MATHEMATICS DEPARTMENT SEMINAR SCHEDULE

October 14 – October 18, 2002

All seminars are held in Boyd Graduate Studies unless otherwise noted

MONDAY, October 14, 2002

Group Representation & Cohomology
2:30pm, Room 410
Speaker: Kenyon Platt, University of Georgia
Title of talk: *"Blocks of Modular Representations", continued*

Topology
2:30p.m.Room 326
Speaker: Nancy Wrinkle, University of Georgia
Title of talk: *"An introduction to Ozsvath-Szabo invariants of 3-manifolds", Part Deux*
Abstract: I'll be continuing on with our discussion and definition of the "Heegaard-Floer" homology groups of a rational homology 3-sphere Y. At some point we'll derive a finitely generated variant of the Floer homology, then later we'll show that these are actually topological invariants of Y.

Faculty and Graduate Social
3:00 p.m., Room 409
Coffee, Tea, Cookies

Analysis
3:30pm, Room 222
Speaker: Jingzhi Tie, University of Georgia
Title of talk: *"Sub-Riemannian Geometry and sub-elliptic PDEs"*

Cats
4:40 p.m., Room 306
Speaker: Jianping Zhu, UGA Computer Science graduate student
Title of talk: *"Top-down View of Fast Dominators in Digraphs Algorithm"*
Abstract: We start by reviewing the definition of dominators and explaining why we are interested in finding them in relation to recognizing minimally strong digraphs (MSDs). Then the algorithm is presented from the top down.

A vertex v dominates another vertex w in a digraph D with root vertex r if every path from r to w contains v. An immediate dominator for w is a vertex v != w which is dominated by every vertex u != w dominating w. It can be seen that for each (D,r) the domination relation is simply the reflexive and transitive closure of the immediate domination relation. It is immediate domination which is directly relevant to recognizing MSDs.

A simple implementation of the algorithm runs in O(m log n) time, where m is the number of edges and n is number of vertices in the digraph.

TUESDAY, October 15, 2002

VIGRE
2:00 p.m-3:15 p.m., Room 304
Speaker: Guantao Chen, Georgia State University
Title of talk: *"Long Cycles in 3-connected graphs"*
Abstract: A cycle of a graph is hamiltonian if it contains all the vertices of the graph. In 1931, Whitney proved that every 4-connected plane triangulation contains a hamiltonian cycle. In 1956, Tutte generalized this result to 4-connected plane graphs. For 3-connected graphs, the situation changes dramatically. There are many 3-connected planar graphs which do not contain hamiltonian cycles. When studying paths in polytopes in 1963, Moon and Moser conjectured that if G is a 3-connected planar graph of order n then G contains a cycle of length at least cn^{log_32}, where c is a positive real number. Ten years later, Gr\"unbaum and Walther made the same conjecture for 3-connected cubic planar graphs. Recently, Chen and Yu fully established the Moon-Moser conjecture. Furthermore, Chen, Sherpardson, Yu, and Zang established a more general conjecture due to Thomas. This talk will focus on the above two results and further research problems surrounding these two results.

Algebraic Geometry
3:30 p.m., Room 326
Speaker: Valery Alexeev, University of Georgia
Title of talk: ""Introduction to spherical varieties""
Abstract Toric varieties are a basic and very useful tool in algebraic geometry (Mumford, Oda, Fulton...), symplectic geometry (Guillemin, Abreau, Donaldson...), string theory and mirror symmetry (Batyrev, Givental, Yau...). Spherical varieties (Luna, Vust, Knop, Brion...) generalize them to the case of noncommutative reductive group action.

Student Number Theory
3:30 p.m., Room 303
No Meeting this week

WEDNESDAY, October 16, 2002

Wavelet Analysis
10:10 – 11:00 a.m., Room 410
Speaker: Kyunglim Nam, University of Georgia
Title of talk: *"Tight frame construction"*
Abstract: We continue to prove the basic conditions to be tight wavelet frames.

Graduate Teaching Seminar
2:30 p.m., Room 303
No Meeting this week

Faculty and Graduate Social
3:00 p.m., Room 409
Coffee, Tea, Cookies

Numercial Analysis
3:30pm, Room 410
Speaker: MingJun Lai , University of Georgia
Title of talk: *"The estimates of K0 and K1"*
Abstract: After we established two fundamental theorems on PSC and SSC, we work on the estimate of two key constants K0 and K1.

Lie Theory
3:30 p.m., Room 302
Speaker: Frederic Holweck, Georgia Tech
Title of talk: *"When two notions of discriminant coincide"*
Abstract: Let X be a smooth projective variety. The dual X^* of X is "usually" a hypersurface. When that is the case, the equation which defines X^* is called the X-discriminant (denoted $\Delta_{X} in Gelfand-Kapranov-Zelevinsky's book "Discriminants, Resultants and Multidimensional Determinants)". If we consider X the unique smooth orbit in the projectivization of a Lie algebra $\frac(g)$, we get a "prefered" discriminant Δ_X associated to $\frac{g}$. On the other hand for simple Lie algebras there is a natural notion of discriminant: the discriminant of the map $\Phi:\frac(g) \mapto mathbf{C}^n$, where $\Phi(x)=(P_1(x),...,P_n(x))$, and the P_i's are generators of the ring of invariant polynomials. After recalling both definitions and introducing various examples, I'll show when these two different discriminants define the same hypersurface.

Number Theory
3:30 p.m., Room 304
Speaker: Steve Donnelly , University of Georgia
Title of talk: *"An overview of Kolyvagin's theorem on the finiteness of the Tate-Shafarevich group"*

FRIDAY, October 18, 2002

Geometry
2:30 p.m., Room 322
Speaker: Chad Mullikin, University of Georgia
Title of Talk: *"On Computing the Writhe of a Knot"*
Abstract: Each planar projection of a closed space curve (defined by a point on S^2) may or may not have any crossings. If so, one can associate a value, +1 or -1, depending on orientation, to each crossing (provided they are *nice* crossings) and add these values up to obtain what is known as the Tait number of the knot K (which also depends on the direction of projection). I will discuss a proof showing that the Tait number changes only when the projection direction crosses a certain curve on the two sphere (the tangent indicatrix). Moreover, using this fact along with Gauss-Bonnet we can find a slick formula to compute the writhe of our closed space curve."