

1T2: Introduction to Audio Signal Processing

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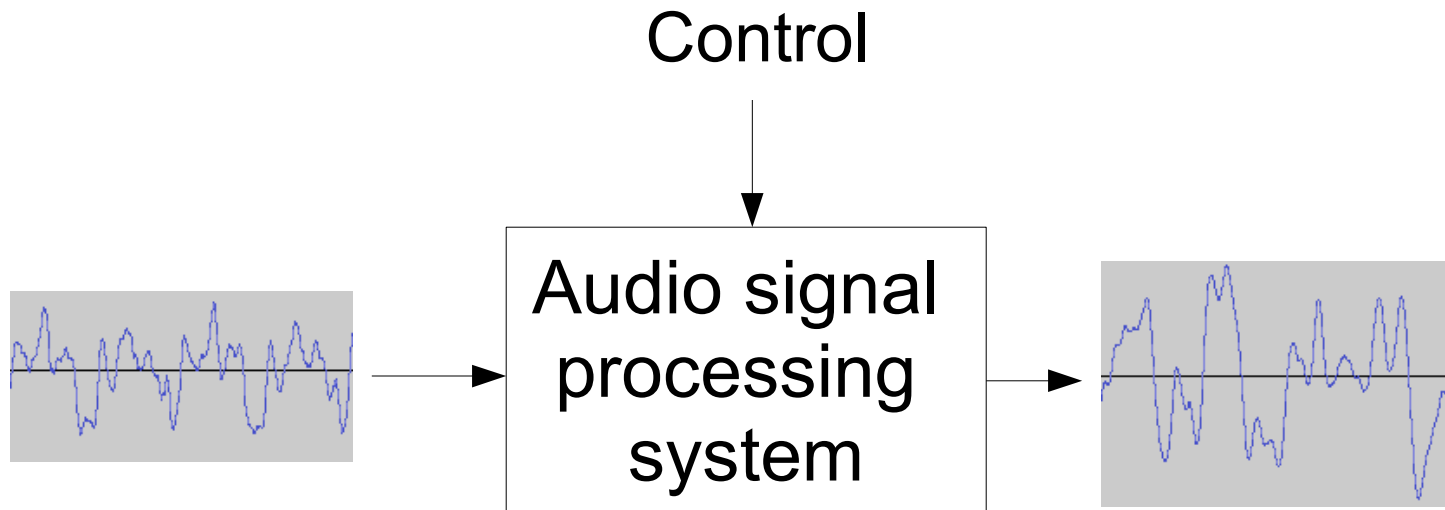
Stanford University

