Mathematisches Forschungsinstitut Oberwolfach

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Algebraic Groups

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Abstract. Linear algebraic groups is an active research area in contemporary mathematics. It has rich connections to algebraic geometry, representation theory, algebraic combinatorics, number theory, algebraic topology, and differential equations. The foundations of this theory were laid by A. Borel, C. Chevalley, J.-P. Serre, T. A. Springer and J. Tits in the second half of the 20th century. The Oberwolfach workshops on algebraic groups, led by Springer and Tits, played an important role in this effort as a forum for researchers, meeting at approximately 3 year intervals since the 1960s. The present workshop continued this tradition, covering a range of topics, with an emphasis on recent developments in the subject.

Mathematics Subject Classification (2010): 14Lxx, 17Bxx, 20Gxx, 14Mxx.

Introduction by the Organisers

The theory of linear algebraic groups originated in the work of E. Picard in the mid-19th century. Picard assigned a "Galois group" to an ordinary differential equation. This construction was developed into what is now known as "differential Galois theory" by J. F. Ritt and E. R. Kolchin in the 1930s and 40s. Their work was a precursor to the modern theory of algebraic groups, founded by A. Borel, C. Chevalley, J. P. Serre, T. A. Springer and J. Tits in the second half of the 20th century. The Oberwolfach workshops on algebraic groups, originated by Springer and Tits, played an important role in this effort as a forum for researchers, meeting at regular intervals since the 1960s.

The present workshop continued this tradition. There were 53 participants from 10 countries: Australia, Canada, Denmark, France, Germany, Great Britain,

Italy, the Netherlands, Russia, Switzerland and the United States. The scientific program consisted of 27 lectures and a problem session. The lectures covered a broad range of topics of current interest, including

- spherical varieties over the complex and real numbers,
- intersection theory of toric and spherical varieties, tropical geometry and Newton-Okounkov theory,
- homogeneous spaces and their twisted forms,
- Hessenberg varieties,
- geometric invariant theory,
- Tamagawa numbers,
- quiver varieties, R matrices and related algebras
- cluster varieties with relations to representation theory
- tilting modules,
- structure theory of finite-dimensional Lie algebras in finite characteristic,
- infinite-dimensional Lie algebras.

Recreational activities during the workshop consisted of the traditional Wednesday afternoon hike and a Thursday night "talent show", featuring classical piano and vocal performances by workshop particupants.

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Workshop: Algebraic Groups

Table of Contents