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DISTRIBUTION THEOREMS FOR TWISTED L-FUNCTIONS OF ELLIPTIC CURVES

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Let E be an elliptic curve over the field of rational numbers with discriminant $\Delta \neq 0$. The L-function $L_E(s)$, $s = \sigma + it$, of the curve E is defined by the product

$$L_E(s) = \prod_{p|\Delta} \left(1 - \frac{\lambda(p)}{p^s}\right)^{-1} \prod_{p\nmid\Delta} \left(1 - \frac{\lambda(p)}{p^s} + \frac{1}{p^{2s-1}}\right)^{-1},$$

where $\lambda(p)$ are real numbers satisfying, for all primes p, the inequality $|\lambda(p)| \leq 2\sqrt{p}$. This inequality ensures the absolute convergence of the product for $\sigma > \frac{3}{2}$.

Let q be a prime number, and χ denote a Dirichlet character modulo q. In a series of works [1], [2], [3], limit theorems for twists

$$L_E(s,\chi) = \prod_{p|\Delta} \left(1 - \frac{\lambda(p)\chi(p)}{p^s}\right)^{-1} \prod_{p\nmid\Delta} \left(1 - \frac{\lambda(p)\chi(p)}{p^s} + \frac{\chi^2(p)}{p^{2s-1}}\right)^{-1},$$

as $q \to \infty$, were considered, however, only in the region $\sigma > \frac{3}{2}$.

The report is devoted to an extension of the mentioned results to the region $\sigma > 1$. Moreover, the explicit form of the limit measure will be given.

REFERENCES

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