EXPONENTIAL STABILITY OF STOCHASTIC DIFFERENTIAL EQUATIONS

Contents

Preface General Notation		V
		x
1.	Semimartingales with Spatial Parameters and Stochastic Integrals	
	1.1. Introduction	1
	1.2. Preliminaries on stochastic processes	2
	1.3. C-semimartingales with spatial parameters	12
	1.4. Stochastic integrals with nonlinear integrators	17
	1.5. Generalized Itô's formula and others	20
	1.6. Time change formula of stochastic integrals	22
	1.7. Inequalities	24
2.	Stochastic Differential Equations	
	2.1. Introduction	33
	2.2. One-dimensional stochastic differential equations	36
	2.3. Special d-dimensional stochastic differential equations	55
	2.4. General d-dimensional stochastic differential equations	58
	2.5. Lp-estimates of solutions	72
	2.6. Almost surely asymptotic bounds of solutions	76
	2.7. Stochastic flows and stochastic differential equations	89
3.	Stochastic Differential Delay Equations	
	3.1. Introduction	93
	3.2. Existence and uniqueness of solutions	94
	3.3. Bounded stochastic integral contractors and solutions	101
	3.4. Cauchy-Maruyama's approximate solutions	117
	3.5. Carathéodory's approximate solutions	124
	3.6. LP-estimates	132
	3.7 Almost surely asymptotic bounds of solutions	134

x Contents

4.	Exponential Stability of Stochastic Differential Equations	
	4.1. Introduction	147
	4.2. Almost sure exponential stability	148
	4.3. Pth moment exponential stability	163
	4.4. Stochastic stabilization and destabilization	167
	4.5. Lyapunov exponents of stochastic flows	172
	4.6. Stochastic oscillators	176
5.	Almost Sure Exponential Stability of Stochastic Differential Delay Equations	
	5.1. Introduction	183
	5.2. Equations with constant delay	184
	5.3. Equations with variable delay	195
	5.4. Stochastic differential functional equations	201
	5.5. Examples	215
6.	Moment Exponential Stability of Stochastic Differential Delay Equations	
	6.1. Introduction	223
	6.2. Pth moment exponential stability of delay equations	224
	6.3. Generalizations	229
	6.4. Pth moment exponential stability of functional equations	238
	6.5. Pth moment exponential stability of functional equations with	
	perturbation	243
	6.6. Examples	251
7.	Exponential Stability of Stochastic Differential Equations with Small Time Lag	
	7.1. Introduction	259
	7.2. Linear equations with small time lag	260
	7.3. Semi-linear equations with small time lag	265
	7.4. Non-linear equations with small time lag	266
	7.5. Further remarks and examples	273
8.	Exponential Stability of Large-Scale Stochastic Differential Delay Systems	
	8.1. Introduction	277
	8.2. Definitions and relationships between various exponential stabilities	279
	8.3. Large-scale stochastic delay systems in hierarchical form	283
	8.4. General large-scale stochastic delay systems	288
	8.5. Applications	290
Re	eferences	295
Inc	dex	305