

CONTENTS

EDITOR'S PREFACE	xi
PREFACE	xiii
NOTATION AND DEFINITIONS	1
CHAPTER 1: SOME FACTS ON THE THEORY OF DISTRIBUTIONS	7
1. Distributions and their properties	7
1. Spaces of test functions	7
2. The space of distributions $\mathcal{D}'(\mathcal{O})$	11
3. The space of distributions $\mathcal{S}'(F)$	13
4. Linear operations on distributions	14
5. Change of variables	17
6. L -invariant distributions	17
7. Direct product of distributions	21
8. Convolution of distributions	22
9. Convolution algebras of distributions	26
2. Integral transformations of distributions	29
1. The Fourier transform of tempered distributions	29
2. Fourier series of periodic distributions	31
3. The B -transform of distributions	33
4. Fractional derivatives (primitives)	37
5. The Laplace transform of tempered distributions	38
6. The Cauchy kernel of the tube domain $T^{\mathbb{C}}$	40

7. Regular cones	42
8. Fractional derivatives (primitives) with respect to a cone	45
9. The Radon transform of distributions with compact support in an odd-dimensional space	47
3. Quasi-asymptotics of distributions	50
1. General definitions and basic properties	50
2. Automodel (regularly varying) functions	56
3. Quasi-asymptotics over one-parameter groups of transformations	57
4. The one-dimensional case. Quasi-asymptotics at infinity and at zero	61
5. The one-dimensional case. Asymptotics by translations	65
6. Quasi-asymptotics by selected variable	70
CHAPTER 2: MANY-DIMENSIONAL TAUBERIAN THEOREMS	80
4. The General Tauberian theorem and its consequences	80
1. The Tauberian theorem for a family of linear transformations	80
2. The general Tauberian theorem for the dilatation group	84
3. Tauberian theorems for nonnegative measures	88
4. Tauberian theorems for holomorphic functions of bounded argument	92
5. Admissible and strictly admissible functions	96
1. Families of linear transformations under which a cone is invariant	96
2. Strictly admissible functions for a family of linear transformations	101
3. Admissible functions of a cone	103

Contents	vii
4. Some examples of admissible functions of a cone	109
6. Comparison Tauberian theorems	112
1. Preliminary theorems	112
2. The comparison Tauberian theorems for measures and for holomorphic functions with nonnegative imaginary part	115
Comments on Chapter 2	118
CHAPTER 3: ONE-DIMENSIONAL TAUBERIAN THEOREMS	119
7. The general Tauberian theorem and its consequences	119
1. The general Tauberian theorem and its particular cases	119
2. Quasi-asymptotics of a distribution f from \mathcal{S}'_+ and a function $\arg \tilde{f}$	125
3. Tauberian theorem for distributions from the class \tilde{H}	127
4. The decomposition theorem	134
8. Quasi-asymptotic properties of distributions at the origin	138
1. The general case	138
2. Quasi-asymptotics of distributions from H and asymptotic properties of the reproducing functions of measures	144
9. Asymptotic properties of the Fourier transform of distributions from M_+	157
1. Asymptotic properties of the Fourier transform of finite measures	158
2. Asymptotic properties of the Fourier transform of distributions from M_+	173
3. The Abel and Cezaro series summation with respect to an automodel	177

weight

10. Quasi-asymptotic expansions	182
1. Open and closed quasi-asymptotic expansions	182
2. Quasi-asymptotic expansions and convolutions	185
CHAPTER 4: ASYMPTOTIC PROPERTIES OF SOLUTIONS OF CONVOLUTIONS EQUATIONS	189
11. Quasi-asymptotics of the fundamental solutions of convolution equations	189
1. Quasi-asymptotics and convolution	189
2. Quasi-asymptotics of the fundamental solutions of hyperbolic operators with constant coefficients	191
3. Quasi-asymptotics of the solutions of the Cauchy problem for the heat equation	194
12. Quasi-asymptotics of passive operators	201
1. The translationally-invariant passive operators	201
2. The fundamental solution and the Cauchy problem	204
3. Quasi-asymptotics of passive operators and their fundamental solutions	208
4. Differential operators of the passive type	211
5. Examples	214
Comments on Chapter 4	218
CHAPTER 5: TAUBERIAN THEOREMS FOR CAUSAL FUNCTIONS	220
13. The Jost-Lehmann-Dyson representation	220

Contents	ix
1. The Jost-Lehmann-Dyson representation in the symmetric case	220
2. Inversion of the Jost-Lehmann-Dyson representation in the symmetric case	224
3. The Jost-Lehmann-Dyson representation in the general case	235
14. Automodel asymptotics for the causal functions and singularities of their Fourier transforms on the light cone	248
1. Some preliminary results and definitions	248
2. The main theorems	257
3. On forbidden asymptotics in the Björken domain	270
4. Asymptotic properties of the two-point Wightman function	278
Comments on Chapter 5	283
BIBLIOGRAPHY	285