

Contents

Part I	Nonlinear Equations	
<hr/>		
Multisoliton-like Solutions of Wave Propagation in Periodic Nonlinear Structures By A.B. Aceves and S. Wabnitz		3
Complex Deformation of Integrable Hamiltonians over Generalized Jacobi Varieties By S.J. Alber		6
Collective Coordinates by a Variational Approach: Problems for Sine Gordon and Φ^4 Models By J.G. Caputo and N. Flytzanis		21
Spatiotemporal Chaos in the Nonlinear Three Wave Interaction By C.C. Chow, A. Bers, and A.K. Ram (With 1 Figure)		25
On the Instability of the Static Soliton-like "Bubbles" By A. de Bouard		29
Symplectic and Hamiltonian Structures of Nonlinear Evolution Equations By I.Ya. Dorfman		32
A Fuchs Extension to the Painlevé Test By R. Conte, A.P. Fordy, and A. Pickering		35
Modulation Equations for Nearly Integrable PDEs with Periodic Boundary Conditions By M.G. Forest		45
Spectrum of Domain Wall Excitations in YIG By A.V. Mikhailov and I.A. Shimokhin (With 4 Figures)		47
Interaction of Defects in Nonlinear Dissipative Fields By L.M. Pismen, J. Rubinstein, A.A. Nepomnyashchy, and J.D. Rodriguez		53
On the Analytic Degenerate Dispersion Laws By E.I. Schulman and D.D. Tskhakaya		60

Breaking Solitons. Systems of Hydrodynamic Type By O.I. Bogoyavlenskij	67
Real and Virtual Multidimensional Solitons By M. Boiti, L. Martina, O.K. Pashaev, and F. Pempinelli	77
Resolvent Approach for the Nonstationary Schrödinger Equation with Line-Type Potential* By M. Boiti, F. Pempinelli, A.K. Pogrebkov, and M.C. Polivanov	82
Lattice Construction of Quantum Integrable Systems By D.A. Coker	87
Combining Dressing and Nonlocality By A. Degasperis	91
Initial Boundary-Value Problems for Soliton Equations By A.S. Fokas	96
Non-Perturbative Two-Dimensional Quantum Gravity and the Isomonodromy Method By A.S. Fokas, A.R. Its, and A.V. Kitaev	102
The Action of the Virasoro Nonisospectral KdV Symmetries of the Whitham Equations By P.G. Grinevich	108
A Generalized Sato's Equation of the KP Theory and Weyl Algebra By Y. Kodama	113
Quasirelativistic Analogs of Lax Equations By B.A. Kupershmidt	114
$n \times n$ Zakharov-Shabat System of the Form $(d\psi/dx)(z^2 - 1/z^2)J\psi + (zQ + P + R/z)\psi$ By J.-H. Lee	118
Homoclinic Orbits and Bäcklund Transformations for the Doubly Periodic Davey-Stewartson Equation By Y. Li and D.W. McLaughlin (With 2 Figures)	122
Volterra Operator Algebra for Zero Curvature Representation. Universality of KP By A.Yu. Orlov	126
Calculation of All Commutation Relations Among Scattering Data Without Using the R-Matrix Approach By G.D. Pang and A.S. Fokas	132
Fluctuating Solitons of the KdV Hierarchy By L. Trlifaj	136

The Periodic Fixed Points of Bäcklund Transformations By J. Weiss (With 3 Figures)	139
IST for KPI By Xin Zhou	148

Part III	Plasmas
-----------------	----------------

A Physical Model for Nonlinear, Supersonic Equatorial Bubbles By W.J. Burke and T.L. Aggson (With 3 Figures)	153
Nonlinear Dynamics of Electron Cyclotron Heated Plasmas By G.E. Guest	166
Nonlinear Evolution of Alfvén Waves in Space Plasmas By T. Hada	169
Alfvén Solitons and the DNLS Equation By R.L. Hamilton, C.F. Kennel, and E. Mjølhus	175
On the Analytical Theory for Self-Focusing of Radiation By V.M. Malkin	179
Ionospheric Langmuir Turbulence Driven by an Electromagnetic Pump Below the Upper-Hybrid Frequency By D.L. Newman and M.V. Goldman (With 3 Figures)	180
Mode Conversions in Ionospheric Modification Experiments By N.N. Rao and D.J. Kaup (With 2 Figures)	185
On the Superstrong Wave Collapse By V.F. Shvets (With 2 Figures)	191
A Moving Boundary Problem in Plasma Physics By N. Sternberg and V.A. Godyak	195
Proton-Whistler Interactions in the Radiation Belts By E. Villalón and W.J. Burke (With 1 Figure)	199

