The distribution in arithmetic progressions of primes of $r - 1$ cyclic components for Drinfeld modules

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Abstract: Given a prime power $q$, let $A = \mathbb{F}_q[T]$ and $k = \mathbb{F}_q(T)$. Take a finite extension $K/k$ and $\psi$ a generic Drinfeld $A$-module over $K$ of rank $r \geq 2$. Given a prime $\mathfrak{p}$ of good reduction for $\psi$, the reduction $\psi_{\mathfrak{p}}(\mathbb{F}_\mathfrak{p})$ forms a finite $A$-module of rank at most $r$. Let us denote the first invariant factor of $\psi_{\mathfrak{p}}(\mathbb{F}_\mathfrak{p})$ by $d_{1,\mathfrak{p}}(\psi)$. Kuo and Liu determined the density of primes of $K$ for which $d_{1,\mathfrak{p}}(\psi) = 1$, given $\psi$ has a trivial endomorphism ring. Cojocaru and Shulman largely generalized their results and determined the density of primes of $K$ for which $d_{1,\mathfrak{p}}(\psi) = d$ without any assumption. In this talk, we add a congruence class condition on their results, i.e., we study the distribution of primes $p$ of $k$ that lie in an arithmetic progression and $d_{1,p}(\psi) = d$. 