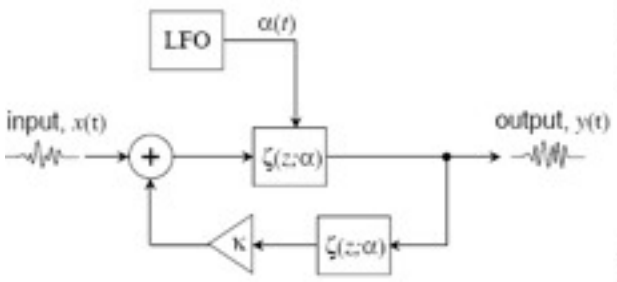
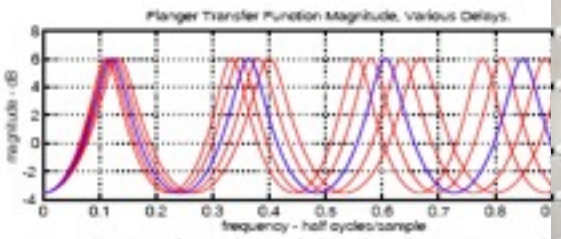
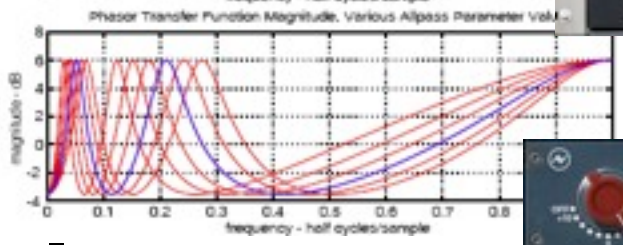
Music 424 / EE 367D
Signal Processing Techniques for Digital Audio Effects







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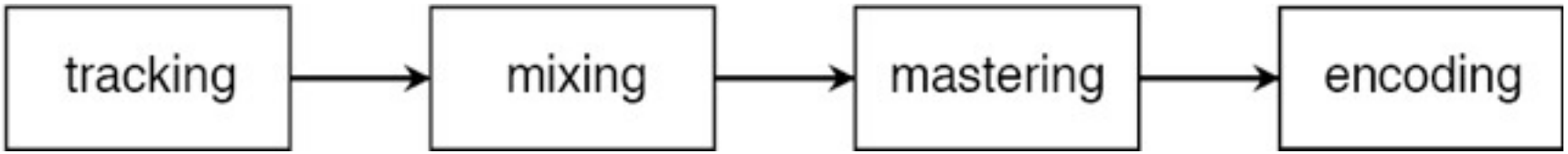
Introduction

