



International  
Scientific Conference

# Algebraic and Geometric Methods of Analysis

26-30 may 2020  
Odesa, Ukraine

## 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

## ORGANIZERS

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

## PROGRAM COMMITTEE

<b>Chairman: Prishlyak A.</b> ( <i>Kyiv, Ukraine</i> )	<b>Kiosak V.</b> ( <i>Odesa, Ukraine</i> )	<b>Pokas S.</b> ( <i>Odesa, Ukraine</i> )
<b>Balan V.</b> ( <i>Bucharest, Romania</i> )	<b>Kirillov V.</b> ( <i>Odesa, Ukraine</i> )	<b>Polulyakh E.</b> ( <i>Kyiv, Ukraine</i> )
<b>Banakh T.</b> ( <i>Lviv, Ukraine</i> )	<b>Konovenko N.</b> ( <i>Odesa, Ukraine</i> )	<b>Sabitov I.</b> ( <i>Moscow, Russia</i> )
<b>Bolotov D.</b> ( <i>Kharkiv, Ukraine</i> )	<b>Lyubashenko V.</b> ( <i>Kyiv, Ukraine</i> )	<b>Savchenko A.</b> ( <i>Kherson, Ukraine</i> )
<b>Borysenko O.</b> ( <i>Kharkiv, Ukraine</i> )	<b>Maksymenko S.</b> ( <i>Kyiv, Ukraine</i> )	<b>Sergeeva A.</b> ( <i>Odesa, Ukraine</i> )
<b>Cherevko Ye.</b> ( <i>Odesa, Ukraine</i> )	<b>Matsumoto K.</b> ( <i>Yamagata, Japan</i> )	<b>Shelekhov A.</b> ( <i>Tver, Russia</i> )
<b>Fedchenko Yu.</b> ( <i>Odesa, Ukraine</i> )	<b>Mormul P.</b> ( <i>Warsaw, Poland</i> )	<b>Volkov V.</b> ( <i>Odesa, Ukraine</i> )
<b>Karlova O.</b> ( <i>Chernivtsi, Ukraine</i> )	<b>Mykhailyuik V.</b> ( <i>Chernivtsi, Ukraine</i> )	<b>Zarichnyi M.</b> ( <i>Lviv, Ukraine</i> )
	<b>Plachta L.</b> ( <i>Krakov, Poland</i> )	

## 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;
- Kotlik S., Director of the P.M. Platonov Educational-scientific institute of computer systems and technologies "Industry 4.0";
- Svytyy I., Dean of the Faculty of Computer Systems and Automation.

## ORGANIZING COMMITTEE

Kirillov V.  
Konovenko N.  
Fedchenko Yu.

Maksymenko S.  
Cherevko Ye.

Osadchuk E.  
Prus A.

ІНТЕРНАЦІОНАЛЬНИЙ ЦЕНТР СПІВРОБОТИ

# The density and the $\tau$ -placed of the $N_\tau^\varphi$ -nucleus of a space $X$

F. G. Mukhamadiev

(National University of Uzbekistan, Uzbekistan)

E-mail: farhod8717@mail.ru

Let  $X$  be a topological space and let  $\xi$  be a system of closed subsets of  $X$ . The system  $\xi$  is called *linked*, if any two elements of it have nonempty intersection. A linked system  $\xi$  of closed subsets of  $X$  is called *complete*, if for any closed set  $F \subset X$ , the condition

" any neighborhood  $OF$  contains the set  $\Phi \in \xi$  " ( $\star$ )

implies that  $F \in \xi$  [1]. The set of all complete linked systems (CLS) in the space  $X$  is denoted by  $NX$ .

Let  $U_1, \dots, U_k, V_1, \dots, V_n$  be a set of nonempty open subsets of  $X$ . Set  $O(U_1, \dots, U_k) \langle V_1, \dots, V_n \rangle = \{ \xi \in NX : \text{for any } i = 1, \dots, k \text{ there exists } F_i \in \xi \text{ such that } F_i \subset U_i, \text{ and for any } j = 1, \dots, n \text{ and any } \Phi \in \xi, \text{ the intersection } \Phi \cap V_j \text{ is nonempty} \}$ . It is easily seen that the set of subsets of  $NX$  of the form  $O(U_1, \dots, U_k) \langle V_1, \dots, V_n \rangle$  is an open basis of some topology on  $NX$ .

**Definition 1.** Let  $X$  be a  $T_1$ -space,  $\varphi$  be a cardinal-valued function, and  $\tau$  be a cardinal number. The  $N_\tau^\varphi$ -nucleus of a space  $X$  is the space

$$N_\tau^\varphi X = \{ \xi \in NX : \text{there exists } F \in \xi \text{ such that } \varphi(F) \leq \tau \} [2].$$

**Definition 2.** A topological space  $X$  is said to be  $N_\tau^\varphi$ -nuclear if  $N_\tau^\varphi X = NX$ .

As  $\varphi$ , we take a density function  $d$ . Let  $\tau = \aleph_0$ .

The definition implies that any space  $X$  is  $N_\tau^d$ -nuclear, where  $\tau = d(X)$ ; in particular, any separable space  $X$  is  $N_{\aleph_0}^d$ -nuclear.

**Theorem 3.** Let  $X$  be an infinite  $T_1$ -space. Then

- 1)  $\pi w(N_{\aleph_0}^d X) = \pi w(X)$ ;
- 2)  $d(N_{\aleph_0}^d X) = d(X)$  (taken from [2]).

A set  $A \subset X$  is called  $\tau$ -placed in  $X$  if for each point  $x \in X \setminus A$  there is a set  $P$  of type  $G_\tau$  in  $X$  such that  $x \in P \subset X \setminus A$  [3].

Put  $q(X) = \min\{ \tau \geq \aleph_0 : X \text{ is } \tau\text{-placed in } \beta X \}$ ;  $q(X)$  is called the *Hewitt-Nachbin number* of  $X$ . We say that  $X$  is a  $Q_\tau$ -space if  $q(X) \leq \tau$ .

A space  $X$  is called an  $m_\tau$ -space, where  $\tau$  is given cardinal, if for each canonical closed set  $F$  in  $X$  and each point  $x \in F$  there is set  $P$  of type  $G_\tau$  in  $X$  such that  $x \in P \subset F$ .

Clearly,  $X$  is an  $m_\tau$ -space for  $\tau = |X|$ . This allows us to give the following definition: put  $m(X) = \min\{ \tau \geq \aleph_0 : X \text{ is an } m_\tau\text{-space} \}$ . The space  $X$  is called a *Moscow space* if  $m(X) \leq \aleph_0$ .

**Theorem 4.** Let  $q(N_{\aleph_0}^d X) \leq \tau$  and  $m(NX) \leq \tau$ , then  $N_{\aleph_0}^d X$  is  $\tau$ -placed in  $NX$ .

**Theorem 5.** Let  $m(NX) \leq \tau = d(X)$ , then an  $N_{\aleph_0}^d$ -nucleus  $N_{\aleph_0}^d X$  is  $\tau$ -placed in  $NX$ .

**Theorem 6.** Let  $NX$  is a Moscow space and  $X$  is a separable, then  $N_{\aleph_0}^d X$  is  $\tau$ -placed in  $NX$ .

## REFERENCES

- [1] A.V.Ivanov. A space of complete linked systems. // *Siberian Mathematical Journal*, 27 : 863–875, 1986.
- [2] F.G.Mukhamadiev. On Certain Cardinal Properties of the  $N_\tau^\varphi$ -Nucleus of a Space  $X$ . // *Journal of Mathematical Sciences*. 245 : 411–415, 2020.
- [3] A.V.Arkhangel'skii. *Topological Function Spaces*, volume 78 of *Mathematics and Its Applications*. Dordrecht / Boston / London : Kluwer Academic Publisher, 1992.

<b>I. Kuznietsova, S. Maksymenko</b> <i>On the squares of diffeomorphisms of surfaces</i>	<b>40</b>
<b>K. Matsumoto</b> <i>A recurrent (CHR)-curvature tensor field in a trans-Sasakian manifold</i>	<b>41</b>
<b>N. Mazurenko, M. Zarichnyi</b> <i>Spaces of probability measures and box dimension</i>	<b>43</b>
<b>L. Michalak</b> <i>Framed cobordism of systems of submanifolds in the classification of free quotients</i>	<b>44</b>
<b>F. G. Mukhamadiev</b> <i>The density and the <math>\tau</math>-placed of the <math>N_\tau^\varphi</math>-nucleus of a space <math>X</math></i>	<b>45</b>
<b>I. V. Mykytyuk</b> <i>Ricci-flat Kähler metrics on tangent bundles of rank-one symmetric spaces of compact type</i>	<b>47</b>
<b>A. Y. Narmanov, A. N. Zoyidov</b> <i>On the group of isometries of foliated manifolds</i>	<b>49</b>
<b>I. Petkov, V. Ryazanov</b> <i>On boundary behavior by prime ends of solutions to Beltrami equations</i>	<b>50</b>
<b>L. Plachta</b> <i>Some topological obstructions for strong coloring of uniform hypergraphs</i>	<b>51</b>
<b>S. Maksymenko, E. Polulyakh</b> <i>On quotient spaces and their spaces of continuous maps</i>	<b>53</b>
<b>A. Prishlyak, A. Prus</b> <i>Topology of flows with collective dynamics on surfaces</i>	<b>54</b>
<b>V.M. Prokip</b> <i>On similarity of two families of matrices over a field</i>	<b>56</b>
<b>A. M. Romaniv, N. S. Dzhaliuk</b> <i>Some connections between invariant factors of matrix and its submatrix</i>	<b>57</b>
<b>Y. Sachkov</b> <i>Conjugate time in sub-Riemannian problem on Cartan group</i>	<b>58</b>
<b>A. Sadullaev, F. Mukhamadiev</b> <i>The density and the local density of the space of permutation degree</i>	<b>59</b>
<b>U. Samanta</b> <i>A short note on Hurewicz and <math>\mathcal{L}</math>-Hurewicz properties in topological spaces</i>	<b>60</b>
<b>O. Sazonova</b> <i>About one class of Continual distributions with screw modes</i>	<b>62</b>
<b>A. Serdyuk, T. Stepanyuk</b> <i>Asymptotically best possible Lebesgue inequalities on the classes of generalized Poisson integrals</i>	<b>64</b>
<b>A. Ya. Narmanov, X. F. Sharipov</b> <i>Differential invariants of transformations group</i>	<b>66</b>
<b>S. Som, A. Bera, L. K. Dey</b> <i>Some remarks on the Metrizable of <math>F</math>-metric spaces</i>	<b>67</b>
<b>V. Starodub, R. Skuratovskii</b> <i>Triangle Cubics and Conics</i>	<b>69</b>
<b>T. P. Mokritskaya, A. V. Tushev</b> <i>On some fractal-based estimations of subsidence volume for various types of soils</i>	<b>71</b>
<b>Jun Ueki</b> <i>Non-acyclic <math>SL_2</math>-representations of twist knots and non-trivial <math>L</math>-invariants</i>	<b>73</b>