

Generalized Integrals in the Theory of Trigonometric,
Haar, and Walsh Series.

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In the first lecture we survey some work done by Soviet mathematicians on the application of generalized integrals to trigonometric series.

The first group of these integrals was introduced to integrate sums of everywhere convergent trigonometric series, and to calculate the coefficients of those series by the Fourier formulae. They are the T_{2s} -, P^2 -, SCP-, and MZ- integrals; see [2, 3, 4, 5].

We give results concerning the properties of the primitives of these integrals, see [6, 7, 8, 9], and their relations to the Denjoy integrals in the restricted sense and in the wide sense, see [10, 11, 12].

Among such properties we draw attention to the fact that for these integrals the first order primitive does not necessarily have the Luzin N-property, [10]. Furthermore an example of a function with such a primitive can be chosen from the sums of everywhere convergent trigonometric series, [12]. For more references see [13].

Another group of integrals discussed includes A-, and B- integrals, which were introduced to integrate the conjugate function of any summable function. Most results concerning these integrals surveyed in the lecture have been published, see [14, 15, 16]. We mention here only the recently published result by Pannikov, [16], that the B- integral is included in the A- integral.