

Contents

| | |
|--|-----|
| Preface | 5 |
| Summary of Notation | 11 |
| 1 A Primer on Feller Semigroups and Feller Processes | 13 |
| 1.1 Feller Semigroups | 14 |
| 1.2 From Feller Processes to Feller Semigroups—and Back..... | 24 |
| 1.3 Resolvents | 27 |
| 1.4 Generators of Feller Semigroups and Processes | 28 |
| 1.5 Feller Semigroups and L^p -Spaces | 38 |
| 2 Feller Generators and Symbols | 41 |
| 2.1 Orientation: Convolution Semigroups and Lévy Processes | 42 |
| 2.2 Positive and Negative Definite Functions | 50 |
| 2.3 Generator and Symbol of a Feller Semigroup on \mathbb{R}^d | 55 |
| 2.4 The symbol of a Stochastic Process | 66 |
| 2.5 The Semimartingale Connection | 71 |
| 3 Construction of Feller Processes | 77 |
| 3.1 The Hille-Yosida Construction | 78 |
| 3.2 Stochastic Differential Equations (SDEs) | 82 |
| 3.3 Dirichlet Forms | 86 |
| 3.4 Evolution Equations | 93 |
| 3.5 The Martingale Problem | 95 |
| 3.6 Unbounded Coefficients | 102 |
| 4 Transformations of Feller Processes | 105 |
| 4.1 Random Time Changes | 105 |
| 4.2 Subordination in the Sense of Bochner | 108 |
| 4.3 Perturbations | 111 |
| 4.4 Feynman–Kac Semigroups | 113 |

| | | |
|----------|--|-----|
| 5 | Sample Path Properties | 117 |
| 5.1 | Probability Estimates | 118 |
| 5.2 | Hausdorff Dimension and Indices | 129 |
| 5.3 | Asymptotic Behaviour of the Sample Paths | 133 |
| 5.4 | The Strong Variation of the Sample Paths | 136 |
| 5.5 | Besov Regularity of Feller Processes | 139 |
| 6 | Global Properties | 145 |
| 6.1 | Functional Inequalities | 145 |
| 6.2 | Coupling Methods | 150 |
| 6.3 | Transience and Recurrence | 162 |
| 7 | Approximation | 169 |
| 7.1 | Constructive Approximation | 170 |
| 7.2 | Simulation | 173 |
| 8 | Open Problems | 177 |
| | References | 179 |
| | Index | 195 |