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Title: On a class of Complete Permutation Monomials

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Abstract: Let \mathbb{F}_q be the finite field with q elements and p be the characteristic of \mathbb{F}_q . A *permutation polynomial* (or PP) $f(x) \in \mathbb{F}_q[x]$ is a bijection of \mathbb{F}_q onto itself. A polynomial $f(x) \in \mathbb{F}_q[x]$ is a *complete permutation polynomial* (or CPP) if both $f(x)$ and $f(x) + x$ are PPs of \mathbb{F}_q . We consider CPPs of \mathbb{F}_{q^n} of type $f_a = ax^{\frac{q^n-1}{q-1}}$. The cases $n = 2$, $n = 3$, and $n = 4$ were investigated by Bassalygo and Zinoviev, and by Wu, Li et al. For $n = 6$ and $p \in \{3, 5, 7\}$, sufficient conditions for f_a to be a CPP were given by Wu, Li et al., and by Ma, Zhang et al.

In this work we complete the study of the case $n = 6$, for arbitrary q . In particular, we provide CPPs of type f_a over \mathbb{F}_{q^6} , and we show that there are no other CPPs of this type for $q \geq 421$.

This is a joint work with Daniele Bartoli and Massimo Giulietti.