# Some new applications on absolute matrix summability

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In this paper, Theorem 1 and Theorem 2 on weighted mean summability methods of Fourier series have been generalized for $|A, p_n|_k$ summability factors of Fourier series by using different matrix transformations. New results have been obtained dealing with some other summability methods.

**Theorem 1.** *Let $(p_n)$ be a sequence such that*

$$P_n = O(np_n) \tag{1}$$

$$P_n \Delta p_n = O(p_n p_{n+1}). \tag{2}$$

*If $\varphi_1(t)$ is of bounded variation in $(0, \pi)$ for any $x \in (-\pi, \pi)$ and $(\lambda_n)$ is a sequence such that*

$$\sum_{n=1}^{\infty} \frac{1}{n} |\lambda_n|^k < \infty \tag{3}$$

*and*

$$\sum_{n=1}^{\infty} |\Delta \lambda_n| < \infty, \tag{4}$$

*then the series $\sum C_n(t) \frac{\lambda_n P_n}{np_n}$ is summable $\mid \bar{N}, p_n \mid_k$, $k \geq 1$*
*(taken from [2]).*

**Theorem 2.** *If the sequences $(p_n)$ and $(\lambda_n)$ satisfy the conditions (1)-(4) of Theorem 1 and*

$$B_n \equiv \sum_{v=1}^{n} v a_v = O(n), \quad n \to \infty, \tag{5}$$

*then the series $\sum a_n \frac{\lambda_n P_n}{np_n}$ is summable $\mid \bar{N}, p_n \mid_k$, $k \geq 1$(taken from [2]).*

**Lemma 3.** *If $\varphi_1(t)$ is of bounded variation in $(0, \pi)$ for any $x \in (-\pi, \pi)$, then*

$$\sum v C_v(x) = O(n) \quad as \quad n \to \infty \tag{6}$$

*(taken from [11]).*

**Lemma 4.** *If the sequence $(p_n)$ such that conditions (1) and (2) of Theorem 1 are satisfied, then*

$$\Delta \left\{ \frac{P_n}{p_n n^2} \right\} = O\left( \frac{1}{n^2} \right) \tag{7}$$

*(taken from [2]).*

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