



SEQUENCES

Why

We introduce language for the steps of an infinite process.

Definition

A *finite sequence* is a family whose index set is a natural number (excluding zero). An *infinite sequence* is a family whose index set is the set of natural numbers (without zero). The *nth term* of a sequence (finite or infinite) is the result of the *nth* natural number. Let A be a non-empty set. A sequence in A is a function from the natural numbers to the set.

Notation

Let A be a non-empty set. Let $a : \mathbf{N} \rightarrow A$. Then a is a sequence in A . $a(n)$ is the *nth* term. We also denote a by $(a_n)_n$ and $a(n)$ by a_n .

Natural Unions and intersections

If $\{A_i\}$ is a finite sequence of sets indexed by $\{1, 2, \dots, n\}$, then we denote the union of the family by

$$\cup_{i=1}^n A_i$$

If $\{A_i\}$ is an infinite sequence of sets, then we denote the union of the family by

$$\cup_{i=1}^{\infty} A_i.$$

Similarly, we denote the intersections of a finite and infinite sequence of sets $\{A_i\}$ by

$$\cap_{i=1}^n A_i \quad \text{and} \quad \cap_{i=1}^{\infty} A_i.$$

respectively.

