

UNIQUENESS RESULTS ON L-FUNCTIONS AND CERTAIN DIFFERENCE-DIFFERENTIAL POLYNOMIALS

PREETHAM N. RAJ AND HARINA P. WAGHAMORE*

Abstract. Using the notion of weighted sharing, we study the value distribution of a L-function and an arbitrary meromorphic function when certain type of difference-differential polynomials generated by them share a non-zero small function or a non-zero rational function and obtain some uniqueness results which generalises and improves the recent results due to Hao and Chen [3], Mandal and Datta [11].

Mathematics subject classification (2020): 30D35.

Keywords and phrases: Meromorphic functions, L-functions, difference-differential polynomial, weighted sharing, uniqueness.

REFERENCES

- [1] A. BANERJEE, *Uniqueness of meromorphic functions that share two sets*, Southeast Asian Bull. Math., **31**, 1 (2007), 7–17.
- [2] R. HALBURD, R. KORHONEN, R AND K. TOHGE, *Holomorphic curves with shift-invariant hyperplane preimages*, Trans. Amer. Math. Soc., **366**, 8 (2014), 4267–4298.
- [3] W.-J. HAO AND J.-F. CHEN, *Uniqueness of L-functions concerning certain differential polynomials*, Discrete Dyn. Nat. Soc., Art. ID 4673165, (2018), 12 pp.
- [4] W. K. HAYMAN, *Meromorphic functions*, Oxford Mathematical Monographs, Clarendon Press, Oxford, 1964.
- [5] I. LAHIRI, *Weighted sharing and uniqueness of meromorphic functions*, Nagoya Math. J., **16**, (2001), 193–206.
- [6] B. Q. LI, *A result on value distribution of L-functions*, Proc. Amer. Math. Soc., **138**, 6, (2010), 2071–2077.
- [7] L. LIAO AND C.-C. YANG, *On some new properties of the gamma function and the Riemann zeta function*, Math. Nachr., **257**, (2003), 59–66.
- [8] F. LIU, X.-M. LI AND H.-X. YI, *Value distribution of L-functions concerning shared values and certain differential polynomials*, Proc. Japan Acad. Ser. A Math. Sci., **93**, 5 (2017), 41–46.
- [9] K. LIU, X. LIU AND T. CAO, *Some results on zeros and uniqueness of difference-differential polynomials* Appl. Math. J. Chinese Univ. Ser. B., **27**, 1 (2012), 94–104.
- [10] N. MANDAL AND N. K. DATTA, *Uniqueness of L-function and its certain differential monomial concerning small functions*, J. Math. Comput. Sci., **10**, 5 (2020), 2155–2163.
- [11] N. MANDAL AND N. K. DATTA, *Uniqueness of difference differential polynomials of L-functions concerning weighted sharing*, International Journal of Applied Mathematics., **34**, 3 (2021), 471.
- [12] P. SAHOO, *Meromorphic functions that share fixed points with finite weights*, Bull. Math. Anal. Appl., **2**, 4 (2010), 106–118.
- [13] A. SELBERG, *Old and new conjectures and results about a class of Dirichlet series*, In Proceedings of the Amalfi Conference on Analytic Number Theory (Maiori, 1989), Univ. Salerno, Salerno, vol. **2**, (1992), 47–63.
- [14] J. STEUDING, *Value-distribution of L-functions*, Lecture Notes in Mathematics, 1877, Springer, Berlin, 2007.
- [15] C.-C. YANG AND H.-X. YI, *Uniqueness theory of meromorphic functions*, Mathematics and its Applications, **557**, Kluwer Academic Publishers Group, Dordrecht, 2003.

- [16] L. YANG, *Value distribution theory*, translated and revised from the 1982 Chinese original, Springer-Verlag, Berlin, 1993.
- [17] X.-M. ZHENG AND H. Y. XU, *On the deficiencies of some differential-difference polynomials*, Abstr. Appl. Anal., Art. ID 378151, (2014), 12 pp.