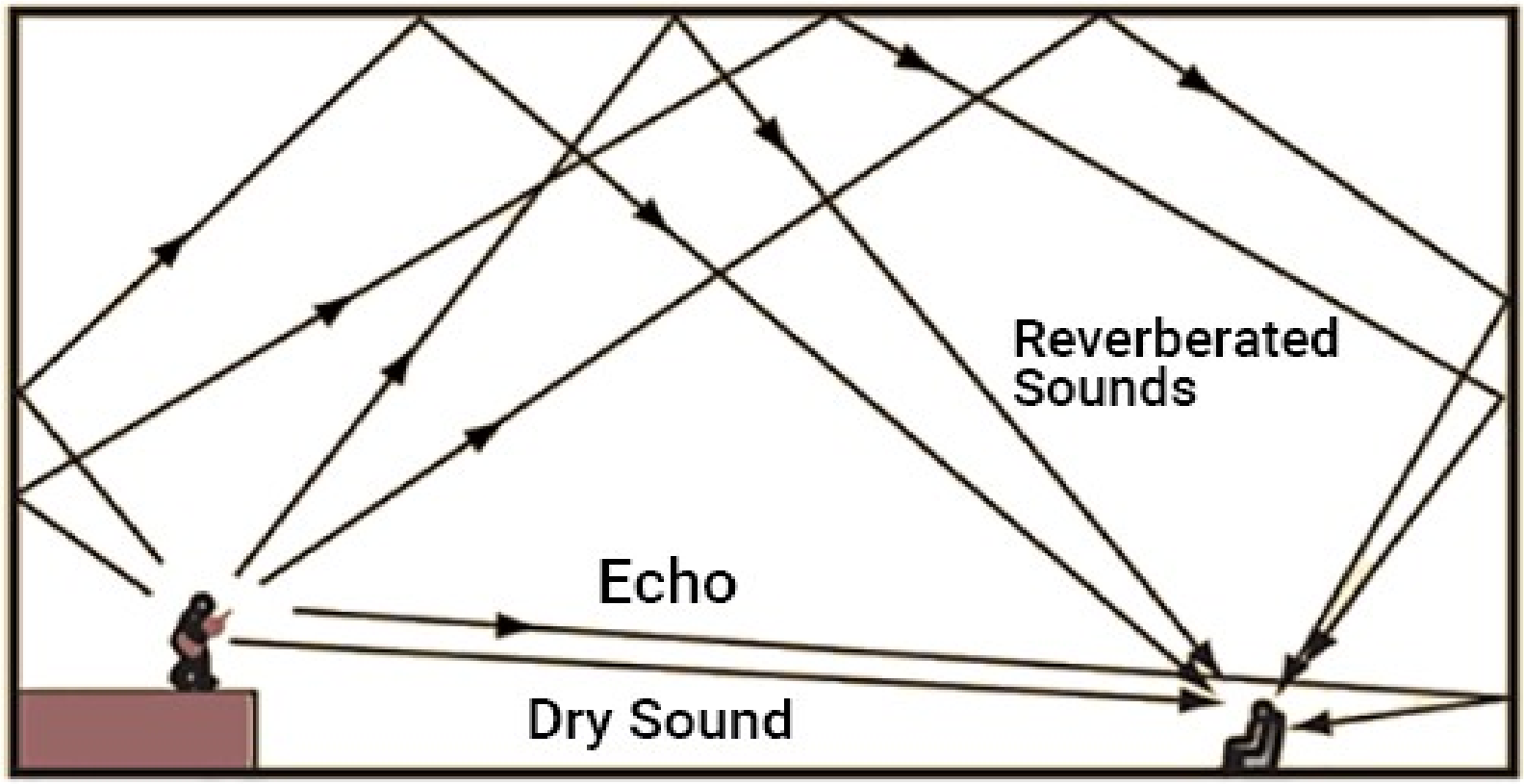
Remove reverb from sound

Reverb = echo from walls



- source: https://www.softdb.com/what-is-reverberation-in-acoustical-analysis/

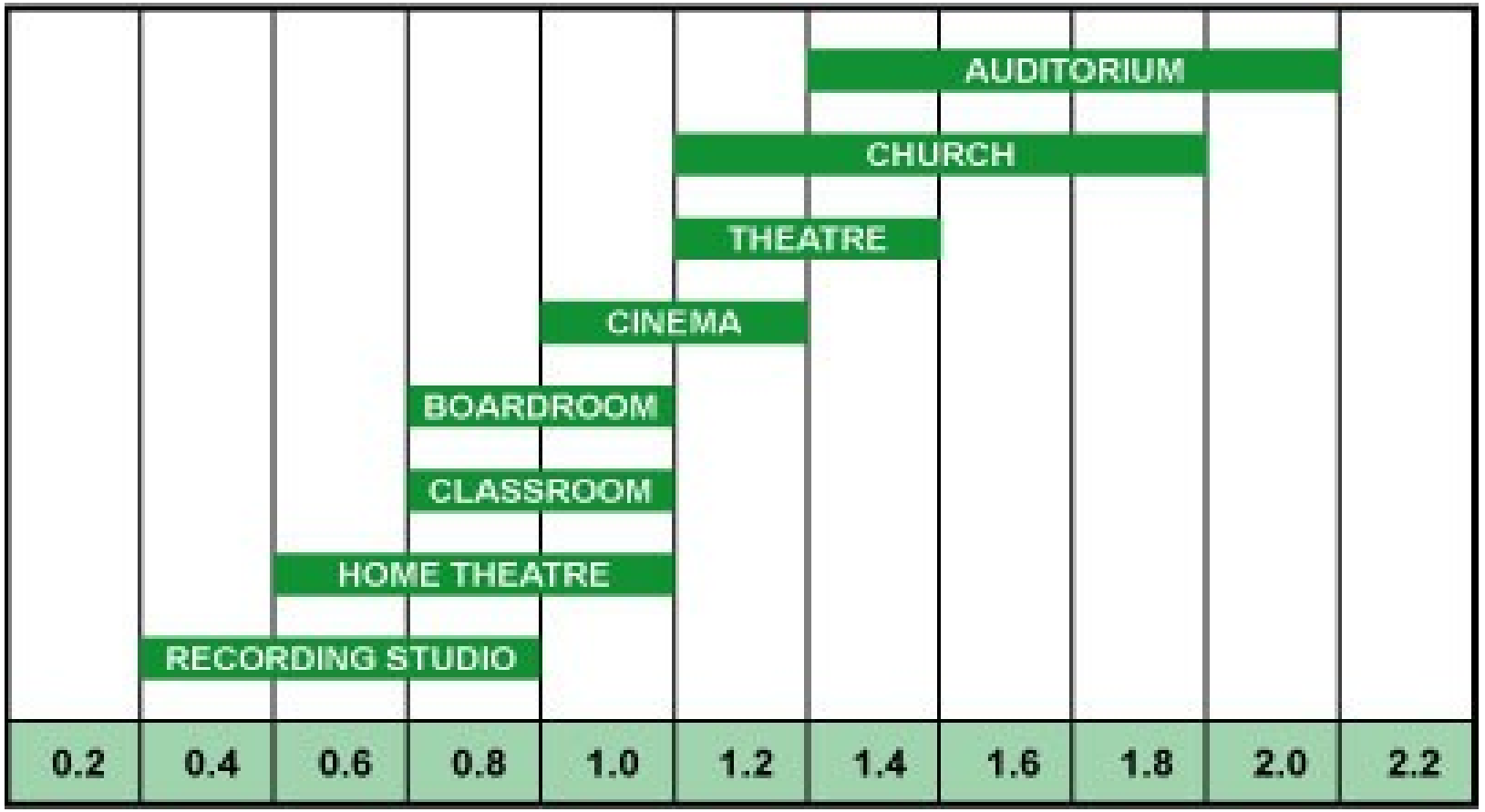
Use cases

1) professional music production
   - real time
   - high quality
2) home recordings
   - post production for e.g. youtubers
   - not real time
3) speech transfer
   - zoom, phone calls
   - real time
   - lower quality is sufficient

Generate sound with reverb

- anechoic sound + convolution with IR = sound with reverb
- $$\int_0^t f(t-y)g(y)dy = h(t)$$
- IR: impulse response characterizes the room acoustics
- can be computed with FFT
- depends on:
  - room size and shape
  - position of source and receiver
  - shape and size of objects in the room

Reverberation times



- source : https://www.primacoustic.com/broadway-panels/science/common-reverberation-times/

Remove reverb from sound by deconvolution

- deconvolution with **known** IR
- can be done by FFT
- numerically unstable: strong amplification of even small noise
- better, but not perfect: Wiener deconvolution

Blind dereverberation

- deconvolution with **unknown** IR
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- one possible approach:
  - sample space of relevant IR sufficiently
  - classify IRs with a neural network
  - deconvolve by Wiener deconvolution
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Blind dereverberation