HERMITIAN CODES AND COMPLETE INTERSECTIONS

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ABSTRACT. The *Hermitian curve* $\mathcal{H}$ is the affine, plane curve defined by the polynomial $x^{q+1} = y^q + y$, where q be a power of a prime. Starting from the Hermitian curve and any positive integer m, it is possible to construct a linear code C_m over $\mathbb{F}_{q^2}$, that is called *Hermitian code*.
We consider the unique writing $\mu q + \lambda(q+1)$ of the distance d with μ, λ non negative integers, and $\mu \leq q$, and prove that the minimum-weight codewords correspond to complete intersection divisors cut on the Hermitian curve $\mathcal{H}$ by curves $\mathcal{X}$ of degree $\mu+\lambda$ having $x^\mu y^\lambda$ as leading term w.r.t. the `DegRevLex` term order (with $y > x$). Moreover, we show that any such curve $\mathcal{X}$ corresponds to minimum-weight codewords provided that the complete intersection divisor $\mathcal{H} \cap \mathcal{X}$ is made of simple $\mathbb{F}_{q^2}$-points.

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