

A class of polynomials over finite fields

I will discuss polynomials of the form

$$F_r(x) = bx^{q^r+1} - ax^{q^r} + dx - c$$

with coefficients a, b, c, d in the finite field \mathbb{F}_q and $r \geq 0$. The factorization of these polynomials into irreducibles in the polynomial ring $\mathbb{F}_q[x]$ shows some striking patterns as r varies. For instance, almost all irreducible factors have degree Dr for some integer D .

First I will show these patterns by considering some examples (computed with MAGMA), and then I will explain where they come from, by introducing an action of the projective linear group $\mathrm{PGL}(2, q)$ on the algebraic closure of the field \mathbb{F}_q .

This is joint work with Alev Topuzođlu.