Oper. Res.*, 256(1):75–92, Sep 2017.

[23] N. K. Krivulin and J. V. Romanovsky. Solution of mathematical programming problems using tropical optimization methods. *Vestnik St. Petersburg Univ. Math.*, 50(3):274–281, Jul 2017. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 4(3):448-458.

[24] N. Krivulin. Algebraic solution of tropical optimization problems via matrix sparsification with application to scheduling. *J. Log. Algebr. Methods Program.*, 89:150–170, Jun 2017.

[25] N. Krivulin. Tropical optimization problems in time-constrained project scheduling. *Optimization*, 66(2):205–224, Feb 2017.

[26] N. Krivulin. Direct solution to constrained tropical optimization problems with application to project scheduling. *Comput. Manag. Sci.*, 14(1):91–113, Jan 2017.

[27] N. K. Krivulin and P. V. Plotnikov. Using tropical optimization to solve minimax location problems with a rectilinear metric on the line. *Vestnik St. Petersburg Univ. Math.*, 49(4):340–349, Dec 2016. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 3(4):602-614.

[28] N. Krivulin. A maximization problem in tropical mathematics: A complete solution and application examples. *Informatica*, 27(3):587–606, Sep 2016.

[29] N. K. Krivulin and V. N. Sorokin. Solution of a tropical optimization problem with linear constraints. *Vestnik St. Petersburg Univ. Math.*, 48(4):224–232, Dec 2015. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 2(4):541-552.

[30] N. Krivulin. Algebraic solutions of tropical optimization problems. *Lobachevskii J. Math.*, 36(4):363–374, Dec 2015.

[31] N. K. Krivulin and P. V. Plotnikov. On an algebraic solution of the Rawls location problem in the plane with rectilinear metric. *Vestnik St. Petersburg Univ. Math.*, 48(2):75–81, Jun 2015. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 2(2):194-202.

[32] N. Krivulin. A multidimensional tropical optimization problem with a non-linear objective function and linear constraints. *Optimization*, 64(5):1107–1129, May 2015.

[33] N. Krivulin. Extremal properties of tropical eigenvalues and solutions to tropical optimization problems. *Linear Algebra Appl.*, 468:211–232, Mar 2015.

[34] N. K. Krivulin and O. A. Nev. Calculation of the asymptotic characteristics of a stochastic synchronized dynamic system. *Vestnik St. Petersburg Univ. Math.*, 47(4):145–153, Oct 2014. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Matematika*, 1(4):533-543.

[35] N. Krivulin. Solution of linear equations and inequalities in idempotent vector spaces. *Int. J. Appl. Math. Inform.*, 7(1):14–23, 2013.

[36] N. Krivulin. A new algebraic solution to multidimensional minimax location problems with Chebyshev distance. *WSEAS Trans. Math.*, 11(7):605–614, Jul 2012.

[37] N. Krivulin. An algebraic approach to project schedule development under precedence constraints. *Int. J. Appl. Math. Inform.*, 6(2):92–100, 2012.

[38] N. K. Krivulin. An extremal property of the eigenvalue for irreducible matrices in idempotent algebra and solution of the Rawls location problem. *Vestnik St. Petersburg Univ. Math.*, 44(4):272–281, Dec 2011. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (4):42-51.

[39] N. Krivulin. An algebraic approach to multidimensional minimax location problems with Chebyshev distance. *WSEAS Trans. Math.*, 10(6):191–200, Jun 2011.

[40] N. K. Krivulin. Calculating the mean growth rate of the vector of states of a stochastic system with synchronization of events. *Vestnik St. Petersburg Univ. Math.*, 44(1):79–86, Mar 2011. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (1):107-114.

[41] Y. C. Huei, P. H. Keng, and N. Krivulin. Calculating approximate blocking probabilities for TDM wavelength optical networks with OTSIs. *J. High Speed Netw.*, 17(3):129–145, Jan 2010.

[42] N. K. Krivulin. Calculating the Lyapunov exponent for generalized linear systems with exponentially distributed elements of the transition matrix. *Vestnik St. Petersburg Univ. Math.*, 42(2):95–105, May 2009. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (2):37-47.

[43] N. K. Krivulin. Evaluation of the growth rate of the state vector in a second-order generalized linear stochastic system. *Vestnik St. Petersburg Univ. Math.*, 41(1):28–38, May 2008. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (1):38-48.

[44] N. K. Krivulin. On evaluation of the blocking probability in multiwave time division multiplexing networks. *Vestnik St. Petersburg Univ. Math.*, 40(4):279–286, Dec 2007. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (4):73-81.

