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Uniqueness for meromorphic functions and differential polynomials

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**Abstract:** In this article, we deal with the uniqueness problems on meromorphic functions concerning differential polynomials and prove the following result: Let  $f$  and  $g$  be two transcendental meromorphic functions,  $\alpha$  be a meromorphic function such that  $T(r, \alpha) = o(T(r, f) + T(r, g))$  and  $\alpha \not\equiv 0, \infty$ . Let  $a$  be a nonzero constant. Suppose that  $m, n$  are positive integers such that  $n > m + 10$ . If  $\Psi_f'$  and  $\Psi_g'$  share  $((0, 2)^n$ , then (i) if  $m \geq 2$ , then  $f(z) \equiv g(z)$ ; (ii) if  $m = 1$ , either  $f(z) \equiv g(z)$  or  $f$  and  $g$  satisfy the algebraic equation  $R(f, g) \equiv 0$ , where  $R(\varpi_1, \varpi_2) = (n+1)(\varpi_1^{n+2} - \varpi_2^{n+2}) - (n+2)(\varpi_1^{n+1} - \varpi_2^{n+1})$ . The results in this paper improve the results of Xiong-Lin-Mori 14 and the author 12.

**Key Words:** Uniqueness; meromorphic function; differential polynomials.

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