Virdol, Cristian

Cyclicity and Titchmarsh divisor problem for Drinfeld modules. (English) Zbl 1427.11056

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Summary: Let $A = \mathbb{F}_q[T]$, where $\mathbb{F}_q$ is a finite field, let $Q = \mathbb{F}_q(T)$, and let F be a finite extension of Q. Consider ϕ a Drinfeld A-module over F of rank r. We write $r = hed$, where E is the center of $D := \mathrm{End}_{\overline{F}}(\phi) \otimes Q$, $e = [E : Q]$, and $d = [D : E]^{\frac{1}{2}}$. If $\wp$ is a prime of F, we denote by $\mathbb{F}_\wp$ the residue field at $\wp$. If ϕ has good reduction at $\wp$, let $\bar{\phi}$ denote the reduction of ϕ at $\wp$. In this article, in particular, when $r \neq d$, we obtain an asymptotic formula for the number of primes $\wp$ of F of degree x for which $\bar{\phi}(\mathbb{F}_\wp)$ has at most $(r-1)$ cyclic components. This result answers an old question of Serre on the cyclicity of general Drinfeld A-modules. We also prove an analogue of the Titchmarsh divisor problem for Drinfeld modules.

MSC:

11G09 Drinfel'd modules; higher-dimensional motives, etc.
11G15 Complex multiplication and moduli of abelian varieties

Keywords:

Drinfeld modules; cyclicity; Titchmarsh divisor problem

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