

ON THE HILBERT TRANSFORM II

By

Sumiyuki KOIZUMI

CONTENTS

Chapter 1. Relevant theorem.

1. Relevant theorems of generalized harmonic analyses.
2. Relevant theorems of generalized Hilbert transforms.
3. Unified theorems of generalized Fourier transforms and generalized Hilbert transforms.

Chapter 2. Generalized harmonic analyses in the complex domain.

4. Generalized harmonic analyses in the half-plane.
5. Generalized harmonic analyses in the strip domain.
6. Analytic almost periodic functions of the Besicovitch class.
7. Analytic almost periodic functions of the Bohr-Stepanoff class.

References.

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

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

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

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

It is clear that

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

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