

Combinatorics Seminar

Wednesday April 1st, 2015
3:50 PM-4:50 PM in Hume 331

Automorphism groups of codes



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ABSTRACT In a recent ArXiv posting, Muzychuk noticed a relationship between the isomorphism problem for Cayley digraphs of a group G and the isomorphism problem for codes permutation invariant under G . For cyclic groups, he showed that in fact the permutation isomorphism problem for cyclic codes reduces to the isomorphism problem for circulant digraphs. This latter problem has been completely solved, and so Muzychuk produced a solution to the permutation isomorphism problem for cyclic codes. We consider the problem of computing the automorphism group of cyclic codes (and codes invariant under other groups as well). We first give a sufficient condition to decompose a code C into two subcodes C_1 and C_2 , both invariant under the permutation automorphism group of C , and which are determined by codes of smaller length. Additionally, we show that $\text{PAut}(C) = \text{PAut}(C_1) \cap \text{PAut}(C_2)$. This sufficient condition corresponds to an existing sufficient condition that gives a similar decomposition of a vertex-transitive digraph. We then use this to determine strong constraints on the permutation automorphism groups of cyclic codes of length pq , where p and q are prime. This is joint work with Mikhail Muzychuk of Netanya Academic College.