ON INFINITE MATRICES AND (σ,λ)- CONVERGENCE

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By l_∞ we denote the Banach space of bounded sequences $x=(x_k)$ normed by $||x|| = \sup_k |x_k|$.

Shaefer [5] defined the σ-convergence as follows: Let σ be a one-to-one mapping from the set of natural numbers into itself. A continuous linear functional ϕ on l_∞ is said to be an invariant mean or a σ-mean provided that

(i) $\phi(x) \geq 0$ when the sequence $x=(x_k)$ is such that $x_k \geq 0$ for all k,
(ii) $\phi(e)=1$ where $e=(1,1,1,\ldots)$, and
(iii) $\phi(x)=\phi(x_{\sigma(k)})$ for all $x \in l_\infty$.

The main object of this paper is to study $V_\sigma^\lambda(p)$ and $V_{\sigma_0}^\lambda(p)$ (the definitions are given below) and characterize certain matrices in $V_\sigma^\lambda(p)$.

If p_m is real such that $p_m > 0$ and $\sup p_m < \infty$, we define

$$V_{\sigma_0}^\lambda(p) = \left\{ x : \lim_{m\to\infty} |t_{mn}(x)|^{p_m} = 0, \text{ uniformly in } n \right\}$$

and

$$V_\sigma^\lambda\,(p) = \left\{ x : \lim_{m\to\infty} |t_{mn}(x-le)|^{p_m} = 0, \text{ for some } l \text{ , uniformly in } n \right\},$$

where

$$t_{mn}(x) = \frac{1}{\lambda_m} \sum_{i\in I_m} x_{\sigma^i(n)},$$

and $I_m = [m-\lambda_m+1, m]$.

In particular, if $p_m = p > 0$ $\forall m$, we have $V_{\sigma_0}^\lambda(p) = V_{\sigma_0}^\lambda$ and $V_\sigma^\lambda(p) = V_\sigma^\lambda$.

References

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