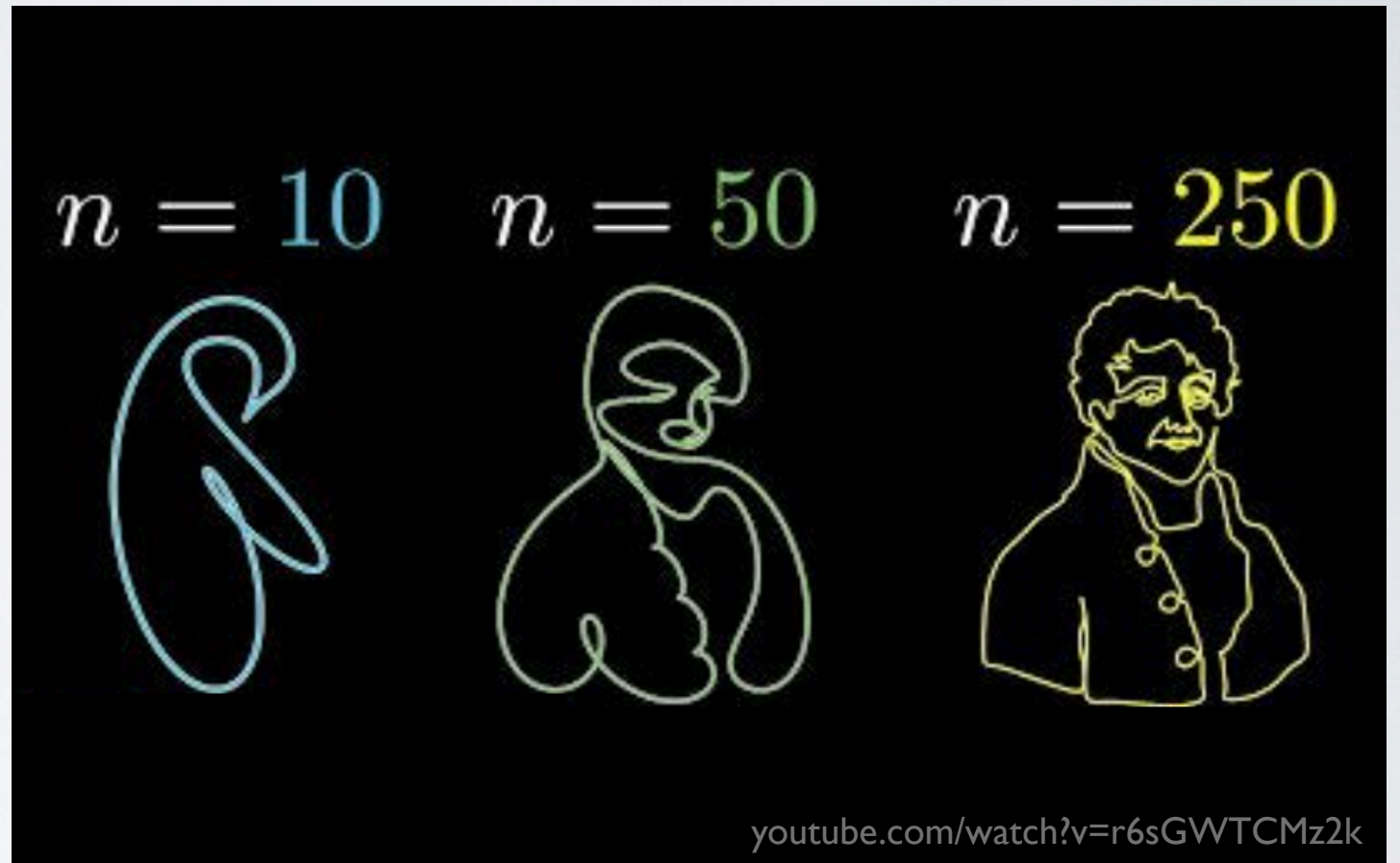


Week 9 - #2

Fourier Series and Transforms (II)



Today: Ch 7

Next Class: Ch 8

Ji-hoon Kim (Seoul National University)

