

GEOMETRIC METHODS IN PHYSICS

Proceedings of the XXVIII Workshop on
Geometric Methods in Physics

Białowieża, Poland

28 June – 4 July 2009

EDITORS

Piotr Kielanowski

University of Białystok, Poland

and

Cinvestav, México City, México

S. Twareque Ali

Concordia University, Montréal, Quebec, Canada

Anatol Odziejewicz

University of Białystok, Poland

Martin Schlichenmaier

University of Luxembourg, Luxembourg

Theodore Voronov

University of Manchester, United Kingdom

All papers have been peer reviewed

SPONSORING ORGANIZATION

University of Białystok, Poland

**AMERICAN
INSTITUTE
OF PHYSICS**

Melville, New York, 2009

AIP CONFERENCE PROCEEDINGS ■ 1191

Editors

Piotr Kielanowski
Departamento de Física
Cinvestav
Av. IPN 2508
07360 México D.F.
México

E-mail: kiel@physics.utexas.edu

Martin Schlichenmaier
Mathematics Institute, FSTC
University of Luxembourg
162A, avenue de la Faiencerie
L-1511 Luxembourg City
Luxembourg

E-mail: martin.schlichenmaier@uni.lu

S. Twareque Ali
Dept. of Mathematics and Statistics
Concordia University
1455 de Maisonneuve W.
Montréal, QC H3G 1M8
Canada

E-mail: stali@mathstat.concordia.ca

Theodore Voronov
School of Mathematics
University of Manchester
Oxford Road
Manchester M13 9PL
United Kingdom

E-mail: theodore.voronov@manchester.ac.uk

Anatol Odziejewicz
Institute of Mathematics
University of Białystok
ul. Akademicka 2
15-267 Białystok
Poland

E-mail: aodziejew@uwb.edu.pl

Authorization to photocopy items for internal or personal use, beyond the free copying permitted under the 1978 U.S. Copyright Law (see statement below), is granted by the American Institute of Physics for users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$25.00 per copy is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923, USA. For those organizations that have been granted a photocopy license by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Services is: 978-0-7354-0728-2/09/\$25.00

© 2009 American Institute of Physics

Permission is granted to quote from the AIP Conference Proceedings with the customary acknowledgment of the source. Republication of an article or portions thereof (e.g., extensive excerpts, figures, tables, etc.) in original form or in translation, as well as other types of reuse (e.g., in course packs) require formal permission from AIP and may be subject to fees. As a courtesy, the author of the original proceedings article should be informed of any request for republication/reuse. Permission may be obtained online using Rightslink. Locate the article online at <http://proceedings.aip.org>, then simply click on the Rightslink icon/"Permission for Reuse" link found in the article abstract. You may also address requests to: AIP Office of Rights and Permissions, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502, USA; Fax: 516-576-2450; Tel.: 516-576-2268; E-mail: rights@aip.org.

L.C. Catalog Card No. 2009911101
ISBN 978-0-7354-0728-2 (Original Print)
ISSN 0094-243X
Printed in the United States of America

CONTENTS

Preface	vii
Participants	ix
Group Photograph	xi
 On Extensions of the Legendre Transform	 1
A. B. Antonevich	
A Survey on Weyl Calculus for Representations of Nilpotent Lie Groups	7
I. Beltiță and D. Beltiță	
The Jacobi Group and the Squeezed States—Some Comments	21
S. Berceanu	
Non-Formal Deformation Quantization and Symmetric Spaces	30
P. Bieliavsky	
Heat Equations and Sigma Functions	46
V. M. Buchstaber	
Global Anomaly and Stability of Fold Product of Complex Two-Cycles	59
A. A. Bytsenko	
Path Space Forms and Surface Holonomy	66
S. Chatterjee, A. Lahiri, and A. N. Sengupta	
Rigid Body Systems of Hess-Appel’rot Type and Partial Reductions	72
V. Dragović, B. Gajić, and B. Jovanović	
Relativistic Equations for Spin Particles: What can We Learn from Noncommutativity?	80
V. V. Dvoeglazov	
The Poisson Equations in the Nonholonomic Suslov Problem: Integrability, Meromorphic and Hypergeometric Solutions	85
Y. N. Fedorov, A. J. Maciejewski, and M. Przybylska	
Some Integrable Systems on the Banach Lie-Poisson Space $i\mathbb{R} \oplus \mathcal{U}_{\text{res}}^1$	91
T. Goliński and A. Odziejewicz	
$\varphi(\text{Ric})$-Vector Fields on Conformally Flat Spaces	98
I. Hinterleitner and V. Kiosak	
An Algebraic Method of Factorization of Ordinary Differential Operators . .	104
M. N. Hounkonnou and P. D. Sielenou	
Discretization of Tori of Exceptional Compact Simple Lie Groups	110
J. Hrivnák and J. Patera	
Quantum Ball	116
G. Jakimowicz and A. Odziejewicz	
A Poisson Structure in White-Noise Analysis	123
R. Léandre	
On the Analyticity of the Bergman Transform	127
R. Maj and Z. Pasternak-Winiarski	
On the Whewell Parameterization of the Euler Elastica	133
I. M. Mladenov, M. Ts. Hadzhilazova, P. A. Djondjorov, and V. M. Vassilev	
Graded Commutative Algebras: Examples, Classification, Open Problems . . .	141
S. Morier-Genoud and V. Ovsienko	

Quasicrystal Models in Cryptography	148
M. Nesterenko and J. Patera	
Invariant Variational Problems and Cartan Connections on Gauge-Natural Bundles	160
M. Palese and E. Winterroth	
Spectra of Photon Down Conversion	166
J. Smotlacha, G. Chadzitaskos, and C. Daskaloyannis	
Geometry and Dynamics of the Pentagram Map	172
S. Tabachnikov	
Group Transformations with Discrete Parameter and Invariant Schrödinger Equation	182
I. Tsyfra and T. Czyżycki	
Examples of Star Exponentials	188
A. Yoshioka	
Author Index	195