

# Contents

<b>1</b>	<b>Mellin pseudo-differential operators</b>	<b>11</b>
1.1	Spaces with discrete asymptotics	11
1.1.1	Sobolev spaces based on the Mellin transform	11
1.1.2	The subspaces with discrete asymptotics	26
1.1.3	Green operators	43
1.1.4	Mellin symbols and Mellin operators	51
1.1.5	Notes	69
1.2	The cone algebra with discrete asymptotics	73
1.2.1	Pseudo-differential operators on manifolds with conical singularities	73
1.2.2	Ellipticity, parametrices, asymptotics of solutions	91
1.2.3	The cone algebra over $X^\wedge$	99
1.2.4	Elements of a parameter-dependent theory	113
1.2.5	Notes	117
1.3	Mellin pseudo-differential operators with $L^\mu(X)$ -valued symbols	122
1.3.1	Amplitude functions and distributional kernels	122
1.3.2	The algebra of Mellin $\psi DO$ 's	140
1.3.3	Polar coordinates in $\psi DO$ 's and Mellin operator conventions	165
1.3.4	Notes	172
1.4	The cone algebra with continuous asymptotics	178
1.4.1	Analytic functionals and continuous asymptotics	178
1.4.2	Green operators with continuous asymptotics	194
1.4.3	Mellin symbols and Mellin operators	197
1.4.4	The cone algebra	204
1.4.5	Ellipticity, parametrices, asymptotics of solutions	210
1.4.6	The cone algebra over $X^\wedge$	213
1.4.7	Notes	220

<b>2</b>	<b>Pseudo-differential boundary value problems</b>	<b>226</b>
2.1	Pseudo-differential operators on the half axis . . . . .	226
2.1.1	The Mellin expansions of pseudo-differential operators of order zero . . . . .	226
2.1.2	The Mellin expansions of pseudo-differential operators of arbitrary order . . . . .	254
2.1.3	Another approach to Mellin conventions on $\mathbb{R}_+$ . . . . .	284
2.1.4	Operator-valued amplitude functions . . . . .	295
2.1.5	Green and smoothing Mellin amplitude functions . . . . .	307
2.1.6	The boundary symbolic calculus . . . . .	324
2.1.7	The ellipticity of boundary symbols . . . . .	352
2.1.8	Examples and remarks . . . . .	377
2.1.9	The algebra of pseudo-differential operators on $\mathbb{R}_+$ of order zero . . . . .	391
2.1.10	Mellin symbols in transmission problems . . . . .	423
2.1.11	The algebra of pseudo-differential operators on $\mathbb{R}_+$ of arbitrary orders . . . . .	431
2.1.12	The transmission property . . . . .	443
2.1.13	Notes . . . . .	460
2.2	Boundary value problems . . . . .	466
2.2.1	Sobolev spaces and subspaces with asymptotics . . . . .	466
2.2.2	Pseudo-differential operators with operator-valued symbols . . . . .	490
2.2.3	Green and smoothing Mellin operators . . . . .	515
2.2.4	The algebra of pseudo-differential boundary value problems . . . . .	537
2.2.5	Ellipticity and parametrices . . . . .	557
	<b>Bibliography</b>	<b>567</b>
	<b>Symbol index</b>	<b>572</b>
	<b>Index</b>	<b>576</b>