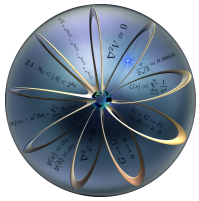

planetmath.org

Math for the people, by the people.

commuting vector fields

Canonical name	CommutingVectorFields
Date of creation	2013-03-22 15:22:37
Last modified on	2013-03-22 15:22:37
Owner	matte (1858)
Last modified by	matte (1858)
Numerical id	6
Author	matte (1858)
Entry type	Definition
Classification	msc 53-00

Vector fields X, Y on a manifold are *commuting* at $p \in M$ if

$$[X, Y]_p = 0$$

where $[\cdot, \cdot]$ is the Lie bracket.

If S is a subset of M, then we say that vector fields X and Y commute on S if they commute at every pont of S. In the case where $S = M$, i.e. when the vector fields commute at every point of the manifold, then we simply say that X and Y are commute.

A set V of vector fields on a manifold is said to be commuting on a set S if, for every pair of vector fields $A \in V$ and $B \in V$, it is the case that A and B commute.

If S is an open set and V is a set of commuting vector fields on S, then the cardinality of V is not greater than the dimension of the manifold and one can find a local coordinate system about any point of S for which these vector fields are coordinate vector fields.