

Denseness of the values of Euler–Zagier type multiple zeta-functions with identical arguments on the critical line

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In this study, we consider the value distribution of Euler–Zagier type multiple zeta-functions with identical arguments. In the one-fold case, this function coincides with the Riemann zeta-function. Various results have been obtained concerning the denseness of the values on vertical lines. However, the denseness of the values of the Riemann zeta-function on the critical line remains an open problem.

On the other hand, for Euler–Zagier type multiple zeta-functions with identical arguments, one can develop arguments analogous to those for the Riemann zeta-function concerning the denseness of the values on vertical lines. However, the corresponding denseness problem on the critical line had remained unresolved for multiple zeta-functions. Recently, Mishou proved that, assuming the Riemann Hypothesis, the values of the double zeta-function on the critical line are dense in the complex plane.

In this talk, under the assumption of the Riemann Hypothesis, we show that, for Euler–Zagier type r -fold multiple zeta-functions with identical arguments and $r \geq 4$, the values on the critical line are also dense in the complex plane.