

MEASURES OF NONCOMPACTNESS IN $\bar{N}(p,q)$ SUMMABLE SEQUENCE SPACES

ISHFAQ AHMAD MALIK AND TANWEER JALAL

Abstract. In this paper, we first define the $\bar{N}(p,q)$ summable sequence spaces and obtain some basic results related to these spaces. The necessary and sufficient conditions for an infinite matrix A to map these spaces into the spaces c_0 , c and ℓ_∞ is obtained and Hausdorff measure of noncompactness is then used to obtain the necessary and sufficient conditions for the compactness of linear operators defined on these spaces.

Mathematics subject classification (2010): 40H05, 46A45, 47B07.

Keywords and phrases: Matrix domains, summable sequence spaces, BK spaces, matrix transformations, measures of noncompactness.

REFERENCES

- [1] R. R. AKHMEROV, M. I. KAMENSKII, A. S. POTAPOV, A. E. RODKINA, B. N. SADOVSKII AND J. APPELL, *Measures of noncompactness and condensing operators*, Vol. 55. Basel: Birkhäuser, 1992.
- [2] J. BANAŚ AND K. GOEBEL, *Measures of noncompactness in Banach spaces. Lecture Notes in Pure and Appl. Math.*, Marcel Dekker, New York and Basel, 1980.
- [3] J. BANAŚ AND M. MURSALEEN, *Sequence spaces and measures of noncompactness with applications to differential and integral equations*, Springer, 2014.
- [4] C. H. E. N. BOCONG, L. I. N. LIREN AND L. I. U. HONGWEI, *Matrix product codes with Rosenbloom-Tsfasman metric*, Acta Math. Sci. **33** (2013), no. 3, 687–700.
- [5] R. G. COOKE, *Infinite matrices and sequence spaces*, Courier Corporation, 2014.
- [6] I. DJOLOVIĆ AND E. MALKOWSKY, *Matrix transformations and compact operators on some new nth-order difference sequences*, Appl. Math. Comput. **198** (2008), no. 2, 700–714.
- [7] T. JACOB, *Matrix transformations involving simple sequence spaces*, Pacific J. Math. **70** (1977), no. 1, 179–187.
- [8] T. JALAL AND Z. U. AHMAD, *A new sequence space and matrix transformations*, Thai J. Math. **8** (2012), no. 2, 373–381.
- [9] T. JALAL, *Some matrix transformations of $\ell(p,u)$ into the spaces of invariant means*, Int. J. Modern Math. Sci. **13** (2015), no. 4, 385–391.
- [10] T. JALAL, *Some new I-lacunary generalized difference sequence spaces in n-normed space*, In Modern Mathematical Methods and High Performance Computing in Science and Technology, 249–258. Springer, Singapore, 2016.
- [11] A. M. JARRAH AND E. MALKOWSKY, *BK spaces, bases and linear operators*, Rend. del Circ. Mat. di Palermo. Serie II. Suppl. **52** (1990), 177–191.
- [12] A. M. JARRAH AND E. MALKOWSKY, *Ordinary, absolute and strong summability and matrix transformations*, Filomat (2003), 59–78.
- [13] C. KURATOWSKI, *Sur les espaces complets*, Fund.Math., **1**(15), (1930), 301–309.
- [14] I. A. MALIK AND T. JALAL, *Measures of noncompactness in (\bar{N}_Δ^q) summable difference sequence spaces*, Filomat, **32** (2018), no. 15, 5459–5470.
- [15] E. MALKOWSKY AND V. RAKOČEVIĆ, *An introduction into the theory of sequence spaces and measures of noncompactness*, Matematički institut SANU, 2000.

- [16] E. MALKOWSKY AND V. RAKOČEVIĆ, *Measure of noncompactness of linear operators between spaces of sequences that are (N, q) summable or bounded*, Czechoslovak Math. J. **51** (2001), no. 3, 505–522.
- [17] E. MALKOWSKY AND V. RAKOČEVIĆ, *The measure of noncompactness of linear operators between certain sequence spaces*, Acta Sci. Math. **64** (1998), no. 1, 151–170.
- [18] E. MALKOWSKY AND V. RAKOČEVIĆ, *The measure of noncompactness of linear operators between spaces of m th-order difference sequences*, Studia Sci. Math. Hungar. **35** (1999), no. 4, 381–396.
- [19] A. MANNA, M. AMIT AND P. D. SRIVASTAVA, *Difference sequence spaces derived by using generalized means*, J. Egyptian Math. Soc. **23** (2015), no. 1, 127–133.
- [20] M. MURSALEEN, V. KARAKAYA, H. POLAT AND N. ŞİMŞEK, *Measure of noncompactness of matrix operators on some difference sequence spaces of weighted means*, Comput. Math. Appl. **62** (2011), no. 2, 814–820.
- [21] M. STIEGLITZ AND T. HUBERT, *Matrixtransformationen von Folgenräumen eine Ergebnisübersicht*, Math. Z. **154** (1977), no. 1, 1–16.
- [22] A. WILANSKY, *Summability through functional analysis*, Elsevier, 2000.