Norddeutsches Gruppentheoriekolloquium 2015

Ort und Zeit

Das Kolloquium findet am 5. und 6. Oktober 2015 in Rostock statt. Alle Vorträge finden im mathematichen Institut, Hoersaal 125 statt. Ein Lageplan findet sich siehe [hier](#).

Programm

Montag, 5.10.	Ab 12	Tee und Kaffee,
		gemeinsames Mittagessen
	14.00-14.45	Barbara Baumeister
		N.N.
	15.00-15.45	Olga Varghese
		Actions of Aut(F_n) on CAT(0) spaces
	16.30-17.30	Ulrich Thiel
		Cuspidal Calogero-Moser and Lusztig families for finite Coxeter groups
	später	Gemeinsames Abendessen
Dienstag, 6.10.	9.00 - 10.00	Gabriela Weitze-Schmitthüsen
		Non-congruence properties of Veech groups of origamis
	10.30-11.15	Erik Friese
		Affine symmetries of orbit polytopes
	11.30-12.30	Stefan Virchow
		The probability of generating the symmetric group
	12.45-13.30	Daniel Skodlerack
		Skolem-Noether in der Darstellungstheorie p-adischer klassischer Gruppen (p-ungerade)

Abstracts

Barbara Baumeister: Critical maximal subgroups and conjugacy of supplements in finite soluble groups

(joint work with Gil Kaplan) I will introduce the concept of a critical subgroup

and will prove a characterization of it. This then can be used to decide about the conjugacy of supplements in finite soluble groups.

Olga Varghese: Actions of Aut(F_n) on CAT(0) spaces

For $n \geqq 4$ we discuss questions concerning global fixed points for isometric actions of Aut(Fn), the automorphism group of a free group of rank n, on complete CAT(0) spaces. We prove that whenever Aut(Fn) acts by isometries on complete d-dimensional CAT(0) space with $d < 2\cdot\frac{n}{4}-1$, then it must fix a point. This property has implications for irreducible representations of Aut(Fn). For SAut(Fn), the unique subgroup of index two in Aut(Fn), we obtain similar results.

Ulrich Thiel: Cuspidal Calogero-Moser and Lusztig families for finite Coxeter groups

A fundamental tool in studying the (ordinary/modular) representation theory of a finite group of Lie type is the partition of the (ordinary) irreducible characters of the corresponding Weyl group into so-called Lusztig families. The most important families are the cuspidal ones, which are those not induced from a proper parabolic subgroup. In joint work with Gwyn Bellamy (University of Glasgow) we have identified these families as being the zero-dimensional symplectic leaves of the Calogero-Moser space attached to the Weyl group, thus providing a Poisson geometric interpretation of Lusztig's notion of cuspidality. This is further evidence for a fundamental (yet unknown) connection between finite groups of Lie type and rational Cherednik algebras at t=0.

(see http://arxiv.org/abs/1505.00486)

Gabriela Weitze-Schmitthüsen: Non-congruence properties of Veech groups of origamis

Translation surfaces are obtained by the following handy construction: Take finitely many Euclidean polygons and glue them along opposite edges of same length and direction such that you obtain a surface. If all polygons are squares of length 1 the resulting translation surface is called an origami. The study of the moduli spaces of translation surfaces of fixed genus has been an important goal for the last twenty years. A crucial invariant of a translation surface is its Veech group which is a discrete subgroup of SL(2,R). For origamis it turns out to be a subgroup of SL(2,Z) of finite index. We study for these groups whether they are congruence subgroups of SL(2,Z) and if not how far they are away from being it.

Erik Friese: Affine symmetries of orbit polytopes

(joint work with Frieder Ladisch) An orbit polytope is the convex hull of an orbit under a finite subgroup G of GL(d, R). We develop a general theory of possible affine symmetry groups of orbit polytopes. For every group, we define an open and dense set of generic points such that the orbit polytopes of generic

points have similar affine symmetry groups. We show how to compute the affine symmetries of generic orbit polytopes just from the character of G. We prove that any symmetry group of a generic point is equal to G if G is itself the affine symmetry group of some orbit polytope.

We use our theory to classify all finite groups which arise as affine symmetry groups of orbit polytopes. The only groups arising not in that way are elementary abelian groups of order 4, 8, and 16, abelian groups of exponent greater than 2, and generalized dicyclic groups. This answers a question of Babai who classified the orthogonal symmetry groups of orbit polytopes.

Stefan Virchow: The probability of generating the symmetric group

We give a new proof of Dixon's conjecture: The probability that a pair of random permutations generates either A_n or S_n is 1-1/n+O(n^(-3/2)). Our proof is based on character theory and character estimates and does not need the classification of finite simple groups.

Daniel Skodlerack: Skolem-Noether in der Darstellungstheorie p-adischer klassischer Gruppen (p-ungerade)

Das klassische Skolem-Noether Theorem besagt, dass zwei Monomorphismen von einer einfachen Algebra in eine endliche zentrale einfache Algebra A (beide über einem Körper F) unter einer Einheit von A konjugiert sind. Es stellt sich die Frage, unter welchen Bedingungen die Aussage für Untergruppen von GL(A) verallgemeinert werden kann. Diese Frage hat Konsequenzen für die Klassifikation irreduzibler komplexer Darstellungen von p-adischen Formen der orthogonalen, symplektischen und allgemeinen linearen Gruppe.