

CONTENTS

LECTURES

Andreas Arvanitoyeorgos

LIE TRANSFORMATION GROUPS AND GEOMETRY	11
1. Introduction	11
2. Lie Groups	13
3. Homogeneous spaces	21
4. Geometry of compact Lie groups and homogeneous spaces	24
5. Homogeneous Einstein metrics	28
References	33

Vladimir S. Gerdjikov and Nikolay A. Kostov

ON MULTICOMPONENT mKdV EQUATIONS ON SYMMETRIC SPACES OF DIH -TYPE AND THEIR REDUCTIONS	36
1. Introduction	36
2. Preliminaries	38
3. The Fundamental Analytic Solutions and the Riemann-Hilbert Problem	44
4. Finite Order Reductions of MMKdV Equations	51
5. Conclusions	63
References	63

Jan J. Ślawnowski and Vasyl Kovalchuk

SEARCH FOR THE GEOMETRODYNAMICAL GAUGE GROUP. HYPOTHESES AND SOME RESULTS	66
1. Introductory Remarks. Four-Component versus Two-Component Spinors in Special Relativity	66
2. Spinors, Fermions and Four-Dimensional Einstein-Cartan Gravitation. Some Standard Ideas, Doubts and Questions	84
3. $U(2,2)$ as an Expected Fundamental Symmetry in Spinor Geometrodynamics	107
Final Remarks	130
References	131

CONTRIBUTIONS

Victor Atanasov and Rossen Dandoloff

FROM DEFORMED SURFACES WITH PRESCRIBED QUANTUM
PROPERTIES TO NEW TWO-DIMENSIONAL QUANTUM DEVICES 135

Julia Bernatska and Petro Holod

GEOMETRY AND TOPOLOGY OF COADJOINT ORBITS OF
SEMISIMPLE LIE GROUPS 146

Giovanni Calvaruso and Zdeněk Dušek

A NULL GEODESIC ORBIT SPACE WHOSE NULL ORBITS REQUIRE
A REPARAMETRIZATION 167

**Peter Djondjorov, Mariana Hadzhilazova, Ivaïlo Mladenov and Vassil Vas-
silev**

EXPLICIT PARAMETERIZATION OF EULER'S ELASTICA 175

Stoil Donev and Maria Tashkova

NONLINEAR CONNECTIONS AND DESCRIPTION OF PHOTON-LIKE
OBJECTS 187

Simona L. Druță

THE SECTIONAL CURVATURE OF THE TANGENT BUNDLES WITH
GENERAL NATURAL LIFTED METRICS 198

Dorel Fetcu

INTEGRAL SUBMANIFOLDS IN THREE-SASAKIAN MANIFOLDS
WHOSE MEAN CURVATURE VECTOR FIELDS ARE EIGENVECTORS
OF THE LAPLACE OPERATOR 210

Nikolay A. Kostov, Vladimir S. Gerdjikov and Tihomir I. Valchev

BOSE-FERMI MIXTURES IN TWO OPTICAL LATTICES 224

Assen Kyuldjiev, Vladimir Gerdjikov, Giuseppe Marmo and Gaetano Vilasi ON THE EQUIVALENCE BETWEEN MANEV AND KEPLER PROBLEMS.....	241
Rémi Léandre CHEN-SOURIAU CALCULUS FOR ROUGH LOOPS.....	252
Josef Mikeš, Irena Hinterleitner and Alena Vanžurová ONE REMARK ON VARIATIONAL PROPERTIES OF GEODESICS IN PSEUDORIEMANNIAN AND GENERALIZED FINSLER SPACES.....	261
Petko Nikolov, Lora Nikolova and Gergana Ruseva THE GENERAL NOTION OF A CURVATURE IN CATASTROPHE THEORY TERMS.....	265
Vladimir Pulov, Ivan Uzunov and Edy Chacarov FINDING LIE SYMMETRIES OF PARTIAL DIFFERENTIAL EQUATIONS WITH MATHEMATICA®: APPLICATIONS TO NONLINEAR FIBER OPTICS.....	280
Tsetska G. Rashkova and Ivailo M. Mladenov AN ALGEBRAIC APPROACH TO SAXON-HUTNER THEOREM.....	292
Gijs M. Tuynman PREQUANTIZATION OF SYMPLECTIC SUPERMANIFOLDS.....	301
Tihomir Valchev ON THE KAUP-KUPERSHMIDT EQUATION. COMPLETENESS RELATIONS FOR THE SQUARED SOLUTIONS.....	308
Gaetano Vilasi ON THE POLARIZATION OF GRAVITATIONAL WAVES.....	320

<i>Subject Index</i>	335
<i>E-mail Addresses</i>	337