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RADONIFICATION THEOREM FOR F-CYLINDRICAL PROBABILITIES

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§1. Introduction

Let E, F and G be real Banach spaces. Let λ be a cylindrical measure on E of type p ([4]), and $w: E\rightarrow G$ a continuous linear operator. Then, for $1<p<\infty$, w is p-Radonifying (i. e. $w(\lambda)$ is a Radon probability on G of order p) if and only if it is p-summing (cf. [10], Theorem 1.1). It is well known that p-left-nuclear operators $w: E\rightarrow G$ are p-Radonifying even in the case $0<p\leq 1$ (cf. [10], Proposition 2.6).

Let α be a norm on $E\otimes F$. Denote by $E\otimes_{\alpha}F$ the normed space $(E\otimes F, \alpha)$ and by $E\hat{\otimes}_{\alpha}F$ its completion. The Radonification problem for the class of F-cylindrical probabilities on the tensor product $E\otimes F$ was considered by B. Maurey in [5]. He introduced (p, F)-Radonifying operators, which map every F-cylindrical probability on $E\otimes F$ of type (p, F) into a Radon probability of order p on some completion $G\hat{\otimes}_{\alpha}F$. It is shown that (p, F)-summing operators of the form $w\otimes 1_{F}: E\otimes F\rightarrow G\hat{\otimes}_{\alpha}F$ are (p, F)-Radonifying, for reflexive F, $1<p<\infty$ and under certain natural assumptions on the norm α (the conditions (1) and (2) in §2). As an example, the operator $w\otimes 1_{F}: E\otimes F\rightarrow G\hat{\otimes}_{\varepsilon}F$ is (p, F)-summing, whenever $w: E\rightarrow G$ is p-summing. Here ε denotes the least reasonable norm. We refer to [7] for definitions and properties of all tensor norms used here.

In this paper it is proved that $\bar{r}_{p}$-nuclear operators $W: E\otimes F\rightarrow G$ are (p, F)-Radonifying, for reflexive F, $1\leq p<\infty$ and the same assumptions on the norm α as in [5]. $\bar{r}_{p}$-nuclear operators generalise classical p-left-nuclear operators, in a natural way, to operators which are defined on the tensor product of two Banach spaces (without any prescribed topology on this space) and such that an operator of the form $w\otimes 1_{F}$ may belong to this class. See §3 for definition and [2] for more details. Furthermore, $\bar{r}_{p}$-nuclear operators are (p, F)-Radonifying from $E\otimes F$ into a third Banach space G which is not necessarily the completion of some tensor product. In the case when this space is actually the completion of some tensor product, we give some examples of (p, F)-Radonifying operators into the completion under a