

# Contents

Chapter 1. Introduction	1
Chapter 2. Equivariant Geometry and Dynamics	9
2.1. Lie groups, $\Gamma$ -manifolds and representations	9
2.1.1. Compact Lie groups	9
2.1.2. $\Gamma$ -manifolds	10
2.2. Equivariant dynamical systems	13
2.2.1. Discrete dynamical systems	13
2.2.2. Skew and principal extensions	14
2.2.3. Continuous dynamical systems	14
2.3. Local theory	14
2.4. Invariant subspaces and transversality	15
2.5. Basic sets for equivariant diffeomorphisms	16
Chapter 3. Technical preliminaries	19
3.1. Geometry of group actions and maps	19
3.1.1. Isotropy types and strata	19
3.1.2. Orbit structure of twisted products	22
3.1.3. Equivariant vector fields	22
3.1.4. Equivariant maps of twisted products	23
3.2. Equivariant subshifts of finite type: $\Gamma$ finite	24
3.2.1. Subshifts of finite type	24
3.3. Hölder continuity and the Ruelle operator	25
3.4. Equilibrium states	27
<b>Part 1. Markov partitions</b>	29
Chapter 4. Markov partitions for finite group actions	31
4.1. Hyperbolicity	31
4.1.1. Local product structure	32
4.2. Markov partitions & Equivariant symbolic dynamics	33
4.2.1. Symbolic dynamics for $\Gamma$ -basic sets	36
4.2.2. Markov partitions on $\Lambda/\Gamma$	38
4.3. Examples of symmetric hyperbolic basic sets: $\Gamma$ finite	41
4.3.1. Equivariant horseshoes	41

4.3.2. Equivariant attractors	42
4.4. Existence of $\Gamma$ -regular Markov partitions	43
Chapter 5. Transversally hyperbolic sets	47
5.1. Transverse hyperbolicity	47
5.1.1. Examples of transversally hyperbolic sets	49
5.2. Properties of transversally hyperbolic sets	50
5.3. $\Gamma$ -expansiveness	52
5.4. Stability properties of transversally hyperbolic sets	53
5.5. Subshifts of finite type and attractors	54
5.6. Local product structure	55
5.7. Expansiveness and shadowing	56
5.8. Stability of basic sets	58
Chapter 6. Markov partitions for basic sets	59
6.1. Rectangles	59
6.2. Slices	60
6.3. Pre-Markov partitions	60
6.4. Proper and admissible rectangles	62
6.5. $\Gamma$ -regular Markov partitions	64
6.6. Construction of $\Gamma$ -regular Markov partitions	67
<b>Part 2. Stable Ergodicity</b>	71
Chapter 7. Preliminaries	73
7.1. Metrics	73
7.2. The Haar lift	73
7.3. Isotropy and ergodicity	74
7.4. $\Gamma$ -regular Markov partitions	74
7.4.1. Holonomy transformations for basic sets	75
7.5. Measures on the orbit space	75
7.6. Spectral characterization of ergodicity and weak-mixing	77
Chapter 8. Livšic regularity and ergodic components	79
8.1. Livšic regularity	79
8.2. Structure of ergodic components	81
Chapter 9. Stable Ergodicity	85
9.1. Stable ergodicity: $\Gamma$ compact and connected	85
9.2. Stable ergodicity: $\Gamma$ semisimple	88
9.3. Stable ergodicity for attractors	89
9.4. Stable ergodicity and SRB attractors	90
Appendix A. On the absolute continuity of $\nu$	93

Appendix. Bibliography

97