0.1 Linear maps

0.1.1 Homomorphisms between vector spaces

Homomorphisms map between algebras, preserving the underlying structure.

A homomorphism vetween vector space V and vector space W can be described as:

$\hom(V, W)$

Homomorphism between vector spaces must preserve the group-like structure of the vector space.

$f(u + v) = f(u) + f(v)$

The homomorphism must also preserve scalar multiplication.

$f(\alpha v) = \alpha f(v)$

A linear map (or function) is a map from one input to an output which preserves addition and scalar multiplication.

That is if function f is linear then:

$$f(aM + bN) = af(M) + bf(N)$$

0.1.2 Alternative names for homomorphisms

Vector spaces homomorphisms are also called linear maps or linear functions.