

# The Fourier Transform

Eric Jonas (jonas@eecs.berkeley.edu)

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Not just another basis

Use example from encyclopedia of mathematics

\* Spectral analysis. What is the relationship between the Fourier Transform, the Discrete-Time Fourier Transform, and the FFT? "Why does matlabs FFT() always give me complex outputs?" forward, inverse transforms.

## **1 The Continuous-time Fourier Transform**

## **2 The Discrete-time Fourier Transform**

## **3 The Discrete Fourier Transform**

## **4 The Fast Fourier Transform**

## **5 Analytic Signals**

Most signals in the real world are real-valued.

Physicists always say "Well we can just use a complex signal and then take the real part" but

1. Why?
2. Ok, there are a whole bunch of ways to create a complex signal from a real one, why do we do it a certain way?
3. I and Q – quadrature signals
4. Negative Frequency