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A Note on Absolute Nörlund Summability Factors

Let $\sum a_n$ be an infinite series with sequence of partial sums (s_n). By δ_n and t_n we denote the nth $(C,1)$ means of the sequences (s_n) and (na_n), respectively. The series $\sum a_n$ is said to be summable $|C,1|_k$, $k \geq 1$, if (see [3])

$$\sum_{n=1}^{\infty} n^{k-1}|\delta_n - \delta_{n-1}|^k < \infty. \tag{1}$$

Since $t_n = n(\delta_n - \delta_{n-1})$ (see [4]), condition (1) can also be written as

$$\sum_{n=1}^{\infty} \frac{1}{n}|t_n|^k < \infty. \tag{2}$$

Let (p_n) be a sequence of constants, real or complex, and let us write

$$P_n = p_0 + p_1 + p_2 + \cdots + p_n \neq 0, \quad (n \geq 0). \tag{3}$$

The sequence-to-sequence transformation

$$z_n = \frac{1}{P_n}\sum_{v=0}^{n} p_{n-v}s_v \tag{4}$$

defines the sequence (z_n) of the Nörlund means of the sequence (s_n), generated by the sequence of coefficients (p_n). The series $\sum a_n$ is said to be summable $|N,p_n|$ if (see [5])

$$\sum_{n=1}^{\infty} |z_n - z_{n-1}| < \infty, \tag{5}$$

Key Words: Absolute summability, strong summability, summability factors, Nörlund methods.

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