Digital Multiband Processing

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Filter primer

8th Order Butterworth Lowpass Filter

- Pass band
- Center frequency
- Stop band
Characteristics of Crossover Filter

- Frequency response flat in Pass band
- Frequency response flat in Stop band
- Lowpass and Highpass variants should sum to flat response
Butterworth Filter

- IIR Filter
- Flat frequency response in the pass band
- Flat frequency response in the stop band
- -3db at center frequency
Linkwitz-Riley Filter

- IIR Filter
- Flat frequency response in the pass band
- Flat frequency response in the stop band
- -6db at center frequency
- Lowpass and Highpass at same frequency sum to a flat frequency response
Frequency Response Comparison
Alternatives

FIR Filter

- No phasing issues
- Difficult to construct
- Requires more CPU time
Crossover construction

Band 1 = Signal -> Lowpass 1 -> Allpass 1 (at F2)
Band 2 = Signal -> Highpass 1 -> Lowpass 2
Band 3 = Signal -> Highpass 1 -> Highpass 2
Demo Plugin

https://github.com/abaga129/BandanaSplit
Sources

https://tttapa.github.io/Pages/Mathematics/Systems-and-Control-Theory/Analog-Filters/Butterworth-Filters.html
