Alexander Shapoval, CV

Personal

webpage: http://www.mccme.ru/~shapoval
e-mail: abshapoval@gmail.com

Fields of interest

Mathematical models of self-organized criticality, non-equilibrium statistical mechanics, prediction of extreme events, solar dynamo, mathematical modelling of economic processes

Professional experience

September 1997 – present	**Institute of Earthquake Prediction Theory and Mathematical Geophysics,** Russian Academy of Science, Moscow, research fellow. Key projects: seismic models, prediction algorithms.
September 2000 – present	**Financial Unversity under the Government of Russian Federation**, Moscow, Professor. Key projects: models of spatial economics, nonlinear analysis of financial time series. Management: vice-head of the chair.
2011 (fall) 2012 (fall)	**The Institute of Earth Physics of Paris**, Visiting Professor. Key project: nonlinear analysis of solar proxies.
December 1998 – December 1999	**International Centre of Theoretical Physics**, Trieste, Italy, long-term visitor,
March 1998 – December 1998	**Independent University of Moscow**, Assistant Professor

Education in mathematics

2012	**Keldysh Institute of Applied Mathematics** (Russian Academy of Sciences), Moscow, *D.Sc. (habilitation) in Applied Mathematics* (concerning mathematical models of self-organized critical systems and their predictability)
November 1994 – November 1997	**Moscow State University**, *Ph.D in Mathematics* (concerning attractors of nonlinear nonautonomous evolutionary differential equations) under supervision of professor M. Vishik
September 1989 – June 1994	**Moscow State University**, Department of Mechanics and Mathematics; *Diploma with Honour*, GPA = 5.0 of 5.0. Major in Dynamical Systems, Partial Differential Equations, Computer Science, Statistics, Stochastic Processes.

Additional education

2010–2012 **New Economic School**, Moscow, 3-year summer school programm in Spatial Economics

Publications

A handbook, 2 tutorials, and approximately 30 papers in peer-refereed jouranls. Principal papers:

1. Attractors of non-linear elliptic equations with a small parameter, Differ. Equ., 37, 1303 (2001),
2. Crossover Phenomenon and Universality: from Random Walk to Deterministic Sand-Piles, Int. J. Mod. Phys. C, 16, 1893 (2005), with M. G. Shnirman.
3. Variable predictability in deterministic dissipative sandpile, Nonlin. Processes Geophys., 17, 85 (2010), with M. G. Shnirman.
4. Prediction problem for target events based on the inter-event waiting time, Physica A, 389, 5145 (2010).
5. The BTW mechanism on a self-similar image of a square: A path to unexpected exponents, Physica A, 391, 15 (2012), with M. G. Shnirman.

Research funding grants

- Russian foundation for basic research (99-01-00304, 02-01-00277, 05-01-00390, 05-05-64384, 08-01-00784, 08-05-00215, 08-06-00283, 10-06-00282, 11-01-00339, 11-01-00887, 11-01-00892, 11-06-00278)
- Research grant of Ministry of Education and Science of the Russian Federation (2002, 2011-2012)

Teaching experience

Probability and statistics, Linear algebra, Calculus, Introduction to the theory of complex systems, and others

Principal Conferences Attended

European Geophysical Union General Assembly, Wien, Austria (2000, 2007), Petrovsky International Conference Differential Equations and Related Topics, Moscow, Russia (2001, 2007), International Conference of Applied Mathematics and Computing, Plovdiv, Bulgaria (2007), International conferences "Mathematics, Computer, Eduction" Dubna, Russia (2010, 2012).

