Radio Labeling Grid Graphs

Eduardo Calles and Henry Gomez
Bakersfield College

For a graph G, let $d(u, v)$ denote the distance between any two distinct vertices u and v, and let $diam(G)$ denote the diameter of G (the maximum distance in G). A *multi-level distance labeling* (or *radio labeling*) for G is a function c that assigns each vertex of G a positive integer so as to satisfy the condition $d(u, v)+|c(u)-c(v)| \geq diam(G)+1$ for all vertex pairs u and v. The *span* of c is the largest integer assigned by c. The *radio number* of G, $rn(G)$, is the minimum span taken over all radio labelings of G. We determine upper and lower bounds for the radio number of Cartesian products of paths.

The Radio Number of Ladder Graphs

Josefina Flores and Kathleen Lewis
California State University Channel Islands

The radio labeling of graphs originated from the real world problem of radio transmitter frequency assignment, which depends on distance between transmitters. For a connected graph G, let $d(u, v)$ denote the distance between any two vertices u and v. The diameter, $diam(G)$, is the longest distance in G. A radio labeling c of G is an assignment of positive integer values to the vertices of G that satisfies $d(u, v) + |c(u) - c(v)| \geq diam(G) + 1$, for all vertex pairs u and v. The maximum integer produced by the labeling is the span of the labeling. The radio number of G, $rn(G)$, is the minimum achievable span. Let L_n be a ladder graph with n rungs and $2n$ vertices. We completely determine the radio number for L_{2k+1} and we find upper and lower bounds for $rn(L_{2k})$ that differ by 5.

Radio Labeling Kneser Graphs of Diameter 2

Yannick Pitcan
Harvard University

A radio labeling c of a connected graph G is an assignment of distinct positive integers to the vertices of G, with $z \in V(G)$ labeled $c(z)$, such that $d(u, v) + |c(u) - c(v)| \geq diam(G) + 1$ for every two vertices u, v of G. The span of a radio labeling is the maximum label assigned to a vertex of G. The radio number of G, $rn(G)$, is the minimum span taken over all possible radio labelings. The Kneser graph $K_{n,k}$ has vertices that correspond to the k-element subsets of an n-element set. Two vertices are adjacent whenever their corresponding sets are disjoint. We explore the radio numbers of Kneser graphs and show that if $K_{n,k}$ is a Kneser graph of diameter 2, then $rn(K_{n,k}) = \binom{n}{k}$.