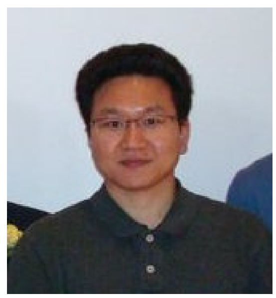
Combinatorics Seminar

Friday Oct 16th, 2015
2:30 PM-3:20 PM in Hume 331

Fractional matchings of graphs



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ABSTRACT

A *fractional matching* of a graph G is a function $\phi : E(G) \to [0,1]$ such that for each vertex v, $\sum_{e\in\Gamma(v)} \phi(e) \le 1$, where $\Gamma(v)$ is the set of edges incident to v. The *fractional matching number* of G, written $\alpha'_f(G)$, is the maximum of $\sum_{e\in E(G)} \phi(e)$ over all fractional matchings ϕ. In this talk, we talk about some lower bounds for $\alpha'_f(G)$ in terms of $|V(G)|, |E(G)|, \delta(G)$, and $\Delta(G)$.

By viewing every matching as a fractional matching, we have $\alpha'(G) \le \alpha'_f(G)$ for every graph G, where $\alpha'(G)$ is the maximum size of a matching in G, but equality need not hold. We also talk about how large the difference (ratio) between $\alpha'_f(G)$ and $\alpha'(G)$ in a (connected) graph can be.

In 2005, Gregory and Haemers had given a relationship between $\lambda_3(G)$ and the existence of a perfect matching in a d-regular graph with even number of vertices, where $\lambda_3(G)$ is the third largest eigenvalue of an adjacency matrix of G. After that, some research between $\lambda_3(G)$ and $\alpha'(G)$ in a d-regular G was investigated. In addition to the above two results, we give a relationship between $\lambda_1(G)$ and $\alpha'_f(G)$, where $\lambda_1(G)$ is the largest eigenvalue of an adjacency matrix of G. (This is a partly joint work with Behrend, Choi, Kim, and West.)