Definitions

Some examples from linear algebra

Definition: A set $\{v_1 \ldots, v_n\}$ of elements of a vector space V is called *linearly independent* if, for any set $a_1, \ldots, a_n$ of scalars, if $\sum_{i=1}^{n} a_i v_i = 0$ then $a_i = 0$ for all $i = 1, \ldots, n$. A set of elements of a vector space that is not linearly independent is called *linearly dependent.*

Definition: A set $v_1, \ldots, v_n$ of elements of a vector space V is called a (finite) *spanning set* if, for any $w \in V$, there exist scalars $a_1, \ldots, a_n$ so that

$$w = \sum a_i v_i.$$

Definition: A set $v_1, \ldots, v_n$ of elements of a vector space V is called a (finite) *basis* if it is both linearly independent and a spanning set.

Definition: A vector space is finite dimensional if it has a finite spanning set.