

Functional Analysis

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Abstract

We will concern ourselves first with the concepts of infinite-dimensional linear algebra (over \mathbb{R} or \mathbb{C}), and then pivot to function spaces and linear operators between them. We aim to give an introduction to the basic concepts of theory, and depending on the amount of time, state and prove some the three main theorems, those being the Banach-Steinhaus theorem, the open mapping theorem, and the Hahn-Banach theorem.

Prerequisites: Basic linear algebra and calculus are good to know. Topology is good to know, but isn't necessary. We will go over everything required.

For detailed notes on functional analysis, as well as more exercises, I recommend checking out this MIT course. For topology and linear algebra, I recommend Munkres' topology 2nd edition and Sheldon Axler's Linear Algebra Done Right, respectively.