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MAPPINGS INTO HYPERBOLIC SPACES

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In this note we state some results on extensions of holomorphic mappings into hyperbolic spaces. A theorem involves extending holomorphic mappings to a domain of holomorphy. An extension problem of holomorphic mappings into a taut complex space was considered by Fujimoto [**1**].

Another result is that the space of all meromorphic mappings from a complex space X into a hyperbolically imbedded space in Y is relatively compact in the space of all meromorphic mappings from X into Y.

A relatively compact complex space M is said to be hyperbolically imbedded in a complex space Y if for all sequences $\{p_n\}$ and $\{q_n\}$ in M such that $p_n \to p \in \overline{M}$ and $q_n \to q \in \overline{M}$ and such that $d_M(p_n, q_n) \to 0$, we have $p = q$. Here d_M denotes the pseudo-distance defined by Kobayashi [**5**]. A relatively compact complex space M in Y is strictly Levi pseudoconvex if for every point $p \in \partial M$ there are a neighborhood U_p of p and a biholomorphic map Φ_p of U_p onto a subvariety of a domain D_p in some C^n and a function φ defined in U_p such that $\varphi \circ \Phi_p^{-1}$ is the restriction to $\Phi_p(U_p)$ of a strictly pluri-subharmonic function $\tilde{\varphi}_p$ defined in D_p and $\Phi_p(U_p \cap M) = \{x \in \Phi(U_p) : \tilde{\varphi}_p(x) < 0\}$.

THEOREM 1. *Let X be a complex manifold and A be an analytic subset of X of codimension at least* 1. *Let M be a strictly Levi pseudoconvex hyperbolic space in Y. Then a holomorphic mapping f of $X - A$ into M can be extended holomorphically to a mapping $\tilde{f}$ of X into M.*

This theorem can be proved using a theorem by Kwack [**6**] and the fact that there exist a neighborhood W of ∂M and a pluri-subharmonic function ψ defined on W such that $W \cap M = \{x \in M : \psi(x) < 0\}$.

THEOREM 2. *Let M be one of the following*: (i) *M is a hyperbolic and strictly Levi pseudoconvex subspace of a complex space Y, and* (ii) *M is a complex manifold having a complete Hermitian metric ds_M^2 all of whose holomorphic sectional curvatures are nonpositive. Let N be an* (*unramified*) *Riemann domain over a Stein manifold and f be a holomorphic mapping of N into M. Then the existence domain of the mapping f from N into M is a Stein manifold.*

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