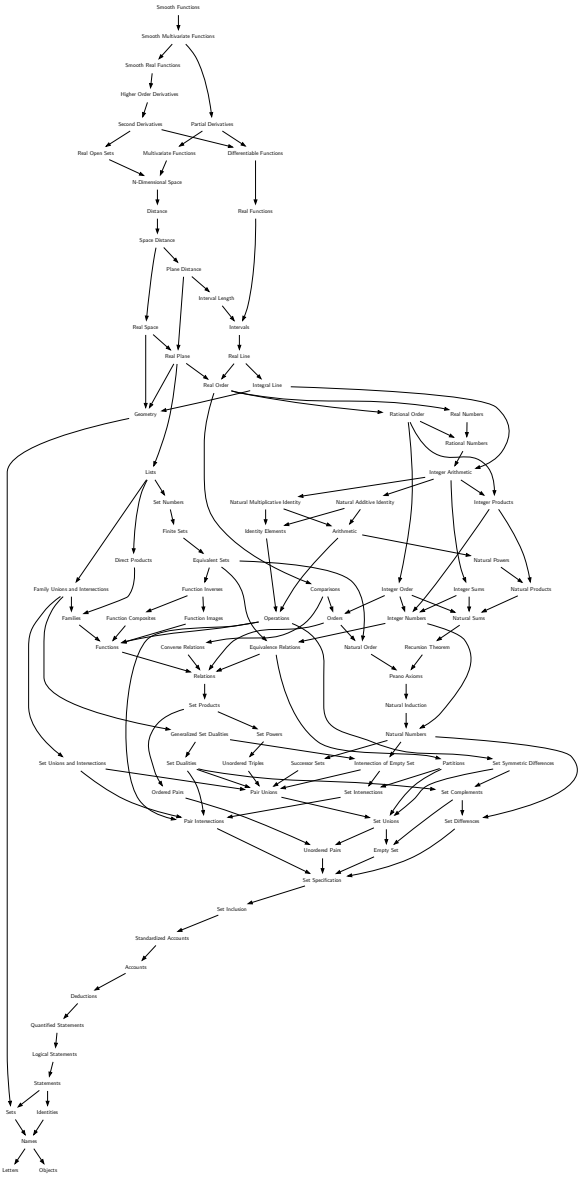
Why

What is the generalisation of smooth functions between Euclidean spaces.

Definition

Let $U \subset \mathbf{R}^n$ be open. A function $f : U \to \mathbf{R}^m$ is *smooth* if each of its components is smooth.

More generally, let $X \subset \mathbf{R}^n$ (not necessarily open). We call $g : X \to \mathbf{R}^m$ smooth if for each $x \in X$ there exists an open set $V \subset \mathbf{R}^n$ with $x \in V$ and smooth function $G : U \to \mathbf{R}^n$ so that $G(y) = g(y)$ for all $y \in U \cap X$. In this case we say that g can be *locally extended* to a smooth map on open sets.


Smooth Functions
Smooth Multivariate Functions
Smooth Real Functions
Higher Order Derivatives
Second Derivatives
Partial Derivatives
Real Open Sets
Multivariate Functions
Differentiable Functions
N-Dimensional Space
Distance
Real Functions
Space Distance
Plane Distance
Interval Length
Real Space
Intervals
Real Plane
Real Line
Real Order
Integral Line
Geometry
Rational Order
Real Numbers
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 Difference
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
Sets
Identities
Names
Letters
Objects