Index

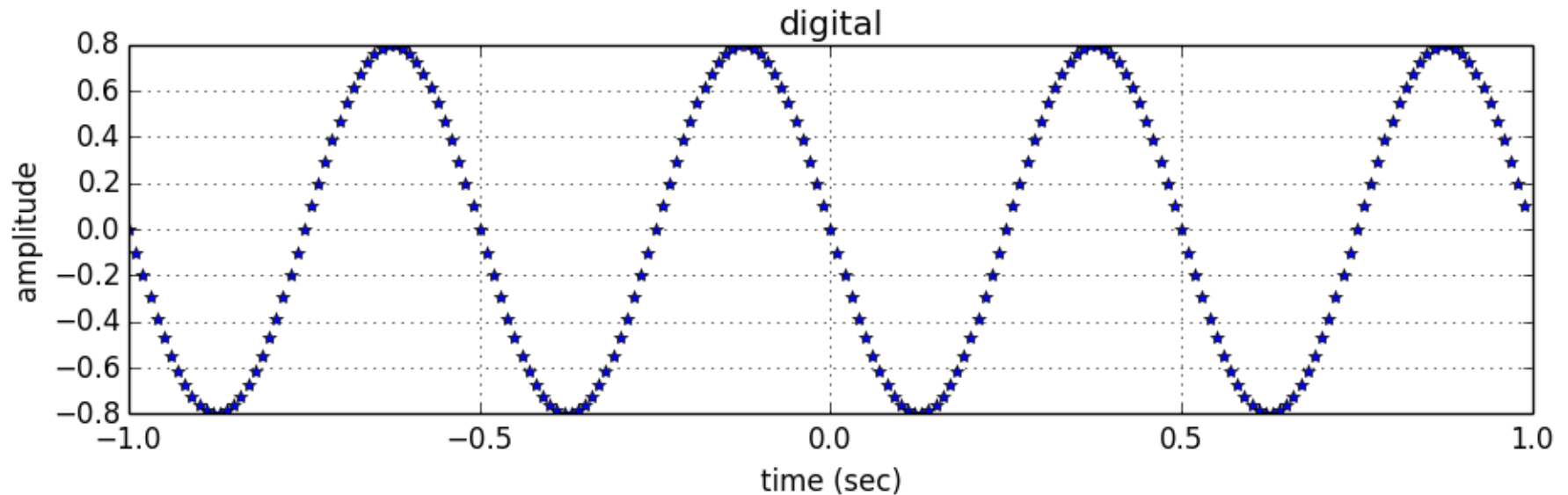
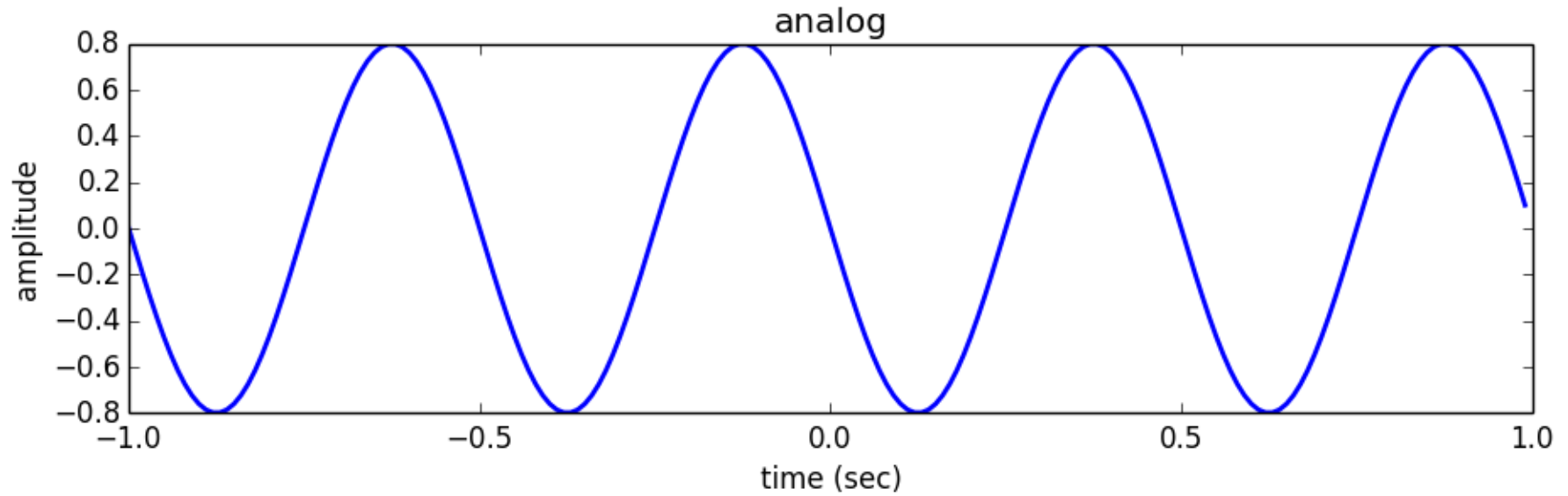
- What is audio signal processing?
- Applications:
 - storage, data compression, effects and transformations, synthesis, description.

What is audio signal processing?

