

Institut f. Mathematische Strukturtheorie (Math C)

Kolloquium aus Anlass des 60. Geburtstages von Wolfgang Woess

Freitag, 10. Oktober 2014, ab 14:00 s.t.

Hörsaal BE01, Steyrergasse 30, EG

14:00 **Tullio G. Ceccherini-Silberstein** (Università degli Studi Roma Tre):
Multipass automata and group word problems

14:45 Coffee break

15:30 **Wilfried Imrich** (Montanuniversität Leoben):
Graph products and symmetry breaking in graphs

16:30 **Balint Virag** (University of Toronto):
Dyson's spike and the spectral measure of groups

Abstracts

Multipass automata and group word problems

Generalizing pushdown automata, we introduce the notion of multipass automata and study the classes of languages accepted by such machines. The class of languages accepted by deterministic multipass automata is exactly the Boolean closure of the class of deterministic context-free languages while the class of languages accepted by nondeterministic multipass automata is exactly the class of poly-context-free languages, that is, languages which are the intersection of finitely many context-free languages. We illustrate the use of these machines by studying groups whose word problems are accepted by multipass automata. This is a joint work with M. Coornaert, F. Fiorenzi and P.E. Schupp.

Graph products and symmetry breaking in graphs

A coloring of the vertices of a graph G is said to break the symmetries of G if it is only preserved by the trivial automorphism. The minimum number of colors of such a coloring is the distinguishing number of G . Despite the fact that the structure of the automorphism group of graph products is well known, there are still open problems about their distinguishing numbers. Many of them pertain to weak products of infinitely many factors. We address such problems for the Cartesian, the strong, and the direct product. On the way we investigate properties of weak products and describe their role in the characterization of median graphs with non-exponential growth and in the game of cops and robbers. Then we turn to countable graphs G with distinguishing 2-colorings where one color class is finite. The minimum number of elements in the finite class of all such colorings is the cost of 2-distinguishing G . We characterize such graphs and give bounds on the cost of 2-distinguishing G . The best bounds are for two-ended graphs and depend on their product-like properties. This is joint work with Debra Boutin and Ehsan Estaji.

Dyson's spike and the spectral measure of groups

In 1953, Dyson discovered that certain 1-dimensional random Schroedinger operators with gamma potentials have a spike in their spectral measure. We generalize Dyson's results to arbitrary potentials satisfying the central limit theorem. It follows that the switch or walk lamplighter graph on \mathbb{Z} , as well as some finitely presented groups, the spectral measure of $(0, x)$ blows up like $1/\log^2(x)$, disproving a conjecture of Lott and Lück. This is joint work with Marcin Kotowski.

F. Lehner, E. Sava, R. Tichy