Combinatorics Seminar

Friday June 7, 2013 at 2PM

Room MS.04

Łukasz Grabowski

(University of Oxford)

Combinatorics related to spectral theory of random walks on lamplighter groups

Recently there was a considerable amount of interest in computing spectral properties of random walk operators (and more generally - group ring operators) on Cayley graphs of lamplighter-type groups. In all cases such computations require some non-trivial input from combinatorics. For example, Lehner and Wagner computed the kernel dimension of a random walk operator on the free lamplighter group by being able to explicitly write down the generating function for the size of the maximal matching in finite trees. In the talk I will explain how the relation between the spectrum of the random walk and combinatorics is usually established. After briefly surveying some of the success stories of this technique I'll focus on presenting two elementary combinatorial problems whose solutions would give some new information about random walk operators. One is related to the generating functions of languages in the complexity class LOGSPACE, and the other is related to coefficients of noncommutative rational functions whose coefficients are powers of a fixed prime number.

warwick.ac.uk/combinatorics