

A Polynomial Shared by an Entire Function and its Linear Differential Polynomials

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Abstract. The uniqueness problems on entire functions sharing at least two values with their derivatives have been studied and many results on this topic have been obtained. In this paper, we study an entire function $f(z)$ that shares a polynomial $a(z)$ with $f^{(1)}(z)$, together with higher order derivatives of linear differential polynomials generated by them.

Keywords: Entire function; Polynomial; Linear differential polynomials.

1. Introduction and Results

Let f and g be two nonconstant entire functions in the complex plane, and let a be a polynomial. We denote by $E(a; f)$ the set of a -points of f , where each point is counted according its multiplicity. We denote by $\bar{E}(a; f)$ the reduced form of $E(a; f)$. We say that f, g share a CM, provided that $E(a; f) = E(a; g)$, and we say that f and g share a IM, provided that $\bar{E}(a; f) = \bar{E}(a; g)$.

L.A. Rubel and C.C. Yang [15] appears to be the first to study the entire functions that share certain values with their derivatives. They proved that if a nonconstant entire function f share two distinct values a, b CM with $f^{(1)}$, then $f \equiv f^{(1)}$.

Since then, shared values problems, especially, the case of f and $f^{(1)}$ sharing values, have been studied by many authors and a number of profound results