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ON THE FINE SPECTRUM OF THE OPERATOR $B(r,s,t)$ OVER THE CLASS OF CONVERGENT SERIES

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Abstract. The main aim of this paper is to determine the fine spectrum of the operator $B(r,s,t)$ on γ of all convergent series. Also, we study the approximate point spectrum, defect spectrum and compression spectrum of the matrix operator $B(r,s,t)$ on γ.

1. Introduction

In functional analysis, the spectrum of an operator generalizes the notion of eigenvalues for matrices. The spectrum of an operator over a Banach space is partitioned into three parts, which are point spectrum, the continuous spectrum and residual spectrum. The calculation of these three parts of the spectrum of an operator is called calculating the fine spectrum of the operator. By w we denote the space of all complex-valued sequences. Any vector subspace of w is called a sequence space. We write l_∞, c, c_0, and l_p for the spaces of all bounded, convergent, null and p-absolutely summable sequences, where $1 \le p < \infty$. The space γ of all convergent series is defined by

$$\gamma = \left\{ (x_k) \in w : \left(\sum_{k=0}^{n} x_k \right) \in c \right\}.$$

If $T : \gamma \to \gamma$ is a bounded linear operator with the matrix A, then its adjoint operator $T^* : \gamma^* \to \gamma^*$ is defined by transpose of the matrix A and γ^* is isomorphic to l_1 with the norm $\|x\| = \sum_{k=0}^{\infty} |x_k|$.

Let X and Y be two sequence spaces and $A = (a_{nk})$ be an infinite matrix of real or complex numbers a_{nk}, where $n,k \in \mathbb{N} = \{1,2,3,\ldots\}$. Then, we say that A defines a matrix

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