0.1 Dot product

0.1.1 Dot product is a bilinear form

This is a bilinear form, a mapping from two vectors in the same vector space to the underlying field.

$V \times V \to F$

0.1.2 Calculating the dot product

This is calculated by multiplying each matching element, and summing the results.

$u \cdot v = \sum_{i=1}^{n} u_i v_i$

0.1.3 Dot product on the complex numbers

Properties don't hold. Can get zero vectors from non-zero inputs. Get complex numbers from dot product on itself.

Inner products better deal with complex number fields. However they are not bilinear maps.