AROUND THE CONTINUITY OF THE OPERATOR OF "CENTER OF DISTANCES"

ARTUR BARTOSZEWICZ, GRAŻYNA HORBACZEWSKA, MAŁGORZATA FILIPCZAK, SEBASTIAN LINDNER, FRANCISZEK PRUS-WIŚNIOWSKI

The notion of a center of distances is an interesting invariant of a metric space. For a given metric space X with a distance ρ *the center of distances* is defined by W. Bielas, S. Plewik and M. Walczyńska as follows:

$$S(X) := \{\alpha : \forall_{x \in X} \ \exists_{y \in X} \ \rho(x,y) = \alpha\}.$$

We consider this operator defined on the family $K([0,1])$ of all nonempty compact subsets of the interval $[0,1]$ equipped with the Hausdorff metric H. We show that $S : (K([0,1]), H) \to (K([0,1]), H)$ is not continuous nor open, has a dense set of continuity points and has a dense set of discontinuity points. We characterize the set of continuity points of S, and prove that S is upper semicontinuous at any $A \in K([0,1])$, so it is of the first Borel class.

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Faculty of Mathematics and Computer Sciences, University of Lodz, ul. Stefana Banacha 22, 90-238 Łódź, Poland

E-mail address: grazyna.horbaczewska@wmii.uni.lodz.pl