Zabrejko's lemma and the fundamental principles of functional analysis in the asymmetric case

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Abstract

A lemma proved by P. P. Zabrejko in 1969 asserts that a countably subadditive and positively homogeneous functional on a Banach space is bounded. This lemma allows to give simple proofs to fundamental principles of functional analysis: the open mapping and the closed graph theorems, and the uniform boundedness principle. We show that the lemma can be adapted to the asymmetric case to obtain proofs of some versions of the mentioned principles in asymmetric normed spaces. One uses a version of Baire category for bitological spaces.