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MULTIPLIERS FOR $|C, 1|$ SUMMABILITY OF FOURIER SERIES

G. S. PANDEY

In the present paper we improve the conditions of all previously known theorems on the absolute $(C, 1)$ summability factors of Fourier series.

1. Let the formal expansion of a function $f(x)$, periodic with period 2π and integrable in the sense of Lebesgue over $[-\pi, \pi]$, in a Fourier-trigonometric series be given by

$$f(x) \sim \frac{1}{2}a_0 + \sum_{n=1}^{\infty}(a_n \cos nx + b_n \sin nx) \equiv \sum_{n=0}^{\infty} A_n(x) . \tag{1.1}$$

We write

$$\phi(u) = f(x+u) + f(x-u) - 2f(x)$$

and throughout this paper A will denote a positive constant, not necessarily the same at each occurrence.

Whittaker [5], in 1930, proved that the series

$$\sum_{n=1}^{\infty} A_n(x)/n^{\alpha} , \qquad \alpha > 0 ,$$

is summable $|A|$ almost everywhere.

Later, Prasad [4] demonstrated that the series

$$\sum_{n=n_0}^{\infty} A_n(x)/\mu_n ,$$

where

$$\mu_n = \left(\prod_{\nu=1}^{k-1} \log^{\nu} n\right)(\log^k n)^{1+\varepsilon} , \qquad \log^k n_0 > 0 , \quad \varepsilon > 0 ,$$

and

$$\log^k n = \log(\log^{k-1} n), \cdots, \log^2 n = \log\log n ;$$

is summable $|A|$ almost everywhere.

Chow [2], on the other hand, has shown that the series $\sum \lambda_n A_n(x)$ is summable $|C, 1|$ almost everywhere, provided $\{\lambda_n\}$ is a convex sequence satisfying the condition $\sum n^{-1}\cdot\lambda_n < \infty$.

Cheng [1], in 1948, established the following:

THEOREM A. *If*