KNOTS IN WASHINGTON 5

UMCP November 22, 1997

The Fifth Conference on Knot Theory and its Ramifications
"Knots in Washington" will be held Saturday, November 22, 1997 at
the University of Maryland (College Park).

This regional miniconference is held every semester, in various locations
in the Washington area. (The Sixth "Knots in Washington" conference:
"Knot Theory Days," will take place Feb. 7-9, 1998 at U.S. Naval Academy,
Annapolis; M.Kidwell, local organizer).

You are cordially invited to participate in this and future meetings.

All talks will be in the Colloquium Room in the Mathematics Department
of the University of Maryland (Room number 3206).

TENTATIVE SCHEDULE:

10:00 - 10:30 Refreshments

10:30 - 11:30 Charles Frohman, University of Iowa;
"Skeins and Characters"

Abstract:
The lecture will begin with a general method for
producing 3-manifold invariants from a compact group.
Out of this we will establish integral formulas for
the Turaev-Viro invariant.

More provocatively, we will show that
the Kauffman bracket skein module at a root of
unity of a 3-manifold can be viewed as functions
on a cartesian product of copies of SU(2). The
mode of evaluation depends on a Heegaard diagram
of the 3-manifold. This gives rise to invariants
of Heegaard diagrams coming from the Kauffman bracket
skein module. It also gives a path to a rigorous
analysis of the asymptotic behavior of Turaev-Viro
invariants in terms of the representation theory
of the fundamental group of the manifold.

11:45 - 12:05 Jozef Przytycki, GWU; "Torsion in skein modules:
Theorems, Conjectures and Speculations."

Abstract.
We discuss torsion in skein modules of 3-manifolds.
1. A nonseparating 2-sphere or 2-torus in a manifold
yields a torsion in most of the skein modules.
2. A separating incompressible 2-sphere or 2-torus is
often yielding a torsion (e.g. for Kaufman bracket,
Homflypt and Kauffman skein modules).
3. A nonseparating surface (of any genus) is a cause
of torsion in the second skein module (related to L_+
-q L_0 skein relation).

We discuss, with more details, torsion in the Kauffman
bracket skein module. In particular we show that
1. If M is a connected sum of M_1 and M_2 then KBSM of
M has a torsion provided that M_1 and M_2 have
first homology groups that are not 2-torsion groups.
2. If M is the double of a hyperbolic manifold with
boundary torus then the Kauffman bracket skein module
of M has a torsion.

12:10 - 2:10 Lunch

2:15 - 3:15 Ted Stanford, Naval Academy; "Vassiliev invariants and the lower central series of the pure braid group."

Abstract:
Vassiliev defined a new set of knot invariants around
1990 using singularity theory. Birman and Lin showed
that the Jones polynomial and its generalizations
can be reparametrized to fit into the Vassiliev
framework. Finding an interpretation of the Jones
polynomial and its generalizations in terms of classical
topology has been notoriously difficult, but Vassiliev
invariants have proved a little more amenable in this
regard.

We will prove the following theorem: Let K1 and K2
be knots. Then v(K1) = v(K2) for every Vassiliev
invariant of order less than n if and only if there
exists a positive integer m and a braid b in Bm
and a pure braid p in the nth group of the lower
central series of Pm, such that K1 is the closure
of b and K2 is the closure of pb. Bm is the
braid group on m strands, and Pm is the pure braid
group on m strands.

Thus we obtain an interpretation of what it means for
two knots to have matching invariants up to order n
in terms of classical group theory and topology.

The proof of the theorem was inspired by a recent
result of Habiro, which gives a characterization
of knots with matching invariants up to order n
in terms of "claspers", which are curves and
handlebodies in a knot complement on which surgery

is performed to modify the knot.

3:30 - 3:50 Adam Sikora, UMCP;
"A topological approach to Sl_n character varieties."

Abstract:
We will present a theorem proved jointly with C. Frohman which gives a purely topological description of the SL_n-character variety of any fundamental group of a manifold. We will discuss applications of this theorem to the representation theory of groups, the theory of character varieties and knot theory.

4:00 - 4:50 Open problem session

Local organizer: William Goldman (wmg@math.umd.edu)
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