

Advanced Calculus (I)

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2.4 Cauchy Sequences

Definition

A sequence of points $x_n \in \mathbf{R}$ is said to be *Cauchy* if and only if for every $\epsilon > 0$ there is an $N \in \mathbf{N}$ such that

$$n, m \geq N \text{ imply } |x_n - x_m| < \epsilon$$

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If $\{x_n\}$ is convergent, then $\{x_n\}$ is Cauchy.

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Let $\{x_n\}$ be a sequence of real numbers. Then $\{x_n\}$ is Cauchy if and only if $\{x_n\}$ converges (to some point a in \mathbf{R}).

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Prove that any real sequence $\{x_n\}$ satisfies

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Thank you.