[45] N. K. Krivulin. Growth rate of the state vector in a generalized linear stochastic system with a symmetric matrix. *J. Math. Sci.*, 147(4):6924–6928, Dec 2007. Transl. from the Russian original publ. in *Zapisky Nauchnih Seminarov POMI*, 341:134-141.

[46] N. K. Krivulin. Evaluation of the growth rate of the state vector in a generalized linear stochastic system. *Vestnik St. Petersburg Univ. Math.*, 40(3):224–232, Sep 2007. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (3):91-99.

[47] N. K. Krivulin and I. V. Romanovskii. On the convergence of matrix powers of a generalized linear operator in idempotent algebra. *J. Math. Sci.*, 142(1):1806–1816, Apr 2007. Transl. from the Russian original publ. in *Problemy Matematicheskogo Analiza*, 34:69-77, Dec 2006.

[48] N. K. Krivulin. Eigenvalues and eigenvectors of matrices in idempotent algebra. *Vestnik St. Petersburg Univ. Math.*, 39(2):72–83, Jun 2006. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (2):29-40.

[49] N. K. Krivulin. Solution of generalized linear vector equations in idempotent algebra. *Vestnik St. Petersburg Univ. Math.*, 39(1):16–26, Mar 2006. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (1):23-36.

[50] N. K. Krivulin, D. Guster, and C. Hall. On parallel implementation of a discrete optimization random search algorithm. *WSEAS Trans. Comput.*, 4(9):1122–1129, Sep 2005.

[51] N. K. Krivulin. Evaluation of bounds on the mean rate of growth of the state vector of a linear dynamical stochastic system in idempotent algebra. *Vestnik St. Petersburg Univ. Math.*, 38(2):42–51, Jun 2005. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (2):45-54.

[52] N. K. Krivulin. The growth rate of state vector in a generalized linear dynamical system with random triangular matrix. *Vestnik St. Petersburg Univ. Math.*, 38(1):25–28, Mar 2005. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (1):33-38.

[53] N. K. Krivulin. A convergence theorem for matrix powers and evaluation of the eigenvalue in idempotent algebra. *Vestnik St. Petersburg Univ. Math.*, 37(2):38–42, Jun 2004. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (2):49-55.

[54] N. K. Krivulin. Estimation of the rate of growth of the state vector of a generalized linear dynamical system with random matrix. *Vestnik St. Petersburg Univ. Math.*, 36(3):41–49, Sep 2003. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (3):47-55.

[55] N. K. Krivulin. Evaluation of the mean cycle time in fork-join queueing networks. *Vestnik St. Petersburg Univ. Math.*, 35(3):20–26, Sep 2002. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (3):27-35.

[56] N. K. Krivulin and D. S. Milov. Evaluation of the mean in-process time for queueing networks with random topology. *Vestnik St. Petersburg Univ. Math.*, 34(3):16–19, Sep 2001. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (3):27-31.

[57] N. K. Krivulin and D. S. Milov. Estimates for a mean time of trouble-free work for one queueing network class. *Vestnik St. Petersburg Univ. Math.*, 34(1):17–22, Jan 2001. Transl. from the Russian original publ. in *Vestnik Sankt-Peterburgskogo Universiteta. Ser. 1*, (1):23-30.

[58] N. K. Krivulin. A max-algebra approach to modeling and simulation of tandem queueing systems. *Math. Comput. Modelling*, 22(3):25–37, Aug 1995.

[59] S. M. Ermakov and N. K. Krivulin. Efficient algorithms for tandem queueing system simulation. *Appl. Math. Lett.*, 7(6):45–49, Nov 1994.

[60] N. K. Krivulin. A recursive equations based representation for the G/G/m queue. *Appl. Math. Lett.*, 7(3):73–77, May 1994.

[61] N. K. Krivulin. Unbiased estimates for gradients of stochastic network performance measures. *Acta Appl. Math.*, 33(1):21–43, Oct 1993.

[62] N. K. Krivulin. Optimization of complex systems for simulation modeling. *Vestnik Leningrad Univ. Math.*, 23(2):64–67, June 1990. Transl. from the Russian original publ. in *Vestnik Leningradskogo Universiteta. Ser. 1*, (3):100-102.

Refereed conference papers and book chapters

[63] N. Krivulin. Algebraic solution of weighted minimax single-facility constrained location problems. In J. Desharnais, W. Guttmann, and S. Joosten, eds, *Relational and Algebraic Methods in Computer Science*, vol. 11194 of *LNCS*, pp. 317–332. Springer, Cham, Oct 2018.

