Abstract

This talk presents new constructions of binary cyclic codes with dimension close to half the code length, aiming to obtain large minimum and dual distances simultaneously. The guiding idea is to design defining sets carefully: they should contain long intervals of consecutive zeros for the code while preserving suitable consecutive zero intervals for the dual code. We develop several constructions in different parameter regimes, based on rotation-symmetric balanced partitions, short cyclotomic cosets, and positive-negative cyclotomic-coset pairings. Our constructions show that binary cyclic codes can still achieve strong simultaneous lower bounds on the minimum and dual distances. In particular, the product of these two distances can asymptotically reach twice the code length.