Other norms: ℓ_1-norm : $\|x\|_1 = \sum_{i=1}^{n} |x_i|$

sup-norm or ℓ_∞-norm : $\|x\|_\infty = \max_i |x_i|$

Sequences $\{x_k\}_{k=1,\dots}$ or $\{x_k\}$, $x_k \in \mathbb{R}^n$

Definition (Convergence) $x_k \to x$, $\lim_{k\to\infty} x_k = x$

Given $\varepsilon > 0$, $\exists N_\varepsilon$ s.t. $\|x_k - x\| < \varepsilon \quad \forall k \geq N_\varepsilon$

Definition (Cauchy sequence) $\{x_k\}$ is Cauchy if given $\varepsilon > 0$, $\exists N_\varepsilon$ s.t. $\|x_k - x_m\| < \varepsilon \quad \forall k, m \geq N_\varepsilon$.

$\{x_k\}$ converges $\iff$ $\{x_k\}$ is Cauchy

Definition (subsequence) infinite subset of $\{x_k\}$.

$\{x_k : k \in \mathcal{K}\}$ or $\{x_k\}_{\mathcal{K}}$, $\mathcal{K}$: infinite subset of $\mathbb{Z}^+$

Definition (Limit point) x is a limit point of $\{x_k\}$ if $\exists$ a subsequence of $\{x_k\}$ that converges to x.

Definition (bounded sequence) $\|x_k\| \leq b, \ \forall k$

Results about Bounded sequences

1. Every bounded has at least one limit point
2. A bounded sequence converges iff it has a unique limit point