[64] N. Krivulin. Methods of tropical optimization in rating alternatives based on pairwise comparisons. In A. Fink, A. Fügenschuh, and M. J. Geiger, eds, *Operations Research Proceedings 2016*, Operations Research Proceedings, pp. 85–91. Springer, Cham, 2018.

[65] N. Krivulin and S. Sergeev. Tropical optimization techniques in multi-criteria decision making with Analytical Hierarchy Process. In D. Al-Dabass, Z. Xie, A. Orsoni, and A. Pantelous, eds, *UKSim-AMSS 11th European Modelling Symposium on Computer Modelling and Simulation (EMS 2017)*, pp. 38–43. IEEE, Nov 2017.

[66] N. Krivulin. Complete solution of an optimization problem in tropical semifield. In P. Höfner, D. Pous, and G. Struth, eds, *Relational and Algebraic Methods in Computer Science*, vol. 10226 of *LNCS*, pp. 226–241. Springer, Cham, May 2017.

[67] N. Krivulin. Using tropical optimization techniques to evaluate alternatives via pairwise comparisons. In A. H. Gebremedhin, E. G. Boman, and B. Ucar, eds, *2016 Proc. 7th SIAM Workshop on Combinatorial Scientific Computing*, pp. 62–72. SIAM, Philadelphia, PA, 2016.

[68] N. Krivulin. Tropical optimization problems in project scheduling. In Z. Hanzálek, G. Kendall, B. McCollum, and P. Šůcha, eds, *MISTA 2015 Proceedings*, pp. 492–506. MISTA, 2015.

[69] N. Krivulin. Solving a tropical optimization problem via matrix sparsification. In W. Kahl, M. Winter, and J. N. Oliveira, eds, *Relational and Algebraic Methods in Computer Science*, vol. 9348 of *LNCS*, pp. 326–343. Springer, Cham, Sep 2015.

[70] N. Krivulin. Rating alternatives from pairwise comparisons by solving tropical optimization problems. In Z. Tang, J. Du, S. Yin, L. He, and R. Li, eds, *2015 12th Intern. Conf. on Fuzzy Systems and Knowledge Discovery (FSKD)*, pp. 162–167. IEEE, Aug 2015.

[71] N. Krivulin. Tropical optimization problems. In L. A. Petrosyan, J. V. Romanovsky, and D. W.-K. Yeung, eds, *Advances in Economics and Optimization: Collected Scientific Studies Dedicated to the Memory of L. V. Kantorovich*, Economic Issues, Problems and Perspectives, pp. 195–214. Nova Sci. Publ., New York, Apr 2014.

[72] N. Krivulin. Complete solution of a constrained tropical optimization problem with application to location analysis. In P. Höfner, P. Jipsen, W. Kahl, and M. E. Müller, eds, *Relational and Algebraic Methods in Computer Science*, vol. 8428 of *LNCS*, pp. 362–378. Springer, Cham, Apr 2014.

[73] N. Krivulin and K. Zimmermann. Direct solutions to tropical optimization problems with nonlinear objective functions and boundary constraints. In D. Biolek, H. Walter, I. Utu, and C. von Lucken, eds, *Mathematical Methods and Optimization Techniques in Engineering*, pp. 86–91. WSEAS Press, Athens, Oct 2013.

[74] N. Krivulin. Explicit solution of a tropical optimization problem with application to project scheduling. In D. Biolek, H. Walter, I. Utu, and C. von Lucken, eds, *Mathematical Methods and Optimization Techniques in Engineering*, pp. 39–45. WSEAS Press, 2013.

[75] N. Krivulin. Algebraic solutions to scheduling problems in project management. In I. J. Rudas, A. Zaharim, K. Sopian, and J. Strouhal, eds, *Recent Researches in Communications, Electronics, Signal Processing and Automatic Control*, pp. 161–166. WSEAS Press, Athens, Feb 2012.

[76] N. Krivulin. Solution to an extremal problem in tropical mathematics. In G. L. Litvinov, V. P. Maslov, A. G. Kushner, and S. N. Sergeev, eds, *Tropical and Idempotent Mathematics. International Workshop*, pp. 132–139, Moscow, 2012.

[77] N. Krivulin. A complete closed-form solution to a tropical extremal problem. In S. Yenuri, ed., *Advances in Computer Science*, vol. 5 of *Recent Advances in Computer Engineering Series*, pp. 146–151. WSEAS Press, Sep 2012.