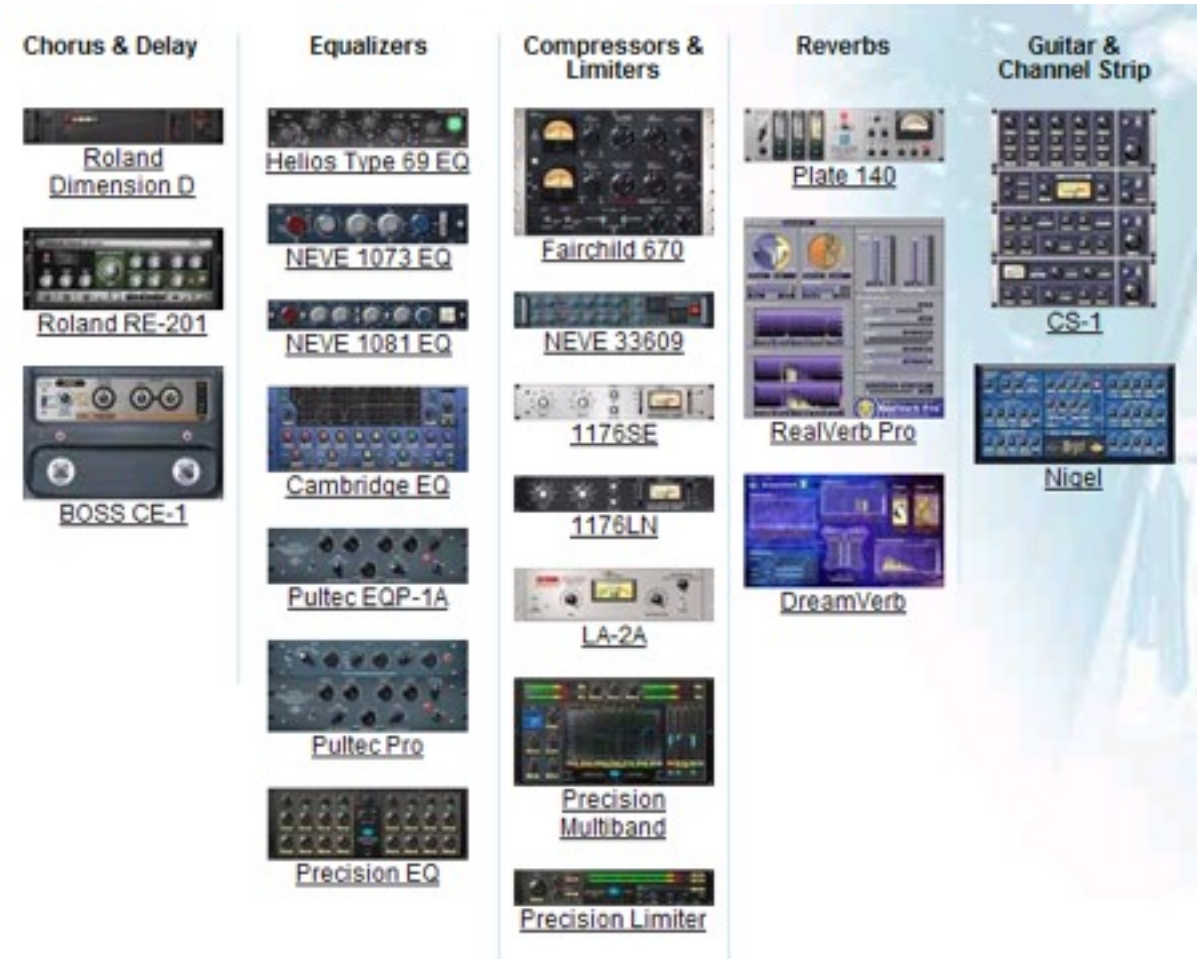


Audio Production Process

- **Music is typically produced in four steps: tracking, mixing, mastering and encoding.**

- **This class is about how to build digital versions of the mainline effects used in mixing and mastering.**
  - **Dynamic range control**
  - **Reverberation and room acoustics**
  - **Equalization and filter design**
  - **Distortion and delay effects**

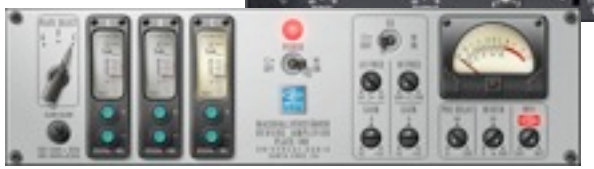
Mixing and Mastering Effects



Lecture Outline

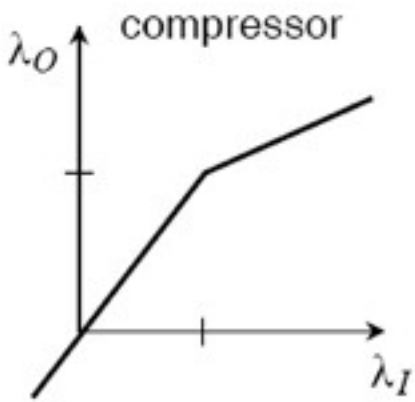
- Handouts
  - Course Information
  - Course Overview
  - Prerequisite Questionnaire
  - Class e-mail list

