Definition

A vector is *normalized* if its norm is 1. A set of vectors $\{u_1, \ldots, u_k\}$ *orthogonal* if $u_i^\top u_j = 0$ whenever $i \neq j$. A set of vectors is *orthonormal* if the set is orthogonal and each vector is normalized.

Orthonormal Real Vectors

Real Inner Product

Real Norm

Space Norm

Real Vectors

N-Dimensional Space — Space Vectors — Plane Vector Sums and Differences — Plane Norm — Plane Inner Product

Distance

Plane Vectors

Right Triangle Sides Relation

Space Distance

Plane Distance

Absolute Value — Real Squares — Square Numbers

Interval Length

Real Arithmetic — Square

Real Space

Intervals

Real Multiplicative Inverse

Real Plane

Real Line

Real Products

Integral Line

Real Order — Real Additive Inverse

Rational Arithmetic — Rational Multiplicative Inverse

Geometry

Rational Order — Real Sums — Real Numbers — Rational Sums — Rational Products

Rational Numbers

Lists

Integer Arithmetic

Set Numbers

Natural Multiplicative Identity — Natural Additive Identity — Integer Products

Direct Products

Finite Sets

Identity Elements — Arithmetic

Family Unions and Intersections

Equivalent Sets — Inverse Elements — Element Functions — Integer Order — Integer Sums — Natural Powers

Natural Products

Comparisons — Function Inverses

Families

Function Composition — Function Images — Orders — Operations — Integer Numbers — Natural Sums

Converse Relations — Functions — Natural Order — Equivalence Relations — Recursion Theorem

Relations

Peano Axioms

Set 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 Symmetric Differences

Ordered Pair — Pair Unions — Set Intersections — Set Complements

Pair Intersections — Set Unions — Set Differences

Unordered Pairs — Empty Set

Set Specification

Set Equality

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Sets — Identities

Names

Letters — Objects

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