Definition

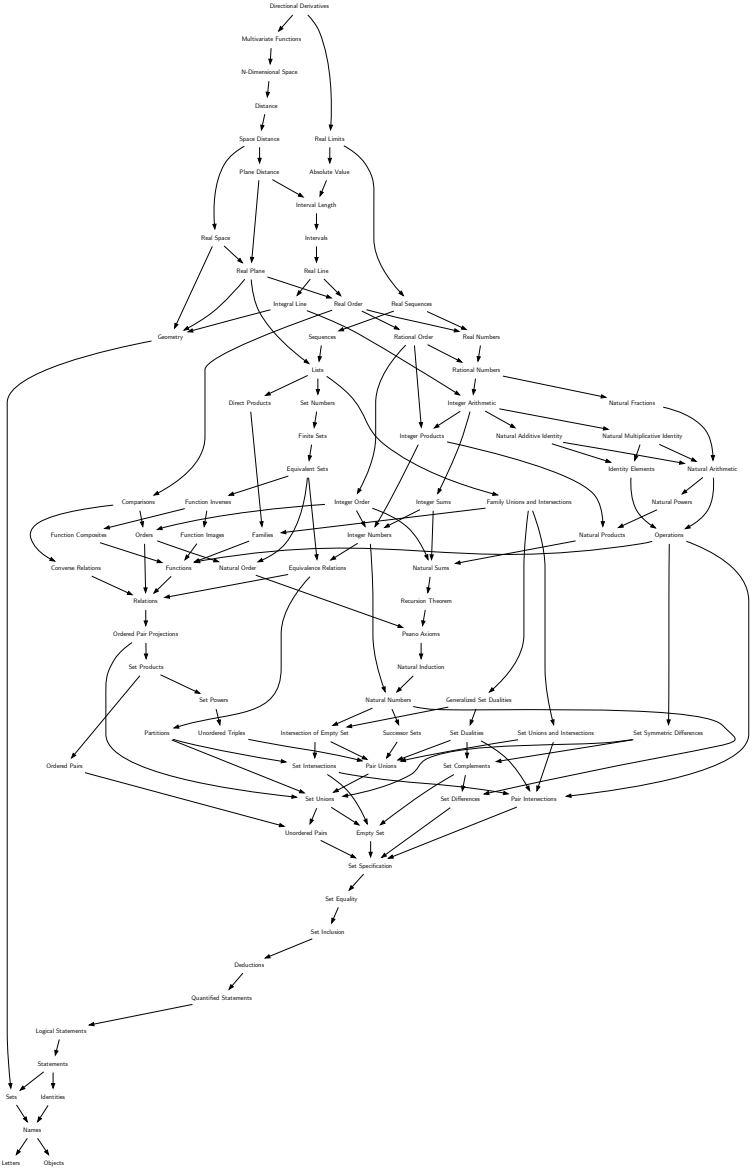
Suppose $f : \mathbf{R}^n \to \mathbf{R}$. Given $a \in \mathbf{R}^n$ and $\delta \in \mathbf{R}^n$, if the limit

$$\lim_{t \to 0} \frac{f(a + t\delta) - f(a)}{t}$$

exists, then we say that f is *differentiable at a in the direction x*. We call the value of the limit the *directional derivative* of f at a, in the direction δ.

Notation

We denote the directional derivative of f at a by $D_x f(x)$.


Directional Derivatives
Multivariate Functions
N-Dimensional Space
Distance
Space Distance
Real Limits
Plane Distance
Absolute Value
Interval Length
Real Space
Intervals
Real Plane
Real Line
Integral Line
Real Order
Real Sequences
Geometry
Sequences
Rational Order
Real Numbers
Lists
Rational Numbers
Direct Products
Set Numbers
Integer Arithmetic
Natural Fractions
Finite Sets
Integer Products
Natural Additive Identity
Natural Multiplicative Identity
Identity Elements
Natural Arithmetic
Equivalent Sets
Comparisons
Function Inverses
Integer Order
Integer Sums
Family Unions and Intersections
Natural Powers
Function Composites
Orders
Function Images
Families
Integer Numbers
Natural Products
Operations
Converse Relations
Functions
Natural Order
Equivalence Relations
Natural Sums
Relations
Recursion Theorem
Ordered Pair Projections
Peano Axioms
Set Products
Natural Induction
Set Powers
Natural Numbers
Generalized Set Dualities
Partitions
Unordered Triples
Intersection of Empty Set
Successor Sets
Set Dualities
Set Unions and Intersections
Set Symmetric Differences
Ordered Pairs
Set Intersections
Pair Unions
Set Complements
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