Basis sets in Banach spaces

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Abstract

A set M in a linear normed space X over field K ($\mathsf{K} = \mathbb{R}$ or $\mathsf{K} = \mathbb{C}$) is called a basis set if every $x \in X$ can be represented as a sum $x = \sum\limits_k c_k e_k$, where $e_k \in M$, $e_k \neq e_l$ $(k \neq l)$, $c_k \in \mathsf{K} \setminus \{0\}$, $\sum\limits_k$ denotes either $\sum\limits_{k=1}^{\infty}$ or $\sum\limits_{k=1}^{N}$, and this representation is unique up to permutations. We prove the existence of an infinite-dimensional separable Banach space X with a basis set M, such that no arrangement of M forms a Schauder basis.

The talk is based on a joint paper with Yu.V. Malykhin