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Reconfiguration for Dominating Sets

Given a problem and a set of feasible solutions to that problem, the associated *reconfiguration problem* involves determining whether one feasible solution to the original problem can be transformed to a different feasible solution through a sequence of allowable moves, with the condition that the intermediate stages are also feasible solutions.

Any reconfiguration problem can be modelled with a *reconfiguration graph*, where the vertices represent feasible solutions and two vertices are adjacent if and only if the corresponding feasible solutions can be transformed to each other via *one* allowable move.

Our interest is in reconfiguring dominating sets of graphs. The *domination reconfiguration graph* of a graph G, denoted $\mathcal{D}(G)$, has a vertex corresponding to each dominating set of G and two vertices of $\mathcal{D}(G)$ are adjacent if and only if the corresponding dominating sets differ by the deletion or addition of a single vertex. We are interested in properties of domination reconfiguration graphs. For example, it is easy to see that they are always connected and bipartite. While none has a Hamilton cycle, we explore families of graphs whose reconfiguration graphs have Hamilton paths.

This is joint work with: K. Adaricheva, Hofstra University, C. Bozeman, Mount Holyoke College, N. Clarke, Acadia University, R. Haas, University of Hawaii at Manoa, K. Seyffarth, University of Calgary, and H. Smith, Davidson College