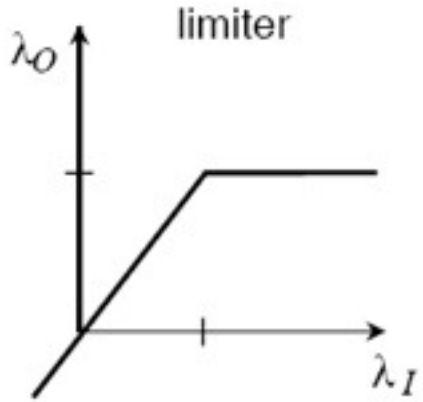
- Course Information

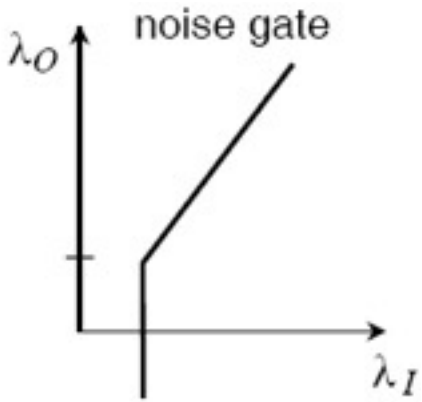


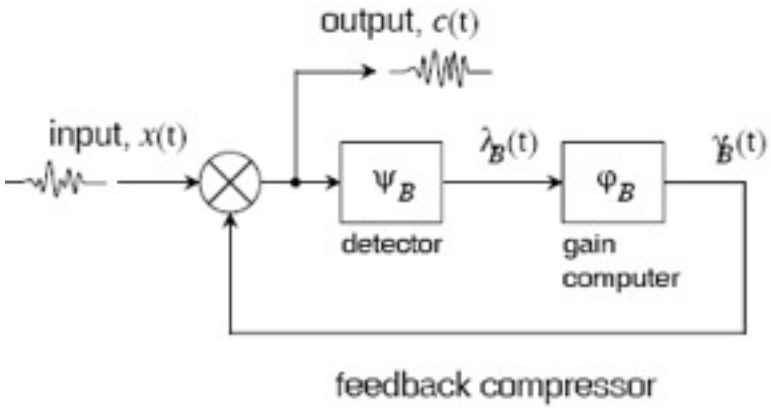
- Course Overview and Demo

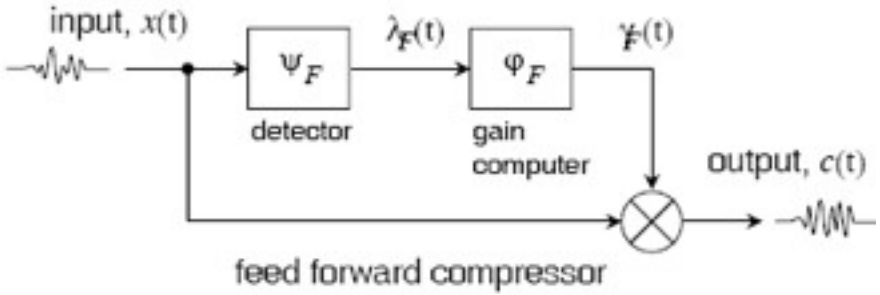
Dynamic Range Control



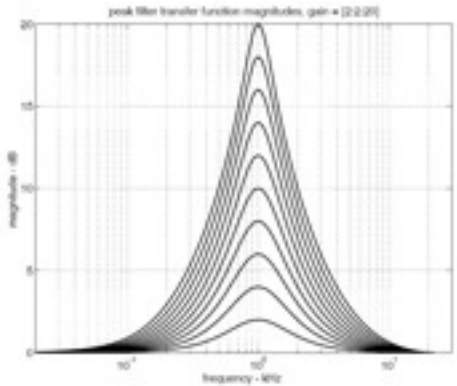


