Efficient domination
in 3-valent vertex-transitive graphs

Martin Knor

(joint work with Primož Potočnik)

A vertex of a graph G dominates itself and all its neighbours. A set S, subset of the vertex set of G, dominates G efficiently if every vertex of G is dominated by exactly one vertex of S. Hence, an efficient dominating set is a perfect 1-code. A Mobius ladder M_n is a 3-valent graph obtained from the cycle on $2n$ vertices by adding a perfect matching connecting pairs of opposite vertices.

Using an algebraic approach based on lifts we prove that, a connected vertex-transitive 3-valent graph G on 2^m vertices does not admit efficient dominating set if and only if $m \geq 3$ and G is isomorphic to the Mobius ladder $M_{2^{m-1}}$.