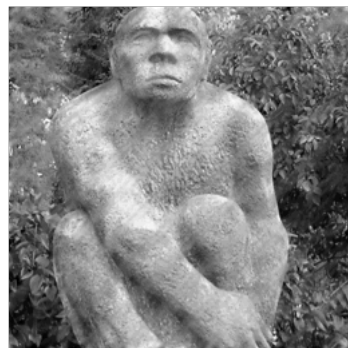
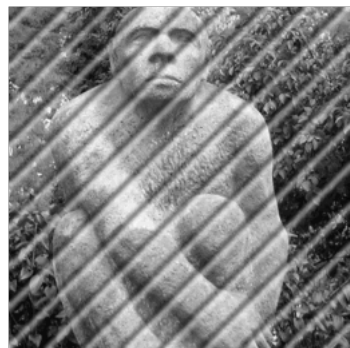
Rudimentary Mathematical Methods of Physics (Fall 2025): Quiz #13

— [open book and open note, “and” cellphone or laptop, drop it off as you leave the class] —

Please write down your name and student ID in the top right corner. (0.0 pt: no paper found with your name / 0.5 pt: paper found with your name and some answers / 1.0 pt: good answers)

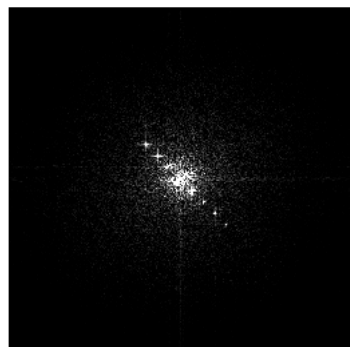
1. Boas, Chapter 7, Section 5, Problem 2

2. Briefly explain, in layman’s terms and without using detailed math, what each of the figure/movie below is trying to visualize.