[78] N. Krivulin. A solution of a tropical linear vector equation. In S. Yenuri, ed., *Advances in Computer Science*, vol. 5 of *Recent Advances in Computer Engineering Series*, pp. 244–249. WSEAS Press, Sep 2012.

[79] N. Krivulin. A tropical extremal problem with nonlinear objective function and linear inequality constraints. In S. Yenuri, ed., *Advances in Computer Science*, vol. 5 of *Recent Advances in Computer Engineering Series*, pp. 216–221. WSEAS Press, Sep 2012.

[80] N. Krivulin. Algebraic solution to a constrained rectilinear minimax location problem on the plane. In *2011 Intern. Conf. on Multimedia Technology (ICMT)*, pp. 6212–6220. IEEE, Jul 2011.

[81] N. Krivulin. Algebraic solutions to multidimensional minimax location problems with Chebyshev distance. In V. Vasek, Y. Shmaliy, D. Trcek, N. P. Kobayashi, R. S. Choras, and Z. Klos, eds, *Recent Researches in Applied and Computational Mathematics*, pp. 157–162. WSEAS Press, May 2011.

[82] N. Krivulin. Evaluation of the mean cycle time in stochastic discrete event dynamic systems. In B. Kim, H. W. Lee, G. U. Hwang, and Y. W. Shin, eds, *Proc. 6th Intern. Conf. on Queueing Theory and Network Applications (QTNA'11)*, pp. 93–100. ACM, New York, NY, Aug 2011.

[83] N. K. Krivulin. Evaluation of Lyapunov exponent in generalized linear dynamical models of queueing networks. In I. Troch and F. Breitenecker, eds, *Proceedings MATHMOD 2009 Vienna – Full Papers CD Volume*, pp. 706–717, Vienna, Feb 2009. Vienna University of Technology, ARGESIM.

[84] Y. C. Huei, P. H. Keng, and N. Krivulin. Average network blocking probabilities for TDM WDM optical networks with OTSIs and without WC. In *15th Intern. Symp. on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems*, pp. 424–431. IEEE, Oct 2007.

[85] N. K. Krivulin and N. B. Nevzorov. On evaluation of the mean service cycle time in tandem queuing systems. In M. Ahsanullah, J. Kennyon, and S.K. Sarkar, eds, *Applied Statistical Science V*, pp. 145–155. Nova Sci. Publ., Huntington, NY, Oct 2001.

[86] N. K. Krivulin and V. B. Nevzorov. Evaluation of the mean interdeparture time in tandem queueing systems. In S. M. Ermakov, Yu. N. Kashtanov, and V. B. Melas, eds, *Simulation 2001. Proc. 4th St. Petersburg Workshop on Simulation*, pp. 310–315, St. Petersburg, 2001. NII Chemistry St. Petersburg University Publishers.

[87] N. K. Krivulin. Algebraic modelling and performance evaluation of acyclic fork-join queueing networks. In N. Balakrishnan, V. B. Melas, and S. Ermakov, eds, *Advances in Stochastic Simulation Methods*, pp. 63–81. Birkhäuser, Boston, MA, Jun 2000.

[88] N. K. Krivulin. Monotonicity properties and simple bounds on the mean cycle time in acyclic fork-join queueing networks. In N. E. Mastorakis, ed., *Recent Advances in Information Science and Technology*, pp. 147–152. World Scientific, Singapore, Oct 1998.

[89] N. K. Krivulin. Max-plus algebra models of queueing networks. In *Intern. Workshop on Discrete Event Systems WODES'96*, pp. 76–81. IEE, London, Aug 1996.

[90] N. K. Krivulin. An algebraic approach in modelling and simulation of queueing networks. In Nikos E. Mastorakis, ed., *Proc. Intern. Conf. on Circuits, Systems and Computers '96.*, vol. 2, pp. 668–672. Hellenic Naval Academy, Jul 1996.

[91] N. K. Krivulin. Unbiased gradient estimation in queueing networks with parameter-dependent routing. In W. S. Wong, ed., *Proc. Intern. Conf. on Control and Information 1995*, pp. 351–356, Hong Kong, Jun 1995. The Institute of Mathematical Sciences, The Chinese University of Hong Kong, The Chinese University Press.

[92] N. K. Krivulin. Using max-algebra linear models in the representation of queueing systems. In J. G. Lewis, ed., *Proc. 5th SIAM Conf. on Applied Linear Algebra*, vol. 72 of *SIAM Proceedings Series*, pp. 155–160. SIAM, Philadelphia, PA, Jun 1994.

