

AET5430: FINAL PROJECT PROTOTYPE

MULTIBAND PARALLEL COMPRESSOR

My final project will be a multiband parallel compressor with inspiration coming from drum bus processing and NY-style compression. For reference, rather than the filter banks being compressed and summed with the other bands, compressed signal will be controlled by a fader to blend to taste. The compression will have peak and RMS capabilities and will be controlled individually under its respective band. The cutoff frequencies for each band should be controllable and there should be input and output gain potentiometers. Ideally, some kind of automatic gain control function (or general gain normalization) should be toggleable so the addition of a parallel signal does not destroy the overall picture as New York compression often can do. While plug-ins like Fabfilter Pro-MB have different modes for their multiband compression, I assume I would want the default of my processing to be (as close to) linear phase as possible.

PROGRAMMING APPROACH IN JUCE

Aside from the general class creation (e.g., filter bank indexing, peak compression, real-time RMS compression) in the JUCE framework, I will need to study the built-in spectral DSP libraries for filter implementation. Considering the multiband parallel compressor is inspired by drum-forward NY-style compression, the plug-in should also be able to process both audio signals and programmed MIDI instruments. For the GUI, I envision what I believe is a magnitude response graph (similar to most visual parametric EQs) with the multiband filters overlaid. Underneath the graph would be individual band controls respective to the number of bands being processed.

Zachary Miller

PLUG-IN PARAMETERS

General multiband filtering (2-4 bands total) using Linkwitz-Riley crossover filters

- Solo and bypass buttons on individual bands
- Compression threshold toggle bar on magnitude response graph (GUI)

Compression

- Ratio (1:1, 2:1, 4:1, 8:1, 10:1, ... inf:1), attack/release, threshold, knee
- Peak/RMS modes

Parallel compression fader

- Starts at -inf to unity gain

OTHER NOTES

SPECTRAL DYNAMIC PROCESSING: It would be neat to work in some kind of spectral switch (like Three-Body Technology's Kirchhoff EQ FFT button) to alternate between time-domain and frequency-domain processing. This isn't necessary – obviously, but it would be interesting to dig into if I had the time.

DRUM-BUS-ESQUE ADDITIONS: I mentioned earlier in the semester about adding a soft clipper and/or limiter to the end of the plug-in's chain. You advised, for efficiency's sake, against it. If there's time, even adding a soft clipper (or some kind of distortion) to the individual band processing would be neat. I feel like it would lean into the drum-bus vibe of NY compression styles that this is all based off.

Zachary Miller

FIR VS IIR FILTERING: The Hack Audio textbook uses Butterworth filters/Linkwitz-Riley crossover filters for multiband filter banking – I also know that Bessel filters are used to maintain phase linearity but that they are not often (if ever) used for crossover filtering. At the same time, phase linearity is “necessary” when doing multiband processing but audio forums gripe often about pre-ringing. With all this in mind, I think I need some advice on what the best direction is and the logic behind it. When I increase the number of bands in my *multibandProcessing.m* script, the more bands there are the less the filter banking acts like a passband. Is the polarity being affected at different (higher?) frequencies, causing the signal to sound filtered?... or does it have something to do with the filter crossover? I was under the impression that coinciding transition bands in Linkwitz-Riley filters are supposed to be passive.