Chapter 0: Signal Processing
PHYS 102: The Physics of Sound and Music (Prof. Ruiz)

Ideal Low-Pass Filter. Which harmonics are transmitted in this case?

- First 5 harmonics get through

Ideal High-Pass Filter. Which harmonics get through in this case below?

- All harmonics greater than H5

Ideal Bandpass Filter. Which harmonics are transmitted through this bandpass filter?

- Harmonics H4, H5, H6, H7

Simple Crossover Circuit

Tweeter
High f
T is Short
Low f
T is Long
Woofe

Two-Way Speaker System: High f pass to the small speaker (the tweeter); low f pass to the large speaker (the woofer).

Think of R like a narrow passage way "C" "Cafeteria" Takes time to charge C (Fill Caf)

Need long T, low f to see action at C Time T depends on RC

Claude Debussy - Impressionism "La Mer" French for The Sea Approximation in Science - Start with Fantasy then Back Away from Reality.
Equalizer. Many bandpass filters, each with a volume control (amplifier), called **active filters**. You make a bandpass filter by connecting a low-pass filter to a high-pass one. You make the filter active by adding an amplifier. You then make the output resistor variable so you can control the volume. The three lines at the far bottom right represent the symbol for ground. It simply means the “minus end of the battery” for us in this case.

**Dolby.** To reduce tape hiss (f > 5000 Hz) that appears on playback, record **boosting high f and play back reducing these. Then, the high frequencies of the music become normal and you kill the hiss. Sketch it.**

**The dbx System.** Tape can handle about a range of 50 dB. But you want 100 dB to go from a drop of a pin to a blaring orchestra. So you compress the 100-dB sound to 50 dB and tape the compression. On playback, you expand.

60-dB gets is recorded at a compressed 30 dB. On playback, it expands to 60 dB.

The Generation Gap of the 1950s. Include characteristics.

- More **Subdued**
- Wild, Rock & Roll, Guitar, Drums
- Big Band Sound
- Glenn Miller "In the Mood"
- Elvis Presley "Hound Dog"
- Both are "Blues"
- Like Machine Gun
- W.E. Handy "Father of the Blues"
- Wynton Marsalis "Blues is like a Vaccine"
- Albert Murray "Stomping the Blues"
- 1950s WW II Crowds → Teenagers Their Children