Mathematical Analysis

Inverted Pastry

Papyrus

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Preface

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Beijing, February 2024 *Inverted Pastry*

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Chapter 1

Limits

Definition 1. A sequence $\{x_n\}_{n=0}^{+\infty}$ in a metric space (X, d) is said to *converge*, if there exists a point $x \in X$, such that for every $\varepsilon > 0$, there is an index N, where $d(x_n, x) < \varepsilon$ for all integers $n > N$. In this case, we say that x is the *limit* of $\{x_n\}$, or that $\{x_n\}$ converges to x, written $\lim_{n\to+\infty} x_n = x$ or simply $x_n \to x$. Symbolically,

$$\left(\lim_{n\to+\infty} x_n = x\right) \coloneqq \forall_{\varepsilon\in\mathbb{R}_{>0}} \exists_N \forall_{n\in\mathbb{Z}_{\geqslant 0}} \left(n > N \implies (x_n, x) < \varepsilon\right).$$

A sequence that does not converge is said to *diverge*.

Bibliography

[1] Walter Rudin. *Principles of mathematical analysis*. 3rd ed. International series in pure and applied mathematics. New York: McGraw-Hill, 1976. ISBN: 978-0-07-054235-8.

[2] В. А. Зорич. *Математический анализ*. 13-е изд. Т. I. Москва: МЦНМО, 2024. ISBN: 978-5-4439-4641-2.

[3] В. А. Зорич. *Математический анализ*. 13-е изд. Т. II. Москва: МЦНМО, 2024. ISBN: 978-5-4439-4642-9.

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