Consider a long but finite sequence of some objects (numbers, functions, etc.). It can be approximated by an infinite sequence. However, such sequences can have a structure different from the standard set ***N*** of positive integer numbers. It can have a different order type. Such phenomenon occurs, for example, in some problems of numerical optimization. This observation hints at the possibility to consider sequences indexed by ordinal numbers rather than ordinary integers. Ultimate case of such sequences is a **long sequence** $\{a_n\}$ where n changes over all countable ordinals. The properties of long sequences are different from the ordinary ones. The following lemma gives a striking example:

Lemma: *If $\{x_n\}$ is a monotonically nonincreasing long sequence of real numbers (i.e. x_n is defined for all countable ordinals n), then there exists an index n_0 such that $x_n = x_{n0}$ for all $n \geq n_0$ (i.e. any such sequence eventually stabilizes).*

This lemma (and its natural generalization) implies the Zorn lemma, and is in some cases more powerful. In particular, it ensures existence of solution of some extremal problems important in the fluid dynamics.

Continual analogue of a long sequence is a **long line** (also called Alexandroff line). In the dynamical system theory, replacement of the ordinary time line by the Alexandroff line brings upon a deep change. The usual time evolution is then replaces by a process named **pseudoevolution** whose study is based on a continual analogue of the above lemma. One of the results of this theory is the existence of a nontrivial weak attractor of the Euler equations describing the motion of an ideal incompressible fluid in 2-d.