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of analysis»

Book of abstracts



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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

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НТБ ОНАФТ

Some cardinal and topological properties of N_τ^φ -kernel of a topological space X and superextensions

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A system $\xi = \{F_\alpha : \alpha \in A\}$ of closed subsets of a space X is called *linked* if any two elements from ξ intersect. Any linked system can be complemented to a maximal linked system (MLS), but this complement is, as a rule, not unique [1].

Proposition 1. [1]. *A linked system ξ of a space X is a MLS iff it possesses the following completeness property: if a closed set $A \subset X$ intersects with any element from ξ , then $A \in \xi$.*

Denote by λX the set of all MLS of the space X . For an open set $U \subset X$, set

$$O(U) = \{\xi \in \lambda X : \text{there is an } F \in \xi \text{ such that } F \subset U\}.$$

The family of subsets in the form of $O(U)$ covers the set λX ($O(X) = \lambda X$), that's why it forms an open subbase of the topology on λX . The set λX equipped with this topology is called *the superextension* of X .

A.V. Ivanov defined the space NX of complete linked systems (CLS) of a space X in a following way:

Definition 2. A linked system M of closed subsets of a compact X is called *a complete linked system* (a CLS) if for any closed set of X , the condition

- any neighborhood OF of the set F consists of a set $\Phi \in M$

implies $F \in M$, [2].

A set NX of all complete linked systems of a compact X is called *the space NX of CLS of X* . This space is equipped with the topology, the open basis of which is formed by sets in the form of

$$\begin{aligned} E &= O(U_1, U_2, \dots, U_n) \langle V_1, V_2, \dots, V_s \rangle \\ &= \{M \in NX : \text{for any } i = 1, 2, \dots, n \text{ there exists } F_i \in M \text{ such that } F_i \subset U_i, \\ &\quad \text{and for any } j = 1, 2, \dots, s, F \cap V_j \neq \emptyset \text{ for any } F \in M\}, \end{aligned}$$

where $U_1, U_2, \dots, U_n, V_1, V_2, \dots, V_s$ are nonempty open in X sets [2].

Definition 3. Let X be a compact space, φ be a cardinal function and τ be an arbitrary cardinal number. We call an N_τ^φ -kernel of a topological space X the space

$$N_\tau^\varphi X = \{M \in NX : \exists F \in M : \varphi(F) \leq \tau\}.$$

Theorem 4. *Let X be a normal topological space and $h\varphi(X) \leq \tau$. Then the following assertions are equivalent:*

- 1) $t(\lambda(\lambda X)) \leq \aleph_0$;
- 2) $t(\lambda(X \times X)) \leq \aleph_0$;
- 3) X is metrizable;
- 4) λX is metrizable;
- 5) $N_\tau^\varphi X$ is metrizable.

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