1 Sequences and Series

Definition 1.1. A sequence is a list of numbers $a_1, a_2, \ldots, a_n, \ldots$.

Sequences can be thought as a function from $\mathbb{N} \to \mathbb{R}$, with $na_n \in \mathbb{R}$.

Definition 1.2. Let L be a number such that for any $\epsilon_n > 0$ there exists N such that $|a_n - L| < \epsilon$ for all values of $n > N$.

If $\{a_n\}$ has a limit L, we say that it **converges** to L. If there is no limit, then a sequence is said to diverge.

Take $c_n =$For any $M > 0$, there exists N so that $c_n > M$ and for all $n > N$. In this case we say that $f(n)$diverges.

Consider now the sequence such that $h_n = 1 + \frac{1}{n}$ if and only if n is odd and $h_n = 0$ if n is even.

We define $\lim_{n\to\infty} h_m = L$, which means that for a given $\epsilon > 0$ there exists $N > 0$ such that $h_{n<L+\epsilon}$ forr $n > N$ and for any $\epsilon > 0$ and M there exists $n > M$ such that $|h_n - L| < \epsilon$.