

Contents

	page
Preface	vii
Chapter 1 Analytic manifolds	1
1.1 Manifolds and differentiability	1
1.2 The tangent bundle	8
1.3 Vector fields	13
Notes	18
Exercises	21
Chapter 2 Lie groups and Lie algebras	24
2.1 Lie groups	24
2.2 The Lie algebra of a Lie group	31
2.3 Homomorphisms of Lie groups	43
2.4 The general linear group	46
Notes	52
Exercises	54
Chapter 3 The Campbell-Baker-Hausdorff formula	58
3.1 The CBH formula for Lie algebras	58
3.2 The CBH formula for Lie groups	61
3.3 Closed subgroups	69
3.4 Simply connected Lie groups	72
Notes	76
Exercises	77
Chapter 4 The geometry of Lie groups	79
4.1 Riemannian manifolds	79
4.2 Invariant metrics on Lie groups	86
4.3 Geodesics on Lie groups	90
Notes	96
Exercises	99

Chapter 5	Lie subgroups and subalgebras	101
5.1	Subgroups and subalgebras	101
5.2	Normal subgroups and ideals	106
	Notes	113
	Exercises	113
Chapter 6	Characterisations and structure of compact Lie groups	115
6.1	Compact groups and Lie groups	115
6.2	Linear Lie groups	119
6.3	Simple and semisimple Lie algebras	121
6.4	The structure of compact Lie groups	131
6.5	Compact connected groups	138
	Notes	151
	Exercises	156
Appendix A	Abstract harmonic analysis	160
A.1	Topological groups	160
A.2	Representations	162
A.3	Compact groups	165
A.4	The Haar integral	167
Bibliography		169
Index		174