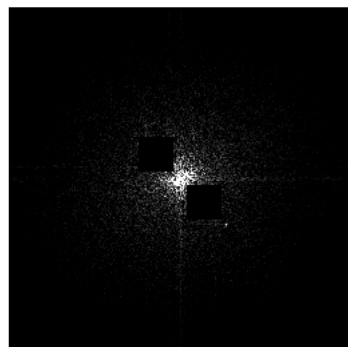


Fourier
transformation

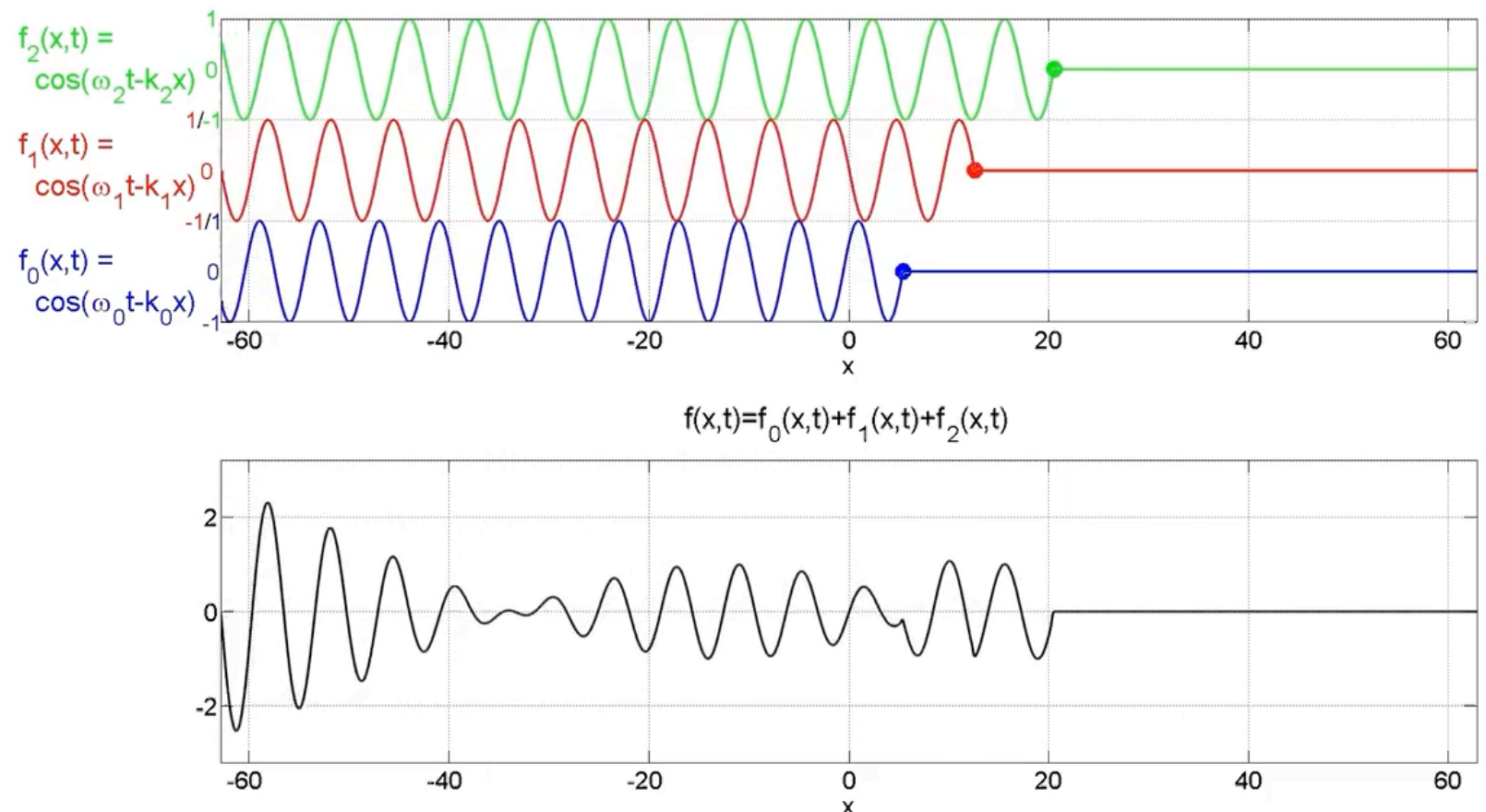
inverse Fourier
transformation



Filtering



Fourier filtering, Wikipedia commons



youtube.com/watch?v=ePJdV75fT5o

Rudimentary Mathematical Methods of Physics (Fall 2025): Suggested Problems in Chapter 7, Boas, 3rd ed.

The problems I suggest you to take a deeper look into include, but are not limited to, the following.
The class homework assignments will mainly be from this list.

- Section 02: Problems 12, 17
- Section 03: Problems 8
- Section 04: Problems 1, 13, 16
- Section 05: Problems 1, 3, 4, 7, 9, 11
- Section 06: Problems 10, 12 (for Problem 5.7 and 5.9), 14, 15
- Section 07: Problems 7, 9, 11, 13
- Section 08: Problems 2, 14, 15(a)(b), 20
- Section 09: Problems 9, 10, 11, 19, 20, 23
- Section 10: Problems 2
- Section 11: Problems 6, 8
- Section 12: Problems 6, 9, 10, 15, 18, 21, 23, 26, 31, 35
- Section 13: Problems 4, 8, 14, 23

Rudimentary Mathematical Methods of Physics (Fall 2025): Suggested Problems in Chapter 8, Boas, 3rd ed.

The problems I suggest you to take a deeper look into include, but are not limited to, the following.
The class homework assignments will mainly be from this list.

- Section 01: Problems 4
- Section 02: Problems 6, 8, 11, 12, 20(b), 34
- Section 03: Problems 4, 11, 14, 16, 20
- Section 04: Problems 2, 6, 8, 10, 15, 20
- Section 05: Problems 6, 9, 11, 13, 15, 24, 31(c)(d)
- Section 06: Problems 6, 8, 10, 14, 21, 23, 28, 34, 35, 42
- Section 07: Problems 2, 3, 8, 17, 22, 30
- Section 08: Problems 1, 2, 4, 7, 10, 11, 12, 19, 22, 26
- Section 09: Problems 8, 9, 14, 16, 28, 30, 34, 38
- Section 10: Problems 3, 8, 11, 14, 18
- Section 11: Problems 6(b)(c), 7, 9, 15, 21, 23, 25
- Section 12: Problems 2, 4, 6, 11, 16

