Vector space

*F* is a field.

A set *V* that is an Abelian group under addition with the property that for each , there is an element  such that the following conditions hold for all  and all :

1. .
2. .
3.  .
4. .

Scalar

A member of a field over which a vector space is constructed.

Vector

A member of a vector space.

Subspace

*V* is a vector space over a field *F*.

A subset *U* of *V* that is a vector space over *F* under the operations of *V*.

Linearly dependent

*S* is a set of vectors; *F* is a field.

Having the property that there are vectors  from *S* and scalars  from *F*, not all zero, such that .

Linearly independent

Not linearly dependent.

Basis

*V* is a vector space over a field *F*.

A subset *B* of *V* that is linearly independent over *F* and for which every element of *V* is a linear combination of elements of *B*.

Invariance of Basis Size

If  and  are both bases of a vector space *V*, then .

Dimension

The number of elements of a basis of a vector space. For the trivial vector space, the number 0.