

## THE LAPLACE TRANSFORM OF DIRICHLET $L$ -FUNCTIONS ON THE CRITICAL STRIP

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Let  $s = \sigma + it$  be a complex variable. The Laplace transform  $\mathfrak{L}(s, f)$  of a function  $f$  is defined by

$$\mathfrak{L}(s, f) = \int_0^{\infty} f(x)e^{-sx} dx$$

provided that the integral exists for  $\sigma > \sigma_0$  with some  $\sigma_0 \in \mathbb{R}$ . Denote by  $L(s, \chi)$  Dirichlet  $L$ -function, where  $\chi$  is Dirichlet character modulo  $q$ . This report is a continuation of [1], and is devoted to the Laplace transform

$$\mathfrak{L}_{\varrho}(s, |L(\chi)|^2) = \int_0^{\infty} |L(\varrho + ix, \chi)|^2 e^{-sx} dx, \quad (1)$$

where  $\varrho, \frac{1}{2} < \varrho < 1$ , is a fixed number. In [1], the case  $\varrho = \frac{1}{2}$  was considered. Formulae involving some elementary functions for  $\mathfrak{L}_{\varrho}(s, |L(\chi)|^2)$  are obtained.

### REFERENCES

- [1] A. Balčiūnas, A. Lauričikas. The laplace transform of Dirichlet  $L$ -functions. *Nonlinear Anal. Model. Control*, **17** (2):127–138, 2012.