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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
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НТБ ОНАФТ

About some properties of functions determined as transformations from W^n to W^m -representation

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In this short article we describe the main properties of W^n -representation of points of unit hypercube. Our main goal is to show main properties of functions determined as transformations from W^n -representation of unit square to W^m -representation of points from unit interval [1].

1. Algorithm for construction of W^n -representation

At the beginning we have the unit n -dimensional hypercube $I^n = [0, 1]^n$. W^n -representation of I^n can be received using next steps.

1) Let us divide the I^n into r parts which are closed in R^n and their interiors don't intersect. Lebesgue measures of new sets $\Delta_0, \Delta_1, \dots, \Delta_{r-1}$ are q_0, q_1, \dots, q_{r-1} respectively.

2) Each set Δ_i is divided analogically into parts $\Delta_{i0}, \dots, \Delta_{i[r-1]}$. The proportion of particles' Lebesgue measures remains invariant. After the second stage process continues and each set $\Delta_{\alpha_1 \dots \alpha_k}$ is divided using the same rule.

If $k \rightarrow \infty$ then the Lebesgue measure of $\Delta_{\alpha_1 \dots \alpha_k}$ must converge to zero.

2. Functions of transformation

Let us to define function of transformation W^n to W^m -representation.

Definition 1. Function of transformation from W^n to W^m -representation is a functional mapping which gives for each $x = \Delta_{\alpha_1 \dots \alpha_k}^{W^n}$ a unique $y = \Delta_{y(\alpha_1) \dots y(\alpha_k)}^{W^m}$.

Remark 2. For uniqueness of such mapping we will consider to choose only the representation of $x \in E^n$ in which vector $(\alpha_1, \dots, \alpha_k, \dots)$ is minimal.

Definition 3. Function of transformation from W^n - to Q -representation is a functional mapping which gives for each $x = \Delta_{\alpha_1 \dots \alpha_k}^{W^n}$ a unique $y = \Delta_{y(\alpha_1) \dots y(\alpha_k)}^Q$.

We received new results for the graphs of functions of transformation from W^n - to Q -representation.

Definition 4. Simple n -cube W^n -representation of I^n is W^n -representation which consists only of n -cubes with equal Lebesgue n -dimensional measure on each step (we enumerate particles from left higher corner and preserve orientation of numeration on next steps).

Theorem 5. *The graph of function of transformation from simple n -cube W^n -representation to s -adic number representation [2] is a fractal set with dimension $\log(4)/\log(4^n) = 1/n$*

Theorem 6. *The graph of function of transformation from simple quadrate W^n -representation to s -adic number representation is nowhere connected set.*

Definition 7. Connected n -cube W^n -representations of I^n is a class of W^n -representations such that:

1) W^n -representation consists only of figures with equal Lebesgue n -dimensional measure on each step (we enumerate particles from left higher corner and preserve orientation of numeration on next steps).

2) At least one point of I^n has continuum quantity of W^n -representations in this system.

Theorem 8. *The graph of function of transformation from connected n -cube W^n -representation to s -adic number representation is nowhere connected set.*

Our next goal is to receive new information about properties of functions of transformation from W^n - to W^m -representation and to formulate general theorems for their classification.

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