1T2: Introduction to Audio Signal Processing

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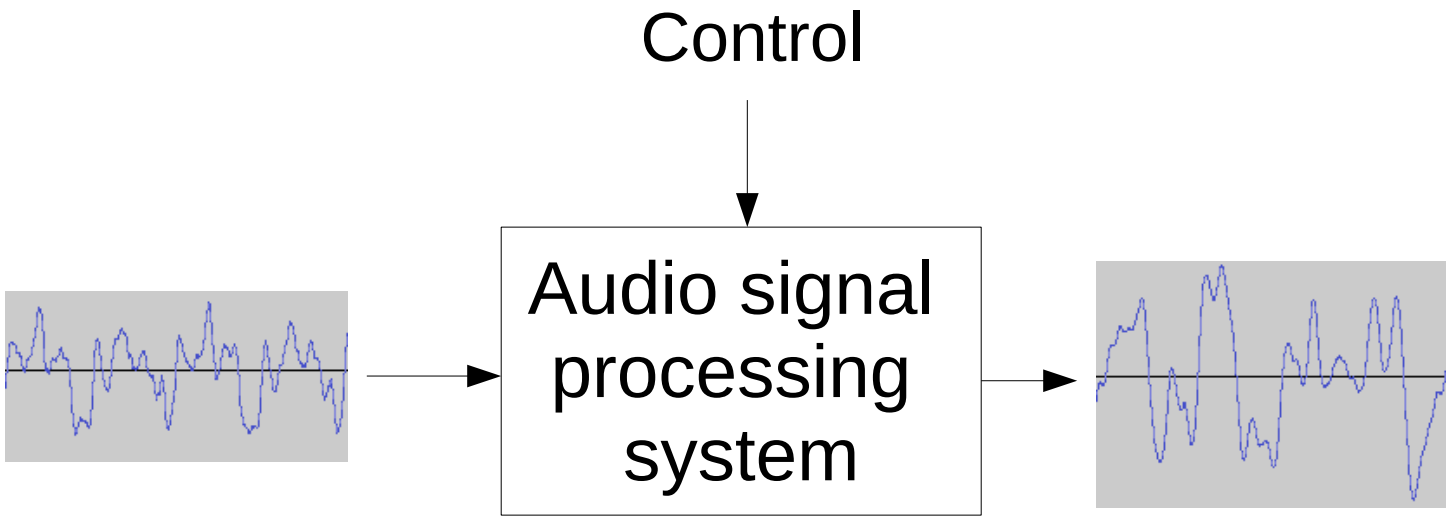
Index

- What is audio signal processing?

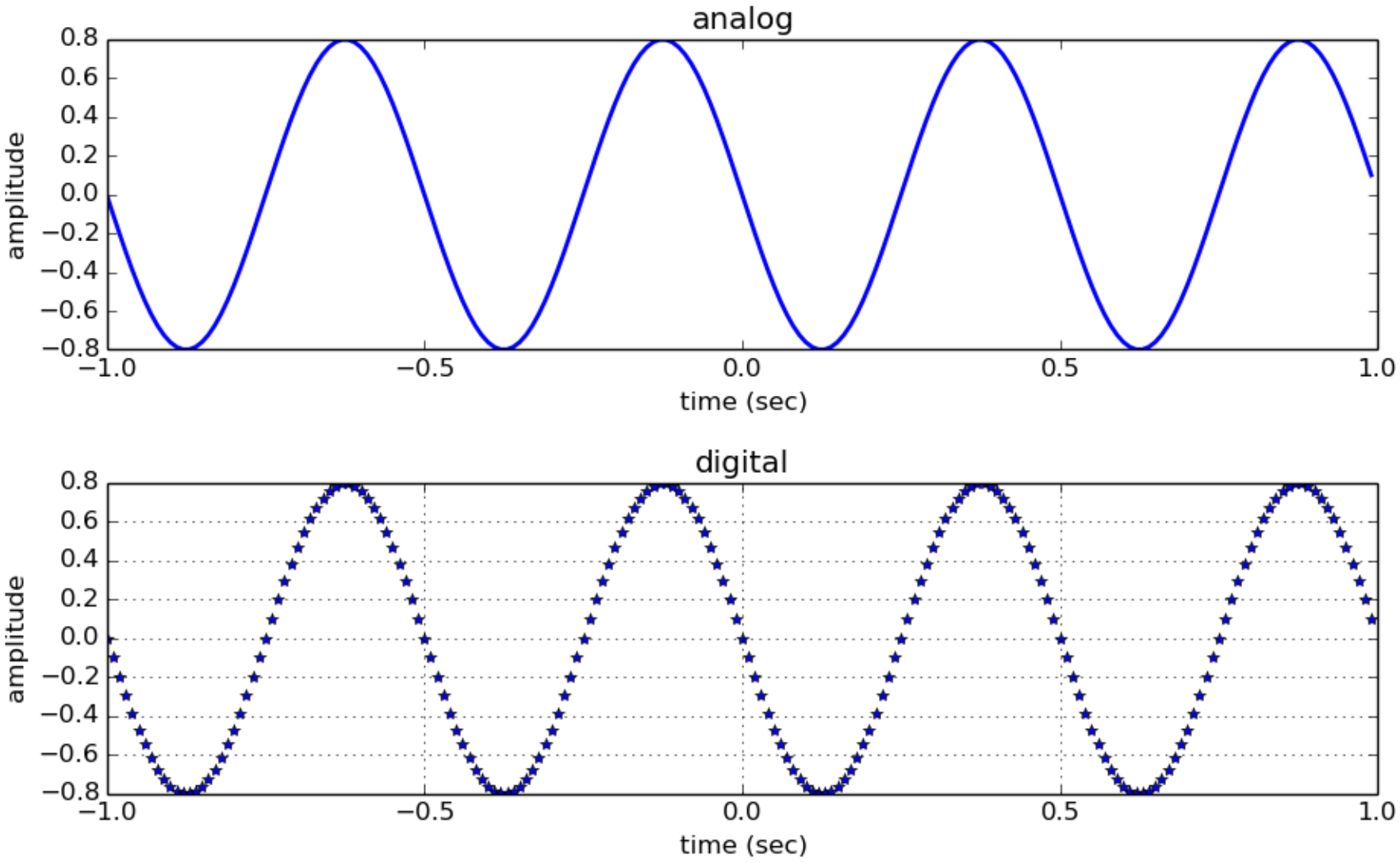
- Applications:
  - storage, data compression, effects and transformations, synthesis, description.

