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Lower Order Terms in the Katz-Sarnak Philosophy

For a nice family of L-functions, $\mathcal{F}$, defined over $\mathbb{F}_q[T]$, the Katz-Sarnak philosophy states that as q tends to infinity, the Frobenii Θ of the L-functions equidistribute in a compact matrix Lie group. More concretely, it predicts that for any continuous class function f, we have

$$\lim_{q\to\infty} \mathbb{E}_{\mathcal{F}}(f(\Theta)) = \int_G f(U)dU$$

where G is some compact matrix Lie group and dU is the corresponding Haar measure. In this talk we will consider lower order terms which vanish with q for certain families of L-functions defined over $\mathbb{F}_q[T]$.