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ZERO-SETS IN POLYDISCS[1]

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For $N=1, 2, 3, \cdots$ the polydisc U^N consists of all $z=(z_1, \cdots, z_N)$ in the space C^N of N complex variables whose coordinates satisfy $|z_j|<1$ for $j=1, \cdots, N$. We write U for U^1. The distinguished boundary of U^N is the torus T^N defined by $|z_j|=1$ $(1\leqq j\leqq N)$. The *zero-set* of a complex function f defined in U^N is the set $Z(f)$ of all $z\in U^N$ at which $f(z)=0$. We call a set $E\subset U^N$ a *zero-set in* U^N if $E=Z(f)$ for some f which is holomorphic in U^N. The main result of this note gives a sufficient condition for zero-sets of bounded functions.

THEOREM 1. *If E is a zero-set in U^N and if no point of T^N is a limit point of E, then there is a bounded holomorphic function F in U^N such that $Z(F)=E$.*

[The term "limit point" refers of course to the topology induced on C^N by the euclidean metric.]

For $N=1$ this is utterly trivial since the hypothesis then forces

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