

A new class of linear operators on ℓ^2 and Schur multipliers for them

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Abstract. We introduce the space $B_w(\ell^2)$ of linear (unbounded) operators on ℓ^2 which map decreasing sequences from ℓ^2 into sequences from ℓ^2 and we find some classes of operators belonging either to $B_w(\ell^2)$ or to the space of all Schur multipliers on $B_w(\ell^2)$. For instance we show that the space $B(\ell^2)$ of all bounded operators on ℓ^2 is contained in the space of all Schur multipliers on $B_w(\ell^2)$.

1. Introduction

Let $A = (a_{ij})_{i,j \geq 1}$ be an infinite matrix. We define

$$B_w(l^2) = \{A \text{ infinite matrix} : Ax \in l^2 \text{ for every } x \in l^2 \text{ with } |x_k| \searrow 0\},$$

where

$$l^2 = \left\{ x = (x_k)_k : \sum_{k=0}^{\infty} |x_k|^2 < \infty \right\} \text{ is the classical Hilbert space of sequences.}$$