

1014-46-490

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Simultaneous Lipschitz Extensions (Part II).

Definition. A metric space M_0 is universal with respect to simultaneous Lipschitz extensions if the following is true. A quasi-isometric image of a subspace of M_0 in an arbitrary metric space M admits a simultaneous Lipschitz extension (see Part I).

According to a result of Lee and Naor, any doubling metric space is universal. It is essential to note that subspaces of doubling metric spaces are also doubling. Our result below present a class of unviersal metric spaces without this hereditary property.

Theorem. A finite direct sum of Gromov hyperbolic metric spaces of bounded geometry and finite-dimensional Banach spaces is universal.

This result remains true for Banach-valued Lipschitz functions.

Example. $\bigoplus_{i=1}^N H^{n_i}$ is universal; here H^n is the Beltrami-Lobachevski space.

The results are obtained in collaboration with A. Brudnyi. (Received September 18, 2005)