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**International Conference
on Partial Differential Equations and Applications
in Memory of Professor B. Yu. Sternin
Moscow, Russia, November 6–9, 2018**

ABSTRACTS

RUDN University,
Moscow State University,
Ishlinsky Institute for Problems in Mechanics RAS



Moscow
2018

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Программы повышения конкурентоспособности РУДН «5-100»
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М43 Международная конференция по дифференциальным уравнениям с частными производными и приложениям, посвящённая памяти профессора Б.Ю. Стернина. Москва, Россия, 6–9 ноября 2018 г. : тезисы докладов = International Conference on Partial Differential Equations and Applications in Memory of Professor B.Yu. Sternin. Moscow, Russia, 6–9 November 2018 : abstracts. – Москва : РУДН, 2018. – 79 с.

Конференция посвящена памяти профессора Бориса Юрьевича Стернина (1939–2017). Научная программа включает доклады по разным разделам теории дифференциальных уравнений с частными производными и их приложениям, которыми занимался проф. Б.Ю. Стернин. В работе конференции принимают участие ведущие российские и зарубежные специалисты, а также его коллеги, ученики и соавторы.

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S. Yu. Dobrokhotov, V. E. Nazaikinskii	
Lagrangian manifolds related to Bessel functions, and their applications . . .	27
J. Ecalle	
Singular & singularly perturbed differential systems and their multiple resur-	
gence	27
A. V. Faminskii	
Large-time decay of solutions to the Zakharov–Kuznetsov equation	28
A. A. Fedotov	
Quasiclassical asymptotics of solutions to difference equations with two close	
turning points	29
A. T. Fomenko	
Topological billiards and integrable Hamiltonian systems	30
H. Gacki, R. Brodnicka	
Asymptotic stability of an evolutionary nonlinear Boltzmann-type equation	31
V. Gasimov	
Hochschild’s method for describing the Mackenzie obstruction to the construc-	
tion of a transitive Lie algebroid	32
R. Gaydukov	
Derivation of the Benjamin–Ono equation at construction of the triple-deck	
structure in problems of a fluid flow along a plate with small irregularities on	
the surface	33
Yu. E. Gliklikh	
On existence of time-global solutions for parabolic equations	34
A. Gorokhovskiy, H. Moscovici	
Pairings for pseudodifferential symbols	35
B. Gramsch	
Complex homotopy principle of Grauert and Gromov for algebras of pseudod-	
ifferential operators	36
D. Grieser, R. B. Melrose	
Eigenvalues for adiabatic problems in the presence of conical singularities .	36
S. M. Gusein-Zade	
Universal Euler characteristic of orbifolds	36
A. Ya. Helemskii	
Multi-normed spaces based on non-discrete measures, and their tensor prod-	
ucts	37
Yu. Ilyashenko	
Global bifurcations on the two sphere	38
V. Ivrii	
Complete semiclassical spectral asymptotics for periodic and almost periodic	
perturbations of constant operators	38
V. S. Kalnitsky	
Phase flow over 0-singularity	39
M. I. Katsnelson	
Engineering of quantum Hamiltonians by high-frequency laser fields	40
A. P. Kiselev	
Simple localized solutions of the wave equation	41

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Phase flow over 0-singularity

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The problem under discussion arose when the author offered the construction of one-dimensional double pendulum with special type of constraint [1]. The configuration space of this pendulum consists of two smooth lines in tangency. This situation means a geometrical uncertainty for trajectories of the motion equation. The series of experiments showed that there is no dynamical uncertainty [2]. Trajectories of motion always cross each other. However, absolutely unexpected was the fact that the lines has non zero curvature at the tangency point and the real trajectories on the state-space are not C^2 -smooth. So the adequate mathematical model is needed to explain this phenomenon.

We offer the geometrical model of special embedding of vector bundle over singular manifold in \mathbb{R}^3 . Consider the equation in \mathbb{R}^3

$$y^2 - \left(zx + \text{sign}(x)x^2 e^{z \ln|x|} \right)^2 = 0.$$

1. For any section $x = \text{const}$ its components of connectedness are homeomorphic to \mathbb{R} . Hence, this manifold has natural structure of one-dimensional vector bundle.
2. All sections $z = \text{const} \neq 0$ are two transversal lines.
3. The section $z = 0$ is the base of bundle and is the lines in tangency of 1-order.

So, even a trajectory is smooth its projection on the base is not C^2 -smooth. Now we can apply to this geometrical model different approaches to build the differential calculus over the base for modeling the above mechanical system.

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И ПРИЛОЖЕНИЯМ,
ПОСВЯЩЁННАЯ ПАМЯТИ
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