MATROIDS, DELTA-MATROIDS, AND KNOT INVARIANTS

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Knot invariants of finite order are described in terms of weight systems, that is, functions on chord diagrams satisfying so-called 4-term relations. Some of these weight systems can be described in terms of the intersection graphs of chord diagrams. In a 2007 paper [1], Chmutov and Lando proved that the weight system corresponding to the Lie algebra sl(2) depends, in fact, on the cycle matroid of the intersection graph rather than the graph itself. This result forces the study of the relationship between matroids and weight systems. However, the Delta matroid structure seems to be more suitable than that of matroid for the analysis of weight systems. Delta matroids are associated to embedded graphs in a way similar to the way matroids are associated to ordinary graphs. They were introduced by A. Bouchet [2] in 1980 ies, and are explored thoroughly during the last decade, because of recently introduced invariants of embedded graphs.

The talk reports on a work in progress with V. Zhukov.

References

[1] S. Chmutov, S. Lando, "Mutant knots and intersection graphs", *Algebraic & Geometric Topology*, Vol. 7, No. 3, 1579–1598 (2007).
[2] A. Bouchet, "Representability of Δ-matroids", *Colloquia Mathematica Societatis János Bolyai*, No. 53, Combinatorica 167–182 (1987).

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