

**Sergey A. NAZIN**  
(curriculum vitae)

**Birth:** Sept. 21, 1977, Moscow, Russia.

**Position:** Senior Research Assistant (since 2004),  
Laboratory of Adaptive and Robust Control Systems  
Institute of Control Sciences, Russian Academy of Sciences, Moscow, Russia.

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**Areas of Interest:**

Estimation theory, Optimization methods, Robust control.

**Education:**

- 1994 – 2000: Moscow Institute of Physics and Technology (State University), Russia.  
Faculty of radio engineering and cybernetics.
- 2000 – 2004: Institute of Control Sciences RAS, Moscow, Russia.  
Post-graduate school (PhD student).

**Degrees and Diplomas:**

- B.S. degree in Applied Mathematics and Physics from Moscow Institute of Physics and Technology in 1998. B.S. project “*Quadratic Mappings and its use in Control*”, supervisor – Prof. Boris Polyak.
- M.S. degree in Applied Mathematics and Physics from Moscow Institute of Physics and Technology in 2000. M.S. thesis “*Ellipsoidal Estimation under Model Uncertainty*”, supervisor – Prof. Boris Polyak.
- Ph.D. degree in Physics and Mathematics from the Institute of Control Sciences RAS, Moscow, Russia, in June 2004. Thesis “*Ellipsoidal and Interval Techniques for State and Parameter Estimation in Discrete-time Dynamic Systems under Model Uncertainty*”. Promoter – Prof. Boris Polyak.

**Former Full-time Positions:**

2000 – 2004: Junior Research Assistant, Laboratory of Adaptive and Robust Control Systems,  
Institute of Control Sciences RAS.

**Visiting Positions:**



- Jan. 2003 – Mar. 2003: Visiting Researcher at the Laboratoire des signaux et systèmes, École Supérieure d’Électricité (Supélec), Gif-sur-Yvette, France (in the framework of INTAS PhD Fellowship program; Promoter – Prof. Eric Walter).

- Feb. 2004 – Apr. 2004: Visiting Researcher at the Laboratoire des signaux et systèmes, École Supérieure d'Électricité (Supélec), Gif-sur-Yvette, France (in the framework of INTAS PhD Fellowship program; Promoter – Prof. Eric Walter).
- Mar. 2006 – Dec. 2006: Post-doctoral Researcher at the Center for Systems Engineering and Applied Mechanics (CESAME), Université Catholique de Louvain (UCL), Louvain-la-Neuve, Belgium; Promoters – Professors Michel Gevers and Yurii Nesterov.

### **Awards and Fellowships:**

- 2002 – 2005: Trapeznikov Scholarship from the Institute of Control Sciences RAS.
- 2002 – 2004: INTAS PhD Fellowship (grant INTAS YSF 2002-181 “*Set-Membership Estimation for Uncertain Dynamic Systems*”).
- 2005 – 2006: Grant of President of Russian Federation (grant MK-1294.2005.8 “*Guaranteed Estimation and Control via Set Invariance*”).

### **Foreign Languages:**

English , French  (fluent)

