Notes for Mathematical Anaysis

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Contents

Chapter 1.

Metric Spaces and Normed Linear Spaces

§1.1 Metric Spaces

Definition 1.1.1. Let X be any non-empty set. A *metric on X* is a mapping $\rho : X \times X \to \mathbb{R}_{\geq 0}$ which satisfies the *metric axioms*. That is, for any $x, y, z \in X$,

M1. $\rho(x, y) = 0$ iff $x = y$;

M2. $\rho(x, y) = \rho(y, x)$;

M3. $\rho(x, y) \leq \rho(x, z) + \rho(z, y)$.

   The ordered pair (X, ρ) is called a *metric space*.

§1.2 Open Sets

Definition 1.2.1. Let $\mathbb{X} = (X, \rho)$ be a metric space. A set $A \subseteq X$ is said to be *open* iff

Chapter 2.

Differentiation