Contents

Introduction 1
Chapter I: Preliminaries 11
1 Attractors of evolutionary equations 11
2 Invariant manifolds 13
Chapter II: Local spectral asymptotics 17
3 Spectral asymptotics 17
4 Examples of local spectral asymptotics 22
Chapter III: Global spectral asymptotics 26
5 Global spectral asymptotics of trajectories 26
Chapter IV: Uniform approximation of trajectories of semigroups depending on a parameter 36
6 The principal asymptotic term 36
7 Stabilised asymptotics of solutions of reaction-diffusion systems, hyperbolic and parabolic equations 44
Chapter V: The asymptotics of solutions of reaction-diffusion equations with small parameter 52
8 Formulation of the problem 52
9 A priori estimates 56
10 The stabilised asymptotics of $u(t)$ 62
Chapter VI: Asymptotics of elements lying on the attractor of solutions of the perturbed evolutionary equations 69
11 The main result 69
12 Construction of the asymptotic expansion 71
13 Proof of Theorem 12.1 79
14 Proof of Propositions 13.1 - 13.3 85
15 Problem with boundary conditions $u|_{\partial \Omega} = 0$, $\Delta u |_{\partial \Omega} = 0$ 93
Chapter VII: Asymptotics of solutions of singular perturbed evolutionary equations 97
16 Asymptotics of trajectories of the first boundary value problem 97
17 Global asymptotics of solutions of singular perturbed equation 106
Appendix: Non-autonomous dynamical systems and their attractors

A1 Processes corresponding to non-autonomous equations and systems in mathematical physics
A2 Families of processes and their attractors: the general framework
A3 Attractors of families of processes generated by non-autonomous equations and systems in mathematical physics
A4 Upper bounds for the dimension of attractors of non-autonomous dynamic systems with quasi-periodic terms
A5 On finite-dimensionality of attractors of non-autonomous equations in mathematical physics with quasi-periodic terms
A6 Sections of attractors and their dimensionality; the case of almost periodic terms

References