Definition

A set $C \subset \mathbf{R}^n$ is a *cone* (or *nonnegative homogeneous*)

$$x \in C \text{ and } \theta \geq 0 \Rightarrow \theta x \in C.$$

Examples

Let $x \in \mathbf{R}^n$. Define $C_1 \subset \mathbf{R}^n$ by

$$C_1 = \{\theta x \mid \theta \geq \theta\}.$$

C_1 is a cone. The set

$$C_2 = \{x \in \mathbf{R}^n \mid x_i \geq 0 \text{ for } i = 1, \ldots, n\}$$

is a cone. C_2 is called the *non-negative orthant*. The set

$$C_3 = \{x \in \mathbf{R}^n \mid x_i \leq 0 \text{ for } i = 1, \ldots, n\}$$

is a cone. The set $C_2 \cup C_3$ is a cone.

Notation

We denote the nonnegative orthant of $\mathbf{R}^n$ by $\mathbf{R}^n_+$. We denote the nonpositive orthant of $\mathbf{R}^n$ by $\mathbf{R}^n_-$.

Real Cones

N-Dimensional Space

Distance

Space Distance

Plane Distance

Interval Length

Intervals

Real Space

Real Plane

Real Line

Real Order

Integral Line

Real Numbers

Rational Order

Geometry

Rational Numbers

Integer Arithmetic

Lists

Set Numbers

Natural Multiplicative Identity

Natural Additive Identity

Integer Products

Finite Sets

Identity Elements

Arithmetic

Direct Products

Equivalent Sets

Natural Powers

Family Unions and Intersections

Function Inverses

Comparisons

Integer Order

Integer Sums

Natural Products

Families

Function Composites

Function Images

Operations

Orders

Integer Numbers

Natural Sums

Functions

Converse Relations

Equivalence Relations

Natural Order

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 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

Identities

Sets

Names

Letters

Objects