Study Time! Reverbs Edition

I'm doing some self-study to how (digital) reverb works, when it comes to all-pass filters, diffuse signals and feedback loops. This is just for myself to put things in order when it comes to making a reverb-block diagram. I'll be writing this as if it was a journal.

Nice Video
Found a nice interesting video of someone explaining how to build a reverb:
https://www.youtube.com/watch?v=QWnD30xHjW4

> Also did some research on all-pass filters, bc i didn't fully understand it:
- https://www.youtube.com/watch?v=eQ_nSUhDEO4
- https://www.uaudio.com/blogs/ua/allpass-filters

All-pass filters basically delay the signal (and different frequencies) instead of alter the frequency levels. They can smear out transients and are used in reverbs.
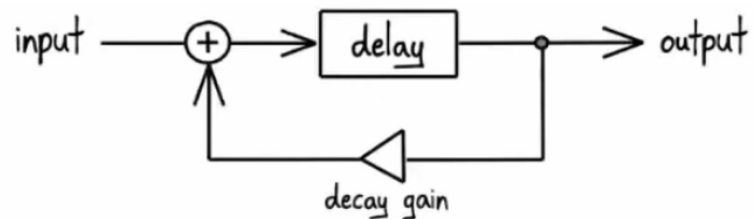
Things to Process
Images from the Build a Reverb - Video, because they were very clear and wanted them in a document.
Here are some things that i wanted to write down which would be important when making a reverb:
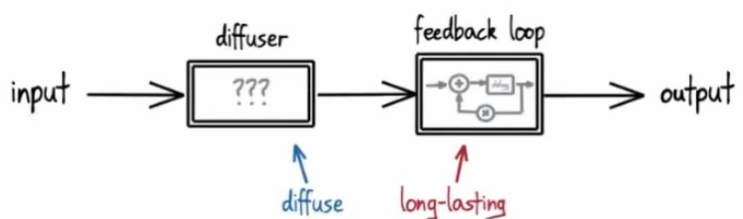
Delay Feedbackloop
Since reverb adds delay to the signal, this loop is the basic necessary thing to control the delay-time and amount of the reverb.
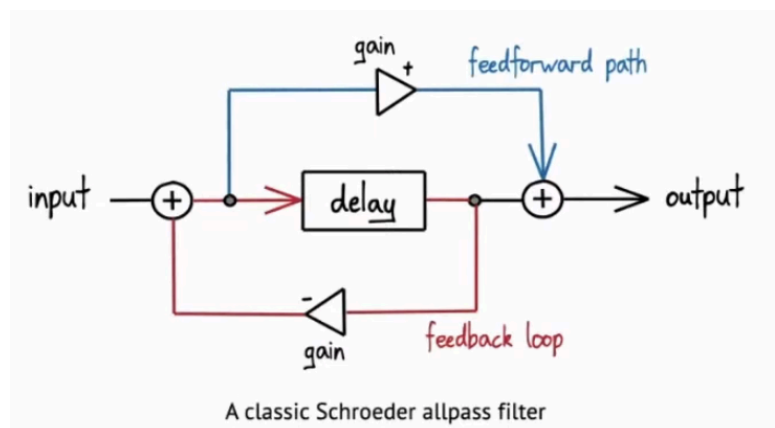

Diffuser and Feedback
Making the sound diffuse inside a feedback loop can be inefficient, So i'm separating them into two:
- Diffuser: Makes the signal sound diffuse
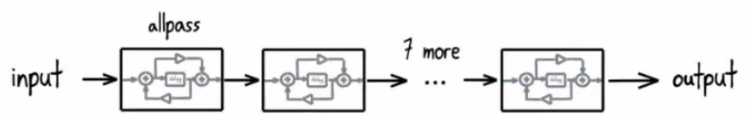- Feedback: Controls delay time and amount

Schroeder All-Pass filter
Delays some frequencies more than others, messing with the phase and smearing it. It has a feedforward path and a feedback loop, making sure the frequencies aren't "filtered". The delay is some milliseconds.
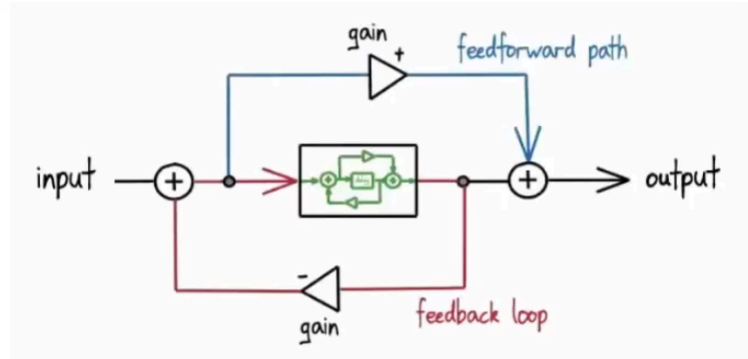

A classic Schroeder allpass filter

More All-Passes
Making a chain of All-Pass filters
already creates a reverb! It sounds
metallic, like a plate reverb.

More Complex Reverb
This is cool! A more complex version
of reverb can be made by building an
All-Pass filter inside the delay of an
All-Pass filter. This way the phase
response is pretty irregular.

Continuing
The rest of the video seems a step further than my reach for this building block effect (plate
reverb). So my step-by-step thing to code for the reverb is this:
- Coding a feedback loop as a building block (Making the sound more forward in time)
- Coding an All-Pass Filter as a building block (shifting the phase of frequencies)
- Coding a chain of All-Pass Filters (creating the reverb sound)
- Extra: Coding an All-Pass Filter inside an All-Pass Filter (more irregular reverb)

Now I can easily start making block diagrams!