

## CHARACTERIZATION OF SOME CLASSES OF COMPACT AND MATRIX OPERATORS ON THE SEQUENCE SPACES OF CESÀRO MEANS

G. CANAN HAZAR GÜLEÇ

**Abstract.** In this study, we give characterization of the matrix classes  $(|C_{-1}|_k, X)$ , where the spaces  $|C_{-1}|_k, k \geq 1$  have been defined and studied by Hazar and Sarigöl in [15] and  $X = \{c_0, c, \ell_\infty\}$ . Also, we determine the Hausdorff measures of noncompactness of certain matrix operators on the spaces  $|C_{-1}|_k$  and apply our results to characterize some classes of compact operators on those spaces. So, we extend some well known results.

*Mathematics subject classification (2010):* 40C05, 40D25, 40F05, 46A45.

*Keywords and phrases:* Absolute Cesàro spaces, sequence spaces, matrix operators, BK spaces, compact operators.

### REFERENCES

- [1] ALTAY, B., BAŞAR, F. AND MALKOWSKY E., *Matrix transformations on some sequence spaces related to strong Cesàro summability and boundedness*, Appl. Math. Comput., 211 (2) (2009) 255–264.
- [2] ALTAY, B. AND BAŞAR, F., *Generalization of the sequence space  $l(p)$  derived by weighted mean*, J. Math. Anal. Appl. 330 (2007) 174–185.
- [3] BAŞARIR M. AND KARA E. E., *On the  $m$ th order difference sequence space of generalized weighted mean and compact operators*, Acta Math. Sci., 33 (2013), 797–813.
- [4] BAŞARIR M. AND KARA E. E., *On the  $B$  difference sequence space derived by generalized weighted mean and compact operators*, J. Math. Anal. Appl., (2012) 391(1), 67–81.
- [5] BAŞARIR M. AND KARA E. E., *On compact operators on the Riesz  $B^m$  difference sequence spaces II*, Iran. J. Sci. Technol. Trans. A, (2012) 36(A), 371–376.
- [6] BAŞARIR M. AND KARA E. E., *On compact operators on the Riesz  $B^m$  difference sequence space*, Iran. J. Sci. Technol. Trans. A, (2011) 35(A4), 279–285.
- [7] BAŞARIR M. AND KARA E. E., *On some difference sequence spaces of weighted means and compact operators*, Annals Funct. Anal., (2011) 2(2), 114–129.
- [8] BOR, H., *Some equivalence theorems on absolute summability methods*, Acta. Math. Hung. 149 (2016), 208–214.
- [9] BOR, H. AND THORPE, B., *On some absolute summability methods*, Analysis 7 (2) (1987), 145–152.
- [10] ET, M. AND İŞIK, M., *On  $p\alpha$ -dual spaces of generalized difference sequence spaces*, Applied Math. Letters 25 (2012) 1486–1489.
- [11] FLETT, T. M., *On an extension of absolute summability and some theorems of Littlewood and Paley*, Proc. London Math. Soc. 7 (1957), 113–141.
- [12] HARDY, G. H., *Divergent Series*, Oxford, 1949.
- [13] HAZAR GÜLEÇ, G. C. (in press). *Summability factor relations between absolute weighted and Cesàro means*, Mathematical Methods in the Applied Sciences. (DOI: 10.1002/mma.5399)
- [14] HAZAR, G. C. AND SARIGÖL M. A., *Absolute Cesàro series spaces and matrix operators*, Acta App. Math., 154, 153–165 (2018)
- [15] HAZAR GÜLEÇ, G. C. AND SARIGÖL M. A., *Compact and Matrix Operators on the Space  $|C_{-1}|_k$* , J. Comput. Anal. Appl., 25(6), (2018), 1014–1024.

