Lipschitz-free Banach spaces and applications - a survey

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Abstract

A Lipschitz-free Banach space is a Banach space $F(X)$ attached to a metric space X. If X, Y are metric spaces, then to every Lipschitz function f from X to Y corresponds a unique linear continuous operator $L(f)$ from $F(X)$ to $F(Y)$ having the norm equal to the Lipschitz norm of the mapping f. There are several concrete constructions of this space: Arens-Eels, Pestov, etc.

Based on this correspondence a lot of results from linear operator theory can be extended to the Lipschitz setting. I shall insist on the Lipschitz analogs of compact and weakly compact operators - Schauder and Gantmacher type results.