Functional Analysis Outline 1

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1. In this section, we discussed the basic notation of set theory: the union of sets ($\cup$), intersection of sets ($\cap$), the difference of sets ($\backslash$), and symmetric difference of sets ($\triangle$), as well as some theorems following the definitions.

2. We defined countable sets and uncountable sets, and ways to prove them. We talked about the diagonal method, and defined functions from countable sets to the natural numbers, in order to prove countability, as well as cantor's construction method to prove uncountability for the reals.

3. We discussed equivalence relation: between sets, and the equivalence of some uncountable sets. Then the properties are discussed: Reflexivity, Symmetry, and Transitivity

4. In order to compare sets, we defined the cardinality of sets. And we compared the size of some uncountable sets.

5. Naturally, we talked about mappings and inverse mappings.