- [16] HAZAR GÜLEÇ, G. C. AND SARIGÖL, M. A., *Hausdorff measure of noncompactness of matrix mappings on Cesàro spaces*, Bol. Soc. Paran. Mat. (in press).
- [17] KARA, E. E. AND İLKAN, M., *Some properties of generalized Fibonacci sequence spaces*, Linear and Multilinear Algebra, (2016), Vol. 64, No. 11, 2208–2223.
- [18] KARA, E. E. AND DEMIRIZ, S., *Some new paranormed difference sequence spaces derived by Fibonacci numbers*, Miskolc Mathematical Notes, Vol. 16 (2015), No. 2, 907–923.
- [19] KARA, E. E., BAŞARIR, M. AND MURSALEEN, M., *Compactness of matrix operators on some sequence spaces derived by Fibonacci numbers*, Kragujevac J. Math., (2015) 39(2), 217–230.
- [20] KARA, E. E. AND BAŞARIR, M., *On compact operators and some Euler  $B^m$  difference sequence spaces*, J. Math. Anal. Appl., (2011) 379(2), 499–511.
- [21] KARAKAYA, V., NOMAN, A., K. AND POLAT, H., *On paranormed  $\lambda$ -sequence spaces of non-absolute type*, Math. Comp. Model. 54 (2011), 1473–1480.
- [22] MADDOX, I. J., *Elements of functional analysis*, Cambridge University Press, London, New York, (1970).
- [23] MALKOWSKY, E. AND RAKOČEVIĆ, V., *On matrix domain of triangles*, Appl. Math. Comp. 189(2), (2007), 1146–1163.
- [24] MALKOWSKY E., RAKOČEVIĆ, V., S. ŽIVKOVIĆ, *Matrix transformations between the sequence spaces  $bv^p$  and certain BK spaces*, Bull. Cl. Sci. Math. Nat. Sci. Math. 123 (27) (2002) 33–46.
- [25] MALKOWSKY, E. AND RAKOČEVIĆ, V., *An introduction into the theory of sequence space and measures of noncompactness*, Zb. Rad. (Beogr) 9, (17), (2000), 143–234.
- [26] MOHAPATRA, R. N. AND DAS, G., *Summability factors of lower-semi matrix transformations*, Monatshefte für Mathematik, 79 (1975), 307–3015.
- [27] MURSALEEN, M. AND NOMAN, A. K., *Hausdorff measure of noncompactness of certain matrix operators on the sequence spaces of generalized means*, J. Math. Anal. Appl., 417 (2014) 96–111.
- [28] MURSALEEN, M. AND NOMAN, A. K., *The Hausdorff measure of noncompactness of matrix operators on some BK spaces*, Operator and Matrices, 5(3) (2011), 473–486.
- [29] MURSALEEN, M. AND NOMAN, A. K., *Applications of the Hausdorff measure of noncompactness in some sequence spaces of weighted means*, Comp. and Math. with App., 60 (2010), 1245–1258.
- [30] MURSALEEN, M. AND NOMAN, A. K., *Compactness by the Hausdorff measure of noncompactness*, Nonlinear Analysis: TMA, 73, 8 (2010), 2541–2557.
- [31] RAKOČEVIĆ, V., *Measures of noncompactness and some applications*, Filomat, 12, (1998), 87–120.
- [32] SARIGÖL, M. A., *Spaces of Series Summable by Absolute Cesàro and Matrix Operators*, Comm. Math Appl. 7 (1) (2016) 11–22.
- [33] SARIGÖL, M. A., *Extension of Mazhar's theorem on summability factors*, Kuwait J. Sci. 42 (3) (2015), 28–35.
- [34] SARIGÖL, M. A., *Matrix operators on  $A_k$* , Math. Comp. Model. 55 (2012), 1763–1769.
- [35] SARIGÖL, M. A., *Matrix transformations on fields of absolute weighted mean summability*, Studia Sci. Math. Hungar. 48 (3) (2011), 331–341.
- [36] SARIGÖL, M. A., AND BOR, H., *Characterization of absolute summability factors*, J. Math. Anal. Appl. 195 (1995), 537–545.
- [37] STIEGLITZ, M. AND TIETZ, H., *Matrixtransformationen von folgenräumen eine ergebnisübersicht*, Math Z., 154 (1977), 1–16.
- [38] THORPE, B., *Matrix transformations of Cesàro summable Series*, Acta Math. Hung., 48(3-4), (1986), 255–265.
- [39] WILANSKY, A., *Summability Through Functional Analysis*, North-Holland Mathematical Studies, vol. 85, Elsevier Science Publisher, 1984.