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On the Distribution of Zeros of Dirichlet's L-Function on the Line $\sigma=1/2$ (II)

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§ 1. Main theorem.

This paper is a continuation of my previous paper [8]. Let χ be a primitive character mod q. We put

(1.1) $$a=\frac{1}{2}(1-\chi(-1))\ ,$$

(1.2) $$\begin{aligned} h(s)&=h(s,\chi)\\ &=\left(\frac{\pi}{q}\right)^{-(s+a)/2}\Gamma\left(\frac{s+a}{2}\right)\ , \end{aligned}$$

(1.3) $$\varepsilon(\chi)=\frac{(-i)^a}{\sqrt{q}}\sum_{m=1}^{q}\chi(m)\exp(2\pi im/q)$$

(1.4) $$f'(s)=h'(s)/h(s)\ ,$$

and

(1.5) $$\begin{aligned} G(s)&=G(s,\chi)\\ &=L(s,\chi)+L'(s,\chi)/(f'(s)+f'(1-s))\ . \end{aligned}$$

We have proved in [8] the following theorem.

THEOREM 1. *Let $N_G(D)$ be a number of zeros of $G(s)$ in the region*

$$1/2\leqq\sigma\leqq 3\ ,$$
$$T\leqq t\leqq T+U\ .$$

Then, for sufficiently large T and for $U\leqq T/\log(qT/2\pi)$, we have

$$N_0(T+U,\chi)-N_0(T,\chi)\geqq\frac{U}{2\pi}\log\frac{qT}{2\pi}-2N_G(D)+O\left(\frac{U^2}{T}+1\right)\ .$$

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