[93] N. Krivulin. An analysis of gradient estimates in stochastic network optimization problems. In W. G. Müller, H. P. Wynn, and A. A. Zhigljavsky, eds, *Model-Oriented Data Analysis*, Contributions to Statistics, pp. 227–240, Heidelberg, 1993. Physica-Verlag.

[94] N. Krivulin. An analysis of the least median of squares regression problem. In Y. Dodge and J. Whittaker, eds, *Computational Statistics*, pp. 471–476. Physica-Verlag, Heidelberg, Aug 1992.

Refereed journal articles in Russian

[95] N. K. Krivulin and E. Yu. Romanova. Approximate factorization of positive matrices by using methods of tropical optimization. *Vestnik Sankt-Peterburgskogo Universiteta. Prikladnaya Matematika*, 16(4):357–374, Dec 2020. (in Russian).

[96] N. K. Krivulin, T. Abildaev, V. D. Gorshechnikova, D. Kapatsa, E. A. Magdich, and A. A. Mandrikova. On solving multicriteria decision making problems based on pairwise comparisons. *Computer Tools in Education*, (2):27–58, Jun 2020. (in Russian).

[97] N. K. Krivulin and V. A. Ageev. Methods of tropical optimization in multicriteria problems of raiting alternatives from pairwise comparisons. *Vestnik Sankt-Peterburgskogo Universiteta. Prikladnaya Matematika*, 15(4):472–488, Dec 2019. (in Russian).

[98] P. V. Plotnikov and N. K. Krivulin. Solution of minimax location problem in three-dimensional space with rectilinear metric. *Computer Tools in Education*, (1):31–50, Feb 2018. (in Russian).

[99] N. K. Krivulin and M. A. Tsobenko. Solution of the two-criteria problem of rating alternatives using tropical optimization. *Computer Tools in Education*, (4):15–32, Dec 2019. (in Russian).

[100] P. V. Plotnikov and N. K. Krivulin. Direct solution of a minimax location problem on the plane with rectilinear metric in a rectangular area. *Vestnik Sankt-Peterburgskogo Universiteta. Prikladnaya Matematika*, 14(2):116–130, Jun 2018. (in Russian).

[101] N. K. Krivulin, V. A. Ageev, and I. V. Gladkikh. Application of methods of tropical optimization for evaluating alternatives based on pairwise comparisons. *Vestnik Sankt-Peterburgskogo Universiteta. Prikladnaya Matematika*, 13(1):27–41, Mar 2017. (in Russian).

[102] N. K. Krivulin and S. A. Gubanov. The use of tropical optimization methods in problems of project scheduling. *Vestnik Sankt-Peterburgskogo Universiteta. Prikladnaya Matematika*, 13(4):384–397, Dec 2017. (in Russian).

[103] N. K. Krivulin and S. A. Gubanov. Solution of a project scheduling problem by using methods of tropical mathematics. *Vestnik Sankt-Peterburgskogo Universiteta. Seriya 10*, 12(3):62–67, Sep 2016. (in Russian).

[104] N. K. Krivulin and I. V. Gladkikh. Computation of the consistent pairwise comparison matrix in marketing research by using methods of tropical mathematics. *Vestnik Sankt-Peterburgskogo Universiteta. Seriya 8*, (1):3–43, Mar 2015. (in Russian).

[105] N. K. Krivulin and D. N. Vasilyev. Computation of the Lyapunov exponent of a generalized linear stochastic dynamical system with a second-order matrix. *Vestnik Sankt-Peterburgskogo Universiteta. Seriya 10*, (1):120–134, Mar 2015. (in Russian).

[106] N. K. Krivulin. On solution of a multidimensional extremal problem in tropical mathematics. *Vestnik Sankt-Peterburgskogo Universiteta. Seriya 1*, 47(4):145–153, Dec 2013. (in Russian).

[107] N. K. Krivulin. On solution of a class of linear vector equations in idempotent algebra. *Vestnik Sankt-Peterburgskogo Universiteta. Seriya 10*, (3):64–77, Sep 2009. (in Russian).

[108] I. V. Gladkikh and N. K. Krivulin. Marketing research of price levels in differentiated product markets. *Vestnik Sankt-Peterburgskogo Universiteta. Seriya 8*, (1):129–156, Mar 2002. (in Russian).

Monographs

[109] N. K. Krivulin. *Methods of Idempotent Algebra for Problems in Modeling and Analysis of Complex Systems*. Saint Petersburg Univ. Press, St. Petersburg, 2009. (in Russian).