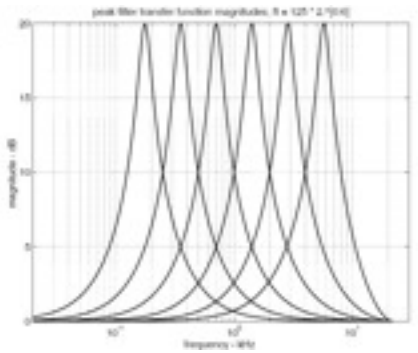


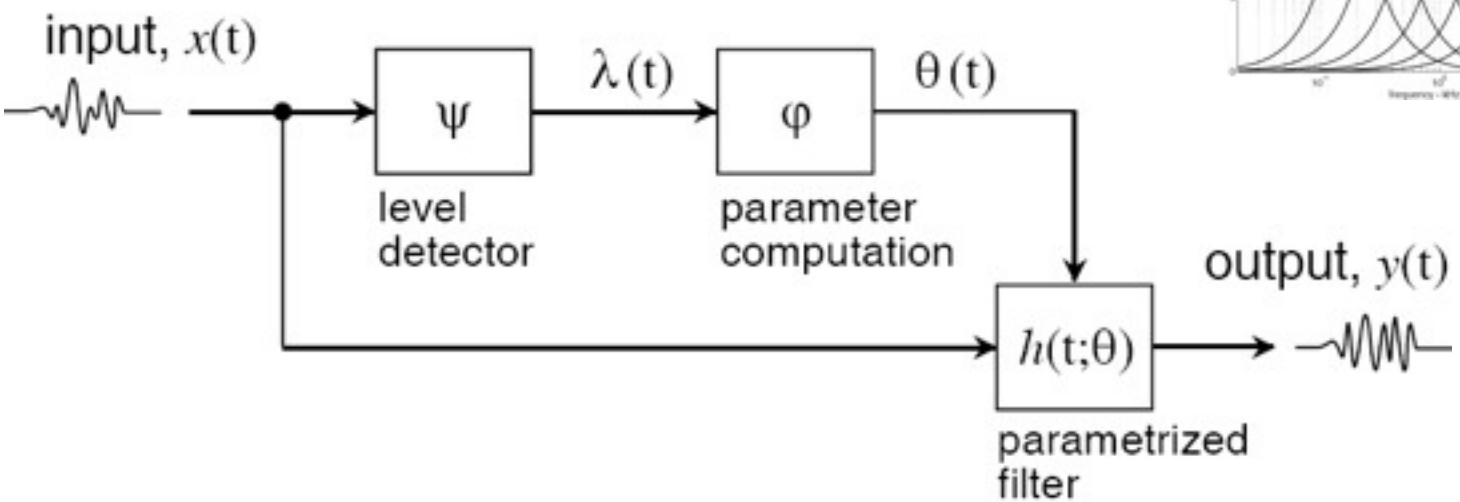




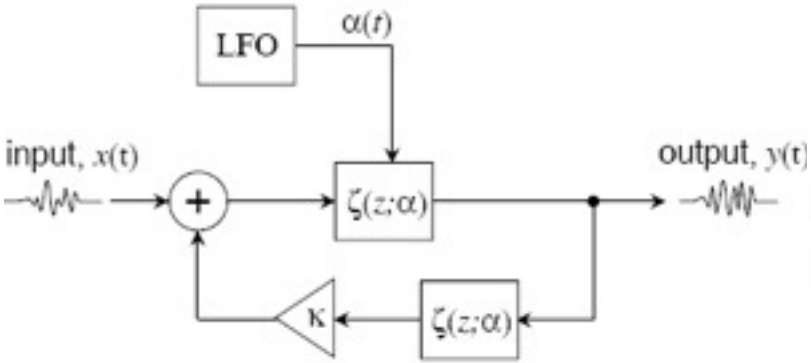
Equalization

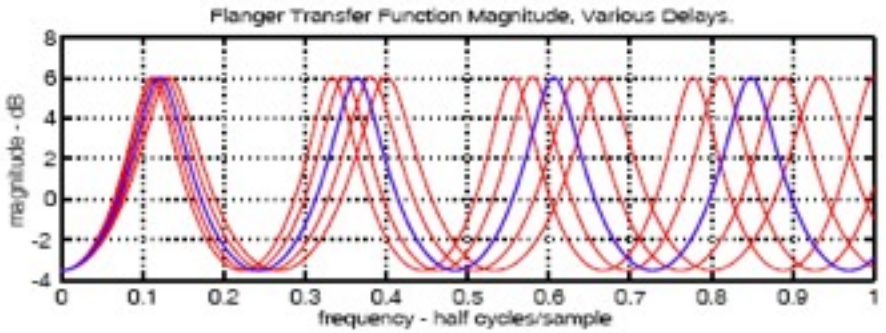


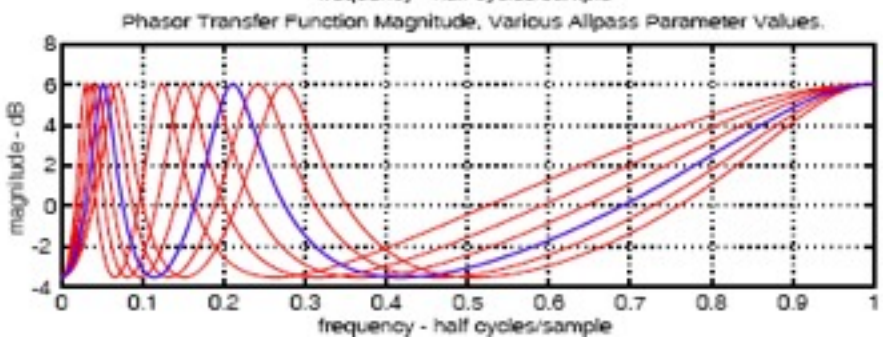




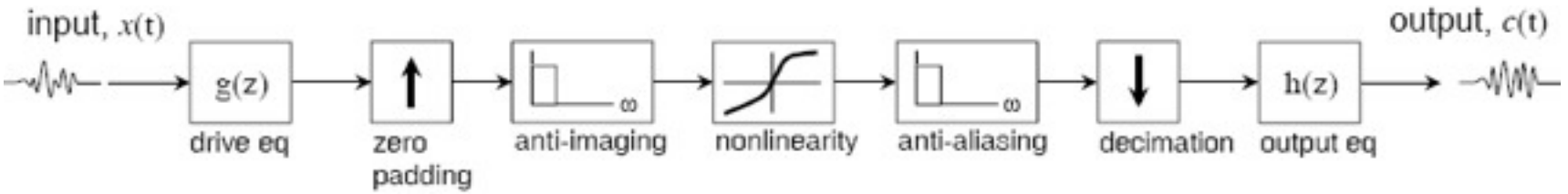
