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UNIQUENESS PROBLEM ON MEROMORPHIC FUNCTION CONCERNING DIFFERENTIAL POLYNOMIALS AND ITS DERIVATIVE WHICH SHARE ONE VALUE

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Abstract. In this paper, we study the uniqueness of meromorphic function concerning differential polynomials share one value with its derivative. The results extend and improve the results of Hui Huang and Bin Huang [11].

1. Introduction

In this paper, we use the standard notations and terms in the value distribution theory [1]. Let $f(z)$ be a non constant meromorphic function on the complex plane C. Define $E(a,f)=\{z|f(z)-a=0\}$, where a zero point with multiplicity m is counted m times in the set. If there zero points are counted only once, then we denote the set by $\overline{E}(a,f)$. Let k be a positive integer. Define

$$E_k(a,f)=\{z|f(z)-a=0,\exists\, i,1\leq i\leq k,f^{(i)}(z)\neq 0\},$$

where a zero point with multiplicity m is counted m times in the set.

Let $f(z)$ and $g(z)$ be two non-constant meromorphic functions. If $E(a,f)=E(a,g)$, then we say that $f(z)$ and $g(z)$ share the value CM; if $\overline{E}(a,f)=\overline{E}(a,g)$, then we say that $f(z)$ and $g(z)$ share the value IM.

Additional, we denote by $N_{k)}(r,f)$ the counting function for poles of $f(z)$ with multiplicity $\leq k$, and by $\overline{N}_{k)}$ the corresponding one for which multiplicity is not counted. Let $N_{(k}(r,f)$ be the counting function for poles of $f(z)$ with multiplicity $\geq k$, and by $\overline{N}_{(k}(r,f)$ the corresponding one for which multiplicity is not counted. Set

$$N_k(r,f)=\overline{N}(r,f)+\overline{N}_{(2}(r,f)+---+\overline{N}_{(k}(r,f).$$

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