

Contents

<i>Preface</i>	ix
0 Introduction	1
1. Origins	1
2. Preliminaries	6
3. Conventions	7
1 The principal ergodic theorems	9
1. Uniform distribution (mod 1) and some topological dynamics	9
2. Recurrence and the ergodic theorems of von Neumann and Birkhoff	19
2 Martingales and the ergodic theorem of information theory	29
1. Martingales	29
2. Information	33
3 Mixing	43
1. Ergodicity	43
2. Weak-mixing	47
3. Strong-mixing	49
4. Markov and Bernoulli shifts	52
4. Entropy	56
1. The isomorphism problem	56
2. Entropy as an invariant	59
3. The Pinsker σ -algebra	63
4. Rohlin–Sinai theorem	65
5. Zero entropy	71
5. Some examples	74
1. Flows and changes in velocity	74
2. Winding numbers	75

viii	<i>Contents</i>
3. Abolishing eigenvalues	78
4. Discrete spectrum with 'topological weak-mixing'	82
5. Minimality without unique ergodicity	84
6. Lebesgue spectrum from discrete spectrum	85
7. A weak-mixing transformation which is not strong-mixing	87
Appendix. Spectral theory of unitary operators	90
1. Two basic theorems	90
2. Spectral multiplicity theorems	92
3. Decompositions	96
<i>References</i>	98
<i>Further literature</i>	107
<i>Index</i>	108