Murata, T.
Osaka J. Math.
28 (1991), 623–637

HOLOMORPHIC MAPPINGS FROM THE UNIT DISK TO ALGEBRAIC VARIETIES

TSUYOSHI MURATA

(Reseived Febraury 16, 1990)

Introduction

In 1925, R. Nevalinnna established the second main theorem for meromorphis functions on the complex plane $\boldsymbol{C}$ and developed the value distribution thoery. His theory was extended by many authors. In particular, H. Cartan proved the second main theorem for holomorphic mpas from $\boldsymbol{C}$ to the complex projective space $P^n(\boldsymbol{C})$ (cf., e.g., S. Lang [7]). And J. Noguchi [9] studied holomorphic maps from $\boldsymbol{C}$ to algebraic verieties and showed a version of second main theorem for these maps. Nevanlinna's lemma on the logarithmic derivative plays a crucial role in these theory.

On the other hand R. Nevanlinna also gave the second main theorem on a disk of finite radius (cf., e.g., W. Hayman [5]).

In this paper we shall study holomorphic maps from a disk of finite radius into an algebraic variety and derive a version of the second main theorem.

Let V be a nonsingular projective algebraic variety and Σ an effective divisor of simply normal crossing. Let Ω be a Kahler form on V and $\Delta(R)$ the disk of $\boldsymbol{C}$ around the origin with radius R. In this paper, we assume that R is greater than 1 for technical reasons. Let us denote by $T_f(r)$ and $\bar{N}_f(r, \Sigma)$ the charactearistic function of f relative to Ω and the counting function for Σ without multiplicities (see §1) respectively. Suppose that V-Σ satisfy condition (A) in §1; namely, there exists a system of logarithmic 1-forms $\{\omega_i\}_{i=1}^{n+1}$ along Σ such that $\omega_1 \wedge \cdots \wedge \check{\omega}_i \wedge \cdots \wedge \omega_{n+1}$ are linearly independent over $\boldsymbol{C}$, where n is the dimension of V. *A* holomorphic map f: $\Delta(R) \rightarrow V$ is by definition *degenerate with respect to* $\{\omega_i\}_{i=1}^{n+1}$ if the image $f(\Delta(R)-f^{-1}(\Sigma))$ is contained in a subvariety

$$\{x \in V-\Sigma: \sum_{i=1}^{n+1} a_i(\omega_1 \wedge \cdots \wedge \check{\omega}_i \wedge \cdots \wedge \omega_{n+1})_x = 0\}$$

with $(a_1, \cdots, a_{n+1}) \neq (0, \cdots, 0)$ $(a_i \in \boldsymbol{C})$. Then the main theorem of this paper is stated as follows.

Theorem A. *Let* V, Σ *and* $\{\omega_i\}_{i=1}^{n+1}$ *be as above. Let* f: $\Delta(R) \rightarrow V$ *be a*