



International
Scientific Conference



Algebraic and Geometric Methods of Analysis



Devoted to 160 anniversary of
Dvytro Grave
(25.08.1863 - 19.12.1939)
Academician of the Ukrainian
Academy of Sciences, the
first director of the Institute of
Mathematics of NAS of Ukraine

May 29 – June 1, 2023
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 and topological methods in natural sciences
- Geometric problems in mathematical analysis

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On K -ultrametrics and $*$ -measures

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The notion of K -ultrametric is introduced in [1]. A metric d on a set X is called a K -ultrametric, where $K \in [0, \infty]$, if $d(x, y) \leq K$, whenever $\min\{d(x, z), d(y, z)\} \leq K$.

Any 0-ultrametric is a metric, and any ∞ -ultrametric is an ultrametric.

Some recent results are devoted to the K -ultrametrization of various functorial constructions on the category of K -ultrametric spaces: hyperspaces, spaces of probability measures, spaces of idempotent measurers [1, 2].

The aim of the talk is provide a construction of K -ultrametrization of the spaces of $*$ -measures. Recall that a t -norm is a binary operation $*$ on $[0, 1]$ which is associative, commutative, continuous, monotone, and 1 is a unit for it.

A functional $\mu : C(X, [0, 1]) \rightarrow [0, 1]$ is called an $*$ -measure if

- 1) μ preserves constants;
- 2) $\mu(\max\{\varphi, \psi\}) = \max\{\mu(\varphi), \mu(\psi)\}$;
- 3) $\mu(\lambda * \varphi) = \lambda * \mu(\varphi)$.

It is proved that the mentioned construction determines a functor on the category of K -ultrametric spaces and K -nonexpanding maps.

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- [1] Oleksandr Savchenko. A remark on stationary fuzzy metric spaces. *Carpatian Mathematical Publications*, 3(1) : 124–129, 2011.
- [2] Oleksandr Savchenko. K -ultrametric spaces. *Proceedings of the International Geometry Center*, 1(1) : 42–49, 2011.
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The Iwasawa invariants of \mathbb{Z}_p^d -covers of links

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In this talk, we will define the Iwasawa invariants of links and give two asymptotic formulae for the first homology groups of \mathbb{Z}_p^d -covers of links in rational homology 3-spheres, which are generalizations of the Iwasawa type formulae proven by Hillman–Matei–Morishita and Kadokami–Mizusawa. We will also provide examples of these formulae. Moreover, when $d = 2$, considering the twisted Whitehead links, we will explain that Iwasawa μ -invariants can be arbitrary non-negative integers. This is a joint work with Jun Ueki.

REFERENCES

- [1] Sohei Tateno and Jun Ueki, *The Iwasawa invariants of \mathbb{Z}_p^d -covers of links*, in preparation.

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