



Final AMMODIT Conference

“Mathematics for Life Sciences”

Book of Abstracts

March 18 – 22, 2019
Kyiv, Ukraine

Information on the conference: This is the final conference in the series of events to be organized in the framework of the Marie Curie RISE project “Approximation Methods for Molecular Modelling and Diagnosis Tools” (AMMODIT). The previous conferences were in Rivne (September 2015), Hasenwinkel (March 2016), Kyiv (January 2017) and Lviv (March 2018).

The conference is devoted to recent research in life sciences based on applications of mathematics to biological and medical studies. It is a multidisciplinary meeting forum for researchers who develop and apply mathematical and computational tools to the study of phenomena in the broad fields of biology, ecology, medicine, bioengineering, environmental science, etc.

Organizers and Partners:

- Institute of Applied Mathematics and Mechanics of the National Academy of Sciences of Ukraine
- Institute of Mathematics of the National Academy of Sciences of Ukraine
- National Technical University of Ukraine “Kyiv Polytechnic Institute”, Faculty of Applied Mathematics
- Österreichische Akademie der Wissenschaften, Johann Radon Institute for Computational and Applied Mathematics
- Politecnico di Milano, Biomechanics Research Group
- Universität zu Lübeck, Institut für Mathematik
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Contents

Assanova A. T. <i>On the solvability of nonlocal problem for impulsive partial differential equation of higher order</i>	6
Bascova O. O. <i>Flow structure formation in corrugated pipes at transient Reynolds numbers</i>	7
Chaichenko S., Shydlich A. <i>Best approximations in modular spaces</i>	8
Chertov O., Malchykov V., Pereverzyev Jr. S., Mayer L., Lamplmayr L., Steiger R., Kusstatscher L., Fritscher K., Knoflach M., Gizewski E. R. <i>Automatic wavelet-based stenosis detection in internal carotid and vertebral arteries from lumen diameters</i>	9
Derevianko N. <i>Mathematical description of protein-ligand docking problem</i>	11
Dimitrieva N. F., Strebkova D. M. <i>Numerical simulation of vortex flows in a semi-cylindrical cavity</i>	12
Djurdjevic T., Semenov V. Yu., Pereverzyev JR. S., Lamplmayr L., Wallner V., Neubauer V., Steiger R., Kiechl-Kohlendorfer U., Grams A. E., Gizewski E. R. <i>A strategy for identifying informative variables: Case study – a prediction of motor and cognitive outcomes of preterm neonates from metabolites ratios at MR spectroscopy</i>	13
Dzhumabaev D. S. <i>A method of solving the nonlinear boundary value problems for ordinary differential equations</i>	15
Dzyubenko G. A. <i>One estimate of three-monotone spline approximation</i>	16
Gorban Yu. S. <i>Equations with L^1-right-hand sides in mechanics of fluids</i>	16
Gryshchuk S. V. <i>Commutative algebras and associated with them “analytic” functions to PDE’s of plane anisotropy</i>	17
Hulianytskyi A. L., Tokar K. S. <i>On weak solvability and convergence of a finite-difference approximation for a variable-order reaction-subdiffusion equation</i>	18
Ivanushkina N., Ivanko K., Prokopenko Y., Redaelli A., Timofeyev V. <i>Action potential pattern recognition in cardiomyocytes</i>	19
Kashpirovskii O. I., Kriukova G. V. <i>On approximation of local solution for infinite stationary system of difference equations</i>	20

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Equations with L^1 -right-hand sides in mechanics of fluids

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We consider the Dirichlet problem for nonlinear second-order elliptic equations with anisotropic and degenerate (with respect to the independent variables) coefficients and L^1 -right-hand sides.

One of the applications of L^1 -theory is to simulate two stationary turbulent fluids coupled by boundary conditions on the interface. The mathematical model is a nonlinear system of partial differential equations with unknown velocities of fluids, their pressures, and their turbulent kinetic energies. This system is motivated by the coupling of two

turbulent fluids, such as in the framework ocean/atmosphere or in the case of two layers of a stratified fluid (see [1]). Equation for turbulent kinetic energy has right-hand sides only belong to L^1 . In this case, it is taken in the entropy concept (see [2]).

In [3, 4] we proved the theorems of existence a unique entropy solution for nonlinear elliptic degenerate anisotropic equations.

- [1] C. Bernardi, T. Chacón Rebollo, R. Lewandowski, F. Murat *Studies in Mathematics and its Applications* **31**, (2002), p. 69–102.
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- [3] Yu. Gorban *Open Math.* **15**, (2017), p. 768–786.
- [4] Yu. Gorban, *Mat. Stud.* **47**, (2017), No. 1, p. 59–70.