

## Fourier Transform - Part 1

↳ applications in physics, computer science, ...  
(JPEG compression, equalization of audio recordings, ...)

Fourier series

$$f: \mathbb{R} \rightarrow \mathbb{R} \text{ (or } \mathbb{C})$$

periodic function

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

↑ ↓ transform

$$\hat{f}: \mathbb{Z} \rightarrow \mathbb{C}$$

continuous Fourier transform

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

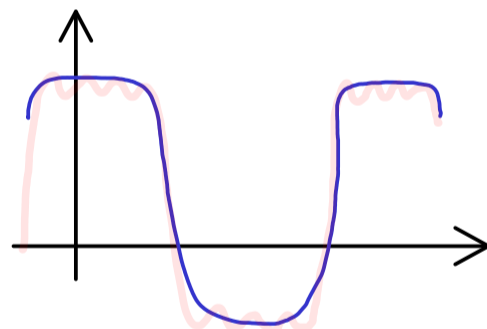
↑ ↓ transform

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

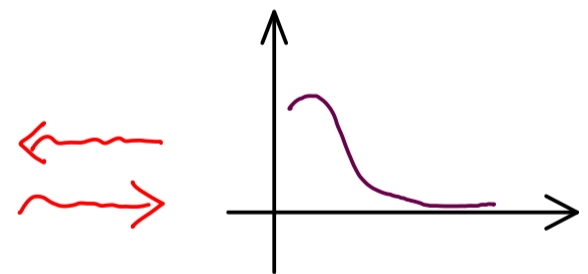
Fourier analysis on groups

general measure theory

Idea of Fourier transform:



time domain



frequency domain



Requirements:

Real Analysis

Linear Algebra

Abstract Linear Algebra

Fourier Transform

