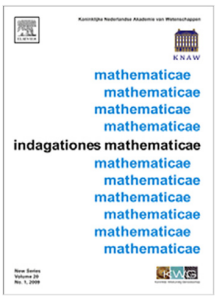
Accepted Manuscript



On boundedness of four-dimensional Hausdorff matrices on the double Taylor sequence spaces

Gholamreza Talebi

PII: S0019-3577(17)30063-0
DOI: http://dx.doi.org/10.1016/j.indag.2017.06.013
Reference: INDAG 490

To appear in: *Indagationes Mathematicae*

Received date : 10 February 2017
Revised date : 21 June 2017
Accepted date : 30 June 2017

Please cite this article as: G. Talebi, On boundedness of four-dimensional Hausdorff matrices on the double Taylor sequence spaces, *Indagationes Mathematicae* (2017), http://dx.doi.org/10.1016/j.indag.2017.06.013

On boundedness of four-dimensional Hausdorff matrices on the double Taylor sequence spaces

Gholamreza Talebi

Department of Mathematics, Faculty of Mathematics,
Vali-e-Asr University of Rafsanjan,
Rafsanjan, Islamic Republic of Iran.
E-mail: Gh.talebi@vru.ac.ir

Abstract

In this paper, we introduce the double Taylor sequence space $\mathcal{T}_p^{r,s}$ consisting of all sequences whose doubly Taylor transforms of orders r, s are in the space $\mathcal{L}_p$ of non-absolute type which is a Banach space including the space $\mathcal{L}_p$. Further, some inclusion relations concerning the space $\mathcal{T}_p^{r,s}$ are given. Then, we focus on the evaluation of the exact values of the operator norm and lower bound of four-dimensional Hausdorff matrices as operators mapping the double sequence space $\mathcal{L}_p$ into the double Taylor sequence spaces $\mathcal{T}_p^{r,s}$. Some estimates are obtained. In particular, we apply our results to some special cases of four-dimensional Hausdorff matrices, such as Cesáro, Euler, Hölder and Gamma matrices.

Keywords: Double sequences, Matrix domain, Four-dimensional Hausdorff matrices, Operator norm and lower bound.
2000 MSC: 46A45, 26D15.

1. Introduction

By Ω, we denote the space of all real or complex valued double sequences which is the vector space with coordinatewise addition and scalar multiplication. Any vector subspace of Ω are called as the double sequence space. The space of bounded double sequences is denoted by $\mathcal{L}_\infty$, which is a Banach space with the norm $\|x\|_{\mathcal{L}_\infty} = \sup_{n,m} |x_{n,m}|$. Also the space $\mathcal{L}_p$ of double sequences [7] is defined by

$$\mathcal{L}_p = \left\{ (x_{n,m}) \in \Omega : \sum_{n=0}^{\infty} \sum_{m=0}^{\infty} |x_{n,m}|^p < \infty \right\}, \quad (0 < p < \infty).$$