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ON THE (*P*) SUMMABILITY OF DOUBLE FOURIER SERIES

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Abstract: In this paper, we have proved a theorem on (P) summability of double Fourier series which generalizes various known results.

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1. Definitions and Notations

Let $\{S_{m,n}\}$ be the sequence of mn^{th} partial sums of the series $\sum u_{m,n}$. Let $\{p_m\}$ and $\{q_n\}$ be sequences of non-negative numbers such that the series

$$p(x,y) = \sum_{m=1}^{\infty}\sum_{n=1}^{\infty} p_m q_n x^m y^n \tag{1.1}$$

converges for all x and y, $0 < x < 1$, $0 < y < 1$ and $p(x,y) \uparrow \infty$ as $x \uparrow 1$ and $y \uparrow 1$.

If

$$p(x,y) = \frac{1}{p(x,y)} \sum_{m=1}^{\infty}\sum_{n=1}^{\infty} s_{m,n} p_m q_n x^m y^n \to S \tag{1.2}$$

as $x \uparrow 1$ and $y \uparrow 1$, then the series $\sum u_{m,n}$ is said to be (P)-summable to S [5].

If

$$L(x,y) = \frac{1}{|\log(1-x)|\,|\log(1-y)|} \sum_{m=1}^{\infty}\sum_{n=1}^{\infty} \frac{s_{m,n} x^m y^n}{mn} \to S \tag{1.3}$$

as $x \uparrow 1$ and $y \uparrow 1$, then the series $\sum u_{mn}$ is said to be L-summable to S [8].

In particular if $p_m = \frac{1}{m}$ and $q_n = \frac{1}{n}$, the (P)-summability reduces to (L) summability.