Delay Effects



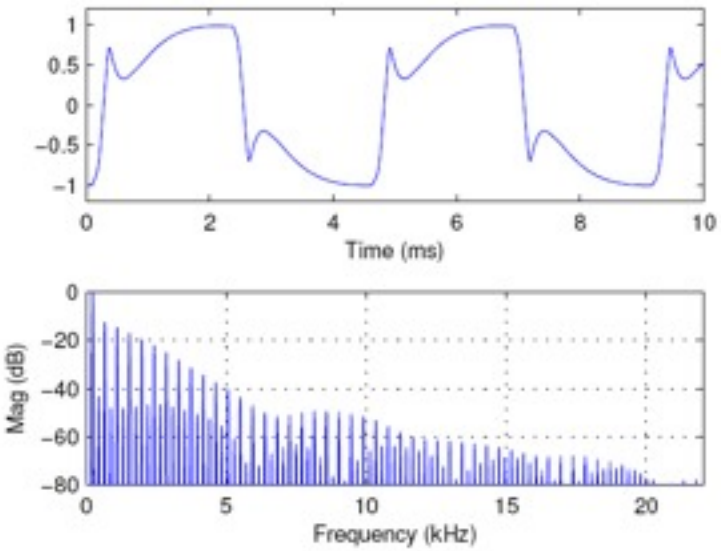


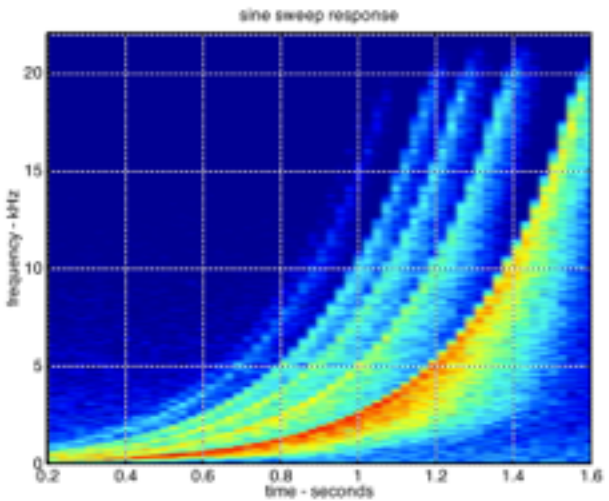


Distortion Processing

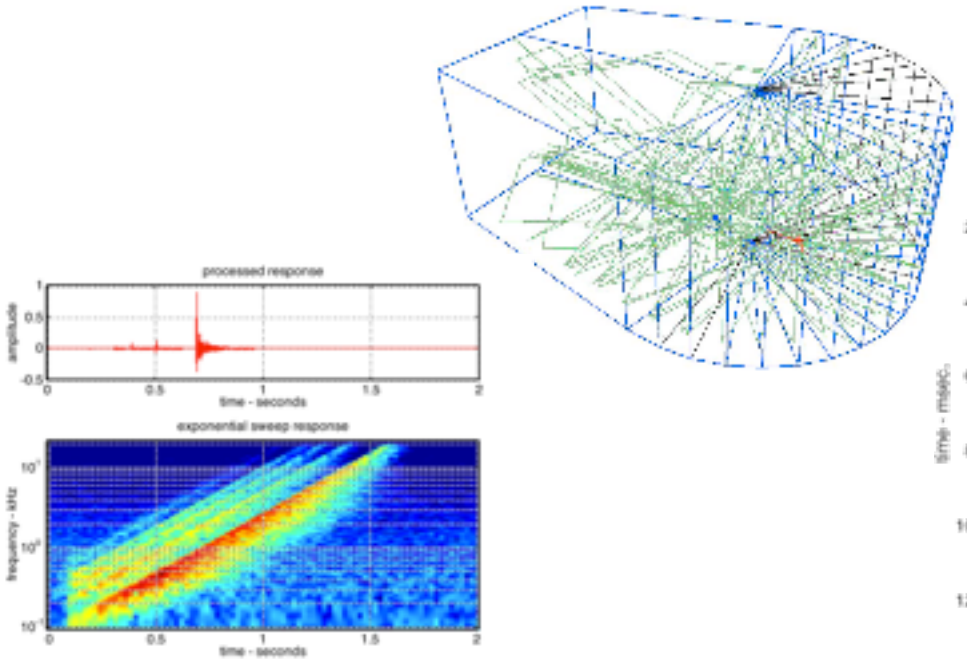


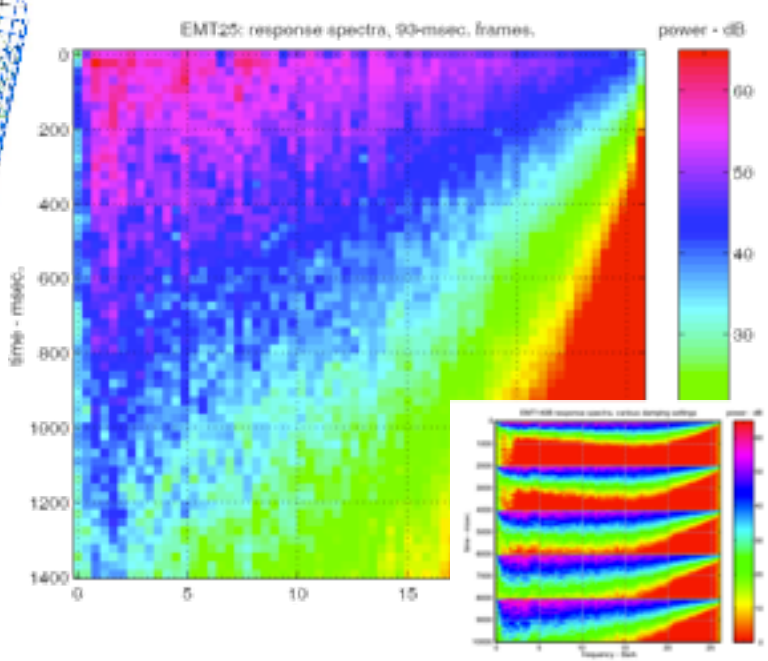
$$r(t) = \sum_k g(t) * \left(\beta(\omega_k) \sin \int_0^t \omega_k(\tau) d\tau \right) \quad \omega_k(t) = k \times \omega(t)$$

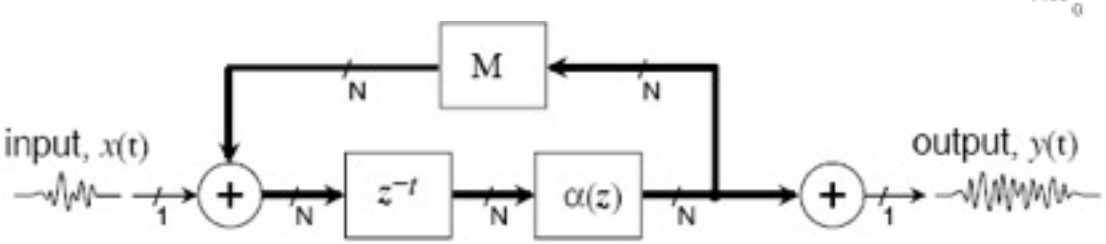




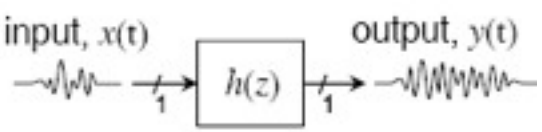
Room Acoustics and Reverberation







feedback delay network reverberator



convolutional reverberator