- Intentional alteration of sound



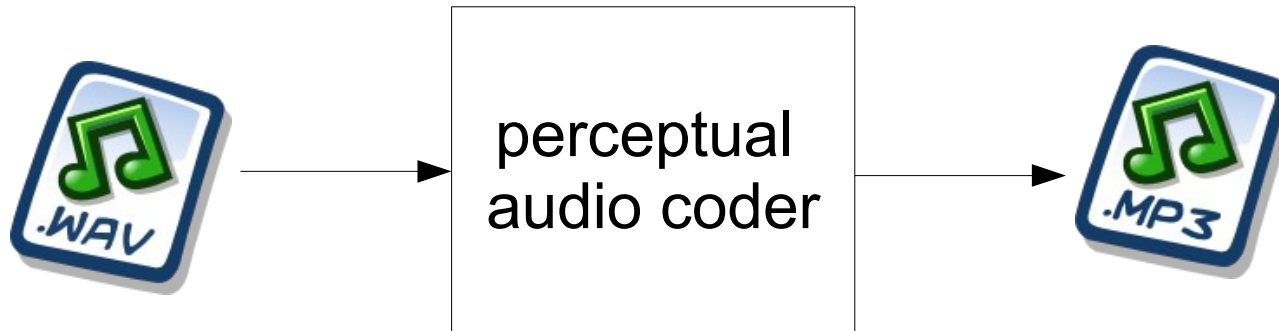
Analog versus digital signals



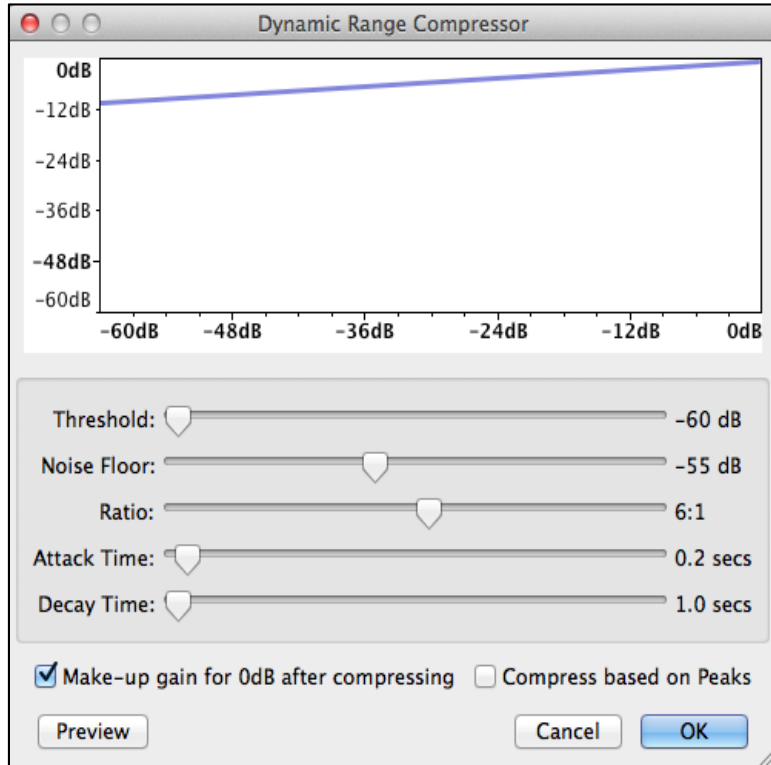
Applications: Storage



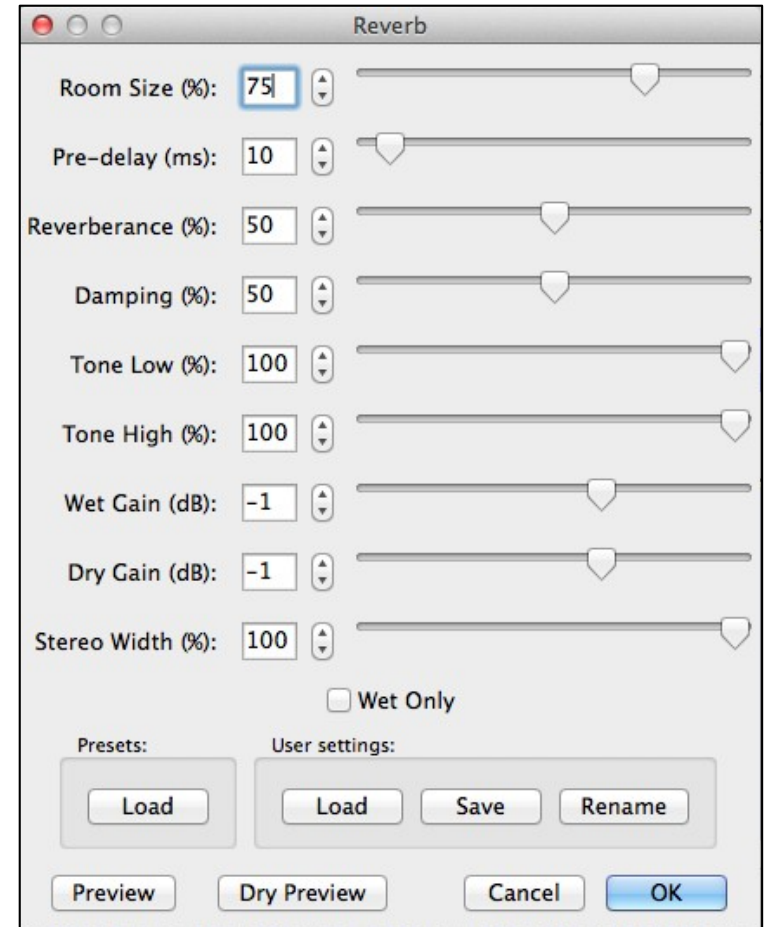
Applications: Data compression



Applications: Transformations

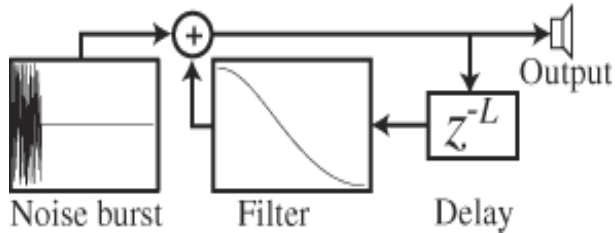


[from
Audacity]