What is audio signal processing?

- Intentional alteration of sound



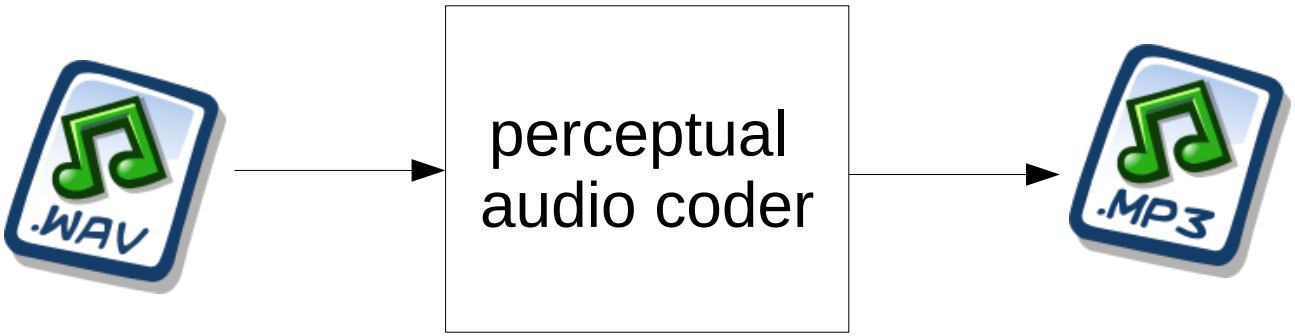
Analog versus digital signals



Applications: Storage

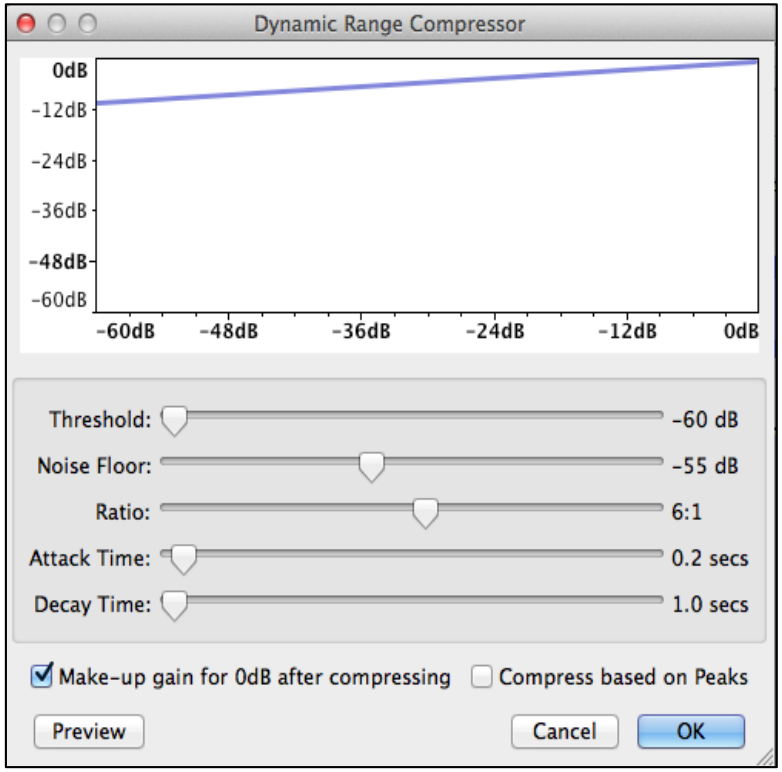
http://commons.wikimedia.org/wiki/File:CD-ROM.png

