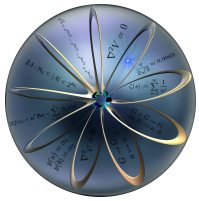

planetmath.org

Math for the people, by the people.

Urysohn's lemma

Canonical name	UrysohnsLemma
Date of creation	2013-03-22 12:12:34
Last modified on	2013-03-22 12:12:34
Owner	yark (2760)
Last modified by	yark (2760)
Numerical id	12
Author	yark (2760)
Entry type	Theorem
Classification	msc 54D15
Related topic	HowIsNormalityAndT4DefinedInBooks
Related topic	ApplicationsOfUrysohnsLemmaToLocallyCompactHausdorffSpaces
Defines	Urysohn function
Defines	normal space
Defines	normal topological space
Defines	normal
Defines	normality

A *normal space* is a topological space X such that whenever A and B are disjoint closed subsets of X, then there are disjoint open subsets U and V of X such that $A \subseteq U$ and $B \subseteq V$.

(Note that some authors include T_1 in the definition, which is equivalent to requiring the space to be Hausdorff.)

Urysohn's Lemma states that X is normal if and only if whenever A and B are disjoint closed subsets of X, then there is a continuous function $f\colon X \to [0,1]$ such that $f(A) \subseteq \{0\}$ and $f(B) \subseteq \{1\}$. (Any such function is called an *Urysohn function*.)

A corollary of Urysohn's Lemma is that normal `http://planetmath.org/T1Space`T_1 spaces are completely regular.