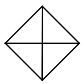


Why

We generalize real polyhedra to aribtrary inner product spaces.

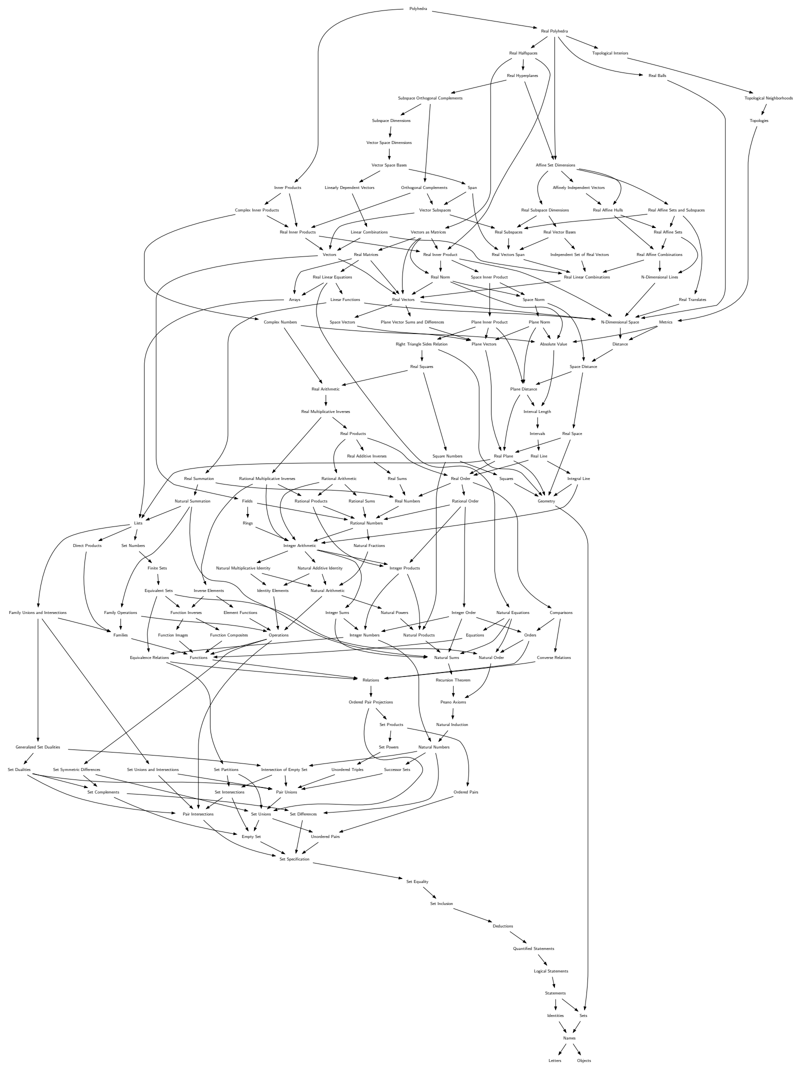
Definition

Suppose X is a vector space with an inner product $\langle \cdot, \cdot \rangle$ over **R**. A set $P \subset X$ is a *polyhedron* (called a *polyhedral set*) if there exists $c_1, \dots, c_m \in X$ and $\alpha_1, \dots, \alpha_m \in$ **R** so that

$$P = \{x \in X \mid \langle x, c_i \rangle \leq \alpha_i \text{ for } i = 1, \dots, m\}$$

In other words, if the set can be described by finitely many inequalities.

As before, a polyhedron is a *polytope* if it is bounded.


Polyhedra
Real Polyhedra
Real Halfspaces
Topological Interiors
Real Hyperplanes
Real Balls
Subspace Orthogonal Complements
Topological Neighborhoods
Subspace Dimensions
Topologies
Vector Space Dimensions
Vector Space Bases
Affine Set Dimensions
Inner Products
Linearly Dependent Vectors
Orthogonal Complements
Span
Affinely Independent Vectors
Complex Inner Products
Vector Subspaces
Real Subspace Dimensions
Real Affine Hulls
Real Affine Sets and Subspaces
Real Inner Products
Linear Combinations
Vectors as Matrices
Real Subspaces
Real Vector Bases
Real Affine Sets
Vectors
Real Matrices
Real Inner Product
Real Vectors Span
Independent Set of Real Vectors
Real Affine Combinations
Real Linear Equations
Real Norm
Space Inner Product
Real Linear Combinations
N-Dimensional Lines
Arrays
Linear Functions
Real Vectors
Space Norm
Real Translates
Complex Numbers
Space Vectors
Plane Vector Sums and Differences
Plane Inner Product
Plane Norm
N-Dimensional Space
Metrics
Right Triangle Sides Relation
Plane Vectors
Absolute Value
Distance
Real Squares
Space Distance
Real Arithmetic
Plane Distance
Real Multiplicative Inverses
Interval Length
Real Products
Intervals
Real Space
Real Additive Inverses
Square Numbers
Real Plane
Real Line
Real Summation
Rational Multiplicative Inverses
Rational Arithmetic
Real Sums
Real Order
Squares
Integral Line
Natural Summation
Fields
Rational Products
Rational Sums
Real Numbers
Rational Order
Geometry
Lists
Rings
Rational Numbers
Direct Products
Set Numbers
Integer Arithmetic
Natural Fractions
Finite Sets
Natural Multiplicative Identity
Natural Additive Identity
Integer Products
Equivalent Sets
Inverse Elements
Identity Elements
Natural Arithmetic
Family Unions and Intersections
Family Operations
Function Inverses
Element Functions
Integer Sums
Natural Powers
Integer Order
Natural Equations
Comparisons
Families
Function Images
Function Composites
Operations
Integer Numbers
Natural Products
Equations
Orders
Equivalence Relations
Functions
Natural Sums
Natural Order
Converse Relations
Relations
Recursion Theorem
Ordered Pair Projections
Peano Axioms
Set Products
Natural Induction
Generalized Set Dualities
Set Powers
Natural Numbers
Set Dualities
Set Symmetric Differences
Set Unions and Intersections
Set Partitions
Intersection of Empty Set
Unordered Triples
Successor Sets
Set Complements
Set Intersections
Pair Unions
Ordered Pairs
Pair Intersections
Set Unions
Set Differences
Empty Set
Unordered Pairs
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects