Why

We generalize convex functions to $\mathbf{R}^n$.

Definition

Let A be a convex subset of $\mathbf{R}^n$. The function $f : A \to \mathbf{R}$ is *convex* if for any $a, b \in A$ and $t \in [0, 1]$,

$$f(ta + (1 - t)b) \leq tf(a) + (1 - t)f(b).$$

It is *concave* if $-f$ is convex.

Convex Functions

Real Convex Functions

Convex Sets

Affine Sets   Line Segments

N-Dimensional Space   Real Functions

Distance

Space Distance

Plane Distance

Interval Length

Real Space   Intervals

Real Plane   Real Line

Real Order   Integral Line

Geometry   Real Numbers   Rational Order

Rational Numbers

Lists   Integer Arithmetic

Set Numbers   Natural Additive Identity   Natural Multiplicative Identity   Integer Products

Finite Sets   Identity Elements   Arithmetic

Direct Products   Equivalent Sets   Operations   Natural Powers

Family Unions and Intersections   Function Inverses   Comparisons   Integer Order   Natural Products   Integer Sums

Families   Function Image   Function Composite   Orders   Natural Sums   Integer Numbers

Functions   Converse Relations   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   Successor Sets   Intersection of Empty Set   Partitions   Set Symmetric Differences

Ordered Pairs   Pair Unions   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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