2025/10/02 22:55 1/4 Algebra Seminar





The Algebra Seminar

The seminar will meet in-person on Tuesdays in room WH-100E at 2:45 p.m. There should be refreshments served at 3:45 in our new lounge/coffee room, WH-104. Masks are optional.

Anyone wishing to give a talk in the Algebra Seminar this semester is requested to contact the organizers at least one week ahead of time, to provide a title and abstract. If a speaker prefers to give a zoom talk, the organizers will need to be notified at least one week ahead of time, and a link will be posted on this page.

If needed, the following link would be used for a zoom meeting (Meeting ID: 93487611842) of the Algebra Seminar:

Algebra Seminar Zoom Meeting Link

Organizers: Alex Feingold, Daniel Studenmund and Hung Tong-Viet

To receive announcements of seminar talks by email, please email one of the organizers with your name, email address and reason for joining this list if you are external to Binghamton University.

Fall 2025

- August 19

Organizational Meeting

Please think about giving a talk in the Algebra Seminar, or inviting an outside speaker.

August 26

Ryan McCulloch (Binghamton University)

The commuting graph and the centralizer graph of a group

Abstract: Let G be a group. The commuting graph $\frac{C}{G}$ for G is the graph whose vertices are G-G, and if a, b in G-G, and if a, b in G-G, and if a in G-G, and if G is the centralizer graph, which we define. When a connected component of G-G is a complete graph, the corresponding component in the centralizer graph is an isolated vertex, and we call such a component trivial. Otherwise, the natural bijection between the commuting graph and the centralizer graph preserves the diameter of connected components. One sees that if G is a Frobenius group

with a nonabelian kernel and a nonabelian complement where the complement has nontrivial center, then the centralizer graph of \$G\$ has more than one nontrivial component. Can this happen in a \$p\$-group? The answer is yes! In fact, for any specified number \$k\$ of nontrivial components and any diameter sizes \$n_1,\dots, n_k\$, one can construct a \$p\$-group of nilpotency class 2 whose centralizer graph has these specs. This is joint work with Mark Lewis.

September 2

No Meeting (Monday classes meet)

September 9

Chris Schroeder (Binghamton University)

A topological quantum field theory and invariants of finite groups

Abstract: In this talk, we will discuss the properties of finite groups that are witnessed by the group invariants arising in the context of Dijkgraaf-Witten theory, a topological quantum field theory, as invariants of surfaces. Assuming the theory is derived from the complex group algebra of a finite group, these invariants are generalizations of the commuting probability, an invariant that has been well studied in the literature. The main goal of this talk is to construct these invariants from scratch, assuming no previous knowledge of quantum mechanics.

September 16

Alex Feingold (Binghamton University)

Lie Algebras, Representations, Roots, Weights, Weyl groups and Clifford Algebras

Abstract: Lie algebras and their representations have been well-studied and have applications in mathematics and physics. The classification of finite dimensional Lie algebras over **C** by Killing and Cartan inspired the classification of finite simple groups. Geometry and combinatorics are both involved through root and weight systems of representations, with the Weyl group of symmetries playing a vital role. Infinite dimensional Kac-Moody Lie algebras have deeply enriched the subject and connected with string theory and conformal field theory. In a collaboration with Robert Bieri and Daniel Studenmund, we have been studying tessellations of Euclidean and hyperbolic spaces which arise from the action of affine and hyperbolic Weyl groups. Our goal has been to define and study piecewise isometry groups acting on such tessellations. Today I will present background material on Lie algebras, representations and examples which show the essential structures. I will present a construction of representations of the orthogonal Lie algebras, \$so(2n,F)\$, of type \$D_n\$ as matrices and also using Clifford algebras to get spinor representations.

September 23

No Algebra Seminar

September 30

Thu Quan (Binghamton University)

A generalization of Camina pairs and orders of elements in cosets

Abstract: Let \$G\$ be a finite group with a nontrivial proper subgroup \$H\$. If \$H\$ is normal in \$G\$ and for every element \$x\in G\setminus H\$, \$x\$ is conjugate to \$xh\$ for all \$h\in H\$, then the pair \$(G,H)\$ is called a Camina pair. In 1992, Kuisch and van der Waall proved that \$(G,H)\$ is a Camina pair if and only if every nontrivial irreducible character of \$H\$ induces homogeneously to \$G\$. In this talk, we discuss the equivalence of these two conditions on the pair \$(G,H)\$ without assuming that \$H\$ is normal in \$G\$. Furthermore, we determine the

structure of \$H\$ under the hypothesis that, for every element \$x\in G\setminus H\$ of odd order, all elements in the coset \$xH\$ also have odd order.

October 7

No Algebra Seminar

October 14

Hung Tong-Viet (Binghamton University)

Orders of commutators and Products of conjugacy classes in finite groups

Abstract: Let \$G\$ be a finite group, $x\in G$, and let \$p\$ be a prime. In this talk, we explore conditions that forces \$x\$ to lie in certain characteristic subgroups of \$G\$. In particular, we prove that the commutator $x\in G$ is a \$p\$-element for all \$g\in G if and only if \$x\$ is central modulo \$O_p(G)\$, the largest normal \$p\$-subgroup of \$G\$. This result unifies and generalizes aspects of both the Baer-Suzuki theorem and Glauberman's \$Z_p^*\$-theorem. Additionally, we show that if \$x\in G\$ is a \$p\$-element and there exists an integer \$m\setminus ge 1\$ such that for every \$g\in G\$, the commutator \$[x,g]\$ is either trivial or has order \$m\$, then the subgroup generated by the conjugacy class of \$x\$ is solvable. As an application, we confirm a conjecture of Beltran, Felipe, and Melchor: if \$K\$ is a conjugacy class in \$G\$ such that the product \$K^{-1}K=1\cup D\cup D^{-1}\$ for some conjugacy class \$D\$, then the subgroup generated by \$K\$ is solvable.

October 21

Inna Sysoeva (Binghamton University)

Title

Abstract: Text of Abstract

October 28

Daniel Studenmund (Binghamton University)

Title

Abstract: Text of Abstract

November 4

Robert Bieri (Binghamton University)

Title

Abstract: Text of Abstract

November 11

Tae Young Lee (Binghamton University)

Title

Abstract: Text of Abstract

November 18

Nguyen N. Hung (University of Akron)

Title

Abstract: Text of Abstract

November 25

(? University)

Title

Abstract: Text of Abstract

December 2 (? University)

Title

Abstract: Text of Abstract

- Pre-2014 semesters
- Fall 2014
- Spring 2015
- Fall 2015
- Spring 2016
- Fall 2016
- Spring 2017
- Fall 2017
- Spring 2018
- Fall 2018
- Spring 2019
- Fall 2019
- Spring 2020
- Fall 2020
- Spring 2021
- Fall 2021
- Spring 2022
- Fall 2022
- Spring 2023
- Fall 2023
- Spring 2024
- Fall 2024
- Spring 2025

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Permanent link:

https://www2.math.binghamton.edu/p/seminars/alge

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