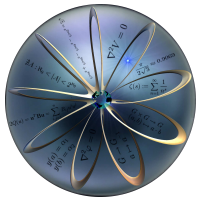

planetmath.org

Math for the people, by the people.

topological ring

Canonical name	TopologicalRing
Date of creation	2013-03-22 12:45:59
Last modified on	2013-03-22 12:45:59
Owner	djao (24)
Last modified by	djao (24)
Numerical id	6
Author	djao (24)
Entry type	Definition
Classification	msc 12J99
Classification	msc 13J99
Classification	msc 54H13
Related topic	TopologicalGroup
Related topic	TopologicalVectorSpace
Defines	topological field
Defines	topological division ring

A ring R which is a topological space is called a *topological ring* if the addition, multiplication, and the additive inverse functions are continuous functions from $R \times R$ to R.

A *topological division ring* is a topological ring such that the multiplicative inverse function is continuous away from 0. A *topological field* is a topological division ring that is a field.

Remark. It is easy to see that if R contains the multiplicative identity 1, then R is a topological ring iff addition and multiplication are continuous. This is true because the additive inverse of an element can be written as the product of the element and -1. However, if R does not contain 1, it is necessary to impose the continuity condition on the additive inverse operation.