### **Participation in Team Projects and Grants:**

- INTAS-97-10782 “*Guaranteed Estimation under Model Uncertainty*”, 02/1999 – 02/2001, Project Coordinator – Prof. Eric Walter (L2S – Supélec, Gif-sur-Yvette, France); 0.05-time participation.
- Russian Foundation for Basic Research, Grant RFBR 00-15-96018 “*Theory of Robust and Optimal Control*”, 01/2000 – 12/2002, Responsible – Prof. B.T. Polyak; 0.1-time participation.
- Combined Program № 19 of Presidium of Russian Academy of Sciences “*Control of Mechanical Systems*”, project 2.6 “*Robust and Optimal Control under Uncertainty*”, 06/2001 – 12/2005, Responsible – Prof. B.T. Polyak; 0.05-time participation.
- Russian Foundation for Basic Research, Grant RFBR 02-01-00127 “*Superstability and its use in Control*”, 01/2002 – 12/2004, Responsible – Prof. B.T. Polyak; 0.1-time participation.
- Russian Foundation for Basic Research, Grant RFBR 05-01-00114 “*Estimation and Control under Bounded Disturbances via Invariant Sets Theory*”, 01/2005 – 12/2007, Responsible – Prof. B.T. Polyak; 0.1-time participation.
- Russian Foundation for Basic Research, Grant RFBR 05-08-01177 “*Frequency Adaptive Control for Technical Systems*”, 05/2005 – 12/2008, Responsible – Prof. A.G. Alexandrov; 0.05-time participation.
- Combined Program № 22 of Presidium of Russian Academy of Sciences “*Control of Mechanical Systems*”, project 1.6 “*Robust and Optimal Control under Uncertainty*”, 06/2005 – 12/2008, Responsible – Prof. B.T. Polyak; 0.05-time participation.
- Grant of Youth Scientific School of Institute of Control Sciences RAS (Head – Prof. B.T. Polyak), 06/2007 – 12/2008; 0.2-time participation.
- Russian Foundation for Basic Research, Grant RFBR 08-08-00371 “*Robust Control and Filtering under Non-Random Noise*”, 01/2008 – 12/2010, Responsible – Prof. B.T. Polyak; 0.1-time participation.
- Russian Foundation for Basic Research, Joint Russian-Ukrainian Project RFBR-Ukr\_a 08-08-90425 “*Control of Dynamical Systems under Uncertainties and Perturbations*”, 01/2008 – 12/2009, Responsible – Academician S.N. Vasiliev; 0.05-time participation.

### **Participation in the Conferences and Scientific Summer Schools:**

- 5<sup>th</sup> IFAC Symposium on Nonlinear Control Systems, St.-Petersburg, Russia, July 4-6, 2001.
- 15<sup>th</sup> IFAC World Congress, Barcelona, Spain, July 21-26, 2002.
- 4<sup>th</sup> IMACS Symposium on Mathematical Modelling, Vienna, Austria, February 5-7, 2003.
- 2<sup>nd</sup> International Conference on Control Problems, Moscow, Russia, June 17-19, 2003.
- Workshop “Interval Mathematics and Constraints Propagation Methods” in the framework of 5<sup>th</sup> International Conference “Perspectives of System Informatics”, Novosibirsk, Russia, July 8-9, 2003.
- VIII International Workshop “Stability and Oscillations of Nonlinear Control Systems”, Moscow, Russia, June 2-4, 2004.
- CIME Summer School on Stochastic Geometry, Martina Franca, Italy, September 13-18, 2004.
- International Conference “Optimization and Control”, Moscow, Russia, May 19-20, 2005.
- 16<sup>th</sup> IFAC World Congress, Prague, Czech Republic, July 4-8, 2005.
- Grenoble Summer School on Automatic Control, France, September 12-16, 2005.
- 48th Scientific Conference of Moscow Institute of Physics and Technology, Dolgoprudni, Russia, November 25-26, 2005.
- 25<sup>th</sup> Benelux Meeting on Systems and Control, Heeze, The Netherlands, March 13-15, 2006.
- 13<sup>th</sup> IFAC Workshop on Control Application of Optimization, Paris-Cachan, France, April 26-28, 2006.
- Grenoble Summer School on Automatic Control, France, September 11-15, 2006.
- 15<sup>th</sup> ERNSI Workshop on System Identification, Linköping, Sweden, September 20-21, 2006, + Forever Ljung Workshop (a workshop on the occasion of Lennart Ljung’s 60<sup>th</sup> birthday), Linköping, Sweden, September 22, 2006.
- 2<sup>nd</sup> National Scientific Conference “Theory and Practice of System Dynamics”, Apatity, Russia, April 3-6, 2007.
- 14<sup>th</sup> International Workshop on Dynamic and Control, Moscow – Zvenigorod, Russia, May 28 – June 2, 2007.

### **Lectures and Given Seminars:**

- Seminar in Institute for Problems of Mechanics RAS, Moscow, Russia, January 15, 2004.
- Seminar in Laboratoire des Signaux et Systemes (L2S), Ecole Supérieure d’Electricité (Supelec), Gif-sur-Yvette, France, March 15, 2004.
- Seminar in Institute of Mechanics of Moscow State University, Moscow, Russia, June 4, 2004.
- Seminar in Center for Systems Engineering and Applied Mechanics (CESAME), Université catholique de Louvain, Louvain-la-Neuve, Belgium, March 21, 2006.
- Seminar in Center for Systems Engineering and Applied Mechanics (CESAME), Université catholique de Louvain, Louvain-la-Neuve, Belgium, October 17, 2006.
- Seminar in Laboratoire d’automatique de Grenoble (LAG), Institut National Polytechnique de Grenoble, France, January 26, 2007.

