Contents

Chapter	- 0	
	inaries	1
		1
§0.1	Introduction	3
§0.2	Measure Spaces	6
§0.3	Integration Absolutely Continuous Measures and Conditional Expectations	8
§0.4	Absolutely Continuous Measures and Conditional Expectations	9
§0.5	Function Spaces Haar Measure	11
3	Character Theory	12
	Endomorphisms of Tori	14
	Perron–Frobenius Theory	16
	Topology	17
30.10	Торогоду	
Chapte		40
Measu	re-Preserving Transformations	19
81.1	Definition and Examples	19
	Problems in Ergodic Theory	23
	Associated Isometries	24
	Recurrence	26
§1.5	Ergodicity	26
§1.6	The Ergodic Theorem	34
	Mixing	39
Chamta	- 2	
Chapte		53
Isomo	rphism, Conjugacy, and Spectral Isomorphism	
§2.1	Point Maps and Set Maps	53
§2.2	Isomorphism of Measure-Preserving Transformations	57
§2.3	Conjugacy of Measure-Preserving Transformations	59
82.4	The Isomorphism Problem	62

viii	Contents
§2.5 Spectral Isomorphism §2.6 Spectral Invariants	63 66
Character 2	
Chapter 3 Measure-Preserving Transformations with Discrete Spectrum	68
§3.1 Eigenvalues and Eigenfunctions	68
§3.2 Discrete Spectrum §3.3 Group Rotations	69 72
Chapter 4 Entropy	75
§4.1 Partitions and Subalgebras	75
§4.2 Entropy of a Partition	77
§4.3 Conditional Entropy	80
§4.4 Entropy of a Measure-Preserving Transformation	86
§4.5 Properties of $h(T, \mathcal{A})$ and $h(T)$	89 94
§4.6 Some Methods for Calculating $h(T)$	100
§4.7 Examples §4.8 How Good an Invariant is Entropy?	103
§4.9 Bernoulli Automorphisms and Kolmogorov Automorphisms	105
§4.10 The Pinsker σ-Algebra of a Measure-Preserving Transformation	113
§4.11 Sequence Entropy	114
§4.12 Non-invertible Transformations	115
§4.13 Comments	116
Chapter 5	
Topological Dynamics	118
§5.1 Examples	118
§5.2 Minimality	120
§5.3 The Non-wandering Set	123
§5.4 Topological Transitivity	127
§5.5 Topological Conjugacy and Discrete Spectrum	133
§5.6 Expansive Homeomorphisms	137
Chapter 6	
Invariant Measures for Continuous Transformations	146
§6.1 Measures on Metric Spaces	146
§6.2 Invariant Measures for Continuous Transformations	150
§6.3 Interpretation of Ergodicity and Mixing	154
§6.4 Relation of Invariant Measures to Non-wandering Sets, Periodic Points and Topological Transitivity	156
§6.5 Unique Ergodicity	158
§6.6 Examples	162
Chapter 7	
Chapter 7 Topological Entropy	164
§7.1 Definition Using Open Covers	164
87.2 Bowen's Definition	168
§7.3 Calculation of Topological Entropy	176

Contents	ix
Chapter 8 Relationship Between Topological Entropy and	
Measure-Theoretic Entropy	182
§8.1 The Entropy Map	182
§8.2 The Variational Principle	187
§8.3 Measures with Maximal Entropy	191 196
§8.4 Entropy of Affine Transformations §8.5 The Distribution of Periodic Points	203
§8.6 Definition of Measure-Theoretic Entropy Using the Metrics d_n	205
Chapter 9	
Topological Pressure and Its Relationship with	205
Invariant Measures	207
§9.1 Topological Pressure	207
§9.2 Properties of Pressure	214
§9.3 The Variational Principle	217 221
§9.4 Pressure Determines $M(X, T)$ §9.5 Equilibrium States	223
Chapter 10	
Applications and Other Topics	229
§10.1 The Qualitative Behaviour of Diffeomorphisms	229
§10.2 The Subadditive Ergodic Theorem and the Multiplicative	
Ergodic Theorem	230
§10.3 Quasi-invariant Measures	236 238
§10.4 Other Types of Isomorphism §10.5 Transformations of Intervals	238
§10.6 Further Reading	239
References	240
Index	247