

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

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Representation Theory and Harmonic Analysis

Organised by
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November 14th – November 20th, 2010

ABSTRACT. The workshop gave an overview of current research in the representation theory and harmonic analysis of reductive Lie groups and its relation to algebraic number theory. Some particular topics covered in the 17 talks related to unitarity questions and globalizations for Harish–Chandra modules, Fourier transformation on symmetric spaces and p -adic groups, affine Hecke algebras or the spectral theory of automorphic forms and trace formulas.

Mathematics Subject Classification (2000): 22xx, 43xx.

Introduction by the Organisers

The international conference *Representation Theory and Harmonic Analysis*, organized by Toshiyuki Kobayashi (Tokyo) and Bernhard Krötz (Hannover) was held November 14th – November 20th, 2010. The general theme was representation theory of real and p -adic reductive Lie groups, also in connection to automorphic forms. Further talks included relations to other fields such as lattice counting, infinite symmetric groups or quantum ergodicity.

The format of the workshop consisted of 2-hour lectures by leading specialists supplemented by shorter presentations, many of which were given by younger participants. In between the talks the schedule reserved plenty of time for informal discussions. Thursday was reserved for a joint session with the parallel workshop on infinite-dimensional representation theory.

Topics covered in the presentations included unitarity questions and globalizations for Harish–Chandra modules, Fourier and Radon transforms on symmetric spaces or p -adic groups, affine Hecke algebras or the spectral theory of automorphic forms and trace formulas.

More specifically, as major topics of the workshop Schmid proposed Hodge–theory as an ingredient to understand the unitary dual of a real reductive Lie group in terms of its Harish–Chandra modules, and Bernstein gave an alternative approach to Casselman–Wallach’s theorem about the unique smooth globalization of Harish–Chandra modules. The latter was supplemented by Gimperlein’s talk for the analytic case.

Questions from classical harmonic analysis and Fourier transformation were treated in Delorme’s presentation of a Plancherel theorem for p -adic reductive groups, in the shorter contributions by van den Ban and Kuit for symmetric spaces as well as by Sayag and Vargas.

The spectral theory of automorphic forms and trace formulas were surveyed by Müller. The number theoretic issues were followed up on by Offen’s application of a relative trace formula to period integrals. Aizenbud generalized Jaquet’s smooth transfer of Kloosterman integrals to the Archimedean case. Also of relevance to local trace formulas, Opdam employed techniques for affine Hecke algebras to generalize a formula by Arthur for an Euler–Poincaré pairing to fields of arbitrary characteristic.

Among the further topics, Sahi outlined a detailed analysis of Whittaker functionals and associated varieties for irreducible unitary representations of $GL(n, \mathbb{R})$. In a shorter presentation, Möllers exhibited explicit L^2 -models for minimal representations. Connections to the infinite-dimensional theory featured in the parallel workshop were present in Neretin’s talk on the permutation group S_∞ . Hilgert discussed quantum ergodicity on Riemannian symmetric spaces of noncompact type. Finally, the desingularization of deformation spaces associated to discontinuous group actions was considered by Yoshino.