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ON THE SUMMATION OF MULTIPLE FOURIER SERIES. III[1]

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Let $f(x)=f(x_1, \cdots, x_k)$ be a function of the Lebesgue class L, which is periodic in each of the k-variables, having the period 2π. Let

$$a_{\nu_1\cdots\nu_k} = \frac{1}{(2\pi)^k} \cdot \int_{-\pi}^{+\pi} \cdots \int_{-\pi}^{+\pi} f(x) \exp \{-i(\nu_1 x_1 + \cdots + \nu_k x_k)\} dx_1 \cdots dx_k,$$

where $\{\nu_k\}$ are all integers. Then the series $\sum a_{\nu_1}\cdots_{\nu_k} \exp i(\nu_1 x_1 + \cdots + \nu_k x_k)$ is called the multiple Fourier series of the function $f(x)$, and we write

$$f(x) \sim \sum a_{\nu_1\cdots\nu_k} \exp i(\nu_1 x_1 + \cdots + \nu_k x_k).$$

Let the numbers $(\nu_1^2 + \cdots + \nu_k^2)$, when arranged in increasing order of magnitude, be denoted by $\lambda_0 < \lambda_1 < \cdots < \lambda_n < \cdots$, and let

$$C_n(x) = \sum a_{\nu_1\cdots\nu_k} \exp i(\nu_1 x_1 + \cdots + \nu_k x_k),$$

where the sum is taken over all $\nu_1^2 + \cdots + \nu_k^2 = \lambda_n$,

$$\phi(x, t) = \sum C_n(x) \exp(-\lambda_n t),$$

$$S_R(x) = \sum_{\lambda_n \leqq R^2} C_n(x), \qquad \lambda_n \leqq R^2 < \lambda_{n+1}.$$

Received by the editors December 7, 1945.

[1] Papers I and II with the same title are to appear in Proc. London Math. Soc.