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Fakultät für Mathematik

**VORTRÄGE**

**Mittwoch, 25. Mai 2016 von 15:00 bis 15:45 Uhr,** Sky Lounge, OMP 1
**Junior Kolloquium: Karel Dekimpe (Univ. of Leuven): "The nilpotent groups to Lie algebras: linearizing group theory"**

Nilpotent groups are a generalization of abelian groups. In this talk I will focus on the so-called finitely generated and torsion free nilpotent groups $G$, which should be seen as generalizing the free abelian groups $\mathbb{Z}^k$. A well known example of such a group is the discrete Heisenberg group

$$H = \left\{ \begin{pmatrix} 1 & x & z \\ 0 & 1 & y \\ 0 & 0 & 1 \end{pmatrix} \mid x, y, z \in \mathbb{Z} \right\}.$$

We will show how one can associate to these groups a Lie algebra $\mathfrak{g}$, which consist of a vector space and a bilinear product, called the Lie bracket, $[\cdot, \cdot] : \mathfrak{g} \times \mathfrak{g} \to \mathfrak{g}$, which is antisymmetric and satisfies the so-called Jacobi-identity: $[X, [Y, Z]] + [Y, [Z, X]] + [Z, [X, Y]] = 0$. There is a very strong relationship between the (auto)morphisms of the group $G$ and the (auto)morphisms of the Lie algebra $\mathfrak{g}$. As the latter ones consist of linear maps (preserving the Lie bracket), these are much easier to deal with than automorphisms on the group level. We will illustrate the use of this with examples.

**15:45 Uhr Kaffeejause**

**Mittwoch, 25. Mai 2016 von 16:15 bis 17:00 Uhr,** Sky Lounge, OMP 1
**Mathematisches Kolloquium: Karel Dekimpe (Univ. of Leuven):"A journey into Lie algebra structures arising from geometry"**

In this colloquium talk I will show how certain problems in geometry can be translated, using Lie groups, into a problem on Lie algebras. Since the latter have a linear structure, namely they consist of a vector space equipped with a bilinear product, it is obvious that this new problem is easier to deal with than the original one. Moreover, in many cases, it turns out that the Lie algebra problem we end up with, is not only interesting from the geometrical point of view, but is also of interest on its own and has already popped up in seemingly independent contexts. I will present a short overview on what prof. D. Burde and I have been working on in this area over the last 10 years and more.

**im Anschluss vinum cum pane**

**Dietrich Burde, Harald Rindler**

**Dienstag, 24. Mai 2016, 8:30 bis 9:30 Uhr,** SR 7, 2 OG. OM P 1,
**Vortrag im Rahmen der Tenure Track Ausschreibung "Mathematics": Maria Charina (Institut für Mathematik): "Wavelet frames, real algebraic geometry and system theory"**

Abstract: We link recent advances in real algebraic geometry, system theory and theory of multivariate tight wavelet frames. Namely, we reformulate the algorithm for construction of tight wavelet frames in terms of hermitian sums of squares of certain nonnegative Laurent polynomials. This interpretation allow us to answer affirmatively the long standing open question of the existence of such tight wavelet frames in dimension $d=2$. We exhibit a class of counterexamples in dimension $d=3$ showing that the corresponding tight wavelet frames do not always exist in this case. Moreover, in the univariate and bivariate settings, the polynomial masks of a tight wavelet frame form the transfer function of a conservative multivariate linear system. Recent advances in system theory enable us to develop a more effective method for tight frame constructions.

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**Dienstag, 24. Mai 2016, 10:00 bis 11:00 Uhr,** SR 7, 2 OG. OM P 1,
**Vortrag im Rahmen der Tenure Track Ausschreibung "Mathematics": Eleonore Faber (Ann Arbor): "Singularities in Algebraic Geometry and Representation Theory"**

**Dienstag, 24. Mai 2016 von 13.15 bis 14:45,** Seminarraum 9, 2. OG, OMP 1
**Complexe Analysis SE: Michael Reiter (Univ. Wien): "Infinitesimal and local rigidity of holomorphic mappings (Part 2)**
org. by B. Lamel, M. Reiter
**http://complex.univie.ac.at/events/detail-of-talk/news/infinitesimal-and-local-rigidity-of-holomorphic-mappings-part-2/**

**Dienstag, 24. Mai 2016, von 15:00 bis 17:00 Uhr,** SR 9, 2. OG., OMP 1
**Geometry and Analysis on Groups, Research SE: Gilbert Levitt (Univ. de Caen):"On the elementary theory of hyperbolic groups."**
org. by G. Arzhantseva, Ch. Cashen
**http://www.mat.univie.ac.at/~gagt/abstracts/160524.html**

**Dienstag, 24. Mai 2016, von 15:15 bis 16:45 Uhr,** TU Dissertantenraum, Freihaus, Turm A, 8. Stock, Wiedner Hauptstraße 8-10, 1040 Wien
**AG Diskrete Mathematik Seminar: Henri Muehle (Ecole Polytechn. Palaiseau): "On Noncrossing Partitions for the Alternating Groups"**
org. by Ch. Krattenthaler
**http://dmg.tuwien.ac.at/nfn/agdm.html**

**Mittwoch, 25. Mai 2016, ab 11.30 Uhr,** Seminarraum 10, 2. OG, OMP 1,
**NuHAG Seminar: Michael Speckbacher (ARI OEAW): "SIC-POVMs, equiangular tight frames and Zauner's conjecture"**
org. by K. H. Gröchenig
**http://www.univie.ac.at/nuhag-php/program/talks_details.php?id=3201**

**Mittwoch, 25. Mai 2016, von 17:15 bis 18:15 Uhr,** HS 13, 2. OG., OMP 1
**Fachdidaktisches Kolloquium**
**Sandra Reichenberger (Univ. Linz): „Mathematik: Spannend-Abwechslungsreich-Nachvollziehbar, Förderung des Interesses bei SchülerInnen"**
org. by H. Humenberger
(siehe Anhang)