

Contents

Introduction	1
1 Linear differential systems with parameter excitation	9
1.1 The model	10
1.2 Spherical coordinates for linear systems	12
1.3 The Multiplicative Ergodic Theorem: Lyapunov exponents ...	20
1.4 The deterministic case: Lyapunov exponents for asymptotically constant linear systems	28
1.5 Sample systems	44
2 Locality and time scales of the underlying non-degenerate stochastic system: Freidlin-Wentzell theory	53
2.1 Preliminaries and assumptions	55
2.2 The limiting distribution (stationary measure)	60
2.3 The large deviations principle	68
2.4 Exit probabilities for non-degenerate systems	72
2.5 Sublimiting distributions: Metastability and quasi-deterministic behavior	91
2.6 Sample systems	108
3 Exit probabilities for degenerate systems	125
3.1 Exit probabilities for degenerate systems depending on a small parameter	126
3.2 Uniform consequence for the exit probability	140
4 Local Lyapunov exponents	143
4.1 Local Lyapunov exponents: upper and lower bound	144
4.2 The local growth rate of the determinant	156
4.3 Local Lyapunov exponents in the diagonal case	157

4.4	Local Lyapunov exponents in the two-dimensional, general case.....	177
4.4.1	Qualitative theory of nonlinear real noise systems on time scales.....	178
4.4.2	The local Lyapunov exponent.....	186
4.5	Concluding remarks.....	226
	Notations	231
	Bibliography	239
	Index	253