INNER PRODUCTS

Why

1

Definition

Two vectors in an inner product space are *orthogonal* if their inner product is zero. An *orthogonal family of vectors* in an inner product space is a family of vectors for which distinct family members are orthogonal.

A vector is *normalized* if its inner product with itself is one.

Examples

R^n with the usual inner product is an inner product space. Some authors call any finite-dimensional inner product space over the real numbers is a *Euclidean vector space*.

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[1]Future editions will include complete and rework this sheet.

2

Inner Products

Vectors

N-Dimensional Space

Distance

Space Distance

Plane Distance

Interval Length

Intervals

Real Plane   Real Line   Real Space

Integral Line   Real Order

Geometry   Real Numbers   Fields

Rational Numbers   Groups

Sequences   Integer Arithmetic   Integer Additive Inverses

Set Numbers   Natural Additive Identity   Natural Multiplicative Identity   Inverse Elements   Integer Sums

Direct Products   Finite Sets   Identity Elements   Arithmetic   Element Functions

Equivalent Sets   Algebra   Natural Exponents   Integer Products

Family Unions and Intersections   Operations   Function Inverses   Natural Products   Integer Numbers

Families   Equivalence Relations   Function Composite   Function Images   Natural Sums

Natural Order   Functions   Recursion Theorem

Relations   Peano Axioms

Cartesian Products   Natural Induction

Generalized Set Dualities   Set Powers   Natural Numbers

Set Unions and Intersections   Set Dualities   Unordered Triples   Intersection of Empty Set   Successor Sets   Partitions

Set Complements   Pair Unions   Set Intersections   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