

CONTENTS

1	The complex projective line	1
1.1	Projective geometry	1
1.2	Circles	9
1.3	Elliptic geometry	11
1.4	Hyperbolic geometry	21
2	Algebraic and geometric background	29
2.1	Linear algebra	29
2.2	Hermitian linear algebra	33
2.3	Symplectic geometry	46
2.4	Complex analysis	51
2.5	Contact geometry and CR geometry	54
2.6	Heisenberg spaces	59
3	The ball model	67
3.1	The unit ball in \mathbb{C}^n and its projective model	67
3.2	Trigonometry	84
3.3	Computations in the ball model	99
4	The paraboloid model and Heisenberg geometry	111
4.1	The Siegel domain	111
4.2	Heisenberg geometry	118
4.3	Chains	125
4.4	\mathbb{R} -circles	137
5	Bisectors and spinal spheres	152
5.1	Two decompositions of bisectors	152
5.2	Automorphisms of bisectors	163
5.3	Elementary bisector intersections	169
5.4	Calibrating the CR-structure at infinity	179
5.5	Differential geometry of bisectors	186
6	Automorphisms	195
6.1	Symplectic geometry of $\mathbf{H}_{\mathbb{C}}^2$	195
6.2	Classification of automorphisms in dimension 2	202
7	Numerical invariants	210
7.1	Cartan's angular invariant	210
7.2	The complex cross-ratio	224
7.3	Real geodesics and complex hyperplanes	230

8	Extors in Projective Space	248
8.1	Extending bisectors to extors	248
8.2	Topology and symmetry of an extor	253
8.3	Pairs of extors	260
9	Intersections of bisectors	271
9.1	Pairs of spinal spheres	272
9.2	Connected bisector intersections	281
9.3	Dirichlet and Ford polyhedra	294
A	Comments on Giraud's paper	299
	References	303
	Index	313