

## Set Theory

1. Axioms of ZFC set theory with explanation of their role in capturing fundamental intuistic properties of sets. Varies formulation of axioms of choice with proofs of their equivalence (e.g. existence of choice function, Zermello theorem, Kuratowski-Zorn lemma).
2. Definitions of fundamental notions of set theory with help of axioms.
3. Properties of well ordered sets. Transfinite inductions. Definitions with help of transfinite inductions.
4. Von Neumann ordinals.
5. Von Neumann cardinals.
6. Cardinal arithmetic and some of it applications to other parts of mathematics.
7. Cofinality of cardinals and Konig Theorem.
8. Natural numbers in set theory.
9. Weakly and strongly inaccessible cardinals.
10. Real and 0-1 measurable cardinals. Banach –Kuratowski Theorem. Ulam Theorem. Ulam matrix.
11. Universal measure zero sets and strong measure zero sets. Luzin set.
12. Some fundamental constructions of big family of sigma-independent sets, almost disjoint sets, cardinality of sigma-field generated by a family of sets.
13. Role of axiom of choice and continuum hypothesis in set theory.
14. Some consequences of Martin axiom for measure theory and topology.