Study Notes

October 6, 2014

definitions

bounds

bounded above

a set $S \subset \mathbb{R}$ is **bounded above** if there is a real number M such that $s \leq M$ for all $s \in S$.

upper bound

If $M \geq s, \forall s \in S \subset \mathbb{R}$ then M is an **upper bound**

supremum

if L is the lowest upper bound such that $M \geq L \geq s \forall s \in S \subset \mathbb{R}$ where M is any upper bound of S, then L is the supremum.

least upper bound principle

proof

squeeze theorem

proof

define limit

thm

If (a_n) is a convergent sequence of real numbers, then the set $\{a_n : n \in \mathbb{N}\}$ is bounded

2.5.2 arithmetic operations of limits, addition, multiplication, constant multiplication and inversion

define monotonic sequence

monotone convergence theorem

nested intervals lemma

bolzano-weierstrass theorem

cauchy proposition

define cauchy sequence

every cauchy sequence is bounded

definition of completeness

prove completeness of $\mathbb{R}$ (every cauchy sequence of $\mathbb{R}$ converges

definition of summable

thm if series is convergent, then sequence converges to 0

cauchy criterion for series

geometric series