

ALEXANDER OMELCHENKO

Doctor of Sciences (Professor) in Physics and Mathematics

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(a) Education

Baltic State Technical University, Leningrad, USSR, M.S. in Physics 1996
St. Petersburg State University, Department of Mathematics and Mechanics, St.Petersburg, Russia
Fluid Mechanics, Cand.Sci. (PhD) 1999
St. Petersburg State University, Department of Mathematics and Mechanics, St.Petersburg, Russia
Fluid Mechanics, Doct.Sci. (Prof) 2003

(b) Appointments

Dean of of the Faculty School of Physics, Mathematic s and Computer Science	2018-Current	Higher School of Economics - St. Petersburg
Vice-Rector for Academic Affairs of the St. Petersburg Academic University of RAS	2017-2018	St. Petersburg Academic University of RAS
Deputy director of the Higher Education Center	2008-2017	St. Petersburg Academic University of RAS
Vice-Rector for Academic Affairs of the Academic Physico-Technological University of the RAS	2008-2011	Academic Affairs of the Academic Physico- Technological University of the RAS
Head of Department of Mathematical and Informational Technologies	2005-2007	St. Petersburg Academic University of RAS
Vice-Rector for Scientific Work	2003 - 2008	St.Petersburg Technical University of Technology and Design
Senior Lecturer	2001 - 2003	St.Petersburg State Polytechnic Univ., Phys. and Mech. Dept.
Doctoral Student	2001 - 2003	St. Petersburg State University, Math. and Mech. Dept.
Senior Lecturer	1999 - 2001	Baltic State Technical University, Natural Science Dept.

(c) Main Publications:

1. A.V. Omelchenko and V.N. Uskov Optimal Shock-Wave Systems. Fluid Dynamics, Vol.30. No.6, 1995. PP. 905-911.
2. A.V. Omelchenko and V.N. Uskov Optimal Shock-Wave Systems under Constraints on the Total Flow Turning Angle. Fluid Dynamics, Vol.31. No.4, 1996. PP. 597-603.
3. V.N. Malozemov, A.V. Omelchenko and M.A. Rydalevskaya Entropy Maximization under Linear Constraints. Computational Mathematics and Mathematical Physics, Vol.38. No.9, 1998. PP. 1447-1451.
4. V.N. Malozemov, A.V. Omelchenko and V.N. Uskov The Minimization of the Total Pressure Loss Accompanying the Breakdown of a Supersonic Flow J. Applied Mathematics and Mechanics, Vol.62. No.6, 1998. PP.939-944.
5. A.V. Omelchenko The Generalized Chester – Witham Invariant. Technical Physics Letters, Vol. 27. No. 11, 2001. PP. 891-897.
6. A.V. Omelchenko Differential Characteristics of the Flow behind a Shock Wave. Technical Physics, Vol. 47. No. 1, 2002.
7. A.V. Omelchenko Relations between Derivatives across a Shock Discontinuity. Computational Mathematics and Mathematical Physics, Vol.42. No.8, 2002. PP.1200-1211.
8. V. N. Malozemov and A. V. Omelchenko Construction of Optimal Shock-wave Systems. Computational Mathematics and Mathematical Physics, Vol.43. No.4, 2003. PP.1200-1211.
9. V. N. Malozemov and A. V. Omelchenko Global Optimality and Uniqueness in the Problem of Total Pressure Loss Minimization. Doklady Physics, Vol. 48, No. 3, 2003. PP. 138-140.
11. A.V. Omelchenko and E.A. Tropp One Singularly Perturbed Problem of Turbulent Gas Dynamics. Journal of Applied Mechanics and Technical Physics, Vol.45. No.2, 2004. PP.187-198.
12. V. N. Malozemov and A. V. Omelchenko On a Discrete Optimal Control Problem with an Explicit Solution // Journal of Industrial and Management Optimization. Vol. 2, No. 1. February 2006. P.P. 55-62.
13. S. A. Grishanov, V. R. Meshkov, A.V. Omelchenko. Polynomial Invariant for Doubly Periodic Structures // Technical Physics Letters, Vol. 32. No. 5, 2006. PP. 445-448.
14. S. A. Grishanov, V. R. Meshkov, A.V. Omelchenko. Kauffman-type Polynomial Invariants for Doubly Periodic Structures. Journal of Knot Theory and Its Ramifications (JKTR) Vol. 16, No, 6, 2007. PP. 779-788.
15. S. Grishanov, V. Meshkov, and A. Omelchenko. A Topological Study of Textile Structures. Part I: An Introduction to Topological Methods /Textile Research Journal, May 2009; vol. 79, 8: pp. 702-713.
16. S. Grishanov, V. Meshkov, and A. Omelchenko. A Topological Study of Textile Structures. Part II: Topological Invariants in Application to Textile Structures /Textile Research Journal, June 2009; vol. 79, 9: pp. 822-836.
17. V. Meshkov, A. Omelchenko, M. Petrov, and E. Tropp. Dyck and Motzkin Triangles with Multiplicities / Moscow Mathematical Journal. Volume 10 (2010), Number 3.
18. M.V. Durnev, A.V. Omelchenko, E.V. Yakovlev, I.Yu. Evstratov and S.Yu. Karpov. Indium incorporation and optical transitions in InGaN bulk materials and quantum wells with arbitrary polarity. Applied Physics Letters. 97, 051904 (2010).
19. V. Meshkov, A. Omelchenko, M. Petrov, and E. Tropp. Dyck and Motzkin Triangles with Multiplicities / Moscow Mathematical Journal. Volume 10 (2010), Number 3. P.P. 611-628.
20. A. Bogdanov, V. Meshkov, A. Omelchenko, M. Petrov. Enumerating the k-tangle Projections / Journal of Knot Theory and its Ramifications. Vol.21, No. 7 (2012) 1250069 (17 pages).
21. M. I. Petrov, A. V. Omelchenko, and A. A. Lipovskii. Electric field and spatial charge formation in glasses and glassy nanocomposites / J. Appl. Phys. 109, 094108 (2011).
22. V. V. Korenev, A. V. Savelyev, A. E. Zhukov, A. V. Omelchenko, M. V. Maximov. Analytical approach to the multi-state lasing phenomenon in quantum dot lasers /Appl. Phys. Lett. 102, 112101 (2013).
23. V. V. Korenev, A. V. Savelyev, A. E. Zhukov, A. V. Omelchenko, M. V. Maximov. Effect of carrier dynamics and temperature on two-state lasing in semiconductor quantum dot lasers /Semiconductors (2013) 47: 1397.