Chapter 13, Sections 1-4

- Section 01: Problems 1, 4
- Section 02: Problems 1, 2, 3, 7
- Section 03: Problems 2, 3, 7
- Section 04: Problems 2, 5

Public Lecture (계원물리학강의, Nov. 4, Bldg 28)

제8회 "일반인을 위한 계원 물리학 강의"

중력파 100년의 기다림, 그 후 10년

2025년 11월 4일(화) 16:30-18:00

아인슈타인이 1916년 일반상대성이론에서 예견한 중력파는 2015년 9월 14일, LIGO가 쌍성 블랙홀 병합으로부터 오는 미세한 시공간의 떨림을 포착함으로써 직접 감지하는 데 성공했습니다. 이 발견은 이론적 예측이 실험으로 검증되기까지 꼭 100년이 걸린 "기다림의 과학"이자, 새로운 우주 관측의 창을 연 사건으로 평가받습니다. 그로부터 10년, 중력파 천문학은 중성자별 병합, 다중신호 천문관측, 허블 상수 측정, 그리고 중력파 배경 탐색까지 빠른 속도로 영역을 넓혀가며 전혀 새로운 우주 지도를 그려가고 있습니다. 최근에는 블랙홀의 이론적 성질을 입증하는 결과를 발표하기도 했습니다.

이 강연에서는 아인슈타인의 초기 예측, 웨버 막대 탐지기, 그리고 라이고-비르고-카그라 중력파 검출기가 이룩한 실험적 도약을 되짚으며, 인류가 왜 이렇게 오랫동안 중력파를 기다릴 수밖에 없었는지에 대한 100년의 여정을 살펴봅니다. 그리고 첫 발견 이후 불과 한 세대 만에 이룩한 기술 발전과 과학적 성과, 그리고 다중 관측이 가져온 천문학의 패러다임 변화를 소개합니다. 마지막으로 차세대 지상형 검출기, 우주 검출기, 초전도 중력계 네트워크와 같은 새로운 시도들이 어떻게 더 먼 우주, 더 초기의 우주를 열어갈지 전망합니다.

연사

오정근 박사 (국가수리과학연구소)

장 소

서울대학교 자연과학대학 28동 101호

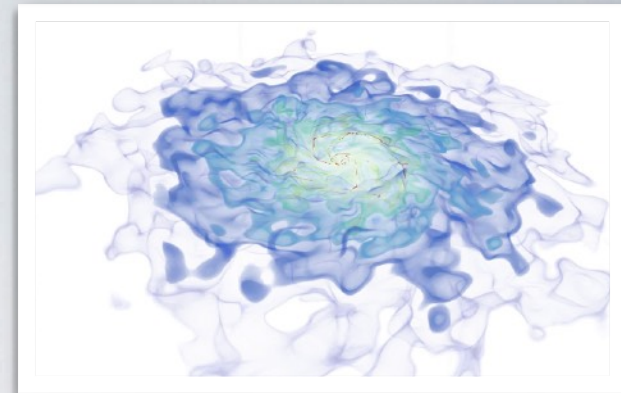
문 의

이론물리학연구소(<http://ctp.snu.ac.kr>)

