

Abstracts

Julian Brough (Kaiserslautern)

Vanishing elements in finite groups

A classical result of Burnside shows us that every row of the character table corresponding to a non-linear character contains a zero entry. In a natural duality Isaacs, Navarro and Wolf in 1990 asked about when a column of the character table contains a zero.

In this talk I will first discuss a new result about when a column does not contain a zero and then discuss how one can use arithmetical conditions on the conjugacy classes whose corresponding column contains a zero to determine finite group structure.

Eugenio Giannelli (Kaiserslautern)

Characters of odd degree of symmetric groups

Let G be a finite group and let P be a Sylow p -subgroup of G . Denote by $\text{Irr}_{p'}(G)$ the set consisting of all irreducible characters of G of degree coprime to p . The McKay Conjecture asserts that $|\text{Irr}_{p'}(G)| = |\text{Irr}_{p'}(N_G(P))|$.

Sometimes, we do not only have the above equality, but it is also possible to determine explicit natural bijections (McKay bijections) between $\text{Irr}_{p'}(G)$ and $\text{Irr}_{p'}(N_G(P))$.

In the first part of this talk I will describe a recently obtained natural McKay bijection for symmetric groups S_n at the prime $p = 2$.

In the second part of the talk I will present a recent joint work with A. Kleshchev, G. Navarro and P.H. Tiep, concerning the construction of natural bijections between $\text{Irr}_{p'}(G)$ and $\text{Irr}_{p'}(H)$ for various classes of finite groups G and corresponding subgroups H of odd index. This includes the case $G = S_n$ and H any maximal subgroup of odd index in S_n , as well as the construction of McKay bijections for solvable and general linear groups.

Steffen Kionke (Düsseldorf)

Relations of profinite groups and representation growth

A. Mann introduced the notion of „positively finitely generated“ (PFG) profinite groups. In these groups any k randomly chosen elements are a generating set with positive probability. By a famous result of Mann and Shalev a profinite group is PFG exactly if it has polynomial maximal subgroup growth. This result provides a link between probabilistic and asymptotic properties of profinite groups.

In a similar vein one can define „positively finitely related“ (PFR) profinite groups.

I will report on a joint project with Matteo Vannacci where we investigate PFR profinite groups. We prove that a finitely presented profinite group is PFR if and only if it has uniformly bounded representation growth over finite fields. This provides an unexpected connection between relations and representations of profinite groups.

Olga Varghese (Münster)

Torsion groups acting on $CAT(0)$ spaces

Let \mathcal{X} be a class of metric spaces. A group G is said to have property \mathcal{FX} if any action of G by isometries on any member of \mathcal{X} has a fixed point. It is well known that a finitely generated torsion group has property \mathcal{FA} where \mathcal{A} is the class consisting of simplicial trees. We generalize this result to the class \mathcal{H}_* consisting of finite dimensional real Hilbert spaces, \mathcal{C}_*^f the class of finite dimensional foldable CAT cube chamber complexes and \mathcal{B} a subclass of the class of affine buildings.