Why

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Definition

The *convex hull* of a subset of n-dimensional space is the intersection of all convex sets containing the set.

Notation

We denote the convex hull of $S \subset \mathbf{R}^n$ by **conv** S.

Characterization

Prop. 1. *Let $S \subset \mathbf{R}^n$. **conv** S is the set of all convex combinations of elements of S.*

Prop. 2. *The convex hull of $\{b_1, \ldots, b_m\} \subset \mathbf{R}^n$ consists of all vectors*

$$\lambda_1 b_1 + \lambda_2 b_2 + \cdots + \lambda_m b_m.$$

where $\lambda_i \geq 0$ and $\sum_i \lambda_i = 1$.

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[1]Future editions will include.

Convex Hulls

Convex Sets

Affine Sets Line Segments

N-Dimensional Space

Distance

Space Distance

Plane Distance

Interval Length

Intervals

Real Space Real Plane Real Line

Real Order Integral Line

Geometry Real Numbers

Rational Numbers

Integer Arithmetic

Sequences

Direct Products Set Numbers Natural Multiplicative Identity Natural Additive Identity Set Operations

Finite Sets Identity Elements Arithmetic

Equivalent Sets Operations Natural Exponents Integer Products

Family Unions and Intersections Natural Products Integer Sums

Function Inverses

Families Function Images Function Composites Natural Sums Integer Numbers

Functions Equivalence Relations Natural Order Recursion Theorem

Relations Peano Axioms

Cartesian Products Natural Induction

Generalized Set Dualities Set Powers Natural Numbers

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

Ordered Pairs Pair Unions Set Intersections Set Complements

Pair Intersections Set Unions Set Differences

Unordered Pairs Empty Set

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Sets Identities

Names

Letters Objects

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