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Geometry of Gromov-Hausdorff classes

Gromov-Hausdorff distance (GH-distance) measures the difference between any pair of non-empty metric spaces. It is non-negative, symmetric, vanishing for pairs of isometric spaces, and it satisfies the triangle inequality. The GH-distance generates the corresponding convergence of metric space sequences. Traditionally, the interest to GH-distance itself is restricted to the set of isometry classes of non-empty compact metric spaces. For non-compact case, including Polish spaces and even boundedly compact (proper) ones, a modification of this type convergence (so-called pointed GH-convergence) is mainly considered. Notice that only a few years before it appeared a paper where the pointed GH-convergence for boundedly compact spaces was described in terms of some metric constructed on the set of such spaces.

In the present talk, we deal with the traditional GH-distance on the class GH of all metric spaces considered up to isometry. Note that the collection of isometric classes of all metric spaces is not a set (see Cantor paradox). We use Von Neumann–Bernays–Gödel set theory to construct the corresponding geometry on the class GH. In addition, we prove that the GH-distance on GH is an intrinsic pseudo-metric in the following sense: for points on a finite distance, this distance equals the infimum of the lengths of all curves joining these points.

Further, we discuss a few results devoted to metric segments in the class GH and its subclass consisting of all bounded metric spaces. The metric segment is the class of all metric spaces between a pair of given ones. We present a few results concerning possibility to extend such segments over their ends.

In the last part, we give a short review on classical and modern results devoted to GH-distance of compact metric spaces.

The presentation was prepared in English, however, the talk will be in Russian.

SCIENTIFIC SEMINAR
"DIFFERENTIAL GEOMETRY AND APPLICATIONS"

headed by Academician of RAS Anatoly T. Fomenko

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