ON THE HILBERT TRANSFORM II

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Chapter 1. Relevant theorems

§ 1. **Relevant theorems of generalized harmonic analyses.** We begin with several notations definitions and theorems which we shall quote from N. Wiener [13].

Definition 1. *We shall say that $f(x)$ belongs to the class W_2, if $f(x)$ is measurable and*

(1.01)
$$\int_{-\infty}^{\infty} \frac{|f(x)|^2}{1+x^2}\, dx < \infty .$$

Definition 2. *We shall say that $f(x)$ belongs to the class S_0, if $f(x)$ is measurable and exists*

(1.02)
$$\lim_{T \to \infty} \frac{1}{2T} \int_{-T}^{T} |f(x)|^2\, dx .$$

It is clear that

(1.03)
$$S_0 \subset W_2 .$$

For any function $f(x)$ of the class W_2, the Fourier-Wiener transform $s^f(u)$ is defined, that is