Fourier Transform Notes

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- The fourier transform is most easily demonstrated by the frequency of sound
- Example: a microphone picks up the air pressure at different points in time, therefore only seems the sum of the sine/cosine waves
- When the beats per second matches the cycles per second (sine/cosine function) the high points are seen on the right and the low points on the left, at the origin, when mapped to a circle
- The statement above also offsets the center of mass, whereas when the beats and cycles dont match, the center of mass typically stays at around zero, oscillating above and below zero as the values change. However there is a spike in the position of the center of mass when beats and cycles match
- The Fourier transform can be described as the integral of a scaling function, g(t), times $$e^{-2\pi i f t}$$ with respect to time, t, for some time interval:
  $$\int_{t_1}^{t_2}g(t)e^{-2\pi i f t} dt$$
  Although the theory of Fourier uses the bounds of $$-\infinity$$ to $$\infinity$$ where the question is what is the limit as the time interval grows to infinity
- The transform itself can be described as taking an intensity as a function of time, g(t), and making it into a new function with an input of frequency instead $$\hat{g}(f)$$ where the output is now a complex number corresponding to the strength of a given frequency from some signal
- Another simple application is sound editing where you may have some sound pitch thats either irritating or might be distorting the audio in some way, and then by blocking out or heavily decreasing that specific frequency at which it is occurring transforms that signal