

**International scientific conference**

# **“Algebraic and Geometric Methods of Analysis”**

**Book of abstracts**



**May 28 - June 3, 2019**

**Odesa, Ukraine**

Conference webpage: [imath.kiev.ua/~topology/conf/agma2019/](http://imath.kiev.ua/~topology/conf/agma2019/)

## LIST OF TOPICS

- Algebraic methods in geometry
- Differential geometry in the large
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Dynamical systems and their applications
- Geometric problems in mathematical analysis
- Geometric and topological methods in natural sciences
- History and methodology of teaching in mathematics

## ORGANIZERS

- The Ministry of Education and Science of Ukraine
- Odesa National Academy of Food Technologies
- The Institute of Mathematics of the National Academy of Sciences of Ukraine
- Odessa I. I. Mechnikov National University
- Taras Shevchenko National University of Kyiv
- The International Geometry Center

## PROGRAM COMMITTEE

<b>Chairman: Prishlyak A.</b> (Kyiv, Ukraine)	<b>Konovenko N.</b> (Odesa, Ukraine)	<b>Pokas S.</b> (Odesa, Ukraine)
<b>Balan V.</b> (Bucharest, Romania)	<b>Lyubashenko V.</b> (Kyiv, Ukraine)	<b>Polulyakh E.</b> (Kyiv, Ukraine)
<b>Banakh T.</b> (Lviv, Ukraine)	<b>Maksymenko S.</b> (Kyiv, Ukraine)	<b>Sabitov I.</b> (Moscow, Russia)
<b>Fedchenko Yu.</b> (Odesa, Ukraine)	<b>Matsumoto K.</b> (Yamagata, Japan)	<b>Savchenko A.</b> (Kherson, Ukraine)
<b>Fomenko A.</b> (Moscow, Russia)	<b>Mikesh J.</b> (Olomouc, Czech Republic)	<b>Sergeeva A.</b> (Odesa, Ukraine)
<b>Fomenko V.</b> (Taganrog, Russia)	<b>Mormul P.</b> (Warsaw, Poland)	<b>Shvets V.</b> (Odesa, Ukraine)
<b>Haddad M.</b> (Wadi al-Nasara, Syria)	<b>Moskaliuk S.</b> (Wien, Austria)	<b>Shelekhov A.</b> (Tver, Russia)
<b>Karlova O.</b> (Chernivtsi, Ukraine)	<b>Mykhailyuk V.</b> (Chernivtsi, Ukraine)	<b>Vlasenko I.</b> (Kyiv, Ukraine)
<b>Kiosak V.</b> (Odessa, Ukraine)	<b>Nykyforchyn O.</b> (Ivano-Frankivsk, Ukraine)	<b>Volkov V.</b> (Odessa, Ukraine)
<b>Kirillov V.</b> (Odesa, Ukraine)	<b>Plachta L.</b> (Krakov, Poland)	<b>Zadorozhnyj V.</b> (Odesa, Ukraine)
		<b>Zarichnyi M.</b> (Lviv, Ukraine)

## ADMINISTRATIVE COMMITTEE

- Egorov B., chairman, rector of the ONAFT;
- Povarova N., deputy chairman, Pro-rector for scientific work of the ONAFT;
- Mardar M., Pro-rector for scientific-pedagogical work and international communications of the ONAFT;
- Fedosov S., Director of the International Cooperation Center of the ONAFT;
- Svytyy I., Dean of the Faculty of Computer Systems and Automation.

## ORGANIZING COMMITTEE

Kirillov V.  
Konovenko N.  
Fedchenko Yu.

Prus A.  
Osadchuk E.

Maksymenko S.  
Khudenko N.  
Cherevko E.

ІНСТИТУТ  
ОПРАЦІ

## Continual approximate solution with acceleration and condensation mode

Olena Sazonova

(V.N. Karazin Kharkiv National University, Ukraine)

*E-mail:* olena.s.sazonova@karazin.ua

The kinetic equation Boltzmann is the main instrument to study the complicated phenomena in the multiple-particle systems, in particular, rarefied gas. This kinetic integro-differential equation for the model of hard spheres has a form [1, 2]:

$$D(f) = Q(f, f), \quad (1)$$

$$D(f) = \frac{\partial f}{\partial t} + v \frac{\partial f}{\partial x}, \quad (2)$$

$$Q(f, f) = \frac{d^2}{2} \int_{\mathbb{R}^3} dv_1 \int_{\Sigma} d\alpha |(v - v_1, \alpha)| [f(t, v'_1, x) f(t, v', x) - f(t, v_1, x) f(t, v, x)], \quad (3)$$

We will consider the continual distribution [3]:

$$f = \int_{\mathbb{R}^3} \varphi(t, x, u) M(v, u, x, t) du, \quad (4)$$

which contains the local Maxwellian of special form describing the acceleration and condensation flows of a gas (is an analogue of vortices) [4]. They have the form:

$$M(v, u, x, t) = \rho_0 e^{\beta((u - [\omega \times t])^2 + 2[\omega \times x])} \left(\frac{\beta}{\pi}\right)^{\frac{3}{2}} e^{-\beta(v - u - [\omega \times t])^2}. \quad (5)$$

The purpose is to find such a form of the function  $\varphi(t, x, u)$  and such a behavior of all hydrodynamical parameters so that the uniform-integral remainder [3, 4]

$$\Delta = \sup_{(t, x) \in \mathbb{R}^4} \int_{\mathbb{R}^3} |D(f) - Q(f, f)| dv, \quad (6)$$

or its modification "with a weight":

$$\tilde{\Delta} = \sup_{(t, x) \in \mathbb{R}^4} \frac{1}{1 + |t|} \int_{\mathbb{R}^3} |D(f) - Q(f, f)| dv, \quad (7)$$

tends to zero.

