Poincare Journal of Analysis & Applications
Vol. 8, No. 1(II) (2021), 25-38

MEROMORPHIC FUNCTIONS AND THEIR DERIVATIVES CONDITIONALLY SHARE TWO SETS

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Date of Receiving	:	15. 07. 2020
Date of Revision	:	10. 02. 2021
Date of Acceptance	:	03. 05. 2021

Abstract. In the paper, with the aid of relaxed sharing hypothesis, we study the uniqueness of meromorphic (entire) functions whose derivatives share a finite set. The results in this paper will improve a number of theorems earlier obtained by Meng-Hu [11] and Meng [10]. Two examples have been exhibited by us to show that the conclusions in our results actually occur.

1. Introduction and Definitions

Let us denote by $\overline{\mathbb{C}} = \mathbb{C} \cup \{\infty\}$. Throughout the paper by a meromorphic function we shall always mean a meromorphic function in the complex plane $\mathbb{C}$. We adopt the usual notations of Nevanlinna theory as explained in [8]. By E and I we denote any set of finite and infinite linear measure respectively of $0 < r < \infty$. For any non-constant meromorphic function $h(z)$ we define $S(r,h)$ by $S(r,h) = o(T(r,h))$ *where* $r \longrightarrow \infty, r \notin E$.

Let f be a non-constant meromorphic function, $a \in \overline{\mathbb{C}}$ and p be a positive integer. We denote by $E(a,f)$ the set of zeros of $f(z)-a$(counting multiplicity) and by $E_{p)}(a,f)$ the set of zeros of $f(z)-a$ with multiplicity $\leq p$(counting multiplicity).

Let $S \subset \mathbb{C}$. Set

$$E_{p)}(S,f) = \bigcup_{a \in S} E_{p)}(a,f).$$

Then for two non-constant meromorphic functions f and g we say that f, g share the set S truncated p if $E_{p)}(S,f) = E_{p)}(S,g)$. If $p = \infty$, we define $E_{p)}(S,f) = E(S,f) = E_f(S)$.

The inception of set sharing problem in the realm of the theory of meromorphic function was due to the following famous "Gross Question" {see [7]}.

2010 *Mathematics Subject Classification.* 30D35.
Key words and phrases. Meromorphic function, weighted sharing, shared set, truncated multiplicity.
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