Part IV	Nonlinear Optics
----------------	-------------------------

Optical Turbulence in Semiconductor Lasers By E. Abraham, H. Adachihara, O. Hess, R.A. Indik, P. Jacobsen, J.V. Moloney, and P. Ru (With 2 Figures)	213
Chaotic Dynamics Due to Competition Among Degenerate Modes in a Ring-Cavity Laser By A. Aceves, D.D. Holm, and G. Kovacic (With 2 Figures)	218
Quantum Self Phase Modulation in Optical Fibres By K.J. Blow, R. Loudon, and S.J.D. Phoenix (With 1 Figure)	228

Quantum Groups: Q-Boson Theories of Integrable Models and Applications in Non-Linear Optics By R.K. Bullough and N.M. Bogoliubov (With 1 Figure)	232
Perturbation Method and Optical Solitons By Y. Kodama	241
Birefringent Optical Fibers: Modulational Instability in a Near-Integrable System By D.J. Muraki, O.C. Wright, and D.W. McLaughlin	242
Rigorous Results in Quantum Theory of Stimulated Raman Scattering By V.I. Rupakov	247
Bäcklund Transformations as Physical Equations By H. Steudel (With 1 Figure)	252
Level Splitting and Band Formation of Dark Soliton Eigenvalues By G.A. Swartzlander Jr. (With 2 Figures)	256
Soliton Propagation in a Random Medium By P.K.A. Wai, C.R. Menyuk, and H.H. Chen (With 1 Figure)	261

Part V	Hydrodynamics and Turbulence
---------------	-------------------------------------

Length Scales and the Navier-Stokes Equations By M. Bartuccelli, C.D. Doering, J.D. Gibbon, and S.J.A. Malham	267
Local and Nonlocal Transfer of Motion Integrals in Wave Turbulence By G.E. Falkovich and M.D. Spector	271
Weak and Strong Turbulence in the CGL Equation By J.D. Gibbon, M.V. Bartuccelli, and C.R. Doering	275
Numerical Test of a Weak Turbulence Approximation for an Electromagnetically Driven Langmuir Turbulence By A. Hanssen and E. Mjølhus	279
Drift Wave Vortices in Inhomogeneous Plasmas By W. Horton, X. Su, and P.J. Morrison (With 3 Figures)	281
Solitons on a Vortex Filament with Axial Flow By Y.H. Ichikawa, K. Konno, and H. Ohno (With 1 Figure)	291
Lagrangian Statistics of Turbulence By Y. Kaneda	299
Pattern Formation Via Resonant Interactions in Fluid Flows By S. Leibovich and A. Mahalov	303

Length Scale of Vortices and Mode Competition in Quasi 2D Shear Flows By D.Yu. Manin	305
Dynamics of Vortex-Current Filaments in MHD Plasma By V.I. Petviashvili (With 1 Figure)	306
Success of Arnol'd's Method in a Hierarchy of Ocean Models By P. Ripa	310
Wavelets and Two Dimensional Turbulence By J. Weiss (With 3 Figures)	315

Part VI **Inverse Scattering Problems**

Spectral Theory of Linear λ -Matrices and the Solution of Certain Nonlinear Algebraic and Functional Equations By B.A. Dubrovin, A.S. Fokas, and P.M. Santini	329
Nonlinear Acoustic Tomography By P. Monk (With 2 Figures)	334
Spectral Transform for Nonlinear Evolution Equations with N Space Dimensions By P.C. Sabatier	339
Index of Contributors	343