Applications: Data compression

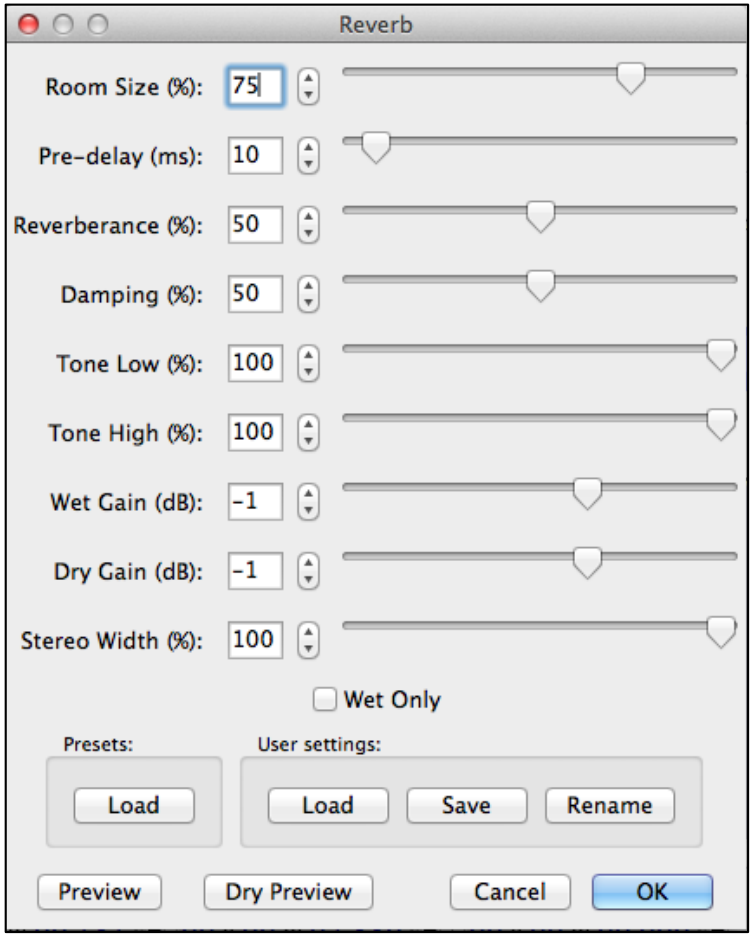


http://commons.wikimedia.org/wiki/File:Gnome-mime-audio-x-mp3.png
http://commons.wikimedia.org/wiki/File:Gnome-mime-audio-x-wav.png

Applications: Transformations

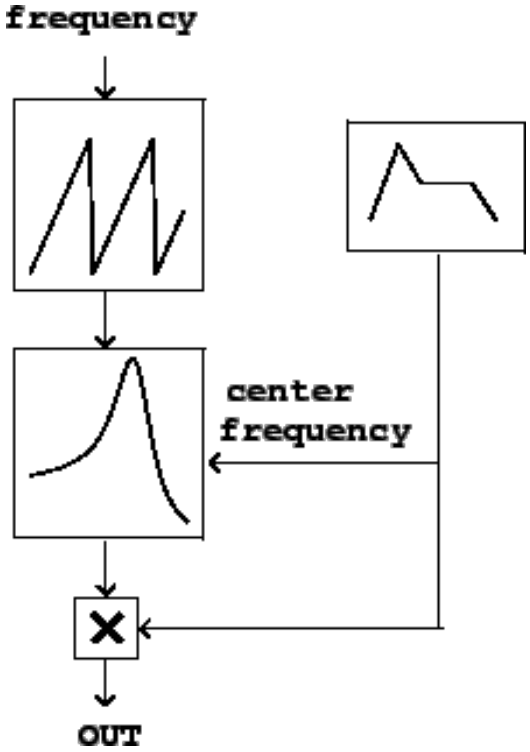


[from Audacity]

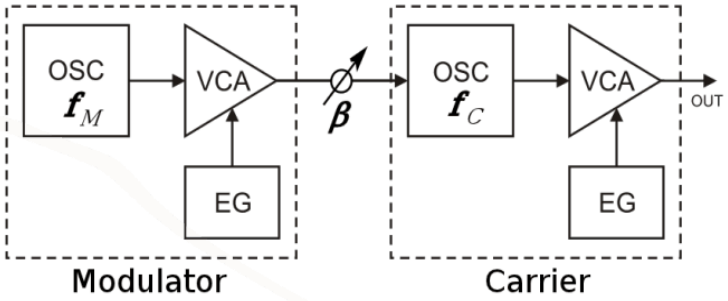


Others: echo, equalizer, flanger, phaser, chorus, pitch shift, time stretching, voice effects, 3D audio effects, morphing, ...

