

## Contents

	Page
Notation . . . . .	VIII
Prologue . . . . .	1
<b>Chapter I. Lattices . . . . .</b>	<b>9</b>
1. Introduction . . . . .	9
2. Bases and sublattices . . . . .	9
3. Lattices under linear transformation . . . . .	19
4. Forms and lattices . . . . .	20
5. The polar lattice . . . . .	23
<b>Chapter II. Reduction . . . . .</b>	<b>26</b>
1. Introduction . . . . .	26
2. The basic process . . . . .	27
3. Definite quadratic forms . . . . .	30
4. Indefinite quadratic forms . . . . .	35
5. Binary cubic forms . . . . .	51
6. Other forms . . . . .	60
<b>Chapter III. Theorems of BLICHFELDT and MINKOWSKI . . . . .</b>	<b>64</b>
1. Introduction . . . . .	64
2. BLICHFELDT's and MINKOWSKI's theorems . . . . .	68
3. Generalisations to non-negative functions . . . . .	73
4. Characterisation of lattices . . . . .	78
5. Lattice constants . . . . .	80
6. A method of MORDELL . . . . .	84
7. Representation of integers by quadratic forms . . . . .	98
<b>Chapter IV. Distance functions . . . . .</b>	<b>103</b>
1. Introduction . . . . .	103
2. General distance-functions . . . . .	105
3. Convex sets . . . . .	108
4. Distance functions and lattices . . . . .	119
<b>Chapter V. MAHLER's compactness theorem . . . . .</b>	<b>121</b>
1. Introduction . . . . .	121
2. Linear transformations . . . . .	122
3. Convergence of lattices . . . . .	126
4. Compactness for lattices . . . . .	134
5. Critical lattices . . . . .	141
6. Bounded star-bodies . . . . .	145
7. Reducibility . . . . .	152
8. Convex bodies . . . . .	155
9. Spheres . . . . .	163
10. Applications to diophantine approximation . . . . .	165
<b>Chapter VI. The theorem of MINKOWSKI-HLAWKA . . . . .</b>	<b>175</b>
1. Introduction . . . . .	175
2. Sublattices of prime index . . . . .	178

	Page
3. The Minkowski-Hlawka theorem . . . . .	181
4. SCHMIDT's theorems . . . . .	184
5. A conjecture of ROGERS . . . . .	187
6. Unbounded star-bodies . . . . .	189
<b>Chapter VII. The quotient space . . . . .</b>	<b>194</b>
1. Introduction . . . . .	194
2. General properties . . . . .	194
3. The sum theorem . . . . .	198
<b>Chapter VIII. Successive minima . . . . .</b>	<b>201</b>
1. Introduction . . . . .	201
2. Spheres . . . . .	205
3. General distance-functions . . . . .	207
4. Convex sets . . . . .	213
5. Polar convex bodies . . . . .	219
<b>Chapter IX. Packings . . . . .</b>	<b>223</b>
1. Introduction . . . . .	223
2. Sets with $V(\mathcal{S}) = 2^n \Delta(\mathcal{S})$ . . . . .	228
3. VORONOI's results . . . . .	231
4. Preparatory lemmas . . . . .	235
5. FEJES TÓTH's theorem . . . . .	240
6. Cylinders . . . . .	245
7. Packing of spheres . . . . .	246
8. The product of $n$ linear forms . . . . .	250
<b>Chapter X. Automorphs . . . . .</b>	<b>256</b>
1. Introduction . . . . .	256
2. Special forms . . . . .	266
3. A method of MORDELL . . . . .	268
4. Existence of automorphs . . . . .	279
5. Isolation theorems . . . . .	286
6. Applications of isolation . . . . .	295
7. An infinity of solutions . . . . .	298
8. Local methods . . . . .	301
<b>Chapter XI. Inhomogeneous problems . . . . .</b>	<b>303</b>
1. Introduction . . . . .	303
2. Convex sets . . . . .	309
3. Transference theorems for convex sets . . . . .	313
4. The product of $n$ linear forms . . . . .	322
<b>Appendix . . . . .</b>	<b>332</b>
<b>References . . . . .</b>	<b>334</b>
<b>Index . . . . .</b>	<b>343</b>