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

Real Space Rectangles Interval Length

Real Plane Intervals

Real Line

Real Order Integral Line

Geometry Rational Order Real Numbers

Rational Numbers

Integer Arithmetic

Integer Products Natural Multiplicative Identity Natural Additive Identity

Lists

Set Numbers Direct Products

Arithmetic Identity Elements Finite Sets

Natural Powers Equivalent Sets

Function Inverses

Family Unions and Intersections

Comparisons Integer Order Integer Sums Natural Products Operations

Function Images Function Composites Families

Orders Integer Numbers Natural Sums Natural Order Equivalence Relations Functions

Converse Relations

Relations Recursion Theorem

Ordered Pair Projections Peano Axioms

Set Products Natural Induction

Set Powers Natural Numbers Generalized Set Dualities

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

Ordered Pairs Pair Unions Set Complements Set Intersections

Set Unions Set Differences Pair Intersections

Unordered Pairs Empty Set

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Sets Identities

Names

Letters Objects