Why

We want to generalize rectangles and cubes to n-dimensional space.

Definition

Let $I : \{1, 2, \ldots, d\} \to \mathbf{R}$ be a family of d intervals. A *hyperrectangle* is the set $\prod_{i=1}^{d} I_i$.[1]

As a result of this definition, an interval, a rectangle, and a cube are all hyperrectangles. Of course, in our definition we include four, five, and "dimensional" rectangles.

As with intervals, rectangles, and cubes, we call a hyperrectangle open, closed, left-open, right-open accordingly.

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[1]Some authors use the term rectangle or *n-dimensional rectangle*. Some authors use the term *box* or *n-box*.

Hyperrectangles

N-Dimensional Space

Distance

Space Distance

Cubes Plane Distance

Rectangles Real Space Interval Length

Real Plane Intervals

Real Line

Real Order Integral Line

Rational Order Real Numbers Geometry

Rational Numbers

Integer Arithmetic

Lists

Set Numbers Integer Products Natural Additive Identity Natural Multiplicative Identity

Finite Sets Arithmetic Identity Elements

Direct Products Equivalent Sets Natural Powers

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

Families Function Composites Function Images Orders Integer Numbers Natural Sums Operations

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 Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities Sets

Names

Letters Objects

4