Why

We want to speak of infinite processes, and to do so we define sequences indexed by **N**. In other words, important families are those indexed by the natural numbers.

Definition

A *sequence* (*infinite sequence*) is a family whose index set is **N** (the set of natural numbers without zero). The *nth term* or *coordinate* of a sequence is the result of the nth natural number, $n \in$ **N**.[1]

Notation

Let A be a non-empty set and $a :$ **N** $\to A$. Then a is a (infinite) sequence in A. $a(n)$ is the nth term. We also denote a by $(a_n)_n$ and $a(n)$ by a_n. If $\{A_n\}_{n \in \mathbf{N}}$ is an infinite sequence of sets, then we denote the direct product of the sequence by $\prod_{i=1}^{\infty} A_i$.

Natural unions and intersections

We denote the family of the infinite sequence of sets $(A_n)_n$ by $\cup_{i=1}^{\infty} A_i$. Similarly, we denote the intersection of an infinite sequence of sets by $\cap_{i=1}^{\infty} A_i$, respectively.

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[1]Future editions may also comment that we are introducing language for the steps of an infinite process.

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

Natural Numbers

Set Powers

Generalized Set Dualities

Set Unions and Intersections

Intersection of Empty Set

Successor Sets

Unordered Triples

Partitions

Set Dualities

Pair Unions

Set Intersections

Ordered Pairs

Set Complements

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