

Since M is Kähler, \exists a Kähler metric. \Rightarrow
 Give the metric on $M - \{x\}$, and on $\tilde{U} = \pi^{-1}(U) = \{(z, l) \in U \times \mathbb{P}^{n-1} \mid z \in U\}$, give the product metric of the Kähler metric and the Fubini-Study metric on \mathbb{P}^n .
 $\Rightarrow \tilde{U}$ is Kähler. $\Rightarrow M - \{x\} \cup_{\pi} \tilde{U}$ is Kähler since $\pi: \tilde{U} - E \rightarrow U - \{x\}$ //

Up to this, I talked nonsense.

"The fact which we have to note is that if $L \rightarrow M$ is a positive line bundle, this implies that M is Kähler."

pf). By the assumption, \exists a metric on L s.t. (see p154)

$\frac{\bar{c}}{2\pi} \Theta$ is a positive (1,1)-form on M , see the def of p148. \Rightarrow Let $\omega = \frac{\bar{c}}{2\pi} \Theta$. \Rightarrow Since $d\Theta = 0$, ω is closed. \Rightarrow By p29, ω induces a metric on M which is Kähler. Also, refer to p251 ~ p252 Por.

Thus since the blow-up \tilde{M} of M has a positive line bundle $\pi^*L^k - E$ for $k \geq k_0$, \tilde{M} is Kähler. \Downarrow

Corollary. If $\tilde{M} \xrightarrow{\pi} M$ is a finite unbranched covering of compact complex manifolds, then M is algebraic $\Leftrightarrow \tilde{M}$ is.

pf) Clearly, if $L \rightarrow M$ is positive, then $c_1(\pi^*L) = \pi^*c_1(L)$ implies that π^*L is positive.

\Uparrow Since π_* is injective, $\pi^*c_1(L) = [\pi^*\omega]$ where ω is a positive form, and $\pi^*\omega$ is positive, see p148 Proposition. \Downarrow

Conversely, say ω is an integral, positive (1,1)-