Also some sufficient conditions to minimization of remainder  $\Delta$  or  $\tilde{\Delta}$  are found. The obtained results are new and may be used with the study of evolution of screw and whirlwind streams.

### REFERENCES

- [1] C. Cercignani. *The Boltzman Equation and its Applications*. New York: Springer, 1988.
- [2] M.N. Kogan. *The dynamics of a Rarefied Gas*. Moscow: Nauka, 1967.
- [3] V.D. Gordevskyy, E.S. Sazonova. Continuum analogue of bimodal distributions. *Theor. Math. Phys.*, 171(3) : 839–847, 2012.
- [4] V.D. Gordevskyy. Vortices in a Gas of Hard Spheres. *Theor. Math. Phys.*, 135(2) : 704–713, 2003.

<b>Mokritskaya T. P., Tushev A. V.</b> <i>On some fractal-based estimations of subsidence volume for various types of soils</i>	<b>39</b>
<b>Mukhamadiev F. G.</b> <i>The Shanin number and the predshanin number of <math>N_{\tau}^{\varphi}</math>-kernel of a topological spaces</i>	<b>41</b>
<b>Najmiddinov J. Sh.</b> <i>The effectiveness of the use of computer programs in the teaching of mathematics in academic lyceums</i>	<b>42</b>
<b>Obikhod T.</b> <i>Gromov-Witten invariants and identification of the energy levels of solitonic states</i>	<b>43</b>
<b>Ostrovska O., Yakymiv R.</b> <i>On isometries satisfying deformed commutation relations</i>	<b>45</b>
<b>Prishlyak A., Prus A.</b> <i>Three-color graph of the Morse flow on a compact surface with boundary</i>	<b>46</b>
<b>Pulemotov A.</b> <i>The Ricci Iteration on Homogeneous Spheres</i>	<b>48</b>
<b>Rmuš V.</b> <i>The construction of squaring the circle</i>	<b>49</b>
<b>Samokhvalov S.</b> <i>Riemann-Klein antagonism and problem of energy in general relativity</i>	<b>51</b>
<b>Savchenko A.</b> <i>On generalized spaces of persistence diagrams</i>	<b>52</b>
<b>Sazonova O.</b> <i>Continual approximate solution with acceleration and condensation mode</i>	<b>53</b>
<b>Serdyuk A. S., Sokolenko I. V.</b> <i>Approximation by Fourier sums and interpolation trigonometric polynomials in classes of differentiable functions with high exponents of smoothness</i>	<b>54</b>
<b>Serdyuk A., Stepanyuk T.</b> <i>Lebesgue-type inequalities for the Fourier sums</i>	<b>57</b>
<b>Skuratovskii R.</b> <i>Minimal generating set and structure of wreath product of cyclic groups, comutator of wreath product and the fundamental group of orbit Morse function <math>\pi_1 O(f)</math></i>	<b>59</b>
<b>Vasilchenko A.</b> <i>Spaces of primitive elements in dual modules over Steenrod algebra 2</i>	<b>61</b>
<b>Morrison P. J.</b> <i>A Geometrical Version of the Maxwell-Vlasov Hamiltonian Structure</i>	<b>63</b>
<b>Wojtowicz M.</b> <i>Note on congruent numbers</i>	<b>64</b>
<b>Кадубовський О. А.</b> <i>Про число топологічно нееквівалентних гладких функцій з однією критичною точкою типу сідла на двовимірному торі</i>	<b>65</b>
<b>Ладиненко Л. П.</b> <i>Щодо геометричної характеристики спеціальних майже геодезичних перетворень просторів афінного зв'язку зі скрутом</i>	<b>67</b>
<b>Овчаренко О. О.</b> <i>Життєвий та науковий шлях Марка Григоровича Крейна</i>	<b>68</b>
<b>Подоусова Т. Ю., Вашпанова Н. В.</b> <i>LGT-лінії та A-деформації мінімальних поверхонь</i>	<b>69</b>
<b>Прокіп В. М.</b> <i>Алгоритм побудови унітального дільника для многочленної матриці</i>	<b>70</b>
<b>Синюкова О.</b> <i>Про геодезичні відображення просторів дотичних розшарувань зі спеціальною метрикою</i>	<b>72</b>
<b>Щеглов М. В.</b> <i>Поточкова оцінка відхилення полінома Крякіна від неперервної на відрізьку функції</i>	<b>73</b>