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RUDIN: TRANSLATED

Introduction

The Real and Complex Number System

Introduction

Before we can begin to talk about what analysis is about, we must have a clear notion of the objects that we want to study.

Basic Topology

Finite, Countable, and Uncountable Sets

Armed with a well-constructed real number system, we can begin to talk about some mathematical constructions. One of the simplest constructions (operations?) on the real numbers is the object called a function. A function is simply a gadget that takes an input number and outputs a number that is determined based on some rule associated to that specific function.

However, note that the notion of a function is not constrained to operating numbers. It can make as much sense to talk about a function on an arbitrary set, and the "outputs" need not even resemble the inputs in any shape or form. For example, one can define a function on the set of names of people in a class, which outputs the birthday of the person in binary.

In this case, we would call the set of names the domain of the function, and

Numerical Sequences and Series

Continuity

Differentiation

The Riemann-Stieltjes Integral

Sequences and Series of Functions

Some Special Functions

Functions of Several Variables

Integration of Differential Forms

The Lebesgue Theory