

International
Online Conference



**Algebraic
and Geometric
Methods of Analysis**

dedicate to the memory
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LIST OF TOPICS

- Topological methods in analysis
- Geometric problems of complex and mathematical analysis
- Algebraic methods in geometry
- Differential geometry in the whole
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Geometric and topological methods in natural sciences

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On the τ -placedness of space of the permutation degree

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We shall say that a set P is of the type G_τ in X if there exists a family

$\gamma = \{U_\alpha : \alpha \in A, |A| \leq \tau\}$ of open sets in X such that $\bigcap_{\alpha \in A} U_\alpha = P$ (taken from [1]).

A subset $A \subset X$ is said to be τ -placed in X , if for each $x \in X \setminus A$ there exists a set $P \subset X$ of type G_τ in X such that $x \in P \subset X \setminus A$ (taken from [1]).

A permutation group X is the group of all permutations (i.s. one-one and onto mappings $X \rightarrow X$). A permutation group of a set X is usually denoted by $S(X)$. If $X = \{1, 2, \dots, n\}$, then $S(X)$ is denoted by S_n , as well.

Let X^n be the n -th power of a compact X . The permutation group S_n of all permutations, acts on the n -th power X^n as permutation of coordinates. The set of all orbits of this action with quotient topology we denote by $SP^n X$. Thus, points of the space $SP^n X$ are finite subsets (equivalence classes) of the product X^n . Thus two points $(x_1, x_2, \dots, x_n), (y_1, y_2, \dots, y_n) \in X^n$ are considered to be equivalent if there is a permutation $\sigma \in S_n$ such that $y_i = x_{(\sigma(i))}$ for all $i = 1, 2, \dots, n$. The space $SP^n X$ is called n -permutation degree of a space X . Equivalent relation by which we obtained space $SP^n X$ is called the symmetric equivalence relation. The n -th permutation degree is always a quotient of X^n . Thus, the quotient map is denoted by as following: $\pi_n^s : X^n \rightarrow SP^n X$. Where for every $x = (x_1, x_2, \dots, x_n) \in X^n$, $\pi_n^s((x_1, x_2, \dots, x_n)) = [(x_1, x_2, \dots, x_n)]$ is an orbit of the point $x = (x_1, x_2, \dots, x_n) \in X^n$.

The concept of a permutation degree has generalizations. Let G be any subgroup of the group S_n . Then it also acts on X^n as group of permutations of coordinates. Consequently, it generates a G -symmetric equivalence relation on X^n . This quotient space of the product of X^n under the G -symmetric equivalence relation is called G -permutation degree of the space X and it is denoted by $SP_G^n X$. An operation SP_G^n is also the covariant functor in the category of compacts and it is said to be a functor of G -permutation degree. If $G = S_n$, then $SP_G^n = SP^n$. If the group G consists only of unique element, then $SP_G^n X = X^n$ (taken from [2]).

Theorem 1. *If the set $SP^n A$ is τ -placed in $SP^n X$, then the set $(\pi_n^s)^{-1}(SP^n A)$ is also τ -placed in X^n .*

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