Why

What is an inner product if we take a vector space over the complex numbers.

Definition

An inner produce over a complex vector space is positive definite, Hermitian, and linear in the first argument.

Notation

Let $(V, \mathbf{C})$ be a complex vector space. Let $f : V \times V \to C$ be a function such that

1. $f(x, x) \geq 0$, $f(x, x) = 0 \Leftrightarrow x = 0$;

2. $f(x, y) = \overline{f(y, x)}$

3. $f(ax + by, z) = a(x, z) + b(y, z)$

Complex Inner Products
Real Inner Products
Real Inner Product
Vectors
Real Norm
Space Inner Product
Complex Numbers
Real Vector
Space Norm
Plane Vector Sums and Differences
Space Vectors
Plane Norm
N-Dimensional Space
Plane Inner Product
Absolute Value
Plane Vectors
Distance
Right Triangle Sides Relation
Space Distance
Real Squares
Real Arithmetic
Plane Distance
Real Multiplicative Inverse
Interval Length
Real Products
Intervals
Real Space
Square Numbers
Real Additive Inverse
Real Line
Real Plane
Rational Multiplicative Inverse
Rational Arithmetic
Real Sums
Real Order
Integral Line
Square
Fields
Rational Products
Rational Sums
Real Numbers
Rational Order
Geometry
Rings
Rational Numbers
Lists
Integer Arithmetic
Set Numbers
Direct Products
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Finite Sets
Inverse Elements
Identity Elements
Arithmetic
Equivalent Sets
Element Functions
Natural Powers
Integer Sums
Function Inverse
Integer Order
Comparisons
Family Unions and Intersections
Operations
Natural Products
Function Images
Function Composites
Integer Numbers
Orders
Families
Natural Sums
Functions
Converse Relations
Equivalence Relations
Natural Order
Recursion Theorem
Relations
Peano Axioms
Ordered Pair Projections
Natural Induction
Set Products
Generalized Set Dualities
Natural Numbers
Set Powers
Unordered Triples
Set Dualities
Intersection of Empty Set
Partitions
Set Unions and Intersections
Set Symmetric Differences
Successor Sets
Ordered Pairs
Pair Unions
Set Intersections
Set Complements
Set Differences
Set Unions
Pair Intersections
Empty Set
Unordered Pairs
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects