Invariance of q-completeness with corners under finite holomorphic surjections

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1 Introduction

It was shown by Narasimhan [6] using purely cohomological methods that a complex space Y is Stein if, and only if, its normalization $Y^\star$ is Stein; more generaly, if $\pi : X \longrightarrow Y$ is a finite surjective holomorphic map, then X is Stein if, and only if, Y is Stein.

In the same circle of ideas, a more general invariance theorem was given in [10]; namely:

Theorem *Let $\pi : X \longrightarrow Y$ be a finite holomorphic surjection of complex spaces. Then X is cohomologically q-complete if, and only if, Y is cohomologically q-complete.*

We recall that a complex space Z is said to be "cohomologically q-complete" if the cohomology group $H^i(Z, \mathcal{F})$ vanishes for every integer $i \geq q$ and every coherent analytic sheaf $\mathcal{F}$ on Z. Therefore, by the well-known theorem of Cartan and Serre, Stein spaces correspond to cohomologically 1-complete spaces.

In this paper we deal with a more geometrical aspect of an extension of Narasimhan's result, which is obtained for $q = 1$; namely we prove the following

Theorem 1 *Let $\pi : X \longrightarrow Y$ be a finite holomorphic surjection of complex spaces. Then X is q-complete with corners (resp. q-convex with corners) if, and only if, Y is q-complete with corners (resp. q-convex with corners).*

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