

Contents

<i>Preface</i>	v
1. Cones in \mathbb{R}^n and Kernels	1
1.1 Notation	1
1.2 Cones in \mathbb{R}^n	4
1.3 Cauchy and Poisson kernels	7
2. Ultradifferentiable Functions and Ultradistributions	13
2.1 Sequences (M_p)	13
2.2 Ultradifferential operators	17
2.3 Functions and ultradistributions of Beurling and Roumieu type	20
2.4 Fourier transform on $\mathcal{D}(*, L^s)$ and $\mathcal{D}'(*, L^s)$	26
2.5 Ultradifferentiable functions of ultrapolynomial growth	28
2.6 Tempered ultradistributions	37
2.7 Laplace transform	40
3. Boundedness	41
3.1 Boundedness in $\mathcal{D}'(*, L^s)$	41
3.2 Boundedness in \mathcal{S}'^*	47
4. Cauchy and Poisson Integrals	51
4.1 Cauchy and Poisson kernels as ultradifferentiable functions	51
4.2 Cauchy integral of ultradistributions	61
4.3 Poisson integral of ultradistributions	76
5. Boundary Values of Analytic Functions	81

5.1	Generalizations of H^r functions in tubes	81
5.2	Boundary values in $\mathcal{D}'((M_p), L^s)$ for analytic functions in tubes	91
5.3	Case $2 < r < \infty$	111
5.4	Boundary values via almost analytic extensions	118
5.5	Cases $s = \infty$ and $s = 1$	129
6.	Convolution of Ultradistributions	135
6.1	Introduction	135
6.2	Definitions of $\mathcal{D}'^{(M_p)}$ -convolution	137
6.3	Equivalence of definitions of $\mathcal{D}'^{(M_p)}$ -convolution	140
6.4	Definitions of $\mathcal{S}'^{(M_p)}$ -convolution	147
6.5	Equivalence of definitions of $\mathcal{S}'^{(M_p)}$ -convolution	150
6.6	Existence of $\mathcal{D}'^{(M_p)}$ - and $\mathcal{S}'^{(M_p)}$ -convolution	153
6.7	Compatibility conditions on supports	157
6.8	Convolution in weighted spaces	162
7.	Integral Transforms of Tempered Ultradistributions	173
7.1	Introductory remarks	173
7.2	Definitions	174
7.3	Characterizations of some integral transforms	179
7.4	Laplace transform	180
7.5	Proof of equivalence of families of norms	182
7.6	Hilbert transform	186
7.6.1	One-dimensional case	187
7.6.2	Multi-dimensional case	196
7.7	Singular integral operators	199
	<i>Bibliography</i>	205
	<i>Index</i>	213