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Factorization of strongly (p, σ)-continuous multilinear operators

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We introduce the new ideal of *strongly* (p, σ)*-continuous linear operators* in order to study the adjoints of the (p, σ)-absolutely continuous linear operators. Starting from this ideal we build a new multi-ideal by using the composition method. We prove the corresponding Pietsch domination theorem and we present a representation of this multi-ideal by a tensor norm. A factorization theorem characterizing the corresponding multi-ideal – which is also new for the linear case – is given. When applied to the case of the Cohen strongly p-summing operators, this result gives also a new factorization theorem.

Keywords: absolutely continuous operators; Pietsch domination theorem; tensor norm; multilinear operator; factorization

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1. Introduction

The interpolated operator ideal $\Pi_{p,\sigma}$ of the (p, σ)-absolutely continuous operators – where $1 \leq p < \infty$ and $0 \leq \sigma < 1$ – was defined by Matter [1]. Essentially, it is defined to be an intermediate operator ideal between the ideal Π_p of the absolutely p-summing linear operators (see [2,3]) and the ideal of all continuous operators (see [5]). In the nineties, several papers describing and analysing the properties and applications of this interpolated class appeared. They were mainly devoted to the study of the factorization properties and the trace duality for these operators, finding in particular the class of tensor norms that represent these operator ideals (see [7,9,10]). It must be said that, due to the interpolative procedure that was used for defining them, (p, σ)-absolutely continuous operators preserve some of the characteristic properties of the absolutely p-summing operators. However, the emergence of new classes whenever $0 < \sigma < 1$, different from absolutely p-summing operators, yields that the theory of p-summing operators cannot be applied. Therefore, these new classes are a useful tool to deal with summability properties of operators weaker than absolutely p-summability (see for instance [7,8,10]).

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