Computer skills

C, TEX, Math Packages

List of publications

1. A. Shapoval, Behavior of solutions of quasilinear elliptic inequalities in an unbounded domain, *Mathematical Notes*, V. 60, 4, 1996, p. 415–424.
2. A. Shapoval, The Integral Manifold for Nonautonomous Nonlinear Parabolic Equations in an Unbounded Domain, *Russ. Math. Surveys*, 2, 1996, p. 929; translation from Uspehi Mat. Nauk 5, 1996.
3. A. Shapoval, Integral manifolds of nonautonomous evolution differential equations, *Mathematical Notes*, V. 61, 2, 1997, p. 258–261.
4. A. Shapoval, The Integral Manifold of a Nonlinear Elliptic Equation in a Cylinder, *Mathematical Notes* V. 61 3, 1997, p. 391 –395.
5. A. Shapoval, Liouville's Theorem for an Elliptic Equation of the Second Order with Degenerating Coefficients (in Russian), *Vestnik Moskovskogo Universiteta*, Ser. 1, Matematika, Mehanika, 2, 1998, p. 21–26.
6. A. Shapoval, Integral Manifolds of Nonlinear Elliptic Equations with a Small Parameter, *Russ. Math. Surveys*, V. 53, 4, 1998. p. 827; translation from Uspehi Mat. Nauk 5, 1996, p. 175.
7. A. Shapoval, On Boundness of one Class of Quasilinear Parabolic Inequalities Solutions, *Differential Equations*, V. 36, 6, 1998, p. 845 – 847.
8. A. Shapoval, Growth of solutions of non-linear degenerating elliptic inequalities in unbounded domains, (in Russian), *Vestnik Moskovskogo Universiteta*, Ser. 1, Matematika, Mehanika, 3, 2001, p. 3–7.
9. Attractors of Nonlinear Elliptic Equations with a Small Parameter, *Differential Equations*, V. 37, 2001, p. 1303–1314.
10. A. B. Shapoval, M. G. Shnirman, Strong Events in the Sand-Pile Model, *International J. Modern Physics C*, V. 15, 2, 2004, p. 279 – 288.
11. A. B. Shapoval, M. G.Shnirman, On Totality of the Strongest Events in the Sandpile (in Russian), *Computational Seismology*, V. 35, 2004, p. 258–267.
12. A. B. Shapoval, M. G. Shnirman, Scaling Properties of Strong Avalanches in Sand-Pile, *International J. Modern Physics C*, V. 16, 2, 2005, p. 341 – 348.
13. A. B. Shapoval, M. G. Shnirman, Crossover Phenomenon and Universality: from Random Walk to Deterministic Sand-Piles *International J. Modern Physics C*, V. 16, 12, 2005, p. 1893 –1907.
14. A. B. Shapoval, M. G. Shnirman, How Size of Target Avalanches Influences Prediction Efficiency *International J. Modern Physics C*, V. 17, 12, 2006, p. 1777–1790.
15. A. B. Shapoval, M. G. Shnirman, Prediction in a two-sign avalanche model, *Computational Seismology and Geodynamics*, Chowdhury D.K. (ed.) V. 7, American Geophysical Union, Washington D. C., 2005. p. 188–197.
16. A. B. Shapoval, M. G. Shnirman, Randomness and step-like distribution of pile heights in avalanche models, *European Physical J. B*, 2007, V. 59, P. 399–403.
17. A. B. Shapoval, M. G. Shnirman, Prediction Efficiency in an Avalanche Model for Different Target Events, *Izvestia, Physics of the Solid Earth*, V. 44, 2008, 495–500.
18. A. B. Shapoval, M. G. Shnirman, Sand density as sandpile descriptor // *International J. of Modern Physics C*, 2008, V. 19, p. 995–1006.
19. A. B. Shapoval, M. G. Shnirman, Scenarios of large events in the sandpile model, *Computational Seismology and Geodynamics*, Ismail-Zade A. (ed.) American Geophysical Uninon, Washington D. C., 2008. V. 8, p. 179–183.

20. V. B. Gisin, A. B. Shapoval, Two Agent Based Models and Market Stylized Facts, *International J. of Pure and Applied Mathematics*, 2008, V. 32, p. 521–527.
21. M. G. Shnirman, A. B. Shapoval, Prediction of the largest events in the sandpile model based on the earthquake precursors, *Izvestia, Physics of the Solid Earth*, V. 45, 2009, 406–413.
22. M. G. Shnirman, A. B. Shapoval, A dissipative deterministic BTW model with an activation scenario of strong events, *Izvestia, Physics of the Solid Earth*. V. 45, 2009, 414–423.
23. M. G. Shnirman, A. B. Shapoval, Variable predictability in deterministic dissipative sandpile, *Nonlinear Processes in Geophysics*, 2010, V. 17, p. 85–91.
24. A. B. Shapoval Prediction problem for target events based on the inter-event waiting time // *Physica A: Statistical Mechanics and its Applications*, 2010, V. 389, p. 5145–5154.
25. A. B. Shapoval, M. G. Shnirman, The BTW mechanism on a self-similar image of square: a path to unexpected exponents // *Physica A: Statistical Mechanics and its Applications*. 2012. V. 391. p. 8–14.

Handbook: I. A. Alexandrova, V. M. Goncharenko, I. E. Denezhkina, V. V. Kiselyov, D. S. Nabatova, V. Yu. Popov, I. G. Shandra, A. B. Shapoval, Methods os optimal solutions in economics and finance (in Russian), Ed. V. M. Goncharenko, V. Yu. Popov, Moscow, KnoRus, 2013, 400 pp.