Exponents of Skew Polynomials

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Abstract

Let A be a finite ring and σ be a ring automorphism of A. Any polynomial $f(t) \in A[t;\sigma]$ which is monic and has a regular constant term is a right (resp. left) factor of a polynomial of the form $t^e - 1$ for some integer $e \geq 1$. The least such integer is called the right (resp. left) exponent of $f(t)$. This generalizes the classical definition of the exponent, also known as order or period. We compute the exponent for $f(t) \in \mathbb{F}_q[t;\theta]$, where θ is the Frobenius. We also give some properties and examples.

Keywords

Finite field, Skew polynomial ring, Period of polynomial