
ANTOINE COMEAU-LAPOINTE, Concordia University

One-level density of the family of twists of an elliptic curve over function fields

We fix an elliptic curve $E/\mathbb{F}_q(t)$ and consider the family $\{E \otimes \chi_D\}$ of E twisted by quadratic Dirichlet characters. The one-level density of their L -functions is shown to follow orthogonal symmetry for test functions with Fourier transform supported inside $(-1, 1)$. As an application, we obtain an upper bound of $3/2$ on the average analytic rank. By splitting the family according to the sign of the functional equation, we obtain that at least 12.5% of the family have rank zero, and at least 37.5% have rank one. The Katz and Sarnak philosophy predicts that those percentages should both be 50% and the average analytic rank should be $1/2$. We finish by computing the one-level density of E twisted by Dirichlet characters of order ℓ coprime to q where we obtain a restriction of $(-1/2, 1/2)$ on the support.