Applications: Synthesis

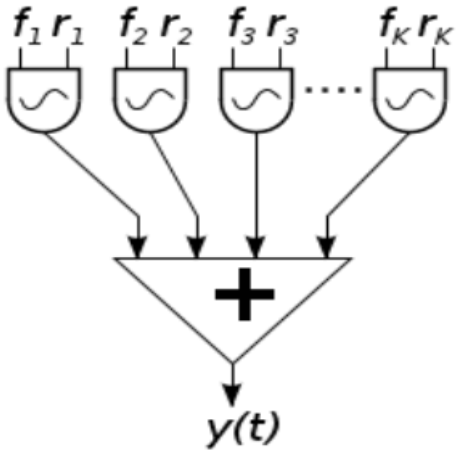


Subtractive synthesis



FM synthesis

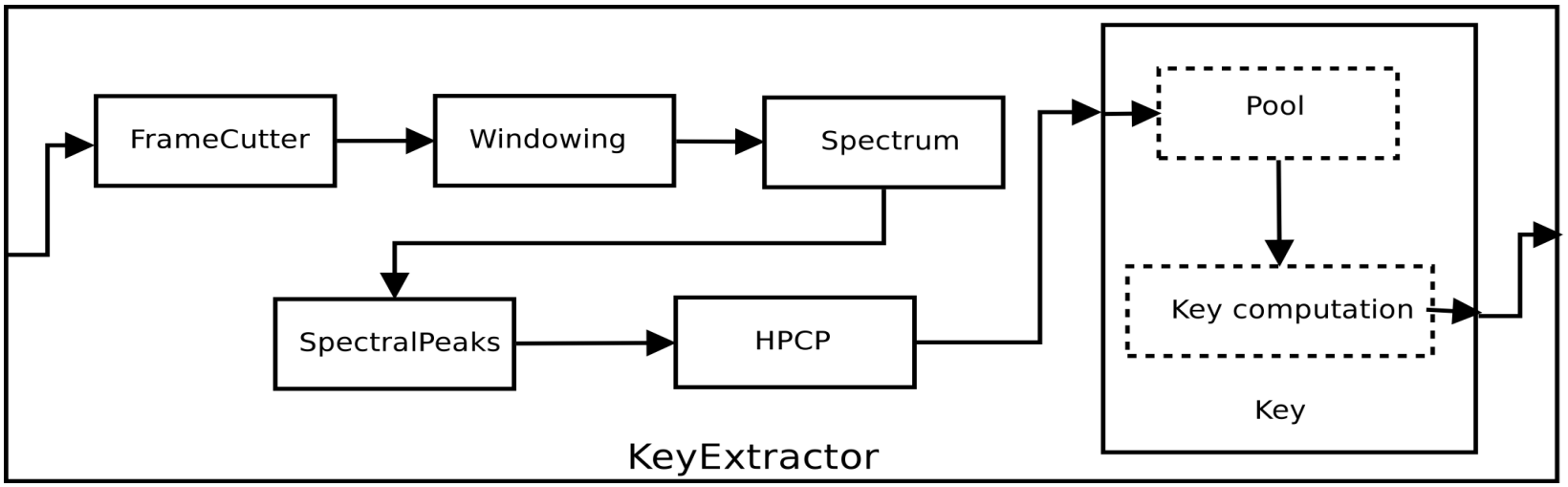
Others: granular synthesis, physical modeling, waveshaping, sampling, spectral synthesis, ...



Additive synthesis

http://msp.ucsd.edu/techniques/v0.11/book-html/node152.html
http://commons.wikimedia.org/wiki/File:2op_FM.svg
http://commons.wikimedia.org/wiki/File:Additive_synthesis.svg

Applications: Description



Low-level: loudness, timbre, pitch, ..
Mid-level: rhythm, harmony, melody, …
High-level: genre, emotions, similarity, …

References and credits

- More information in:https://en.wikipedia.org/wiki/Audio_signal_processing
- Audacity: https://www.audacityteam.org/download/
- Slides released under *CC Attribution-Noncommercial-Share Alike* license and code under *Affero GPL* license; available from https://github.com/MTG/sms-tools

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