
LADR 1B Notes: Definition of Vector Space

Lucas Zheng

1.18 Definition of addition, scalar multiplication on V

...

1.19 Definition of a vector space

A vector space is a set V along with an addition on V and a scalar multiplication on V such that: commutativity, associativity, additive inverse, multiplicative identity, distributive properties all hold.

1.20 Definition of vector, point

Vectors or points refer to elements of a vector space.

Scalar multiplication in V depends on \mathbb{F} . When we need to be precise, we say that V is a vector space over \mathbb{F} . Usually it is obvious from context or irrelevant though.

1.21 Definition of real, complex vector spaces

...

1.23 Notation \mathbb{F}^S

- \mathbb{F}^S is the set of functions from set S to \mathbb{F} .
- For $f, g, f + g \in \mathbb{F}^S$,

$$(f + g)(x) = f(x) + g(x)$$

- For $\lambda \in \mathbb{F}$ and $f, \lambda f \in \mathbb{F}^S$,

$$(\lambda f)(x) = \lambda f(x)$$