Combinatorics Seminar

Wednesday, April 13, 2011

3:00 pm in Hume 331

Linked Graph with Modular Constraints

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ABSTRACT

A graph G is *k-linked* if G has at least $2k$ vertices, and for every sequence $x_1, x_2, \ldots, x_k, y_1, y_2, \ldots, y_k$ of distinct vertices, G contains k vertex-disjoint paths $P_1, P_2, \ldots, P_k$ such that P_i joins x_i and y_i for $i = 1, 2, \ldots, k$. Moreover, the above defined k-linked graph G is *k-linked modulo $(m_1, m_2, \ldots, m_k)$* if, in addition, for any k-tuple $(d_1, d_2, \ldots, d_k)$ of natural numbers, the paths $P_1, P_2, \ldots, P_k$ can be chosen such that P_i has length d_i modulo m_i for $i = 1, 2, \ldots, k$. Thomassen showed that there exists a function $f(m_1, m_2, \ldots, m_k)$ such that every $f(m_1, m_2, \ldots, m_k)$-connected graph is k-linked modulo $(m_1, m_2, \ldots, m_k)$ provided all m_i are odd. For even moduli, he showed in another article that there exists a natural number $g(2, 2, \cdots, 2)$ such that every $g(2, 2, \cdots, 2)$-connected graph is k-linked modulo $(2, 2, \cdots, 2)$ if deleting any $4k - 3$ vertices leaves a non-bipartite graph.

In this talk, we show linear upper bounds for $f(m_1, m_2, \ldots, m_k)$ and $g(m_1, m_2, \ldots, m_k)$ in terms of $m_1, m_2, \ldots, m_k$, respectively. Our results generalize several known results on k-parity-linked graphs. This is a joint work with Guantao Chen, Yuan Chen and Shuhong Gao.