HUGO TEIXEIRA, Carleton University

On the functional graph of $f(X) = c(X^{q+1} + aX^2)$ over quadratic extensions of finite fields

Let $X = \mathbb{F}_q$ be the finite field with q elements and $char(\mathbb{F}_q)$ odd. In this work we discuss the characteristics of the functional graph of the map $X \mapsto c(X^{q+1} + aX^2)$ over the field $\mathbb{F}_{q^2}$, where $c, a \in \mathbb{F}_q$. We observe that this function defines a quadratic form over $\mathbb{F}_q$, therefore it is a natural generalization of the function $x \mapsto cx^2$ over $\mathbb{F}_q$. We give the number of cycles of each length and the precise behavior of the pre-cycles for $a \in \{\pm 1\}$ and some partial results for the other cases. In particular, we describe the connected components that contains the fixed points of f.