



Why

To every real-valued inner product there corresponds a norm, in a similar manner to the construction for \mathbf{R}^n .

Definition

Proposition 1. *Let (V, \mathbf{F}) be a vector space. Let $f : V \times V \rightarrow \mathbf{F}$ be an inner product with $f(x, x) \in \mathbf{R}$. Let $g : V \rightarrow \mathbf{R}$ such that*

$$g(x) = \sqrt{f(x, x)}.$$

Then g is a norm.

The *norm* of a vector in an inner product space is the square root of the inner product of the vector with itself.