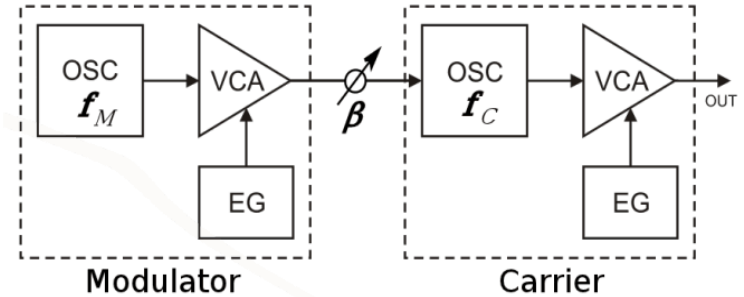


Others: echo, equalizer, flanger, phaser, chorus, pitch shift, time stretching, voice effects, 3D audio effects, morphing,

Applications: Synthesis

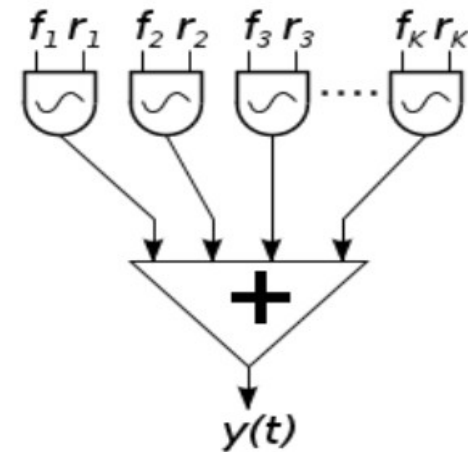


Subtractive synthesis



FM synthesis

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



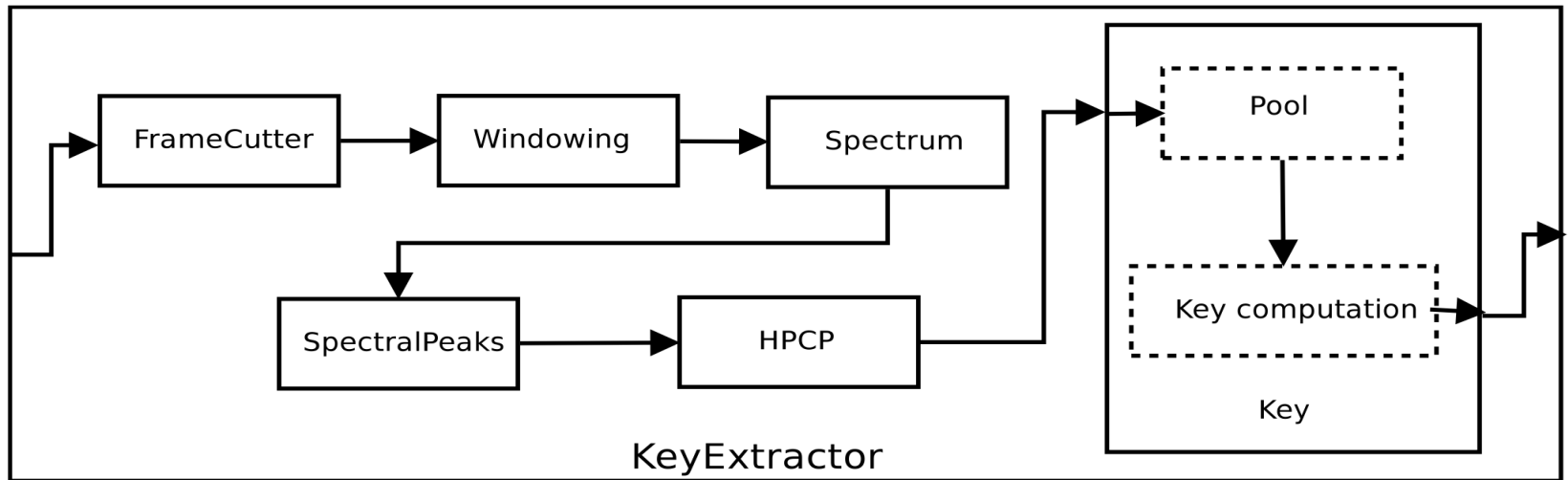
Additive synthesis

<http://commons.wikimedia.org/wiki/File:Karplus-strong-schematic.png>

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: <http://audacity.sourceforge.net>
- Slides and code released using the *CC Attribution-Noncommercial-Share Alike* license or the *Affero GPL* license and available from
<https://github.com/MTG/sms-tools>

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