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Viatcheslav Bykov

Curriculum Vitae

Personal Details

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Education

Habilitation 2013, Reacting Flows, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany.

Mentor: Prof. Dr. rer. nat. habil. Ulrich Maas

Title of habilitation: Manifolds based model reduction for reacting flows

Ph.D. 2004, Applied Mathematics, Department of Mathematics and Computer Science, Ben-Gurion University of the Negev, Israel.

Advisor: Prof. Vladimir Gol'dshtein

Title of thesis: Mathematical problems of multiphase combustion

M.Sc. 1997, Mathematics, Mechanical and Mathematical Department, Novosibirsk State University, Novosibirsk, Russia.

Advisor: Prof. Vladimir Ogorodnikov

Title of thesis: On some probabilistic models of periodically correlated stochastic processes

B.Sc. 1995, Applied Mathematics, Mechanical and Mathematical Department, Novosibirsk State University, Novosibirsk, Russia.

Advisor: Prof. Igor Borisov

Title of thesis: Capability and asymptotical normality of the estimation by maximal spacing

Awards and Fellowships

- 2004 – 2006** Minerva Fellowship of Max Planck Society, Germany.
- 2004** Friedman Prize for Outstanding Mathematicians, Math Department, Ben-Gurion University of the Negev, Israel.
- 2000 – 2003** High Tech. fellowship for excellent Ph.D. students, Ben-Gurion University of the Negev, Israel.

Employment History

- 2004 – present** Research associate, Lecturer, Team leader of mathematical analysis of reacting flow systems, Institute of Technical Thermodynamics, Karlsruhe Institute of Technology (KIT), Germany.
- 1999 - 2004** Teaching assistant (Ph.D. study), Ben-Gurion University of the Negev, Israel.
- 1997 – 1998** Researcher, Institute of Applied Mathematics of the Far-Eastern Branch of the Russian Academy of Sciences, Khabarovsk, Russia.

Visiting Appointments

Visiting researcher, consulting of the research projects

- Model reduction of mathematical models of spray combustion, Brighton University, England, summer/autumn, 2004; spring, 2010.
- Model reduction in combustion theory, Ben-Gurion University of the Negev, Israel, summer 2007 and 2013; winter 2015.
- Theory and modeling of two-phase combustion processes, Ben-Gurion University of the Negev, Israel, winter/spring, 2009.

Scientific Projects

Leading, performing and consulting

- Project Principal Investigator (PI): DFG BY 94/2-1 - „Untersuchung der Dynamik von wasserstoffreichen Flammen, Entwicklung neuer Methoden zur Validierung von Mechanismen der chemischen Kinetik und zur Modellreduktion“
- Project Principal Investigator (PI): DFG SFB/Transregio TRR150, TP B07, “Modellreduktion für Reaktions-Transport-Systeme im Abgasstrang”
- Cooperating scientist: DFG GIF 1162-148.6/2011 “Model reduction approach for modeling of reacting flows”
- Investigator: DFG SFB606 “Non-Stationary Combustion: Transport Phenomena, Chemical Reactions, Technical Systems”

Reviewer of national / international foundations for scientific projects

- 2008 Combustion technology, Clean Combustion Concepts Program, Technologiestichting STW, Netherlands
- 2011 Basic research in natural sciences, Development and Innovation Funding (UEFISCDI), The Executive Agency for Higher Education and Research, Romania
- 2011, 2013 Basic research in natural sciences, National intellectual capacity program, National Centre of Science and Technology Evaluation, Kazakhstan

Education Activities (courses taught)

- 2006 – pres.** Lecturer: Mathematical models and methods in combustion theory; Methods of model reduction for modelling and simulation of combustion processes; Karlsruhe Institute of Technology, Germany.
- 1999 – 2004** Teaching assistant: Calculus 1,2; Ordinary Differential Equations; Advanced Analysis; Algebra 1,2; Probability and Statistics, Ben-Gurion University of the Negev, Israel.
- 1997 – 1998** Teaching assistant: Mathematical analysis, the Khabarovsk State University of Technology, Russia.

Recent presentations and talks at conferences, colloquia, seminars (since 2019)

- 1 Theory of Singularly Perturbed Vector Fields - Application to Model Reduction, International Conference on Mathematical Sciences & Computer Engineering, 17-19 May **2023**, Osaka, Japan
- 2 Urea-water-solution (UWS) evaporation and decomposition for selective catalytic reduction of NO_x, XIV International Symposium "Combustion and Plasmochemistry. Physics and Chemistry of Carbon and Nano energy Materials", November 7-9, **2023**, Almaty, Kazakhstan
- 3 Problem oriented model reduction of mechanisms of chemical kinetics: theory and applications, 2nd International Workshop: Non-linear phenomena and dynamics of flame propagation: theoretical aspects and implementations, Burabay (Kazakhstan), September 24-29, **2022**
- 4 Study of mechanism of ammonia decomposition and oxidation: From NO_x reduction to ammonia auto-ignition problem, 39th International Symposium on Combustion, Vancouver (Canada), July 24-29, **2022**
- 5 Improvement of the Global Quasi-Linearisation (GQL) Model Reduction Method, 28th International Colloquium on the Dynamics of Explosions and Reactive Systems (ICDERS), Naples (Italy), June 20-24, **2022**
- 6 Modelling and model reduction of the evaporation and decomposition of droplets and films of urea-water solution in exhaust gas environment, Seminar on Dynamics of the reaction diffusion systems, P.N.Lebedev Physical Institute, Moscow (Russia), November 19, **2021**
- 7 Some aspects of modeling and reduction of reacting flow systems, School of Young Scientists, P.N.Lebedev Physical Institute, Moscow (Russia), November 16-18, **2021**
- 8 Chemical kinetics - from the time scales to the hierarchy of models and their reduction, II International Workshop and School of Young Scientists, Vladivostok, (Russia), September 27 – October 1, **2021**
- 9 Hydrogen-oxygen flame acceleration in narrow open ended channels, Seminar on the dynamics of reacting systems, P.N.Lebedev Physical Institute, Moscow (Russia), May 20, **2021**
- 10 Rich premixed hydrogen/air oscillatory flames: detailed modelling and model reduction, 7th International Congress on Energy Fluxes and Radiation Effects, Tomsk (Russia), September 14 – 26, **2020**
- 11 Reduced modelling of chemical kinetics in problems of flame acceleration and DDT, Annual International Symposium of Explosions and Reactive Flows, Beijing Institute of Technology, Beijing (China), September 26-27, **2020**
- 12 On dimension of a combustion system in the composition state space, International Workshop and School of Young Scientists, Vladivostok (Russia), October 12 – 16, **2020**
- 13 Role of chemical kinetics in flame acceleration in narrow channels, The 17th International Conference on Numerical Combustion, Aachen (Germany), May 6 – 8, **2019**
- 14 Reaction-Diffusion Manifolds (REDIMs) for premixed combustion systems – automatic manifold generation procedure, The 7th International Workshop on Model Reduction in Reacting Flows, Trondheim (Norway), June 18 – 21, **2019**
- 15 Model reduction of mechanisms of chemical kinetics: standard versus recently developed approaches, The 1st International Workshop: Non-linear phenomena and dynamics of flame propagation: theoretical aspects and implementations, Burabay (Kazakhstan), September 21-25, **2019**