

Contents

<i>Preface</i>	<i>page ix</i>
PART ONE LECTURES	1
1 Notes on coarse median spaces <i>B.H. Bowditch</i>	3
1.1 Introduction	3
1.2 Quasi-isometry invariants	4
1.3 Medians	8
1.4 Coarse median spaces	11
1.5 Surfaces	13
1.6 Asymptotic cones	18
2 Semihyperbolicity <i>M.R. Bridson</i>	25
2.1 The universe of finitely presented groups	27
2.2 Some key features of hyperbolic groups	30
2.3 Some properties of CAT(0) groups	37
2.4 Combings and semihyperbolicity	38
2.5 Languages and the complexity of normal forms	46
2.6 Examples	52
2.7 Algorithmic construction of classifying spaces	56
2.8 Cubulated groups and systolic groups	57
2.9 Subgroups	58
2.10 Containments	59
3 Acylindrically hyperbolic groups <i>B. Barrett</i>	65
3.1 Acylindrically hyperbolic groups	65
3.2 Small-cancellation theory	69
3.3 Dehn surgery	72
3.4 The extension problem	75
3.5 Acylindrically hyperbolic structures	78

PART TWO	EXPOSITORY ARTICLES	81
4	A survey on Morse boundaries and stability <i>M. Cordes</i>	83
4.1	Generalizing hyperbolicity	83
4.2	Contracting and Morse boundaries	85
4.3	(Metric) Morse boundary and stability	95
4.4	Stable subgroups	106
4.5	A metrisable topology on the Morse boundary	110
5	What is a hierarchically hyperbolic space? <i>A. Sisto</i>	117
5.1	Heuristic discussion	120
5.2	Technical discussion	129
PART THREE	RESEARCH ARTICLES	149
6	A counterexample to questions about boundaries, stability, and commensurability <i>J. Behrstock</i>	151
6.1	The construction	152
6.2	Properties	153
6.3	Applications	155
6.4	Further questions	157
7	A note on the acylindrical hyperbolicity of groups acting on CAT(0) cube complexes <i>I. Chatterji and A. Martin</i>	160
7.1	Introduction	160
7.2	Über-contractions and acylindrical hyperbolicity	164
7.3	Über-separated hyperplanes and the proof of Theorem 7.1.1	165
7.4	Proof of Theorem 7.1.5	170
7.5	Artin groups of type FC	173
8	Immutability is not uniformly decidable in hyperbolic groups <i>D. Groves and H. Wilton</i>	179
9	Sphere systems, standard form, and cores of products of trees <i>F. Iezzi</i>	186
9.1	Introduction	186
9.2	Spheres, partitions and intersections	189
9.3	Standard form for sphere systems, piece decomposition and dual square complexes	191
9.4	The core of two trees	197
9.5	The inverse construction	207
9.6	Consequences and applications	217

Contents

vii

10 Uniform quasiconvexity of the disc graphs	<i>K.M. Vokes</i>	223
10.1	Introduction	223
10.2	Preliminaries	225
10.3	Exceptional cases	226
10.4	Proof of the main result	226