46th Annual Iranian Mathematics Conference
25-28 August 2015
Yazd University
Talk Some results on almost L-Dunford–Pettis sets in Banach lattices pp.: 1–4

Some results on almost L-Dunford–Pettis sets in Banach lattices

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Abstract

Following the concept of L–limited sets in dual Banach spaces, we introduce the concept of almost L–Dunford–Pettis sets in dual Banach lattices. Then by a class of operators on Banach lattices, so called disjoint Dunford–Pettis completely continuous operators, we characterize Banach lattices with the positive relatively compact Dunford–Pettis property.

Keywords: Dunford–Pettis set, relatively compact Dunford–Pettis property, Dunford–Pettis completely continuous operator.
Mathematics Subject Classification [2010]: 46A40, 46B42

1 Introduction

A subset A of a Banach space X is called limited (resp. Dunford–Pettis (DP)), if every weak* null (resp. weak null) sequence (x_n^*) in X^* converges uniformly on A, that is

$$\lim_{n\to\infty} \sup_{a\in A} |\langle a, x_n^*\rangle| = 0.$$

Also if $A \subseteq X^*$ and every weak null sequence (x_n) in X converges uniformly on A, we say that A is an L–set.

Every relatively compact subset of E is DP. If every DP subset of a Banach space X is relatively compact, then X has the relatively compact DP property (abb. $\mathrm{DP}_{rc}\mathrm{P}$). For example, dual Banach spaces with the weak Radon-Nikodym property (abb. $WRNP$) and Schur spaces (i.e., weak and norm convergence of sequences in X coincide) have the $\mathrm{DP}_{rc}\mathrm{P}$ [4] and [5]. Also we recall that a Banach space X has the $\mathrm{DP}_{rc}\mathrm{P}$ if and only if every DP and weakly null sequence (x_n) in X is norm null.

Recently, the authors in [7] and [8], introduced the class of L–limited sets and Dunford–Pettis completely continuous (abb. $DPcc$) operators on Banach spaces. In fact, a bounded linear operator $T : X \to Y$ between two Banach spaces is $DPcc$ if it carries DP and weakly null sequences in X to norm null ones in Y. The class of all $DPcc$ operators from X to Y is denoted by $DPcc(X, Y)$. A norm bounded subset B of a dual Banach space X^* is said to be an L–limited set if every weakly null and limited sequence (x_n) of X converges uniformly to zero on the set B, that is $\sup_{f\in B} |f(x_n)| \to 0$. We use some techniques to those in [2] for L–sets and almost L– sets in Banach lattices.

We refer the reader for undefined terminologies, to the classical references [1]

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