

## Contents

---

<i>Preface</i>	<i>page ix</i>
<b>Introduction</b>	1
<b>1 Global Attraction to Stationary States</b>	13
1.1 Free d'Alembert Equation	13
1.2 A String Coupled to a Nonlinear Oscillator	14
1.3 String Coupled to Several Nonlinear Oscillators	28
1.4 Space-Localized Nonlinearity	43
1.5 Wave-Particle System	56
1.6 Maxwell-Lorentz Equations: Radiation Damping	66
1.7 Wave Equations with Concentrated Nonlinearities	68
1.8 Comparison with Dissipative Systems	76
<b>2 Global Attraction to Solitons</b>	77
2.1 Translation-Invariant Wave-Particle System	77
2.2 The Case of Weak Coupling	89
<b>3 Global Attraction to Stationary Orbits</b>	91
3.1 Nonlinear Klein-Gordon Equation	91
3.2 Generalizations and Open Questions	94
3.3 Omega-Limit Trajectories	95
3.4 Limiting Absorption Principle	96
3.5 A Nonlinear Analog of Kato's Theorem	99
3.6 Splitting into Dispersive and Bound Components	102
3.7 Omega-Compactness	103
3.8 Reduction of Spectrum to Spectral Gap	104
3.9 Reduction of Spectrum to a Single Point	105
3.10 On the Nonlinear Radiative Mechanism	107
3.11 Conjecture on Attractors of $G$ -Invariant PDEs	111

<b>4</b>	<b>Asymptotic Stability of Stationary Orbits and Solitons</b>	114
4.1	Orthogonal Projection	114
4.2	Symplectic Projection	116
4.3	Generalizations and Applications	120
4.4	Further Generalizations	122
4.5	The 1D Schrödinger Equation Coupled to an Oscillator	124
<b>5</b>	<b>Adiabatic Effective Dynamics of Solitons</b>	166
5.1	Solitons in Slowly Varying External Potentials	166
5.2	Mass–Energy Equivalence	168
<b>6</b>	<b>Numerical Simulation of Solitons</b>	170
6.1	Kinks of Relativistic Equations	170
6.2	Numerical Observation of Soliton Asymptotics	174
6.3	Adiabatic Effective Dynamics of Relativistic Solitons	174
<b>7</b>	<b>Dispersive Decay</b>	178
7.1	The Schrödinger and Klein–Gordon Equations	178
7.2	Decay $L^1 - L^\infty$ for 3D Schrödinger Equations	180
<b>8</b>	<b>Attractors and Quantum Mechanics</b>	192
8.1	Bohr’s Postulates	192
8.2	On Dynamical Interpretation of Quantum Jumps	194
8.3	Bohr’s Postulates via Perturbation Theory	197
8.4	Conclusion	198
	<i>Bibliography</i>	200
	<i>Index</i>	212