Combinatorics Seminar

Flips in Graphs

Andrzej Dudek
Carnegie Mellon University

Abstract: In this talk we will study a problem motivated by a question related to quantum-error-correcting codes. Given a graph G with ± 1 signs on vertices, each vertex can perform at most one of the following three operations: flip all of its neighbors (*i.e.*, change their signs), flip itself, or flip itself and all of its neighbors. We want to start with all $+1$'s, execute some non-zero number of operations (as small as possible) and return to all $+1$'s.
Combinatorially, it involves the following graph parameter:

$$f(G) = \min \{|A| + |\{x \in V \setminus A : d_A(x) \text{ is odd}\}| : A \neq \emptyset\},$$

where V is the vertex set of G and $d_A(x)$ is the number of neighbors of x in A. We give asymptotically tight estimates of f for the random graph $G_{n,p}$ when p is constant. Also, if

$$f(n) = \max \{f(G) : |V(G)| = n\},$$

then we show that $f(n) \leq (0.382 + o(1))n$.

This is joint work with Tom Bohman, Alan Frieze, and Oleg Pikhurko.

Friday, May 8, 2009, 4:00 pm
Mathematics and Science Center: W303

Mathematics and Computer Science
Emory University