

Contents of Volume 1

Pseudodifferential Operators

Contents of Volume 2	xiii
Notation and Background	xv
Chapter I. Standard Pseudodifferential Operators	1
1. Parametrics of Elliptic Equations	2
2. Definition and Continuity of the "Standard" Pseudodifferential Operators in an Open Subset of Euclidean Space. Pseudodifferential Operators Are Pseudolocal	10
3. Transposition, Composition, Transformation under Diffeomorphisms of Pseudodifferential Operators	21
4. The Symbolic Calculus of Pseudodifferential Operators	30
<i>Appendix:</i> Elliptic Pseudodifferential Operators and Their Parametrics ..	40
5. Pseudodifferential Operators on Manifolds	44
<i>Appendix:</i> Elliptic Pseudodifferential Operators on a Manifold	55
6. Microlocalization and Wave-Front Sets	58
<i>Appendix:</i> Traces and Multiplication of Distributions Whose Wave-Front Sets Are in Favorable Positions	71
7. Standard Pseudodifferential Operators Acting on Vector-Valued Dis- tributions and on Sections of Vector Bundles	73
Chapter II. Special Topics and Applications	83
1. Compact Pseudodifferential Operators	84
2. Fredholm Operators and the Index of Elliptic Pseudodifferential Operators on a Compact Manifold	94
2.1. Fredholm Operators	94
2.2. Application to Pseudodifferential Operators on Compact Manifolds .	100
3. Uniqueness in the Cauchy Problem for Certain Operators with Simple Characteristics	106
4. The Friedrichs Lemma	114
5. The Theorem on "Sum of Squares"	119

Chapter III. Application to Boundary Problems for Elliptic Equations	129
1. The Generalized Heat Equation and Its Parametrix	132
1.1. Existence and "Uniqueness" of the Parametrix	133
1.2. Reduced Symbol of the Parametrix. Operator U^*U . Estimates. "Orthogonal Projections" on the Kernel and the Cokernel	141
1.3. Exact Solution When the Manifold X Is Compact	147
2. Preliminaries to the Study of Elliptic Boundary Problems: Sobolev Spaces in Bounded Open Subsets of Euclidean Spaces. Traces	153
3. Approximate Triangulization of Boundary Problems for Elliptic Equations	157
Appendix: More General Elliptic Systems	167
4. Hypoelliptic Boundary Problems	168
5. Globally Hypoelliptic Boundary Problems. Fredholm Boundary Problems	172
6. Coercive Boundary Problems	188
7. The Oblique Derivative Problem. Boundary Problems with Simple Real Characteristics	190
7.1. An Example: The Oblique Derivative Boundary Problem	190
7.2. Boundary Problems with Simple Real Characteristics	194
7.3. Hypoelliptic Pseudodifferential Operators with Simple Real Characteristics	195
7.4. Subelliptic Pseudodifferential Operators	199
8. Example of a Boundary Problem with Double Characteristics: The $\bar{\partial}$ -Neumann Problem in Subdomains of \mathbb{C}^N	202
8.1. Description of the $\bar{\partial}$ -Neumann Problem	202
8.2. The Principal Symbol of the Calderon Operator \mathcal{B}'	210
8.3. The Subprincipal Symbol of the Calderon Operator \mathcal{B}'	212
8.4. Hypoellipticity with Loss of One Derivative. Condition $Z(q)$	213
Chapter IV. Pseudodifferential Operators of Type (ρ, δ)	217
1. Parametrices of Hypoelliptic Linear Partial Differential Equations	218
2. Amplitudes and Pseudodifferential Operators of Type (ρ, δ)	223
3. The Calderon-Vaillancourt Theorem and the Sharp Gårding Inequality . .	229
Chapter V. Analytic Pseudodifferential Operators	239
1. Analyticity in the Base and in the Cotangent Bundle	240
2. Pseudoanalytic and Analytic Amplitudes	254
3. Analytic Pseudodifferential Operators	264
3.1. Symbolic Calculus	265
3.2. Parametrices of Elliptic Analytic Pseudodifferential Operators	271
3.3. Analytic Pseudodifferential Operators on a Real Analytic Manifold . .	275
4. Microlocalization All the Way. The Holmgren Theorem	278
5. Application to Boundary Problems for Elliptic Equations: Analyticity up to the Boundary	288
5.1. Construction and Estimates of the Local Parametrix $U(t)$	289
5.2. The Operator $U(t)$ Is Analytic Pseudolocal in the Strong Sense . . .	293
5.3. Analyticity in the Cauchy Problem	295
5.4. Application to Elliptic Boundary Problems	296
REFERENCES	xxix
INDEX	xxxv