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REMARKS ON THE FIRST MAIN THEOREM IN EQUIDISTRIBUTION THEORY. IV

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1. The purpose of this paper is to prove three theorems; their raison d'être will be given in § 5 where a formulation and discussion of some open problems of the subject will also be found. The first two theorems have to do with holomorphic mappings into C^n. Let us first recall some notation from Part III [16]. Let τ_0: $C^n \to R$ be $\tau_0 = \sum_i z_i \bar{z}_i$, and let

$$\omega_0 \equiv \frac{1}{4} dd^c \tau = \frac{\sqrt{-1}}{2} \sum_i dz_i \wedge d\bar{z}_i \,. \tag{1}$$

ω_0 is the Kähler form of the flat metric on C^n, whose volume element is

$$\Psi_0 = \frac{\omega_0^n}{n!} = \left(\frac{\sqrt{-1}}{2}\right)^n dz_1 \wedge d\bar{z}_1 \wedge \cdots dz_n \wedge d\bar{z}_n \,. \tag{2}$$

The first theorem is a derivative of Theorem 1 of Part III [16].

Theorem 1. *Let f: $C^n \to C^n$ be holomorphic such that df is nonsingular somewhere, and let $C_r^n = \{z\colon \sum_i z_i \bar{z}_i \le e^r - 1\}$. Write $f = (f_1, \cdots, f_n)$. Then f is quasisurjective if*

(3)
$$\liminf_{r\to\infty} \frac{1}{\displaystyle\int_0^r dt \int_{C_t^n} \frac{f^*\omega_0^n}{(1 + \sum_i f_i \bar{f}_i)^{n+1}}} \int_{C_r^n} \frac{\omega_0 \wedge f^*\omega_0^{n-1}}{(1 + \sum_i z_i \bar{z}_i)(1 + \sum_i f_i \bar{f}_i)^{n-1}} = 0 \,.$$

There is a corollary to this theorem. Introduce the notation:

$$\begin{aligned} \omega_0 \wedge f^*\omega_0^{n-1} &= \frac{1}{n} \sigma_{n-1}^\sharp \omega_0^n \,, \\ f^*\omega_0^n &= \sigma_n^\sharp \omega_0^n \,. \end{aligned} \tag{4}$$

Then $\sigma_{n-1}^\sharp$ and $\sigma_n^\sharp$ are respectively the $(n-1)$-th and the n-th elementary

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