PETER DUKES, University of Victoria, Victoria, BC, Canada

Rational decomposition of circulant graphs with large degree

A rational decomposition of a graph G into copies of an unlabelled subgraph H is a nonnegative rational weighting of the copies of H in G such that the total inherited weight on any edge of G equals 1. It is easy to see that the complete graph $G = K_n$ admits a rational decomposition into copies of K_k, provided $2 \leq k \leq n$. This is done by choosing each K_k with multiplicity $\binom{n-2}{k-2}^{-1}$. We consider this question when G—the graph being decomposed—is a circulant of almost full degree. Given integers $m \geq 1$ and $k \geq 2$, there exists sufficiently large n_0 so that any circulant G on $n \geq n_0$ vertices, of degree at least $n - m$, admits a rational decomposition into copies of K_k (and hence any graph with an edge on at most k vertices). This is the result I will present, using linear algebra and difference families as the main proof techniques.

This is joint work with Alan C. H. Ling.