MATH099
Fourier Analysis & wavelets

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Abstract

This Course follows Chapter 2 form [BK19].

Contents

Chapter 1

Fourier Transform

1.1 Lecture 1: Fourier Series

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Definition 1.1.1 (Fourier Series).

$$f(x) = \frac{A_0}{2} \sum_{k=1}^{\infty} (A_k \cos(kx) + B_k \sin(kx))$$

where

Definition 1.1.2. $A_k = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \cos(kx) \mathrm{d}x = \frac{1}{\|\cos(kx)\|^2} \langle f(x), \cos(kx) \rangle$

and

Definition 1.1.3. $B_k = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \sin(kx)\, \mathrm{d}x = \frac{1}{\|\sin(kx)\|^2} \langle f(x), \sin(kx) \rangle$

1.2 Lecture 2: Inner Products in Hilbert Space

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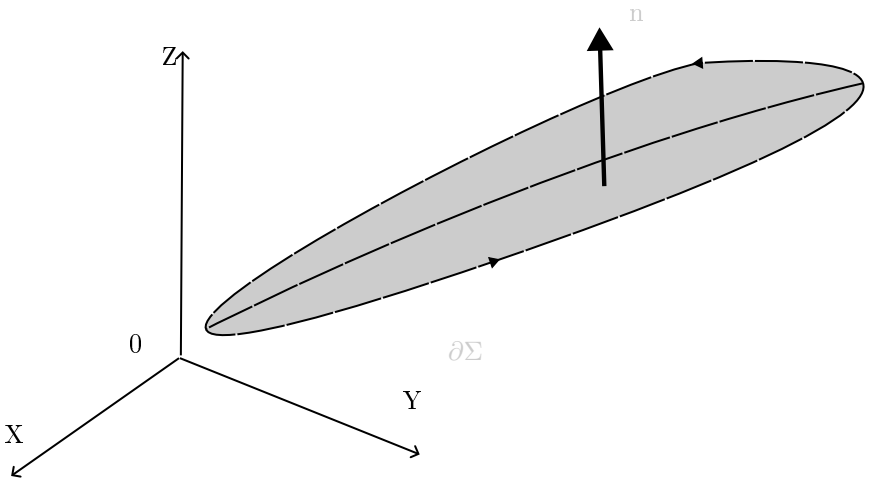
n
Z
0
∂Σ
Y
X

Appendix

Wordcucks BTFO once again

Bibliography

[BK19] Steven L. Brunton and J. Nathan Kutz. *Data-Driven Science and Engineering: Machine Learning, Dynamical Systems, and Control*. Cambridge University Press, 2019. DOI: 10.1017/9781108380690.