- Seminar in European Center for Scientific Computations (CERFACS), The Parallel Algorithms Laboratory, Toulouse, France, February 1, 2007.
- Seminar in Xerox Research Center Europe (XRCE), Grenoble, France, February 8, 2008.

### **Organization Activities and Other Responsibilities:**

- Reviewing of papers for “Automation and Remote Control”, IEEE Transactions on Automatic Control, IFAC Automatica, and some other scientific journals. Reviewing of papers for international conferences and symposia of IFAC and conferences IEEE CDC, IEEE ACC.
- Organizing of the 4<sup>th</sup> Russian-Swedish Control Conference, Moscow, Russia, May 14-16, 2001.
- Organizing of International Conference “*Optimization and Control*”, Moscow, Russia, May 19-20, 2005.
- From September 2007 – scientific secretary of the seminar “Optimization and Automatic Control” in the Institute of Control Sciences RAS (Head of the seminar – Prof. B.T. Polyak).

### **Full List of Publications:**

#### *Papers in Refereed Journal:*

1. Nazin S.A. Ellipsoidal State Estimates of Linear Dynamic Systems: Their Limiting Behavior. *Automation and Remote Control*, 2001, vol. 62, No. 4, pp. 590-596.
2. Nazin S.A. and B.T. Polyak. Limiting Behaviour of Bounding Ellipsoids for State Estimation. In: “*Nonlinear Control Systems 2001*”, (A. Kurzhanskii and A. Fradkov Eds.), Elsevier Science, 2002, vol. 2, pp. 553-558.
3. Polyak B.T. and S.A. Nazin. Interval Solutions for Interval Algebraic Equations. *Mathematics and Computers in Simulation*, 2004, vol. 66, No. 2-3, pp. 207-217.
4. Polyak B.T., S.A. Nazin, C. Durieu and E. Walter. Ellipsoidal Parameter or State Estimation Under Model Uncertainty. *Automatica*, 2004, vol. 40, No. 7, pp. 1171-1179.
5. Nazin A.V., S.A. Nazin and B.T. Polyak. On the Convergence of External Ellipsoidal Approximations of Reachability Domains of Linear Discrete-Time Dynamic Systems. *Automation and Remote Control*, 2004, vol. 65, No. 8, pp. 1210-1230.
6. Nazin S.A. and B.T. Polyak. Interval Parameter Estimation under Model Uncertainty. *Mathematical and Computer Modelling of Dynamical Systems*, 2005, vol. 11, No. 2, pp. 225-238.
7. Polyak B.T. and S.A. Nazin. Estimation of Parameters in Linear Multi-dimensional Systems under Interval Uncertainty. *Journal of Automation and Information Sciences*, 2006, vol. 38, No. 2, pp. 19-33.
8. Polyak, B.T. and S.A. Nazin. Invariant Ellipsoids Technique for Persistent Disturbance Rejection. *International Journal of Tomography & Statistics*, 2007, vol. 5, No. W07, pp. 165-170.
9. Nazin S.A., B.T. Polyak and M.V. Topunov. Rejection of Bounded Exogenous Disturbances by the Method of Invariant Ellipsoids. *Automation and Remote Control*, 2007, vol. 68, No. 3, pp. 467-486.
10. Nazin S.A. and B.T. Polyak. Ellipsoidal-based Parametric Estimation in the Linear Multi-dimensional Systems with Uncertain Model Description. *Automation and Remote Control*, 2007, vol. 68, No. 6, pp. 993-1005.

