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ON A GENERALIZED PRODUCT SUMMABILITY OF FOURIER SERIES

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Abstract. In this paper a generalized product of summability is introduced in order to make an advanced study on the special topic of summability. In addition, employing that product we establish a new theorem regarding to summability of Fourier series.

1. Introduction and Known Results

Let $f(t)$ be a periodic function with period 2π and integrable over the interval $(-\pi, \pi)$ in the sense of Lebesgue. Let

$$f(t) \sim \frac{a_0}{2} + \sum_{n=1}^{\infty}(a_n \cos nt + b_n \sin nt) \tag{1.1}$$

be its Fourier series.

For two sequences of real or complex numbers $p = \{p_n\}$ and $q = \{q_n\}$, let

$$P_n = p_0 + p_1 + p_2 + \cdots + p_n = \sum_{v=0}^{n} p_v, \quad \text{for all} \quad n,$$
$$Q_n = q_0 + q_1 + q_2 + \cdots + q_n = \sum_{v=0}^{n} q_v, \quad \text{for all} \quad n,$$

and let the convolution $(p * q)_n$ be defined by

$$R_n := (p * q)_n := \sum_{v=0}^{n} p_v q_{n-v}.$$

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