

MATHEMATICS DEPARTMENT SEMINAR SCHEDULE
October 15-19, 2001

MONDAY, October 15, 2001

Group Representation & Cohomology

2:30 - 3:30 p.m., Room 410

Speaker: Graham Matthews, University of Georgia

Title of talk: *“Representations of Symmetriz Groups”*

Number Theory

3:30 p.m., Room 304

Speaker: Dr. Renling Jin, Dept. of Mathematics, College of Charleston

Title of talk: *“Inverse Problem For Upper Density”*

Abstract: Let A and B be two sets of natural numbers. The inverse problem of set addition is to find the structure of A and B when the “size” of $A+B$ is small. The “size” of a finite set can be the cardinality of the set and the “size” of an infinite set can be one of the densities of the set.

Nonstandard methods, products of mathematical logic, allow one to enlarge the natural number system so that the new system contains some “infinitely” large natural numbers. These “infinitely” large natural numbers can be used as tools for deriving results in our standard world.

In the talk I will explain, in layman's language, how the nonstandard methods are used to derive results about the inverse problem involving upper density. For example, I will describe the structure of A when the upper density of $A+A+\{0,1\}$ achieves its minimum value, i.e. $\bar{d}(A+A+\{0,1\})=\inf\{\bar{d}(B+B+\{0,1\}): \bar{d}(B)\geq\bar{d}(A)\}$.

Teacher Education Seminar

3:30 – 4:30 p.m., Room 328

Speaker: Brad Findell, Department of Mathematics Education, University of Georgia

Title of talk: *“Learning and Understanding in Abstract Algebra.”*

Note: Math graduate students and postdocs: you are especially encouraged to attend the Teacher Education Seminar as it may help with future job searches.

Analysis

2:30 p.m., Room 322

No meeting this week

Topology

No meeting this week

TUESDAY, October 16, 2001

VIGRE Seminar

Room 302, 2:00 p.m.-3:15 p.m.

Speaker: Jim Solazzo, University of Georgia

Title of talk: "*Hilbert spaces and Positive Maps*"

Abstract: The basic notions of the theory of Hilbert spaces are current in many parts of pure and applied mathematics, and in physics, engineering, and statistics. Hilbert spaces have a rich geometric structure and the theory of these spaces is the core around which functional analysis has developed. In this talk we will define a Hilbert space and describe some specific Hilbert spaces. We shall see that the notion of a matrix being positive definite has a natural generalization to infinite dimensions and we will use the theory of positive maps on a Hilbert space to solve a seemingly simple problem in linear algebra.

Algebraic Geometry

3:30 p.m., Room 326

Speaker: Angela Gibney, University of Michigan

Title of talk: "*A Conjectural Description of the Mori-Kleiman cone of $M_{g,n}$* "

Abstract: I will give a conjectural description of the Mori-Kleiman closed cone of curves of the moduli space of stable n -pointed curves of genus g . It is believed that a divisor D on $M_{g,n}$ is nef if and only if it has positive intersection with all 1 -dimensional strata (the components of the locus of curves with at least $3g+n-4$ nodes). In joint work of myself, Sean Keel and Ian Morrison, to appear in JAMS, it is shown that the conjecture holds for all g if it holds for $g=0$. More precisely, D is nef if it meets all curve strata nonnegatively and is nef on the locus of flag curves (rational curves --- i.e., curves having only rational components --- with g pigtailed attached modulo permutations of the pigtailed). The conjecture follows from this when $g+n \leq 7$. I will moreover show that the conjecture implies a simple description of the nef cone by inequalities generalizing earlier work of Faber and Keel-McKernan. Further, as proved in my thesis, I will explain that if D is nef, then either D is pulled back via a map forgetting some marked points or D is big and its exceptional locus is contained in the boundary. Hence, in the projective category, any fibration factors through a forgetful map, the exceptional locus of any birational map lies in the boundary, and any automorphism fixes the boundary.

Student Number Theory

3:30 p.m., Room 303

Speaker: Stephen Donnelly, University of Georgia

Title of talk: "*Some amazing identities (and other strange characters)*"

WEDNESDAY, October 17, 2001

Group Representation & Cohomology

2:30 - 3:30 p.m., Room 410

Speaker: Graham Matthews, University of Georgia

Title of talk: *'Representations of Symmetriz Groups', continued*

Faculty and Graduate Social

3:00 p.m., Room 409

Coffee, Tea, Cookies

Numerical Analysis

3:30 - 4:30, Room 410

Speaker: Ming-Jun Lai, University of Georgia

Title of talk: *"quasi-uniform refinement of a tetrahedron"*

Representation Theory

3:30 p.m., Room 302

Speaker: Markus Hunziker, University of Georgia

Title of talk: *"Hilbert series of determinantal varieties and highest representations III"*

Abstract: I will (finally) show how to compute the Hilbert series of the classical determinantal varieties. Among other things, I will use the Pieri rule and the Littlewood-Richardson rule to compute branching formulas for the pair $(\mathfrak{so}(2m), \mathfrak{gl}(m))$. The work presented is joint work with Tom Enright at UCSD.

CATS

4:40pm, Rm. 306 Boyd Graduate Studies

Speaker: Feng Sun, Graduate Student, Computer Science Dept.

Title of talk: *"A linear 3-edge-connectivity algorithm"*

Abstract: The connectivity properties of graphs form an important part of graph theory. A linear algorithm for testing 3-edge-connectivity of a graph using three depth-first searches (DFS's) will be presented. First I will identify two types of separation edge-pairs in the context of a DFS spanning tree. Then I will explain the function of each DFS search. The last DFS search, which is the vital part of the algorithm, will be studied carefully. The algorithm is based on a linear algorithm of J. E. Hopcroft and R. E. Tarjan [SIAM J. Comput. 2 (1973), 135-158] for determining the 3-vertex-connected components of a graph.

THURSDAY, October 18, 2001

VIGRE Seminar

No Meeting today

FRIDAY, October 19, 2001

Geometry

2:30 p.m., Room 322

Speaker: Maarten Bergvelt, University of Illinois

Title of talk: "*Vertex Algebras and geometry*"