The generalized Hamming weights of Castle codes

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Castle codes are algebraic geometry one-point codes on Castle curves. This family contains some of the most important algebraic geometry codes among those studied in the literature to date. The generalized Hamming weights of these codes can be bounded by using the orden bound, whose main tools is the notion of well-behaving pairs. This bound is successful and usually gives very good results for the minimum distance (this bound gives the true minimum distance for Hermitian codes) but for weights higher dimension is difficult to compute.

In this talk will present a new way to get the exact value of certain Hamming weights of Castle codes. I will then introduce a notion of regular-behaving pairs and describe your properties in terms of the Weierstrass semigroup associated with the curve. In particular, I will show that for Hermitian codes these Hamming weights are all satisfying the generalized Singleton bound, i.e. are $t-$th rank MDS. Finally, I will propose a new lower bound for the minimum distance of Castle codes.