Why

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

Definition

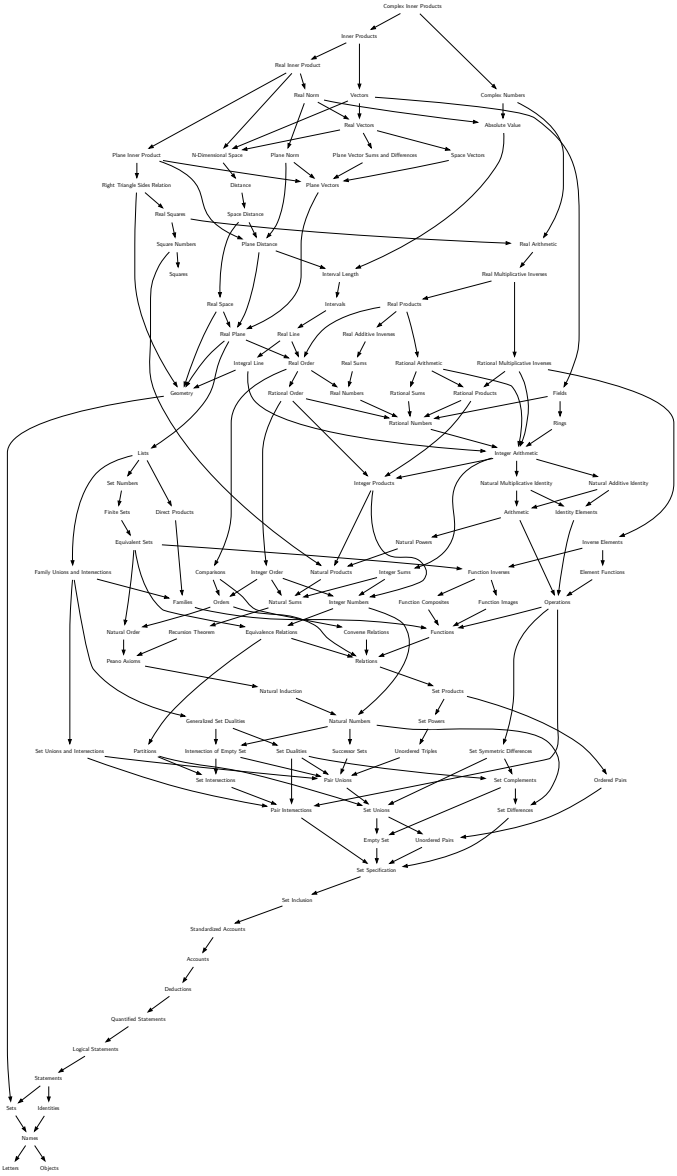
An inner produce over a complex vector space is positive defininte, Hermitian, and linear in the first argument.

0.1 Alternate Conventions

Notation

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