✉ ctp@ctp.snu.ac.kr

☎ Tel. 02-880-6523

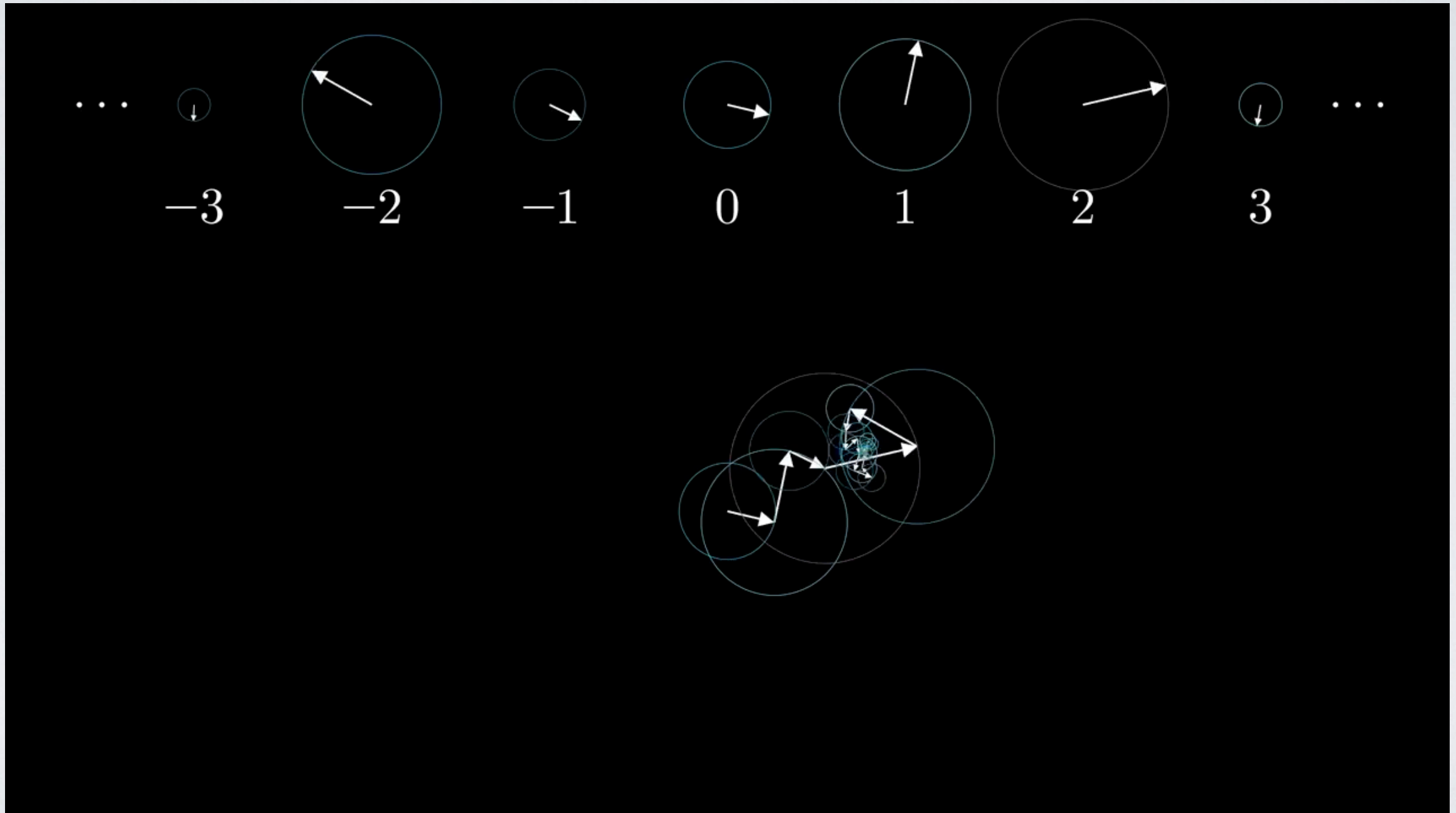




Complex Fourier Series

Complex Fourier Series

- A visualization of complex Fourier series.



youtube.com/watch?v=r6sGWTCMz2k

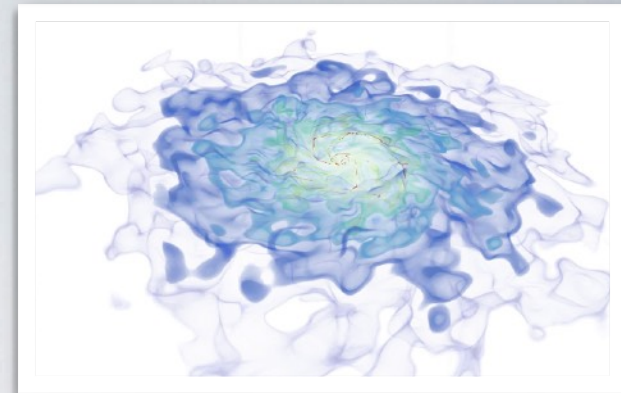
Complex Fourier Series

- A visualization of complex Fourier series.

Joseph Fourier



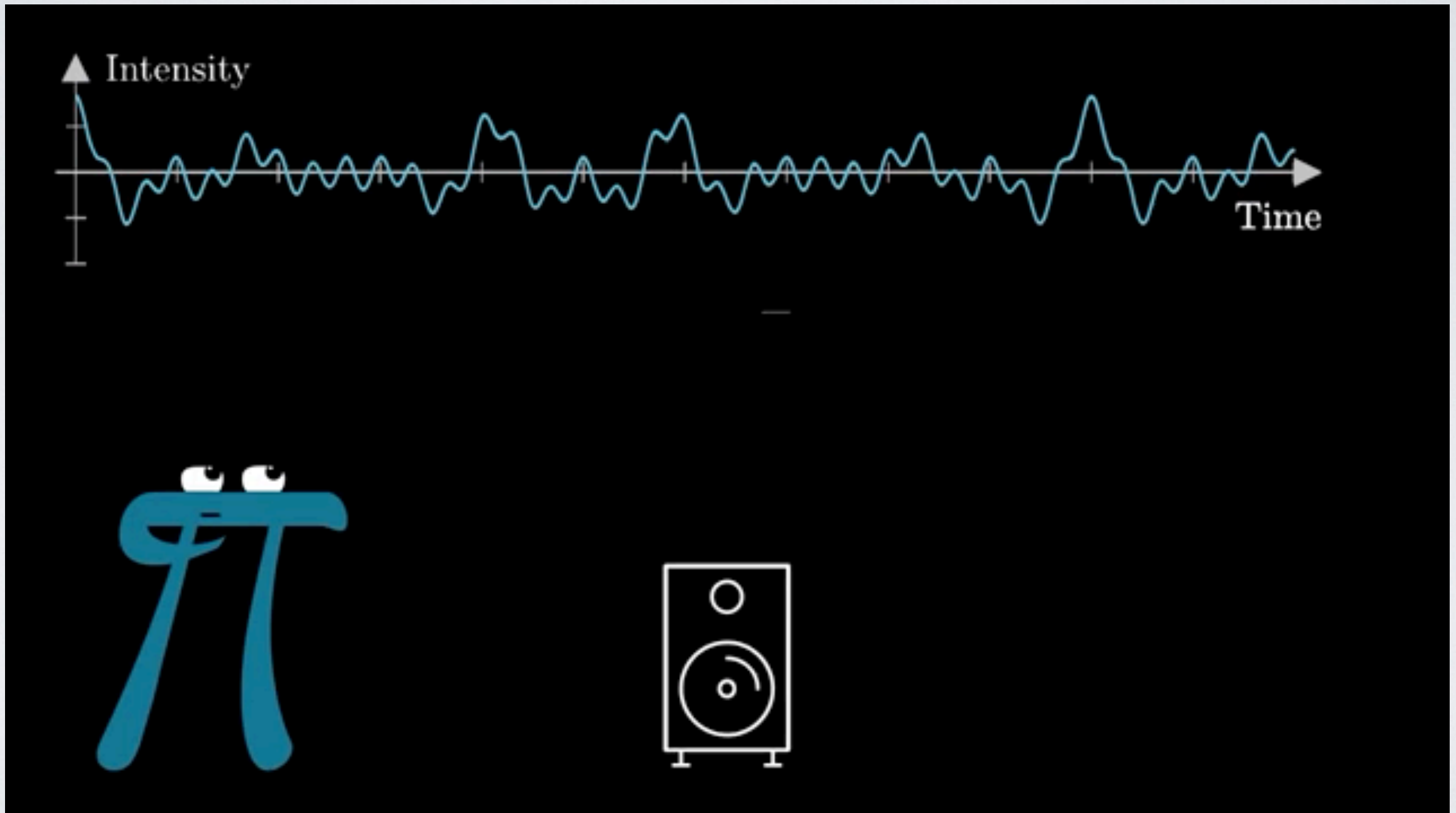
youtube.com/watch?v=r6sGWTCMz2k



Fourier Transform

Fourier Transforms

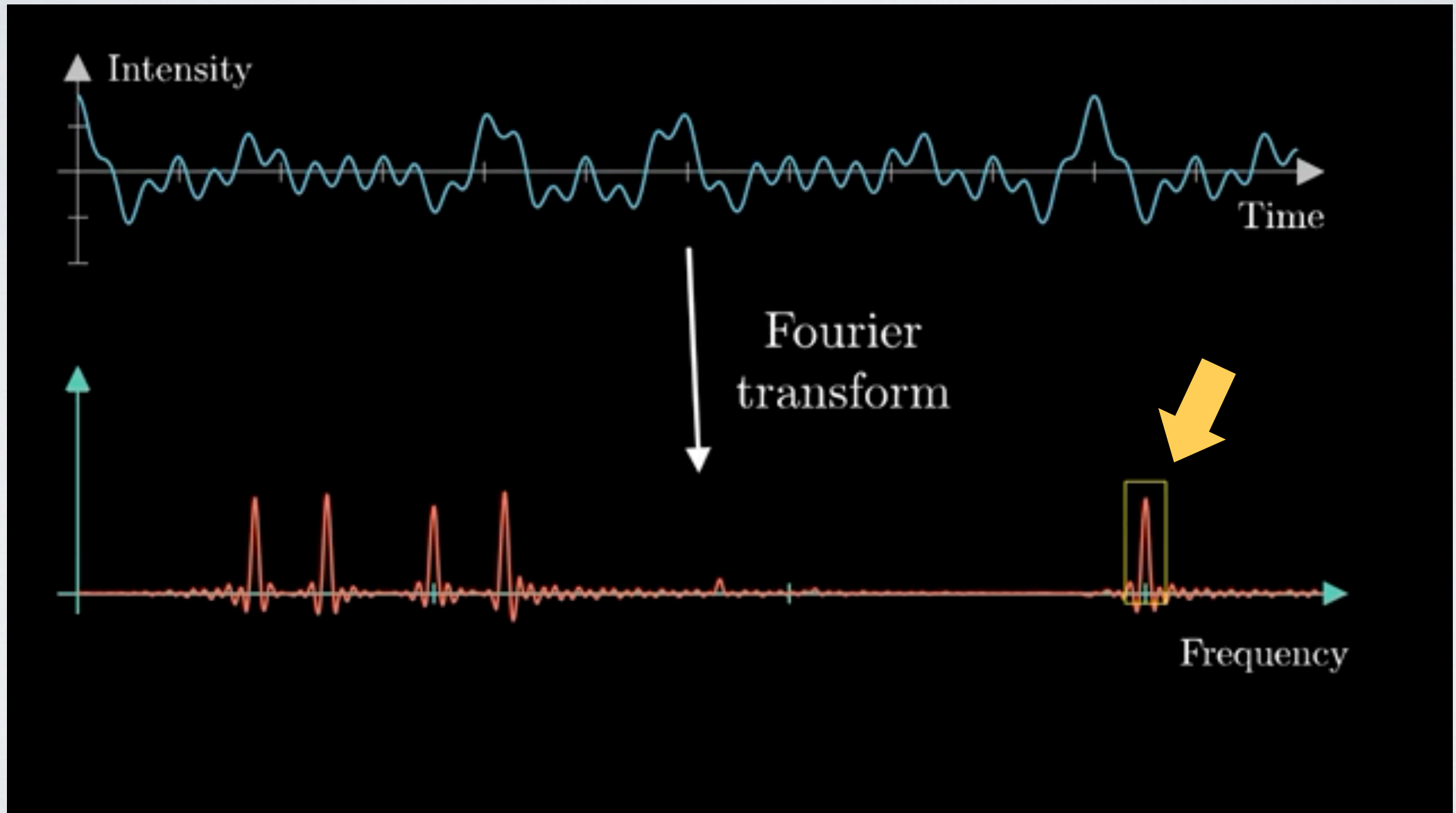
- A visualization of Fourier transforms.



youtube.com/watch?v=spUNpyF58BY

Fourier Transforms and Filtering

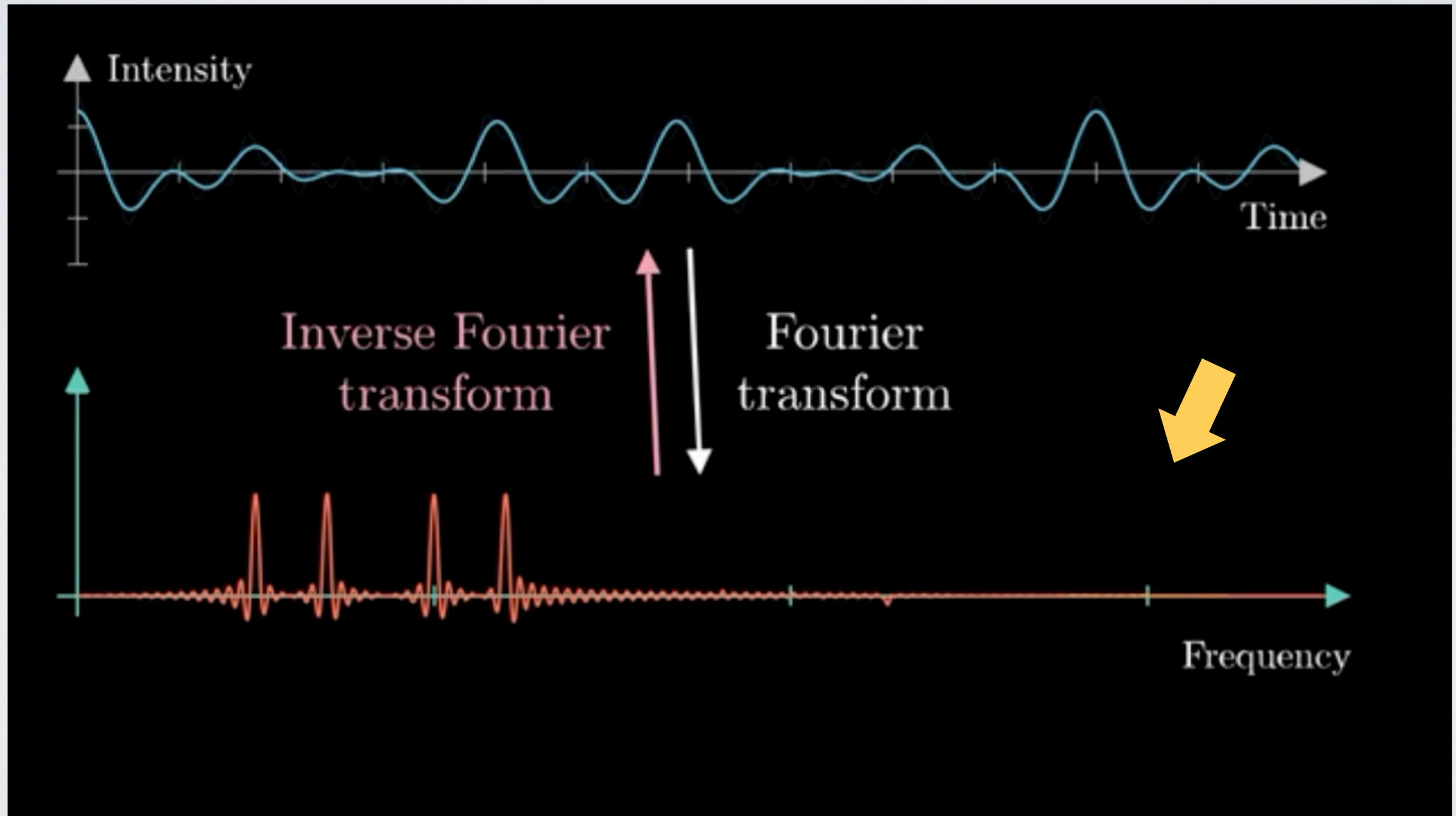
- A visualization of Fourier transforms and filtering.



youtube.com/watch?v=spUNpyF58BY

Fourier Transforms and Filtering

- A visualization of Fourier transforms and filtering.



youtube.com/watch?v=spUNpyF58BY