Abstracts of talks

KNOTS in WASHINGTON IV

The Fourth Conference on Knot Theory and its Ramifications will be held April 5, 1997 at the University of Virginia (Charlottesville).

All talks will take place at UVa–Clark Hall Math. Dept. on Cabell Drive room 140. (Directions: Get off Rt. 29 at the U.Va. exit, US 250 east. Go down to Emmet St. and turn right.)

SCHEDULE:

Saturday, April 5

10:30 - 11:00 Refreshments

11:00 - 11:20 Jozef H. Przytycki, Listing's polynomial of graphs and link diagrams.

Abstract:
Johann Benedict Listing (1808-1882), a student of Gauss, introduced in his 1847 monograph *Vorstudien zur Topologie*, a 2-variable polynomial invariant of link diagrams, the *Listing polynomial*, and noticed that for an alternating diagram the polynomial has no mixed terms (this observation was crucial in the proof, 140 years later, of the first Tait conjecture). Listing noticed that his polynomial is not preserved by topological deformations of the link. The Listing polynomial can also be defined for any graph with edges colored with k colors. The Listing polynomial is a generating function of (colored) valences of a graph.

11:30 - 12:20 Hanna Nencka, On Markov Moves.

Abstract:
One introduces a new formalism to describe a braid group. Then it is possible to show that: there exists a sequence of braid groups $B(C)$ with an uncountable number of generators. Some generalization of the Markov theorem in an algebraic version is given using the above considerations.

12:20 - 2:10 Lunch

2:10 - 3:00 John Bryden, The cohomology ring structure of orientable Seifert manifolds.

Abstract:
In 1932 H. Seifert described a class of 3-manifolds, and classified them up to fibre preserving homeomorphism. This class of manifolds includes many of the important 3-manifolds used in physics. Although the cohomology groups of the Seifert manifolds are easily obtained and have been known since Seifert's time, the cohomology ring structure has only recently been discovered (The cohomology ring of a class of Seifert manifolds, by J. Bryden, C. Hayat-Legrand, H. Zieschang, and P. Zvengrowski; The cohomology ring of the orientable Seifert manifolds II, by J. Bryden and P. Zvengrowski).

Part of the motivation for considering this problem stems from the fact that the homotopy classes of Lorentz metric tensor fields are in one-one correspondence to the set of homotopy classes from M into RP^3. The computation of the group of homotopy classes of maps from M onto RP^3 is dependent on whether or not there exists a degree 1 map from M onto RP^3. By using the cohomology ring structure of the Seifert manifolds we can determine when a Seifert manifold admits a degree 1 map onto RP^3. Furthermore, we can now determine when the orientable Seifert manifolds admit degree 1 maps onto lens spaces.

3:15 - 3:45 Yongwu Rong, Sequence of Degree One Maps between 3-Manifolds.

Abstract:
It is well known, by earlier work of the speaker, that any infinite sequence of degree one maps between geometric 3-manifolds must eventually stabilize. A natural question then arises as to whether one can predict how soon this sequence stabilizes. An affirmative answer will be given for the class of Seifert fibered spaces. The proof depends on an inequality estimating the complexity of such 3-manifolds under degree one maps.

4:00 - 4:30 Maxim Sokolov, Which lens spaces can be distinguished by the Turaev-Viro invariants?

Abstract:
We give a very easy criterion telling whether two lens spaces can be distinguished by the Turaev-Viro invariants or not.

For any $v \in Z$ define a function $h_v : Z \to Z_2$ by the formula

$$h_v(x) = \begin{cases} 1 & \text{if } x \equiv \pm 1 \bmod v \\ 0 & \text{if } x \not\equiv \pm 1 \bmod v \end{cases}$$

We can show that two lens spaces $L(p_1, q_1)$ and $L(p_2, q_2)$ cannot be distinguished by the Turaev-Viro invariants if and only if $p_1 = p_2 = p$ and for any divisor $v > 2$ of p we have $h_v(q_1) = h_v(q_2)$.

4:45 - 5:15 Adam Sikora, On a geometrical interpretation of characters of group representations.

Abstract:
A theorem due to Bullock, Przytycki and Sikora implies that the $Sl_2(C)$-characters of the fundamental group of a manifold M are in 1-1 correspondence with homomorphisms from the skein module, $\mathcal{S}_{2,\infty}(M; C, \pm 1)$, to C. Therefore all identities involving $Sl_2(C)$-characters of $\pi_1(M)$ can be interpreted as skein relations between links in M.

During the talk we will propose a definition of a new class of skein modules, $\mathcal{S}_n(M, C)$, and discuss connections between these modules and characters of $Sl_n(C)$-representations of $\pi_1(M)$.

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