Outline: Week 3 R

Compact Sets and the Heine–Borel Theorem

1. Definition of compact set.
2. Examples:
    - The interval $[a, b]$ is compact due to Bolzano Weierstrass.
    - the naturals $\mathbb{N}$ are closed but unbounded ; in fact any discrete ϵ-separated set is closed but unbounded.
3. Heine Borel theorem
    - If a set is compact, then it is bounded.
    - Compact implies closed.
    - Bounded and closed implies compact.
4. Open cover and finite subcover of open sets, then A is compact (see Abbott 3.3.8).