

Fourier Transform - Part 1

-> applications in physics, computer science,...

(JPEG compression, equalization of audio recordings, ...)

Fourier series

 $f: \mathbb{R} \longrightarrow \mathbb{R} \text{ (or } \mathbb{C})$ periodic function

$$f: [a,b) \longrightarrow \mathbb{R} \text{ (or } \mathbb{C})$$

$$\begin{cases} \begin{cases} \\ \end{cases} \end{cases} \text{ transform}$$

 $\hat{f} \colon \mathbb{Z} \longrightarrow \mathbb{C}$

continuous Fourier transform

$$f: \mathbb{R}^n \longrightarrow \mathbb{R} \text{ (or } \mathbb{C})$$

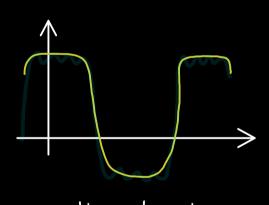
$$\begin{cases} \begin{cases} \\ \end{cases} \text{ transform} \end{cases}$$

 $\hat{f}:\mathbb{R}^n\longrightarrow\mathbb{C}$

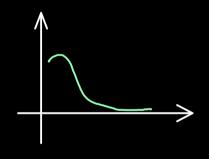
Fourier analysis on groups

general measure theory

Idea of Fourier transform:



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time domain

frequency domain

Requirements:

Real Analysis

Linear Algebra

Abstract Linear Algebra





Fourier Transform