



Image

Analyse de Fourier

Author: CatMono

Date: November, 2025

Version: 0.1

Contents

Preface

This is the preface of the book...

Chapter 1 Fourier Series

1.1 Fourier Expansion

Chapter 2 Convergence of Fourier Series

2.1 Mean Convergence

Lemma 2.1 (Riemann-Lebesgue Lemma)

Let $f(x) \in R[a, b]$, $g(x)$ has a period T and $g(x) \in R[0, T]$, then:

$$\lim_{p \rightarrow +\infty} \int_a^b f(x)g(px) dx = \int_a^b f(x) dx \cdot \frac{1}{T} \int_0^T g(t) dt.$$

A special case is when $g(x) = \sin x$ or $g(x) = \cos x$, then:

$$\lim_{p \rightarrow +\infty} \int_a^b f(x) \sin(px) dx = \int_a^b f(x) \cos(px) dx = 0.$$



2.2 Pointwise Convergence

Chapter 3 Fourier Transform on \mathbb{R}

Chapter 4 Fourier Transform on \mathbb{R}^n

Chapter 5 Finite Fourier Analysis

Chapter 6 Dirichlet Theorem

Bibliography

- [1] Elias M. Stein, Rami Shakarchi. *Fourier Analysis: An Introduction*. Princeton University Press, 2016.
- [2] Author2, Title2, Journal2, Year2. *This is another example of a reference.*