24. Evgeniy Krasko, Alexander Omelchenko. Brown's Theorem and its Application for Enumeration of Dissections and Planar Trees /The Electronic Journal of Combinatorics. Vol 22(1), 2015. #P1.17
25. Evgeniy Krasko, Alexander Omelchenko. Enumeration of 4-regular one-face maps / European Journal of Combinatorics, 62 (2017), 167–177.
26. Evgeniy Krasko, Alexander Omelchenko. Enumeration of Chord Diagrams without Loops and Parallel Chords /The Electronic Journal of Combinatorics. Vol 24(3), 2017. #P3.43
27. А.В.Омельченко. Методы интегральных преобразований в задачах математической физики. М.:Изд-во МЦНМО, 2010.
28. Омельченко А.В. Теория графов. М.: Изд-во МЦНМО, 2018. 416 стр.

(d) TEACHING EXPERIENCE:

- 2000 – PRESENT Combinatorics (St.Petersburg Academic University);
- 2000 – PRESENT Graph theory (St.Petersburg Academic University);
- 2000 – PRESENT Mathematical Physics (St.Petersburg State Technical Univ.);
- 2006 - 2008 Group Theory (St.Petersburg Academic University);
- 2005 Elements of Modern Topology (St.Petersburg State Technical Univ.);
- 2003,2005 Representation Theory (St.Petersburg State Technical Univ.);
- 2002 Elements of Functional Analysis (St.Petersburg State Polytechnic Univ.);
- 1999 – 2001 Analitical Methods in Gas Dynamics (Baltic State Technical Univ.);

(e) THE MAIN FIELDS OF RESEARCH:

1. Enumerative Combinatorics and Graph Theory.
2. Topology and Knots Theory.
3. Asymptotic methods in Mathematical Physics.
4. The problems of discrete optimal control in Physics, Engineering.
5. The theory of non-linear hyperbolic systems of equations.
6. Higher transcendental functions of Mathematical Physics.
7. Shock-wave systems and structures in Gas Dynamics.

(f) GRANTS AND AWARDS

- 2010 - 2018 The Head of Research Projects of the Ministry of Education and Science of the Russian Federation
- 2007 - 2010 The Winner of the Grant Competition of the President of the Russian Federation to support young scientists - doctors of science (2007-2008, 2009-2010).
- 2006 The Scientific Award of the Government of St. Petersburg and the St. Petersburg Scientific Center of the Russian Academy of Sciences named after Leonard Euler (2006).
- 2001, 2002, 2003, 2004, 2005 Grants of the St. Petersburg Scientific Centre of the Russian Academy of Sciences (team manager)
- 2001 - 2003 Grant of the Russian Foundation for Basic Researches (participant)
- 2000 - 2002 Grant of INTAS, Project Reference No INTAS-99-00785 (participant)
- 2000 - 2002 Grant of the Russian Academy of Sciences for Young Scientists
- 2000 FELLOWSHIPS for Young NIS Scientists, Project Reference No YSF 99-4054
- 1997 - 1999 Grant of INTAS, Project Reference No INTAS-96-2356 (participant)
- 1997 - 1999 Grant of the Russian Academy of Sciences for Young Scientists
- 1998 Grant of the Russian President for graduate students
- 1997 Grant of the Russian Government for graduate students
- 1997,1998, 1999, 2000, 2001, 2002 Grants of the St. Petersburg Administration
- 1997, 1998 Grants of Soros for graduate students

1995, 1996 Grants of Soros for students

1995, 1996 Grants of the Mayor of St. Petersburg

1995, 1996 Grants of the Acoustic Association

1994 - 1996 Grant of the Russian Foundation for Basic Researches (participant)