Papers in Conference Proceedings:

1. Nazin S.A. and B.T. Polyak. Limiting Behavior of Bounding Ellipsoids for State Estimation. *Proceedings of the 5<sup>th</sup> IFAC Symposium on Nonlinear Control Systems, NOLCOS'2001*, St.-Petersburg, Russia, July 4-6, 2001, pp. 585-589.
2. Polyak B.T., S.A. Nazin, C. Durieu and E. Walter. Ellipsoidal Estimation Under Model Uncertainty. *Proceedings of the 15<sup>th</sup> IFAC World Congress*, Barcelona, Spain, July 21-26, 2002, pp. 1090-1095.
3. Polyak B.T. and S.A. Nazin. Interval Solutions for Interval Algebraic Equations. *Proceedings of the 4<sup>th</sup> IMACS Symposium on Mathematical Modelling*, Vienna, Austria, February 5-7, 2003, pp. 973-980.
4. Nazin S.A. Asymptotic Properties of Ellipsoidal State Estimation for Linear Discrete-Time Dynamic Systems. *Abstracts of the 2<sup>nd</sup> International Conference on Control Problems*, Moscow, Russia, June 17-19, 2003, vol. 1, p. 61.
5. Nazin S.A. and B.T. Polyak. Interval Technique for Parameter Estimation Problem. *Proceedings of the Workshop on Interval Mathematics and Constraint Propagation Methods in the framework of 5<sup>th</sup> International Conference «Perspectives of System Informatics»*, Novosibirsk, Akademgorodok, Russia, July 8-9, 2003, pp. 54-57, (in Russian).
6. Polyak B.T., S.A. Nazin, C. Durieu and E. Walter. Guaranteed Ellipsoidal State Estimation for Uncertain MIMO Models. *Proceedings of the 13<sup>th</sup> IFAC Symposium on System Identification*, Rotterdam, Netherlands, August 27-29, 2003, pp. 1054-1059.
7. Nazin A.V., S.A. Nazin and B.T. Polyak. Convergence of the Recursive Ellipsoidal Estimates of Reachability Sets for Linear Discrete-Time Dynamical Systems. *Proceedings of the VIII International Workshop "Stability and Oscillations of Nonlinear Control Systems"*, Moscow, Russia, June 2-4, 2004, pp. 125-132, (in Russian).
8. Nazin S.A. Ellipsoidal Estimation for Dynamic Systems with Model Uncertainty. *Abstracts of International Conference "Optimization and Control"*, Moscow, Russia, May 19-20, 2005, p. 28.
9. Polyak B.T. and S.A. Nazin. Interval Technique for Parameter Estimation under Model Uncertainty. *Proceedings of the 16<sup>th</sup> IFAC World Congress*, Prague, Czech Republic, July 4-8, 2005.
10. Nazin S.A. Method of Ellipsoids for Estimation of Parameters through Output Measurements under Model Uncertainty. *48th Scientific Conference of Moscow Institute of Physics and Technology*, Dolgoprudnii, Russia, November 25-26, 2005, vol. 1, pp. 169-171.
11. Polyak B.T. and S.A. Nazin. Invariant Ellipsoids Technique for Persistent Disturbance Rejection. *Proceedings of the 13<sup>th</sup> IFAC Workshop on Control Application of Optimization*, Paris-Cachan, France, April 26-28, 2006, pp. 422-427.
12. Polyak B.T., A.V. Nazin, M.V. Topunov and S.A. Nazin. Rejection of Bounded Disturbances via Invariant Ellipsoids Technique. *45<sup>th</sup> IEEE CDC*, San Diego, CA, USA, December 13-15, 2006, pp. 1429-1434.
13. Nazin S.A. and B.T. Polyak. Rejection of External Disturbances via Invariant Sets Method. *Proceedings of the 2<sup>nd</sup> National Scientific Conference "Theory and Practice of System Dynamics"*, Apatity, Russia, April 3-6, 2007, pp. 65-66, (in Russian).
14. Polyak B.T., S.A. Nazin and M.V. Topunov. The Invariant Ellipsoid Technique for Analysis and Design of Linear Control Systems. *Abstracts of the 14<sup>th</sup> International Workshop on Dynamic & Control*, Moscow – Zvenigorod, Russia, May 28 – June 2, 2007, p. 58.
15. Nazin A.V. and S.A. Nazin. Gap-free Bounds for Stochastic Multi-Armed Bandit: a Class of Exponentiated Gradient Strategies. *Proceedings of the 47<sup>th</sup> IEEE CDC*, Cancun, Mexico, December 9-11, 2008, (submitted).