

Contents

Preface to the first edition — V

Preface to the second edition — VII

1 Bergman spaces — 1

- 1.1 Elementary properties — 1
- 1.2 Examples — 9
- 1.3 Biholomorphic maps — 12
- 1.4 The Segal–Bargmann space — 15
- 1.5 The uncertainty principle — 19
- 1.6 Nonradial weights — 22
- 1.7 Notes — 25

2 The canonical solution operator to $\bar{\partial}$ — 26

- 2.1 Compact operators on Hilbert spaces — 26
- 2.2 The canonical solution operator to $\bar{\partial}$ restricted to $A^2(\mathbb{D})$ — 37
- 2.3 Notes — 47

3 Spectral properties of the canonical solution operator to $\bar{\partial}$ — 49

- 3.1 Complex differential forms — 49
- 3.2 $(0, 1)$ -forms with holomorphic coefficients — 50
- 3.3 Compactness and Schatten class membership — 52
- 3.4 Notes — 63

4 The $\bar{\partial}$ -complex — 65

- 4.1 Unbounded operators on Hilbert spaces — 65
- 4.2 Distributions — 82
- 4.3 A finite-dimensional analog — 88
- 4.4 The $\bar{\partial}$ -Neumann operator — 89
- 4.5 Notes — 106

5 Density of smooth forms — 107

- 5.1 Friedrichs' lemma and Sobolev spaces — 107
- 5.2 Density in the graph norm — 119
- 5.3 Notes — 125

6 The weighted $\bar{\partial}$ -complex — 126

- 6.1 The $\bar{\partial}$ -Neumann operator on $(0, 1)$ -forms — 126
- 6.2 $(0, q)$ -forms — 131
- 6.3 Notes — 134

7	The twisted $\bar{\partial}$-complex — 136
7.1	An exact sequence of unbounded operators — 136
7.2	The twisted basic estimates — 137
7.3	Notes — 141
8	Applications — 142
8.1	Hörmander's L^2 -estimates — 142
8.2	Weighted spaces of entire functions — 145
8.3	Notes — 150
9	Spectral analysis — 151
9.1	Resolutions of the identity — 151
9.2	Spectral decomposition of bounded normal operators — 154
9.3	Spectral decomposition of unbounded self-adjoint operators — 161
9.4	Determination of the spectrum — 178
9.5	Variational characterization of the discrete spectrum — 190
9.6	Notes — 195
10	Schrödinger operators and Witten Laplacians — 196
10.1	Difference quotients — 196
10.2	Interior regularity — 198
10.3	Schrödinger operators with magnetic field — 202
10.4	Witten Laplacians — 209
10.5	Dirac and Pauli operators — 212
10.6	Notes — 213
11	Compactness — 215
11.1	Precompact sets in L^2 -spaces — 215
11.2	Sobolev spaces and Gårding's inequality — 218
11.3	Magnetic Schrödinger operators with compact resolvent — 223
11.4	Compactness in weighted spaces — 231
11.5	Compactness in the Segal–Bargmann space — 247
11.6	Bounded pseudoconvex domains — 249
11.7	Notes — 252
12	The $\bar{\partial}$-Neumann operator and the Bergman projection — 254
12.1	The Stone–Weierstraß theorem — 254
12.2	Commutators of the Bergman projection — 257
12.3	Notes — 263
13	Compact resolvents — 264
13.1	Schrödinger operators — 264

13.2	Dirac and Pauli operators —	271
13.3	Notes —	274
14	Spectrum of $\square$ on the Fock space —	275
14.1	The general setting —	275
14.2	Determination of the spectrum —	277
14.3	Notes —	282
15	Obstructions to compactness —	283
15.1	The bidisc —	283
15.2	Weighted spaces —	284
15.3	Notes —	288
16	The ∂-complex on the Segal–Bargmann space —	290
16.1	Unbounded operators and the complex Laplacian —	291
16.2	Basic estimates and compactness —	293
16.3	Properties of the graph norm and compactness —	298
16.4	The generalized ∂ -complex —	304
16.5	Notes —	315
Bibliography —		317
Index —		321