Point Set Topology Table

Kai Tsuruta

December 6, 2008

The continuous image of a Lindelöf space is also Lindelöf

Let $f : X \rightarrow f(X)$ be a continuous map and $\mathcal{A}$ be any covering of $f(X)$. Then $\{f^{-1}(A)|A \in \mathcal{A}\}$ is a collection of sets covering X; these sets are open in X by the continuity of f. Then, since X is a Lindel$\ddot{o}f$ space, $\exists$ a countable subcover $\{f^{-1}(A_n)\}$ of $\{f^{-1}(A)|A \in \mathcal{A}\}$. Then $\{A_n\}$ is a countable subcover of the original cover $\mathcal{A}$. Thus, $f(X)$ is Lindelöf.