



# Inner Product Norms

## 1 Why

An inner product gives rise to a norm naturally.

## 2 Definition

Let  $R$  be the set of real numbers and  $C$  be the set of complex numbers.

**Proposition 1.** *Let  $(V, C)$  be a complex vector space. Let  $f$  be an inner product on  $(V, C)$ . Let  $g : V \rightarrow R$  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.

### 2.1 Notation