

Contents

| | | |
|----------|---|----------------|
| | <i>Preface</i> | <i>page xi</i> |
| 1 | Polarity | 1 |
| | 1.1 Polar hypersurfaces | 1 |
| | 1.2 The dual hypersurface | 28 |
| | 1.3 Polar s-hedra | 35 |
| | 1.4 Dual homogeneous forms | 48 |
| | 1.5 First examples | 60 |
| | Exercises | 64 |
| | Historical notes | 66 |
| 2 | Conics and quadric surfaces | 69 |
| | 2.1 Self-polar triangles | 69 |
| | 2.2 Poncelet relation | 81 |
| | 2.3 Quadric surfaces | 91 |
| | Exercises | 108 |
| | Historical notes | 111 |
| 3 | Plane cubics | 114 |
| | 3.1 Equations | 114 |
| | 3.2 Polars of a plane cubic | 124 |
| | 3.3 Projective generation of cubic curves | 133 |
| | 3.4 Invariant theory of plane cubics | 136 |
| | Exercises | 141 |
| | Historical notes | 143 |
| 4 | Determinantal equations | 146 |
| | 4.1 Plane curves | 146 |
| | 4.2 Determinantal equations for hypersurfaces | 160 |
| | Exercises | 184 |
| | Historical notes | 186 |
| 5 | Theta characteristics | 188 |
| | 5.1 Odd and even theta characteristics | 188 |

| | | |
|----------|--|-----|
| viii | <i>Contents</i> | |
| | 5.2 Hyperelliptic curves | 192 |
| | 5.3 Theta functions | 197 |
| | 5.4 Odd theta characteristics | 204 |
| | 5.5 Scorza correspondence | 212 |
| | Exercises | 224 |
| | Historical notes | 224 |
| 6 | Plane quartics | 226 |
| | 6.1 Bitangents | 226 |
| | 6.2 Determinant equations of a plane quartic | 235 |
| | 6.3 Even theta characteristics | 243 |
| | 6.4 Invariant theory of plane quartics | 265 |
| | 6.5 Automorphisms of plane quartic curves | 266 |
| | Exercises | 276 |
| | Historical notes | 278 |
| 7 | Cremona transformations | 280 |
| | 7.1 Homaloidal linear systems | 280 |
| | 7.2 First examples | 294 |
| | 7.3 Planar Cremona transformations | 303 |
| | 7.4 Elementary transformations | 320 |
| | 7.5 Noether's Factorization Theorem | 329 |
| | Exercises | 342 |
| | Historical notes | 344 |
| 8 | del Pezzo surfaces | 347 |
| | 8.1 First properties | 347 |
| | 8.2 The E_N -lattice | 358 |
| | 8.3 Anticanonical models | 379 |
| | 8.4 del Pezzo surfaces of degree ≥ 6 | 386 |
| | 8.5 del Pezzo surfaces of degree 5 | 389 |
| | 8.6 Quartic del Pezzo surfaces | 396 |
| | 8.7 del Pezzo surfaces of degree 2 | 405 |
| | 8.8 del Pezzo surfaces of degree 1 | 411 |
| | Exercises | 422 |
| | Historical notes | 423 |
| 9 | Cubic surfaces | 426 |
| | 9.1 Lines on a nonsingular cubic surface | 426 |
| | 9.2 Singularities | 443 |
| | 9.3 Determinantal equations | 449 |
| | 9.4 Representations as sums of cubes | 459 |
| | 9.5 Automorphisms of cubic surfaces | 483 |
| | Exercises | 502 |
| | Historical notes | 504 |

| | | <i>Contents</i> | ix |
|-----------|-------------------------------|-----------------|-----|
| 10 | Geometry of lines | | 508 |
| | 10.1 Grassmannians of lines | | 508 |
| | 10.2 Linear line complexes | | 517 |
| | 10.3 Quadratic line complexes | | 531 |
| | 10.4 Ruled surfaces | | 557 |
| | Exercises | | 588 |
| | Historical notes | | 589 |
| | <i>References</i> | | 593 |
| | <i>Symbol index</i> | | 620 |
| | <i>Subject index</i> | | 623 |