

HANDBOOK OF CONVEX GEOMETRY

Volume A



1983

NORTH-HOLLAND
AMSTERDAM • LONDON • NEW YORK • TOKYO

Contents

Volume A

<i>Preface</i>	v
<i>List of Contributors</i>	xi
0. History of convexity <i>P.M. Gruber</i>	1
Part 1. Classical Convexity	17
1.1. Characterizations of convex sets <i>P. Mani-Levitska</i>	19
1.2. Mixed volumes <i>J.R. Sangwine-Yager</i>	43
1.3. The standard isoperimetric theorem <i>G. Talenti</i>	73
1.4. Stability of geometric inequalities <i>H. Groemer</i>	125
1.5. Selected affine isoperimetric inequalities <i>E. Lutwak</i>	151
1.6. Extremum problems for convex discs and polyhedra <i>A. Florian</i>	177
1.7. Rigidity <i>R. Connelly</i>	223
1.8. Convex surfaces, curvature and surface area measures <i>R. Schneider</i>	273
1.9. The space of convex bodies <i>P.M. Gruber</i>	301
1.10. Aspects of approximation of convex bodies <i>P.M. Gruber</i>	319
1.11. Special convex bodies <i>E. Heil and H. Martini</i>	347
Part 2. Combinatorial Aspects of Convexity	387
2.1. Helly, Radon, and Carathéodory type theorems <i>J. Eckhoff</i>	389

2.2. Problems in discrete and combinatorial geometry	449
<i>P. Schnitt</i>	
2.3. Combinatorial aspects of convex polytopes	485
<i>M.M. Bayer and C.W. Lee</i>	
2.4. Polyhedral manifolds	535
<i>U. Brehm and J.M. Wills</i>	
2.5. Oriented matroids	555
<i>J. Bokowski</i>	
2.6. Algebraic geometry and convexity	603
<i>G. Ewald</i>	
2.7. Mathematical programming and convex geometry	627
<i>P. Grützmann and V. Klee</i>	
2.8. Convexity and discrete optimization	675
<i>R.E. Burkard</i>	
2.9. Geometric algorithms	699
<i>H. Edelsbrunner</i>	
Author Index	xiii
Subject Index	xlvii
 Volume B	
<i>Preface</i>	v
<i>List of Contributors</i>	xi
 Part 3, Discrete Aspects of Convexity	737
3.1. Geometry of numbers	739
<i>P.M. Gruber</i>	
3.2. Lattice points	765
<i>P. Grützmann and J.M. Wills</i>	
3.3. Packing and covering with convex sets	799
<i>G. Fejes Tóth and W. Kuperberg</i>	
3.4. Finite packing and covering	861
<i>P. Grützmann and J.M. Wills</i>	
3.5. Tilings	899
<i>E. Schulte</i>	
3.6. Valuations and dissections	933
<i>P. McMullen</i>	

3.7. Geometric crystallography <i>P. Engel</i>	989
Part 4, Analytic Aspects of Convexity	1043
4.1. Convexity and differential geometry <i>K. Leichtweiß</i>	1045
4.2. Convex functions <i>A.W. Roberts</i>	1081
4.3. Convexity and calculus of variations <i>U. Brechtken-Manderscheid and E. Heil</i>	1105
4.4. On isoperimetric theorems of mathematical physics <i>G. Talenti</i>	1131
4.5. The local theory of normed spaces and its applications to convexity <i>J. Lindenstrauss and V.D. Milman</i>	1149
4.6. Nonexpansive maps and fixed points <i>P.L. Papini</i>	1221
4.7. Critical exponents <i>V. Puk</i>	1237
4.8. Fourier series and spherical harmonics in convexity <i>H. Groemer</i>	1259
4.9. Zonoids and generalisations <i>P. Goodey and W. Weil</i>	1297
4.10. Baire categories in convexity <i>P.M. Gruber</i>	1327
Part 5, Stochastic Aspects of Convexity	1347
5.1. Integral geometry <i>R. Schneider and J.A. Wiercker</i>	1349
5.2. Stochastic geometry <i>W. Weil and J.A. Wiercker</i>	1391
Author Index	xiii
Subject Index	xlvii