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ENTIRE FUNCTIONS SHARING A LINEAR POLYNOMIAL WITH HIGHER ORDER DERIVATIVES OF LINEAR DIFFERENTIAL POLYNOMIAL

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Abstract. In the paper we study the uniqueness of entire functions sharing a linear polynomial with higher order derivatives of linear differential polynomials generated by them. The results of the paper improve and generalize the corresponding results of Lahiri-Kaish (J. Math. Anal. Appl. 406(2013), 66–74).

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1. Introduction, Definitions and Results. Let f be a nonconstant meromorphic function in the open complex plane $\mathbb{C}$ and a be a polynomial. We denote $E(a;f)$ the set of a-points of f, where each point is counted according its multiplicity. We denote by $\overline{E}(a;f)$ the reduced form of $E(a;f)$. For $A \subset \mathbb{C}$ we denote by $n_A(r,a;f)$ the number of zeros of $f-a$, counted with multiplicities, which lie in $A \cap \{z : |z| < r\}$. We define $N_A(r,a;f)$ as follows

$$N_A(r,a;f) = \int_0^r \frac{n_A(t,a;f) - n_A(0,a;f)}{t} dt + n_A(0,a;f) \log r.$$

Let f and g be two nonconstant meromorphic functions. We say that f and g share the polynomial a CM(counting multiplicities) if $E(a;f) = E(a;g)$. Also we say that f and g share a IM(ignoring multiplicities) if $\overline{E}(a;f) = \overline{E}(a;g)$. For standard definitions and results we refer the reader to (Hayman, 1964).

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