

PREFACE

The present volume contains 18 contributions offered by the participants of the “Workshop on Lie groups and Lie algebras”, held from September 4 to September 15, 2000 at the Mathematical Conference Center, Będlewo near Poznań. Over fifty participants took part in this event, some of them for the whole period, and others for part of it only.

The conference was part of the programme of the Stefan Banach International Mathematical Center, but it was also included in the series of semi-annual meetings of the “Seminar Sophus Lie”, taking place at various locations in Germany, Austria and France for more than twelve years now (cf. detailed information about SSL at <http://www.math.tu-clausthal.de/~majhi/Seminare/SSLallg.html>). In fact the conference originated from the desire of the Polish members of the Organizing Committee to bring “Sophus Lie” to Poland. However, in accordance with the usual formula of the meetings organized by the Stefan Banach International Mathematical Center, the programme of the Workshop was so conceived as to combine high-level research presentations typical for the meetings of SSL with introductory material addressed to young researchers and surveys of recent progress in the field. This was achieved by combining in the programme research communications and longer mini-courses, usually consisting of three one-hour lectures devoted to a specialized topic and given by invited lecturers distinguished by their ability to make a clear presentation with a balanced choice of material.

Keeping to the tradition of SSL, the choice of *Harmonic Analysis on Finite-Dimensional Lie Groups and their Homogeneous Spaces* and of *Structure, Geometry and Representation Theory of Infinite-Dimensional Lie Groups* as the main points of the Workshop was a natural one. These two broadly delimited areas also determined the prevailing themes for the two weeks of the conference. The first week, with mini-courses by G. Misiołek, K.-H. Neeb, B. Ørsted, and J. Wolf, was focused mainly on the infinite-dimensional case, while the second one, when the participants could attend the mini-courses of W. Bertram, G. van Dijk and M. Pevzner, J. Faraut, and J. Hilgert, was more oriented toward the finite-dimensional situation. The lectures of J. Mickelsson on new developments in representation theory inspired by quantum physics turned out to be a bridge between the two areas.

Since only a few mini-courses have been transcribed into a written form, we consider it appropriate, in recognition of the efforts of all the lecturers, to give a full list of mini-courses:

Gerard Misiolek, *Diffeomorphism groups and nonlinear PDE's*

Jouko Mickelsson, *Approximative representations of gauge groups from quantizations.*

Gerbes and infinite-dimensional Lie groups

Karl-Hermann Neeb, *Unitary highest weight representations of locally finite Lie algebras*

Joseph A. Wolf, *The Bott–Borel–Weil theorem for direct limit groups*

during the first week and

Wolfgang Bertram, *Symmetric spaces with Jordan structure*

G. van Dijk and M. Pevzner, *On canonical representations and matrix valued Berezin kernels*

Jacques Faraut, *Laplace spherical analysis on ordered symmetric spaces*

Joachim Hilgert, *Geodesic flows on locally symmetric spaces*

during the second.

As already said, the articles in the present volume reflect only partially the scientific activities of the conference. For the record we also list the lectures presented during the conference which, by the decision of their authors, were not included in the Proceedings volume:

Ilka Agricola, *On the algebra of K -invariant vector fields on a symmetric space G/K*

Harald Biller, *Continuous tensor products of highest weight representations*

Günther Czichowski, *Structure groups and equivalence of Abel and Lie equations*

Ewa Damek, *Harmonic and pluriharmonic functions on symmetric Siegel domains*

Thomas Friedrich, *Weak holonomy in dimension $n = 16$*

Hans Plesner Jakobsen, *Deformation quantization connected with quadratic algebras and Lie algebras*

Aleksei Kuchin, *An analogue of the Hilbert transform for the hyperboloid of one sheet*

Harald Löwe, *The classification of symmetric planes*

Claus Mokler, *The $\mathbb{C}$ -valued points of the algebra of strongly regular functions of a Kac–Moody group*

Margit Rösler, *Multivariable Bessel functions related with root systems*

Wolfgang A. F. Ruppert, *Asymptotics of subsemigroups of $SL(2, \mathbb{R})$*

Aleksander Strasburger, *Bochner–Coifman–Howe periodicity relations*

Bartosz Trojan, *Pluriharmonic functions on homogeneous Siegel domains*

Roman Urban, *Unbounded harmonic functions on homogeneous manifolds of negative curvature*

Erhard Weidenauer, *Decomposition of loop groups*

Wojciech Wojtyński, *Banach string-Lie groups*

Michael Wüstner, *Factoring a Lie group into a compactly embedded and a solvable subgroup*

According to the prevailing opinion of the participants, the conference was a great success. If this was really so, we owe it in equal parts to the efforts of the lecturers and the warm response of the younger participants, the smooth and efficient work of the administrative staff of the Stefan Banach International Mathematical Center, Warsaw,

headed by Mrs. Grażyna Pieścik-Bojarska, and of the Mathematical Conference Center, Będlewo, headed by Mrs. Anna Kreczmar-Puacz. The Będlewo staff not only provided vast compensation of our daily expenses of energy, but also introduced us to the marvels of Polish traditional cookery. We address our hearty thanks to them all.

The technical facilities of the newly established Mathematical Conference Center in Będlewo and its beautiful natural surroundings contributed substantially to creating simultaneously great working conditions and ample possibilities for recreation.

Last but not least, we should mention the substantial financial aid obtained from the Volkswagen Stiftung and the Polish-German Cooperation Foundation. The Institute of Mathematics of the University of Białystok also provided valuable help during the early stages of the preparations for the conference. We wish to express our deep appreciation to all those institutions.

The Editors