§0 Overview

R: the set of all real numbers

Rich structure on R:

- Addition + with 0
- Multiplication \times with 1

\{ field structure \}

- Absolute value |p-q| (distance between 2 points)

\{ metric structure \}

- Open neighborhood \{ |x-x_0|<\varepsilon \}

\{ topological structure \}

- Function f: R \rightarrow R
  - limits of functions
  - continuity
  - differentiability
  - integrability
  - etc...

Further “simple” question:

Generalization? (i.e. Any space with similar structure?)

Content of this course:

- Elementary analysis on R
- Topological space
- Metric space

Reference:

[i] Robert G. Bartle, Donald R. Sherbert, Introduction to Real Analysis

[ii] James R. Munkres, Topology

[iii] Erwin Kreyszig, Introduction to Functional Analysis