Why

If the base set of a sequence has a partial order, then we can discuss its relation to the order of sequence.

Definition

A sequence on a partially ordered set is *non-decreasing* if whenever a first index precedes a second index the element associated with the first index precedes the element associated with the second element. A sequence on a partially ordered set is *increasing* if it is non-decreasing and no two elements are the same.

A sequence on a partially ordered set is *non-increasing* if whenever a first index precedes a second index the element associated with the first index succedes the element associated with the second element. A sequence on a partially ordered set is *decreasing* if it is non-increasing and no two elements are the same.

A sequence on a partially ordered set is *monotone* if it is non-decreasing, or non-increasing. An increasing sequence is non-decreasing. A decreasing sequences is non-increasing. A sequence on a partially ordered set is *strictly monotone* if it is decreasing, or increasing.

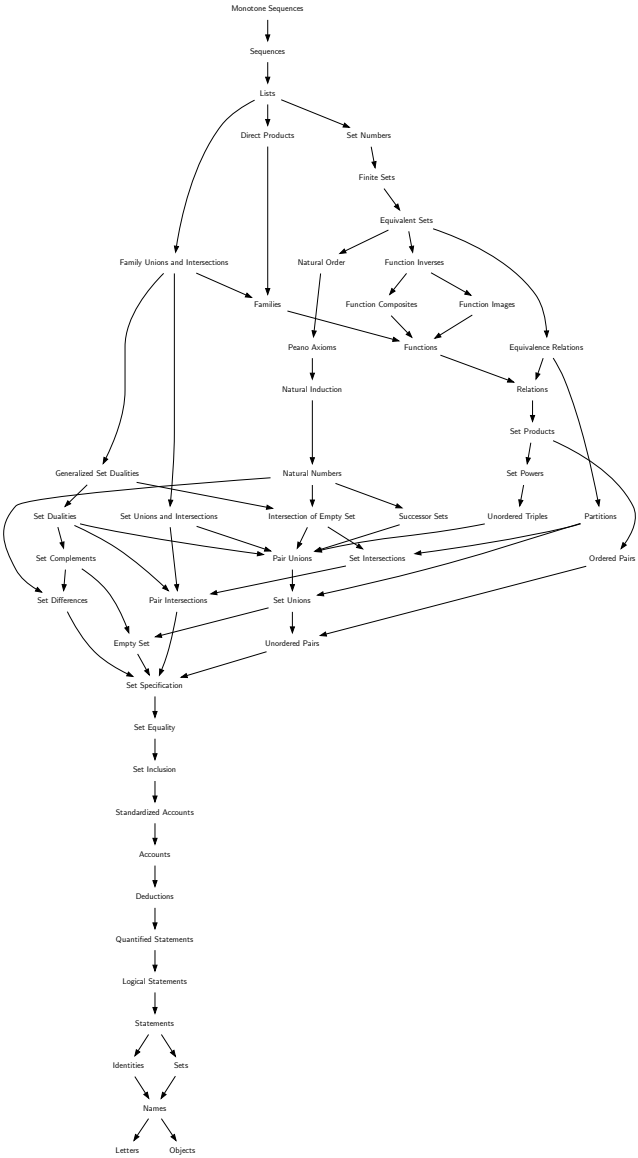
Notation

Let A a non-empty set with partial order $\preceq$. Let $(a_n)_n$ a sequence in A.

The sequence is non-decreasing if $n \leq m \longrightarrow a_n \preceq a_m$, and increasing if $n < m \longrightarrow a_n \prec a_m$. The sequence is non-increasing if $n \leq m \longrightarrow a_n \succeq a_m$, and decreasing if $n < m \longrightarrow a_n > a_m$.

Examples

Example 1. *Let A a non-empty set and $(A_n)_n$ a sequence of sets in $\mathcal{P}(A)$. Partially order elements of $\mathcal{P}(A)$ by the relation contained in.*


Monotone Sequences
Sequences
Lists
Direct Products
Set Numbers
Finite Sets
Equivalent Sets
Family Unions and Intersections
Natural Order
Function Inverses
Families
Function Composites
Function Images
Peano Axioms
Functions
Equivalence Relations
Natural Induction
Relations
Set Products
Generalized Set Dualities
Natural Numbers
Set Powers
Set Dualities
Set Unions and Intersections
Intersection of Empty Set
Successor Sets
Unordered Triples
Partitions
Set Complements
Pair Unions
Set Intersections
Ordered Pairs
Set Differences
Pair Intersections
Set Unions
Empty Set
Unordered Pairs
Set Specification
Set Equality
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects