Quality Report

Bass Decorrelator — Audio Analysis

2026-03-04 · git f2d2e95

Theta Tontechnik

#	Algorithm	Parameters	Latency	Gain L	Gain R	L/R Δ
0	Bypass	no processing	0	+0.000 dB	+0.000 dB	0.000 dB
1	Algo 1	spread=0.7, crossover=150Hz, stag	0	-0.000 dB	-0.000 dB	0.000 dB
2	Algo 2	delayTime=2.0ms, amount=0.	0	-0.000 dB	-0.000 dB	0.000 dB
3	Algo 3	density=0.5	512 smp (11.6 ms)	+0.359 dB	+0.361 dB	0.002 dB
4	Algo 4	amount=0.7	1 smp (0.0 ms)	-0.001 dB	-0.001 dB	0.000 dB
5	Algo 5	delayMs=10, amount=0.7	0	-0.012 dB	-0.013 dB	0.001 dB
6	Algo 6	spread=0.7, stages=6, crossover=1	0	-0.000 dB	-0.000 dB	0.000 dB
7	Algo 7	depth=4, amount=0.7	512 smp (11.6 ms)	-0.082 dB	-0.081 dB	0.001 dB
8	Algo 8	roomSize=8m, amount=0.7	0	+0.448 dB	+0.265 dB	0.182 dB

Tolerances: Freq response ±0.15 dB (wavelet ±0.30 dB) | Absolute gain ±0.5 dB | L/R gain delta ±0.05 dB | THD floor -60 dB

Test: 44.1 kHz, mono input to stereo, 512-sample blocks, 4×1M sample white noise averaged (Welch H2)

Measurement Guide

Diagrams, parameters, and terminology

Frequency Response

Shows the magnitude transfer function H(f) for left (blue) and right (red) channels.

Measured via Welch H_2 estimator: $|H(f)|^2 = Syy/Sxx$, averaged over 4×1M-sample white noise runs.

Dashed gray lines = ±1 dB tolerance. Red-shaded regions = out-of-tolerance.

A flat 0 dB line means perfect transparency. Deviations indicate coloration.

Impulse Response

Time-domain response to a unit impulse (Dirac delta) through the decorrelator.

Shows the effective FIR/IIR shape of the algorithm. Dotted line marks reported latency.

Allpass algorithms show a dispersed impulse; delay-based show a shifted peak.

Decorrelation (Correlation vs Coherence)

Correlation (green, ●): Pearson correlation of L/R in third-octave bands.

+1 = identical (mono), 0 = uncorrelated (ideal decorrelation), −1 = anti-phase.

Coherence (purple, ■): Magnitude-squared coherence $\gamma^2 = |Sxy|^2 / (Sxx \cdot Syy)$.

1 = perfectly linearly related (possibly phase-shifted), 0 = unrelated.

For a good bass decorrelator: correlation near 0 below crossover, coherence stays high

(meaning the signals are related but phase-shifted, not destroyed).

Harmonic Distortion Products

Individual harmonic levels (K2–K5) relative to the fundamental, swept 20–2000 Hz.

K2 (orange), K3 (pink) = even/odd 2nd/3rd harmonics; K4 (cyan), K5 (brown) = 4th/5th.

Dashed line = even harmonic tolerance; dotted = odd harmonic tolerance (more lenient).

Tolerance is adaptive: relaxed below the crossover frequency (150 Hz) where decorrelation

naturally introduces harmonic content. Odd harmonics (K3, K5) get +6 dB extra tolerance

as they are more musically consonant than even harmonics (K2, K4).

Summary Table Values

Gain L/R [dB]: broadband RMS gain through the decorrelator. ±0.5 dB = pass.

L/R Δ [dB]: absolute gain difference between channels. ±0.05 dB = pass.

Latency [samples]: algorithmic delay reported to the host for PDC.

Bypass (Null Reference)

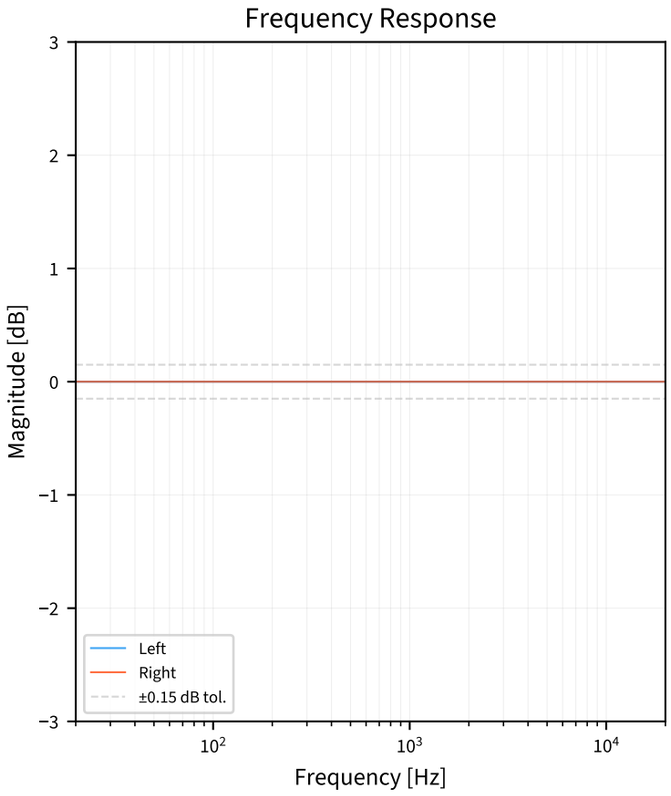
The bypass page shows all measurements with no processing applied.

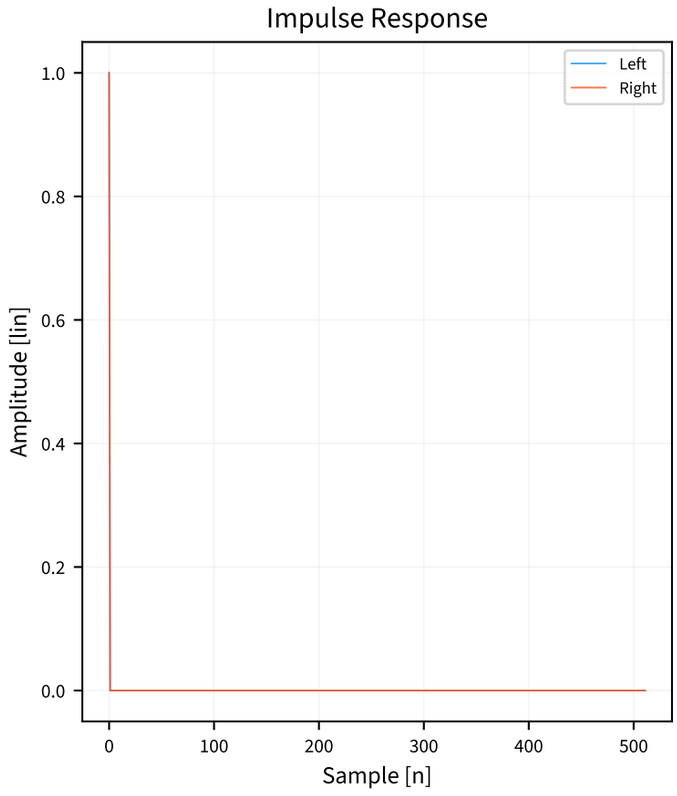
This establishes the measurement noise floor and verifies test infrastructure.

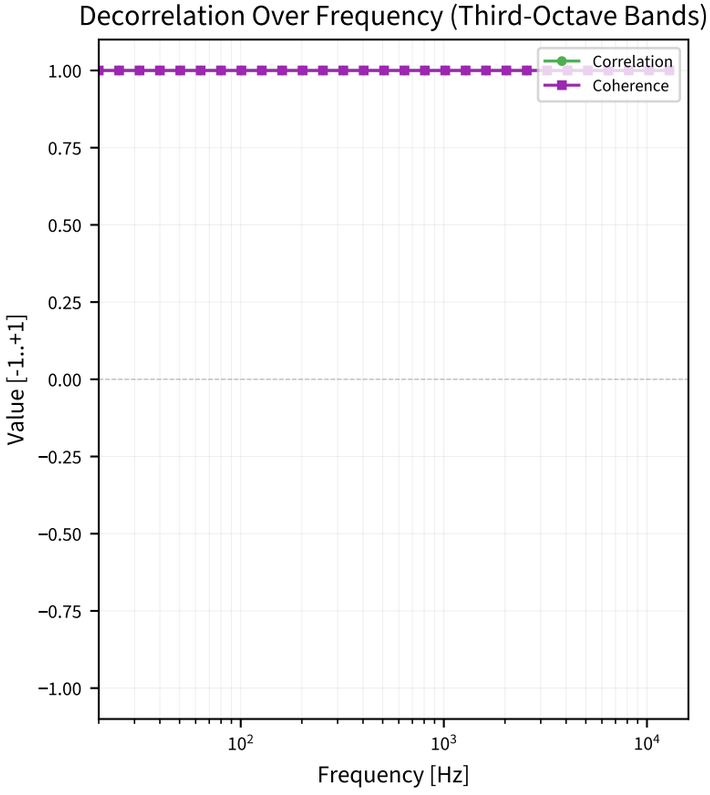
Expect: 0 dB flat response, correlation = 1.0, no harmonics above noise floor.

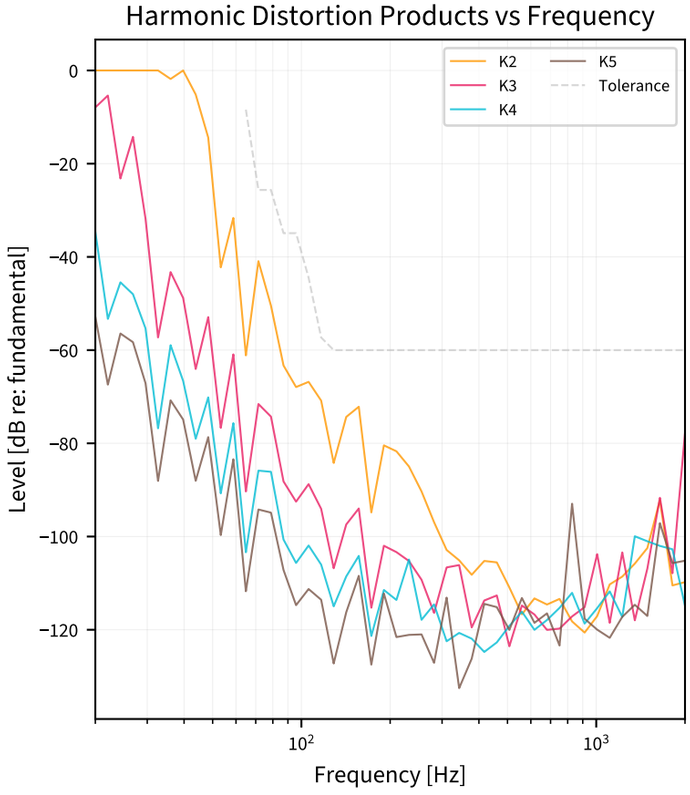
Bypass (null reference)

Parameters: no processing









Algo 1

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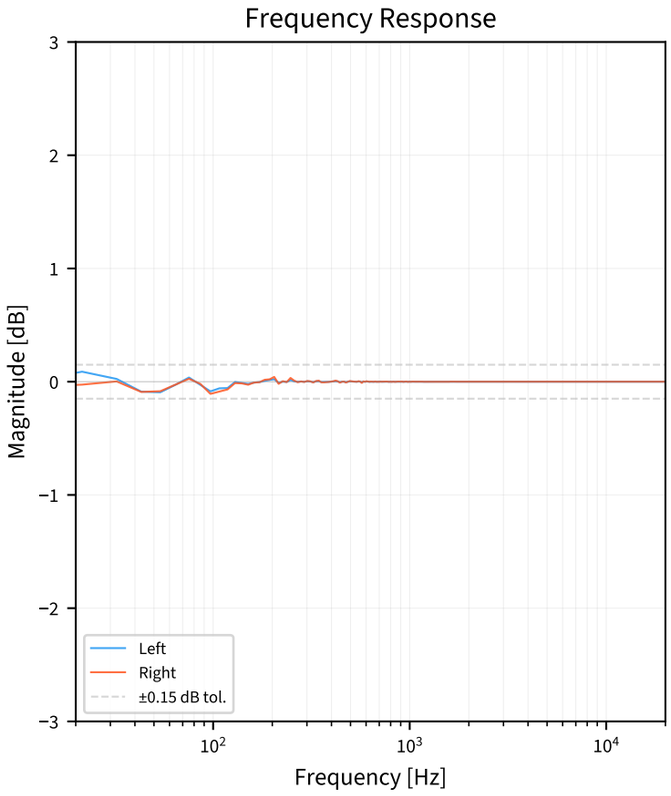
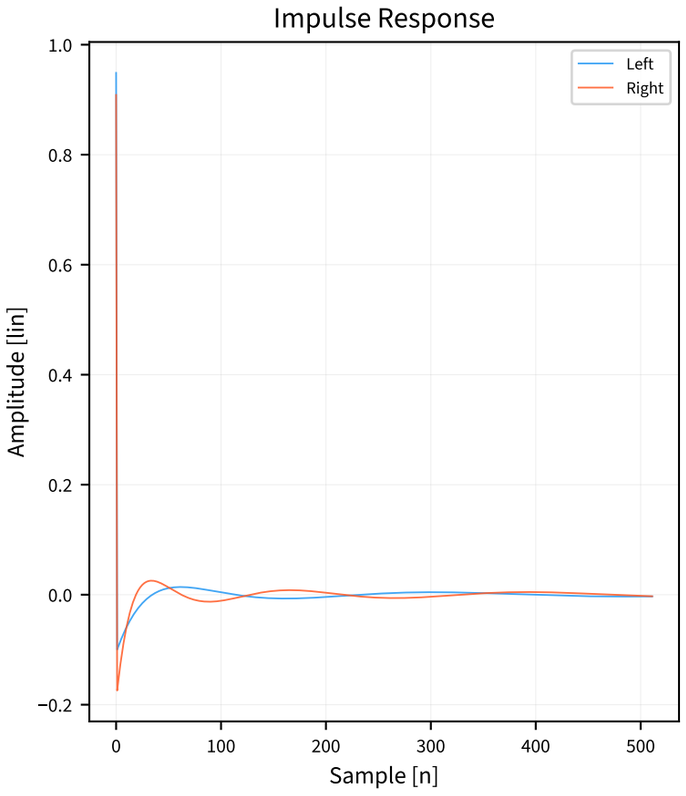
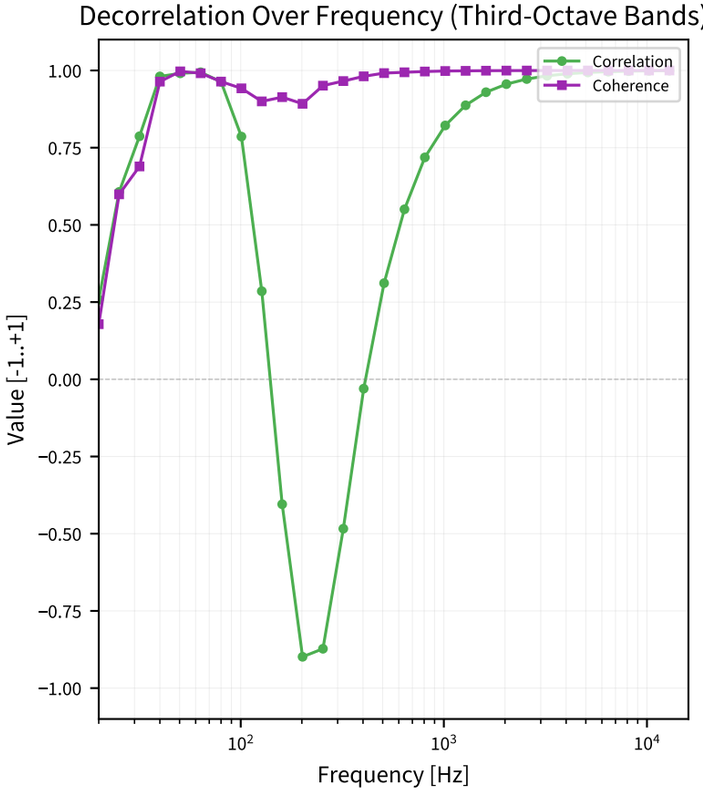
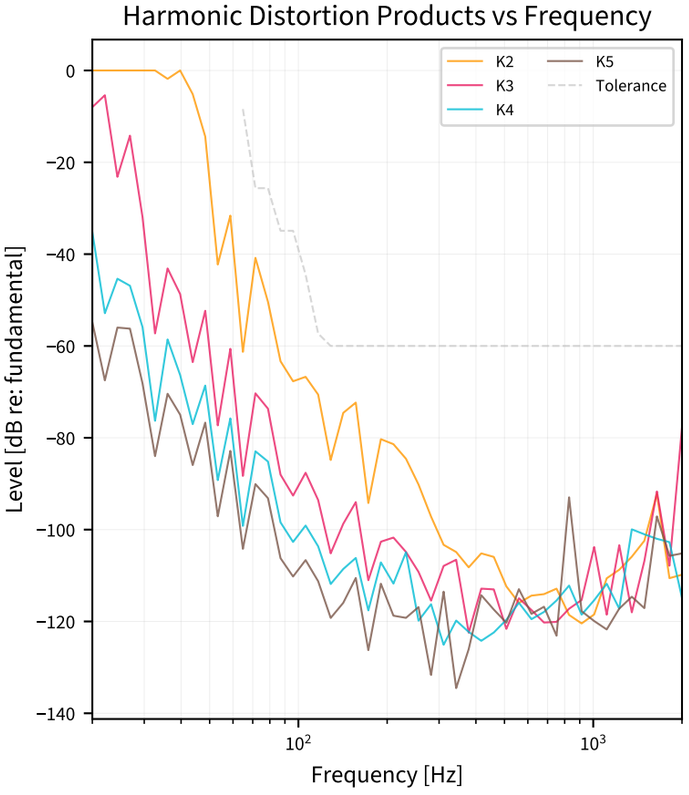


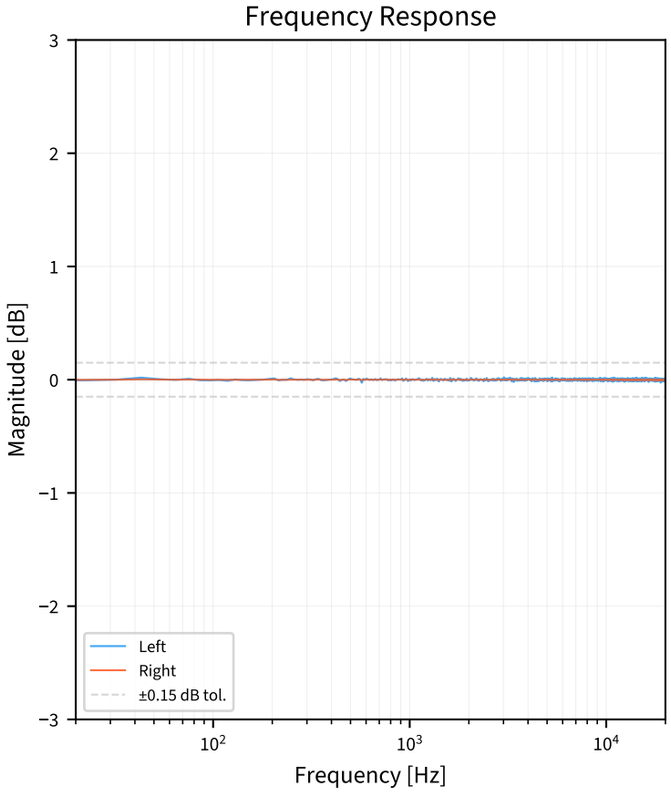


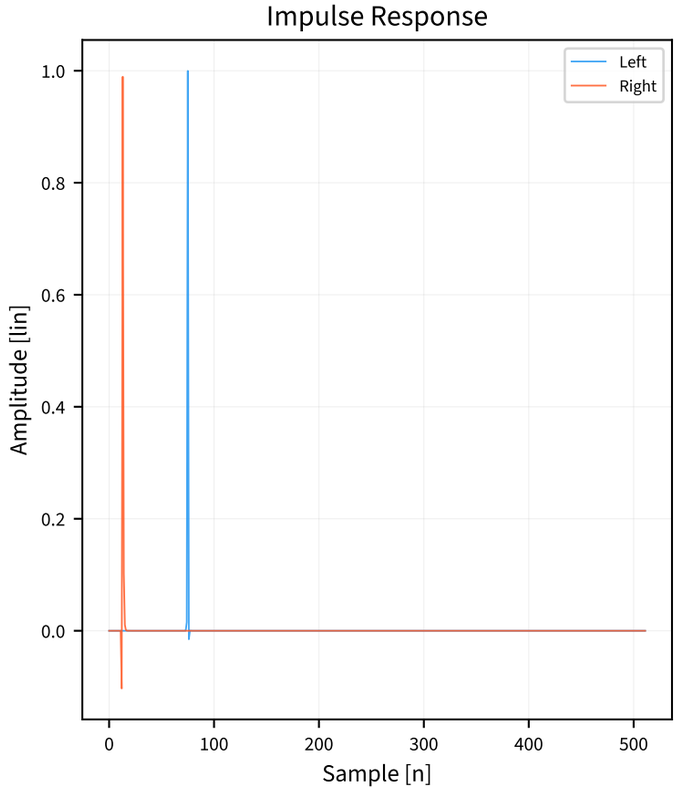


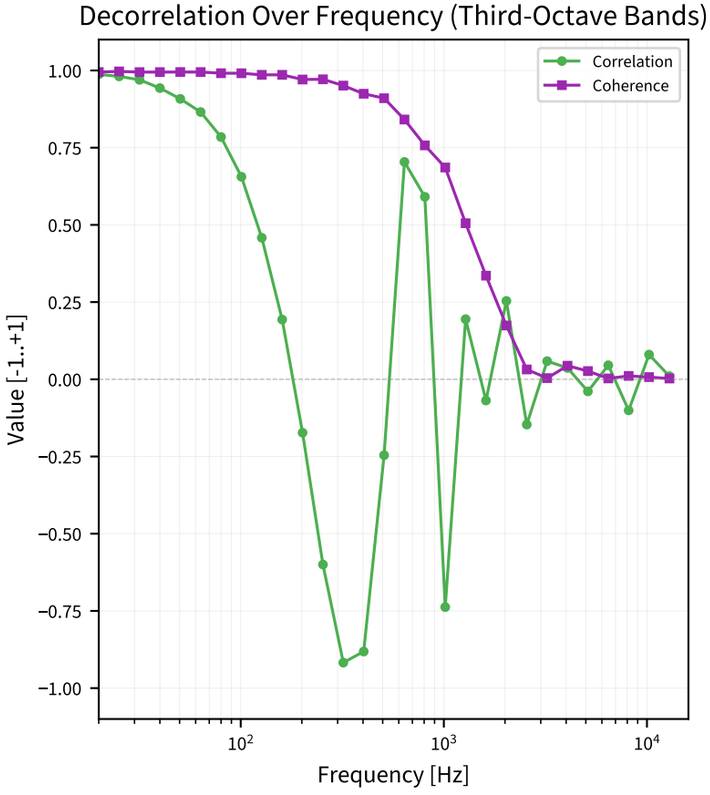


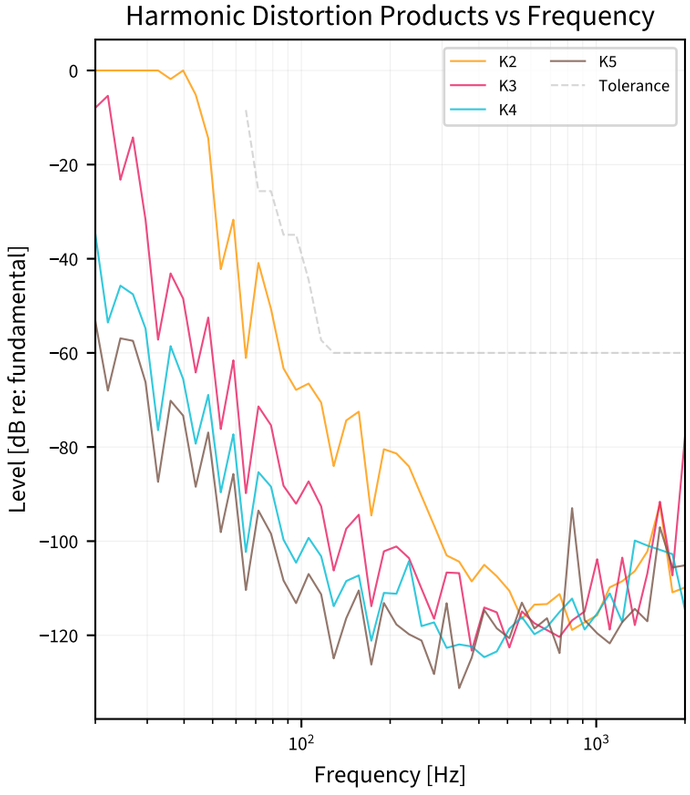
Algo 2

Parameters: delayTime=2.0ms, amount=0.7









Algo 3

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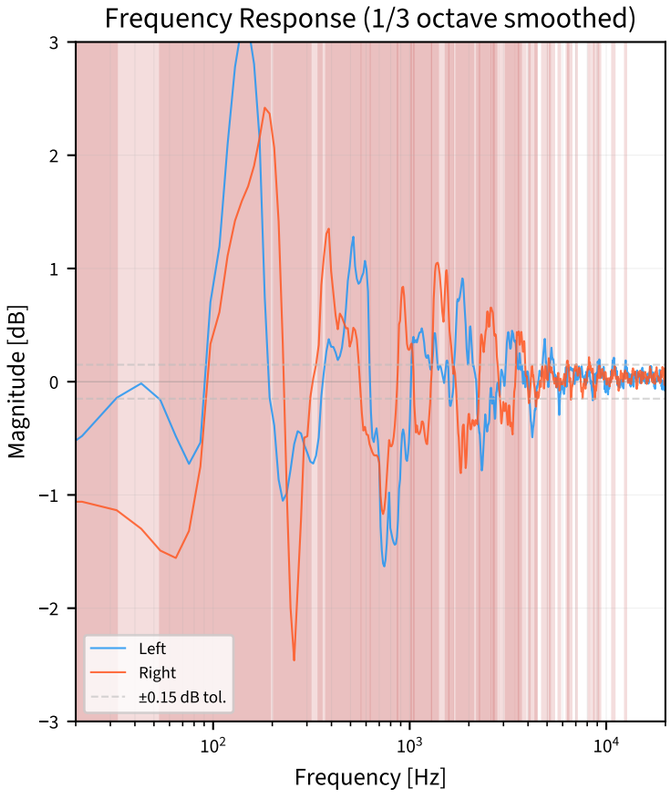
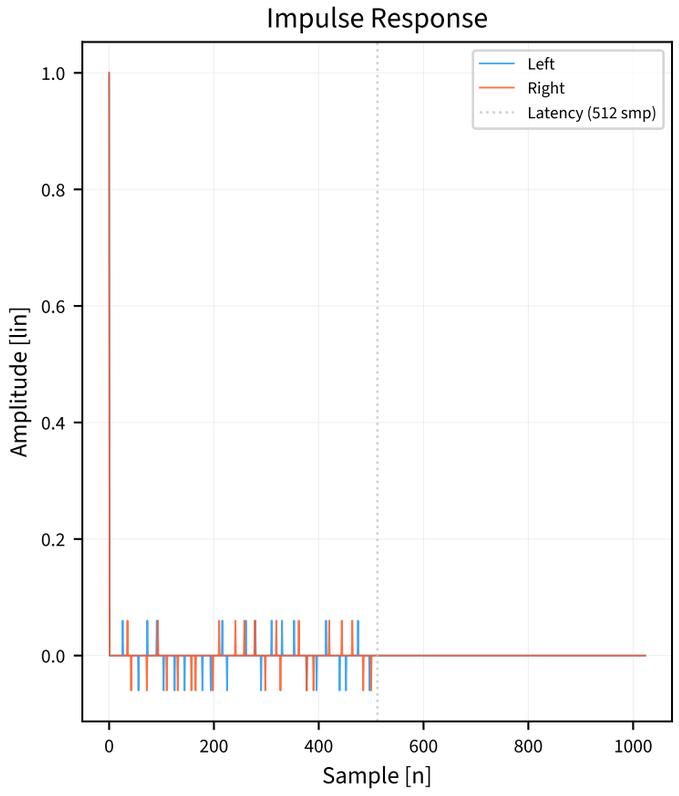
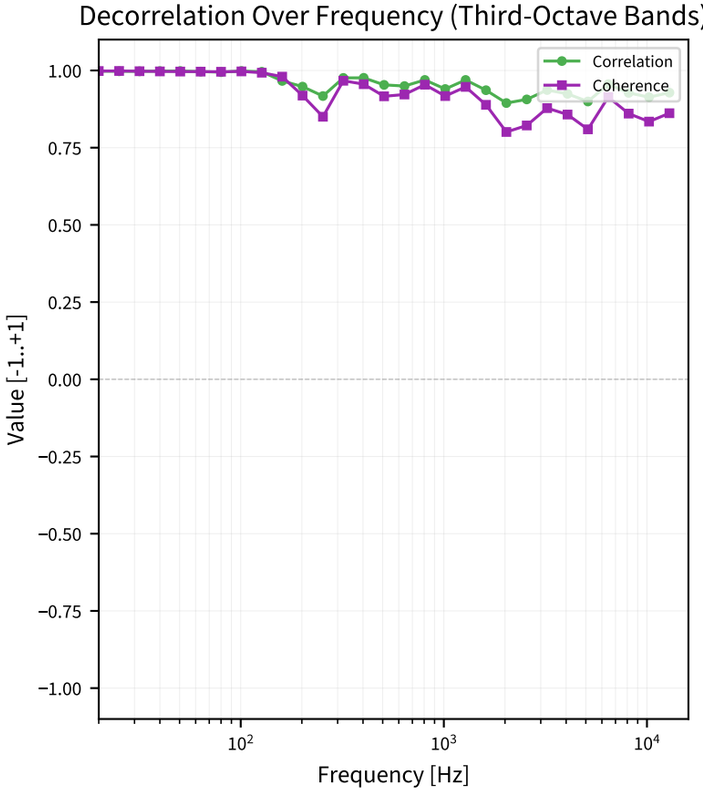
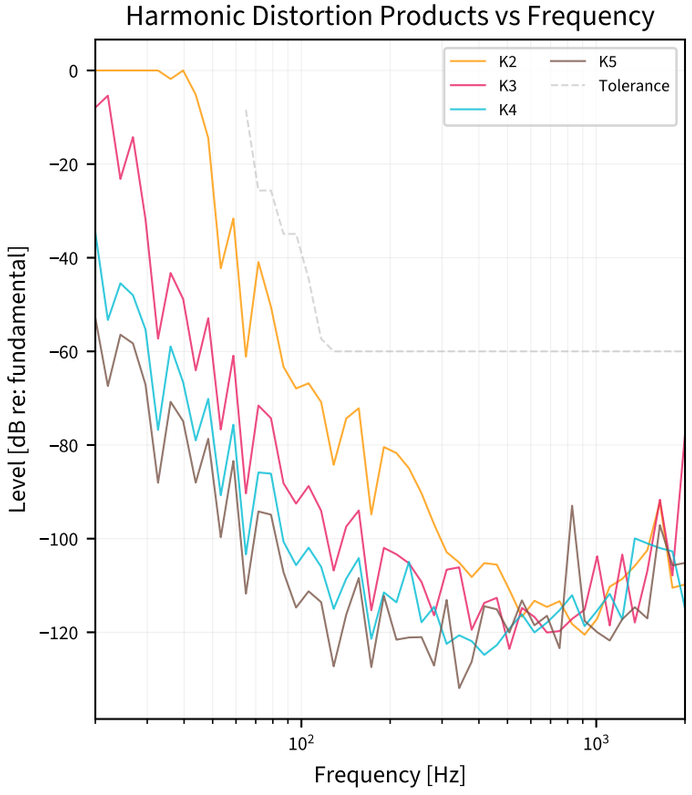


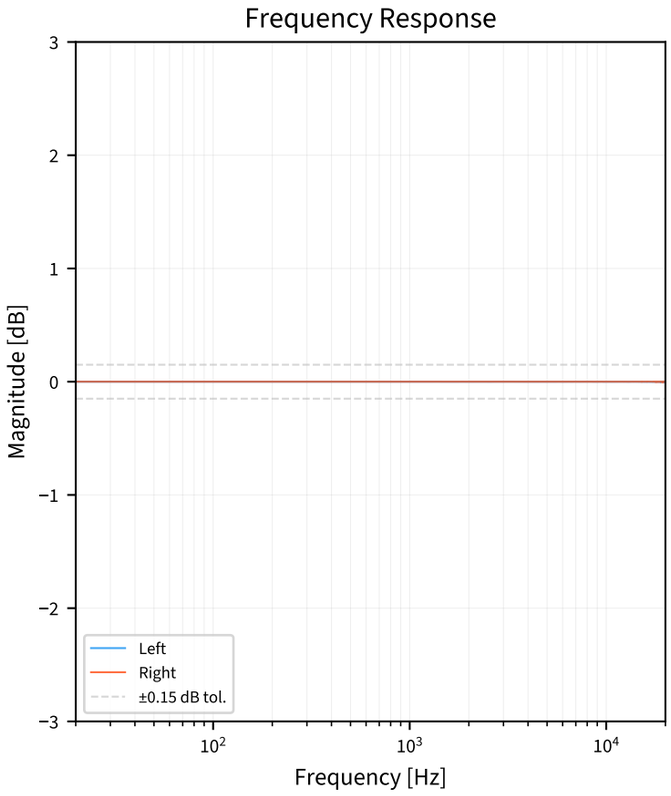


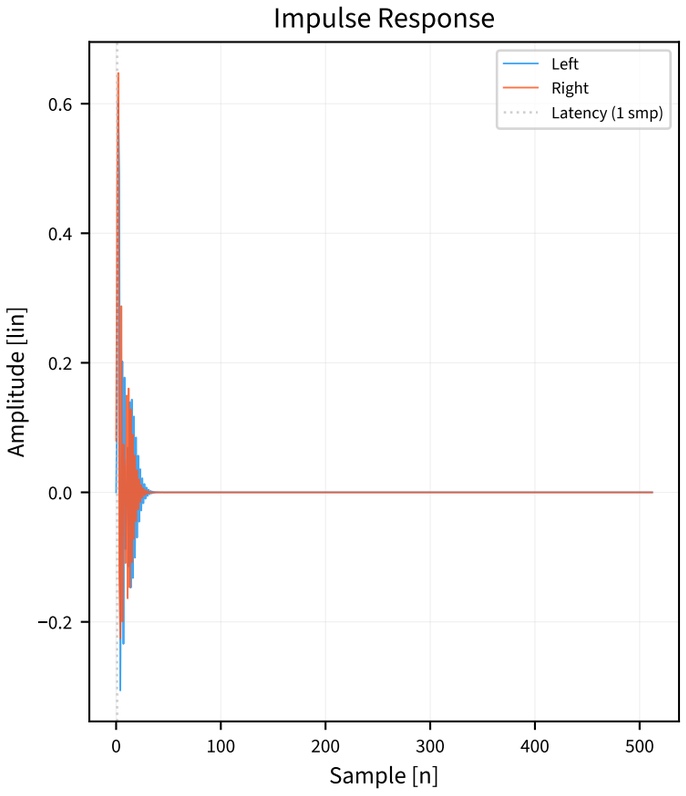


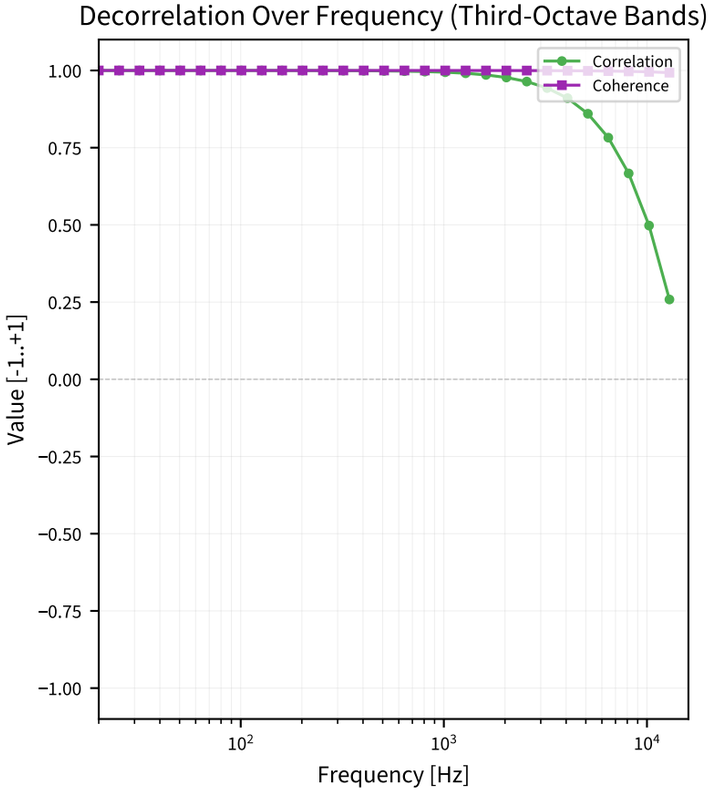


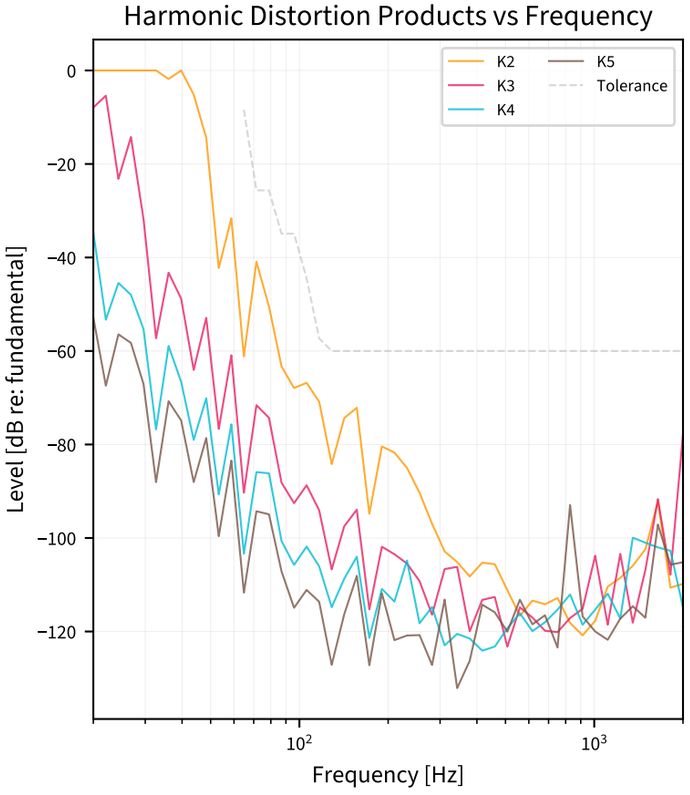
Algo 4

Parameters: amount=0.7



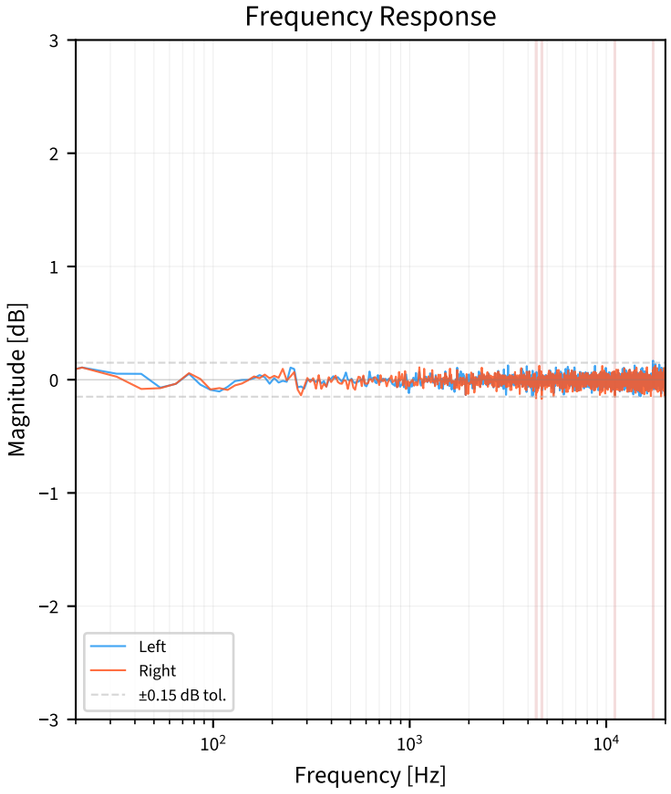


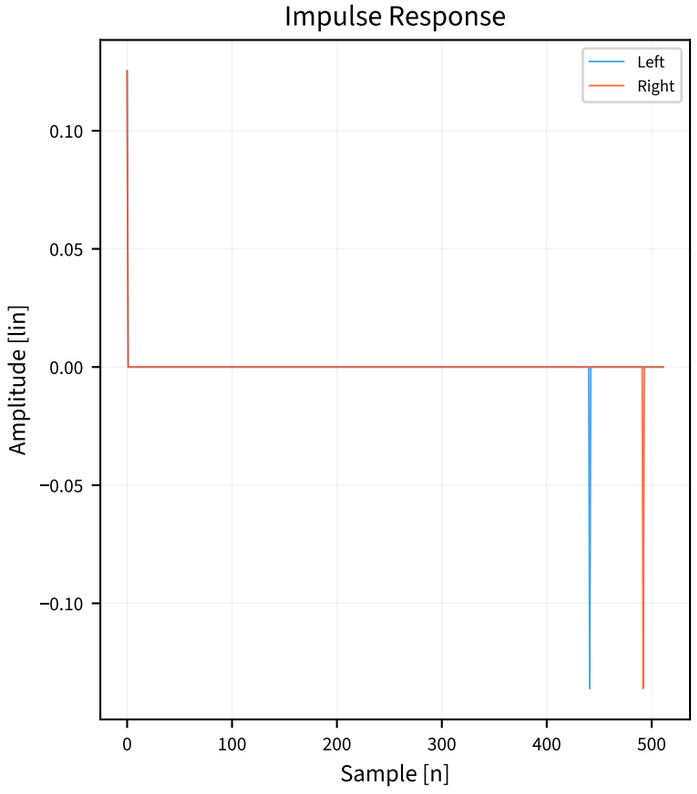


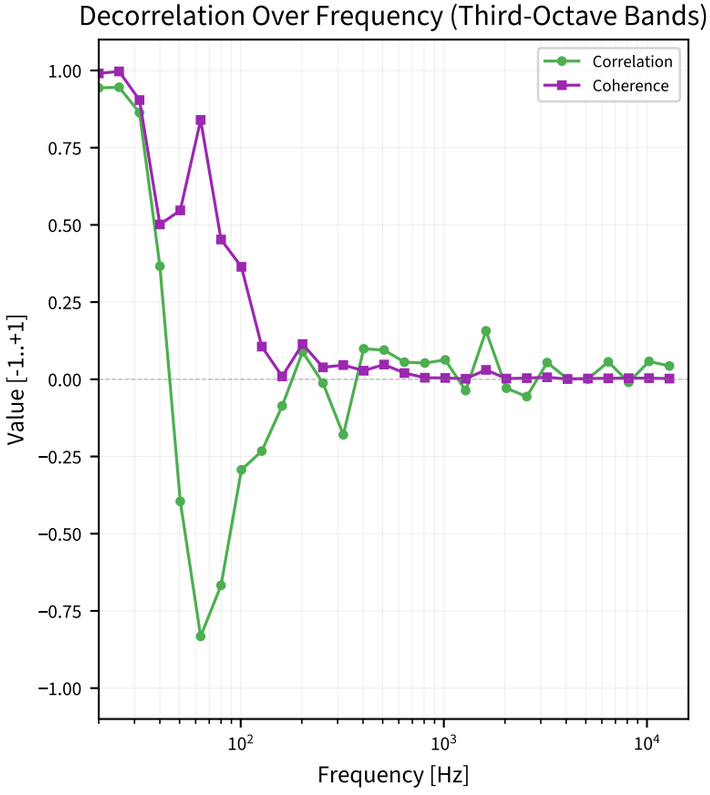


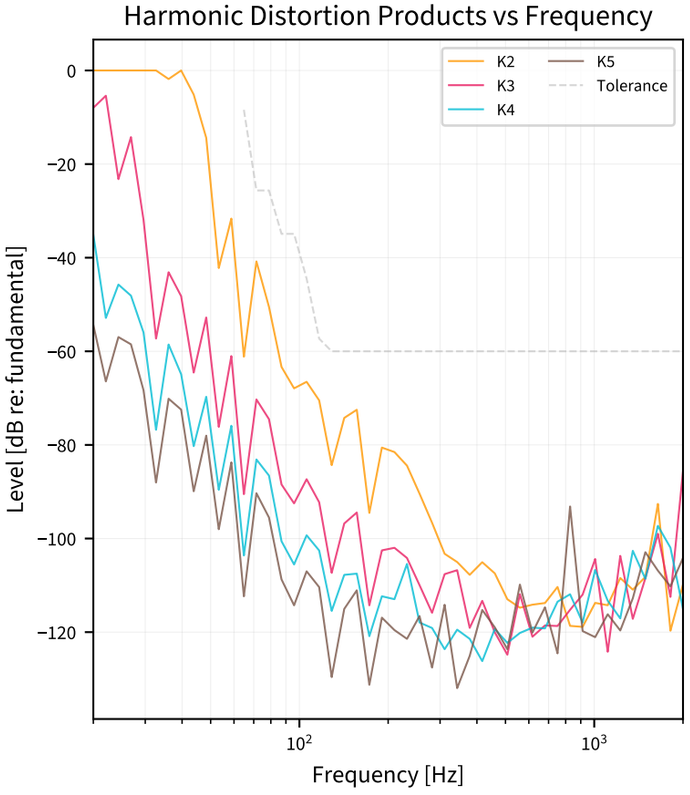
Algo 5

Parameters: delayMs=10, amount=0.7



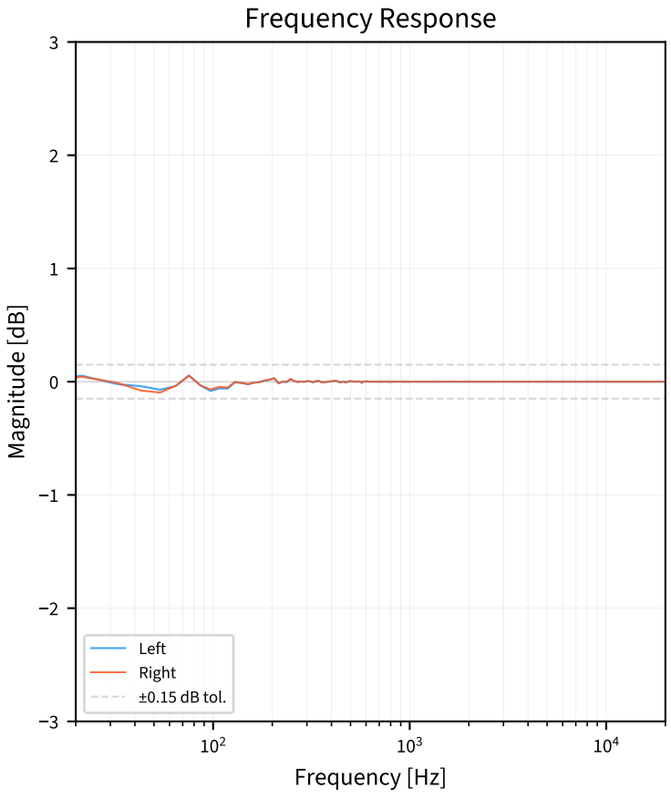


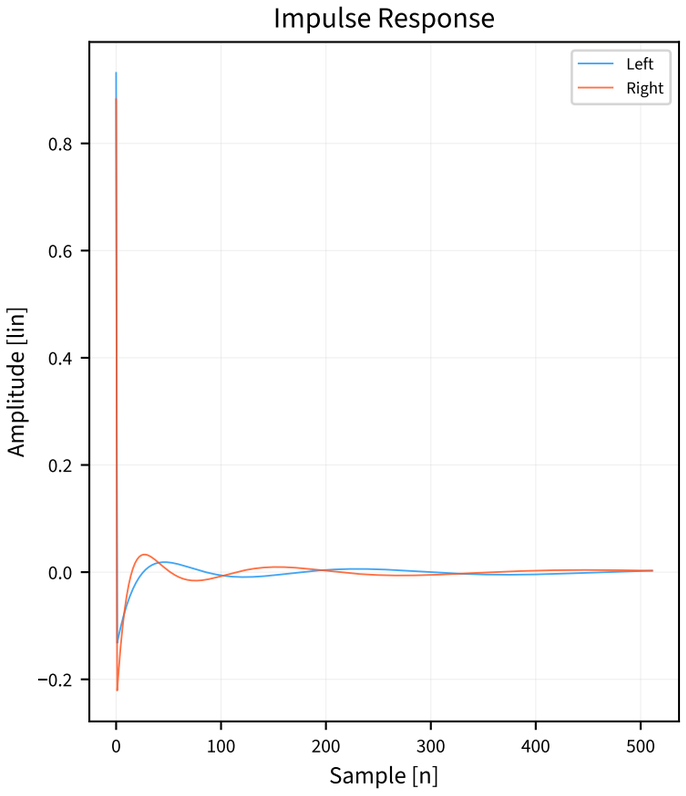


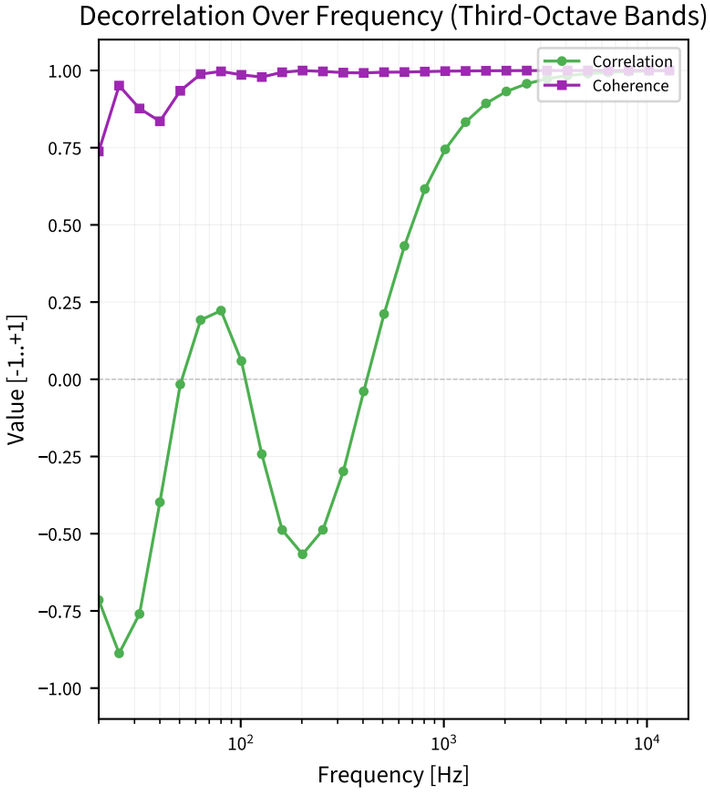


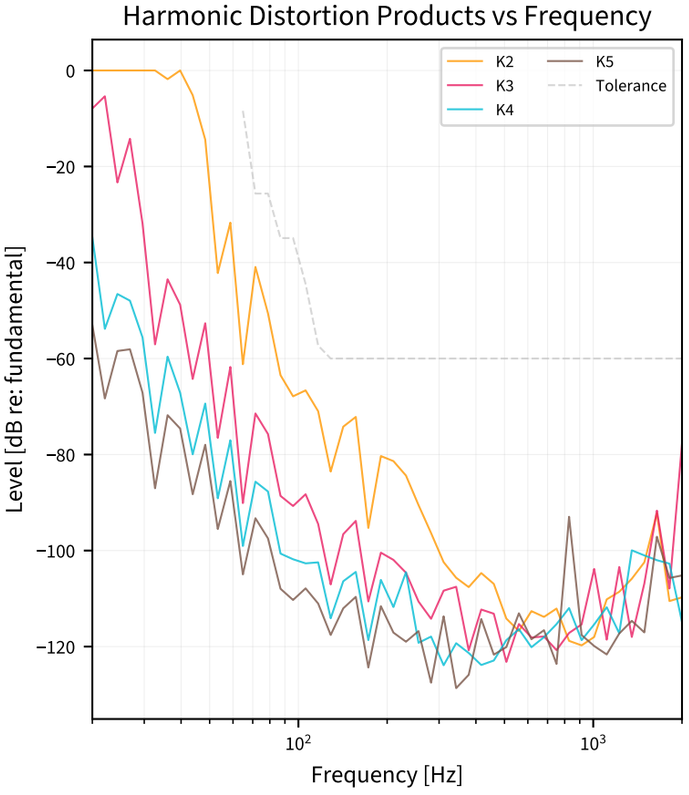
Algo 6

Parameters: spread=0.7, stages=6, crossover=150Hz



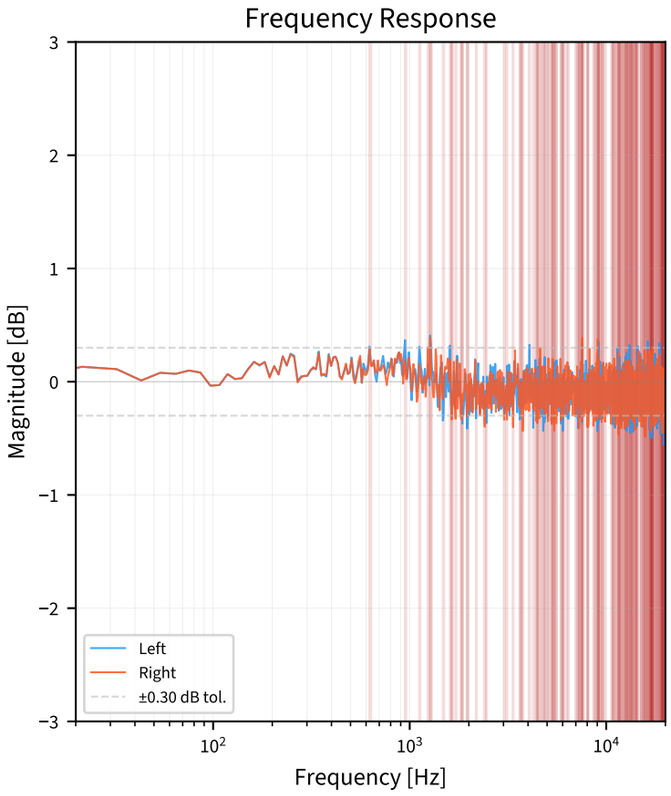


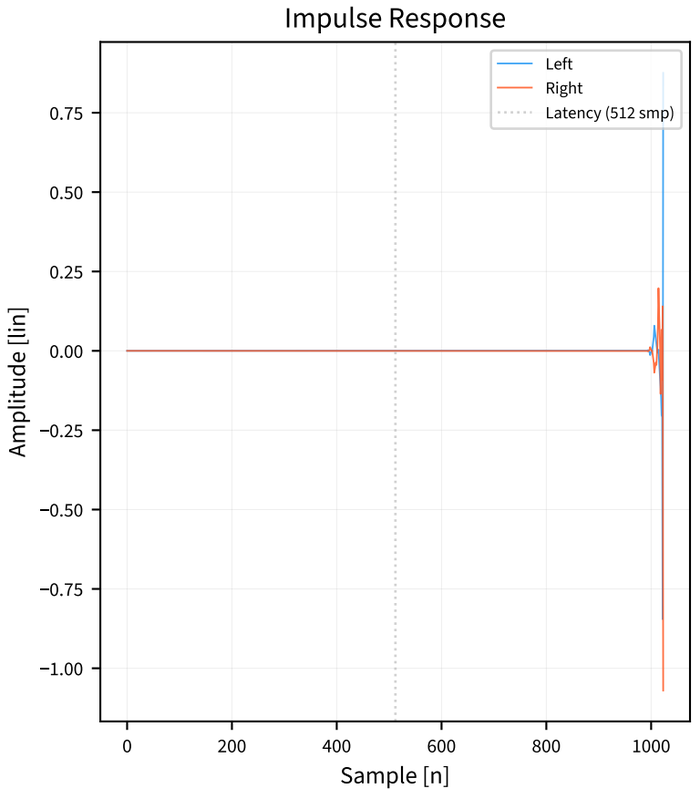


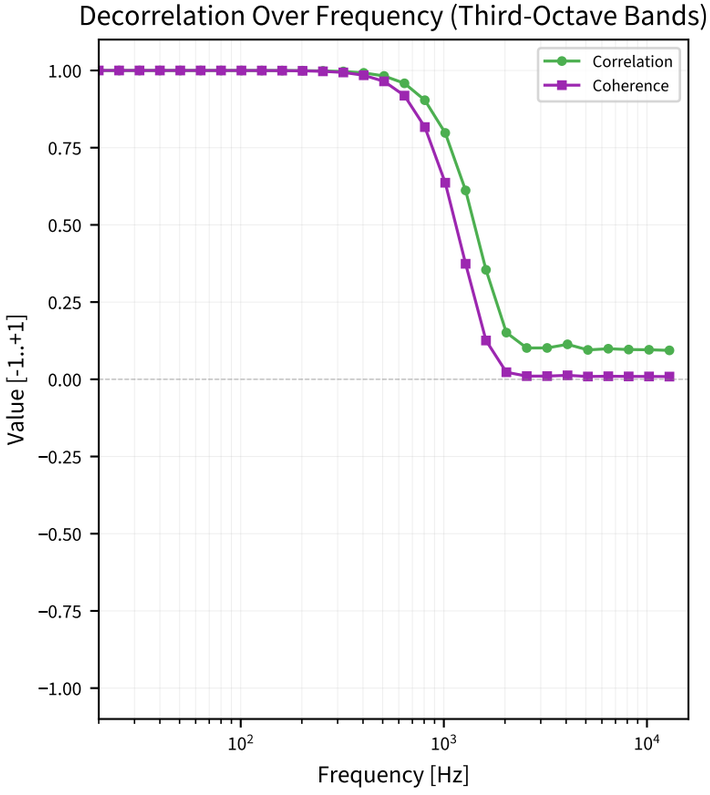


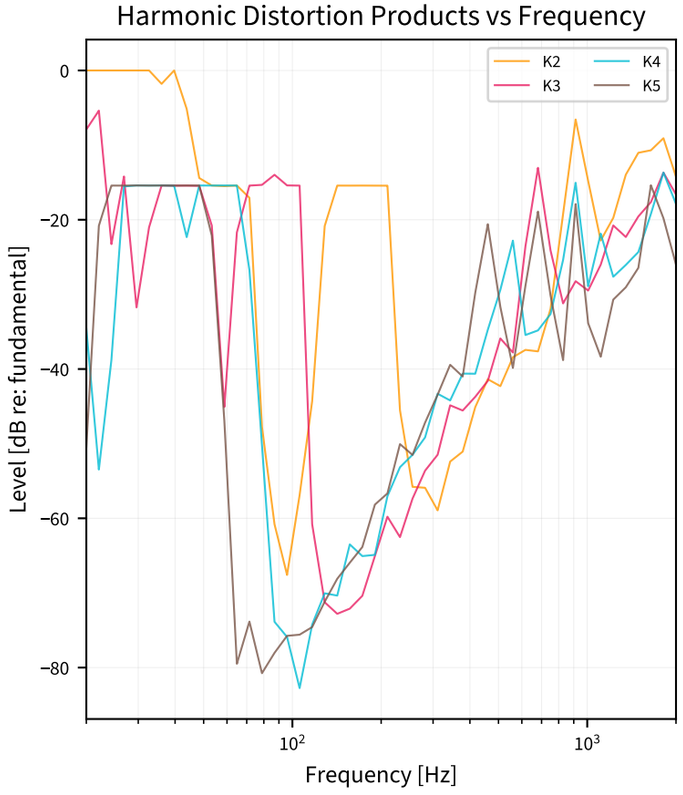
Algo 7

Parameters: depth=4, amount=0.7









Algo 8

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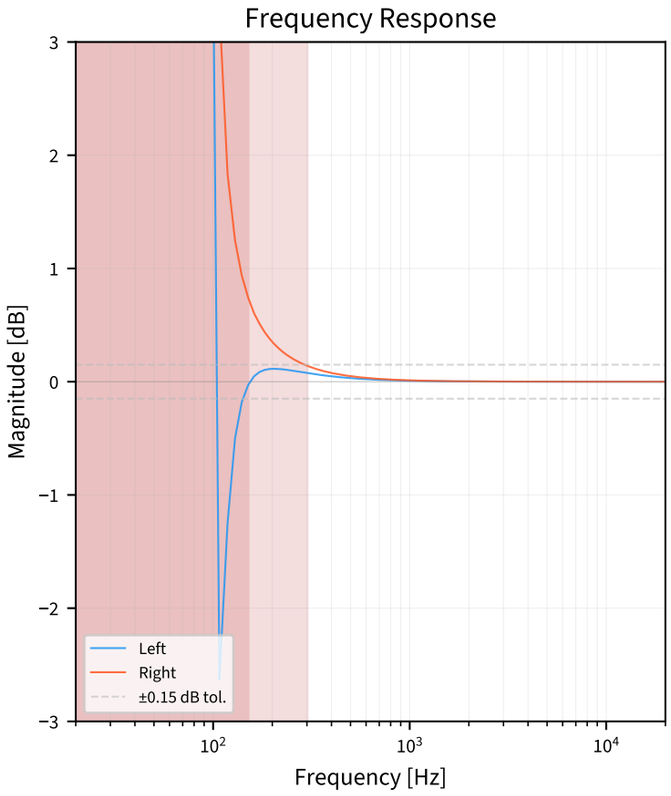
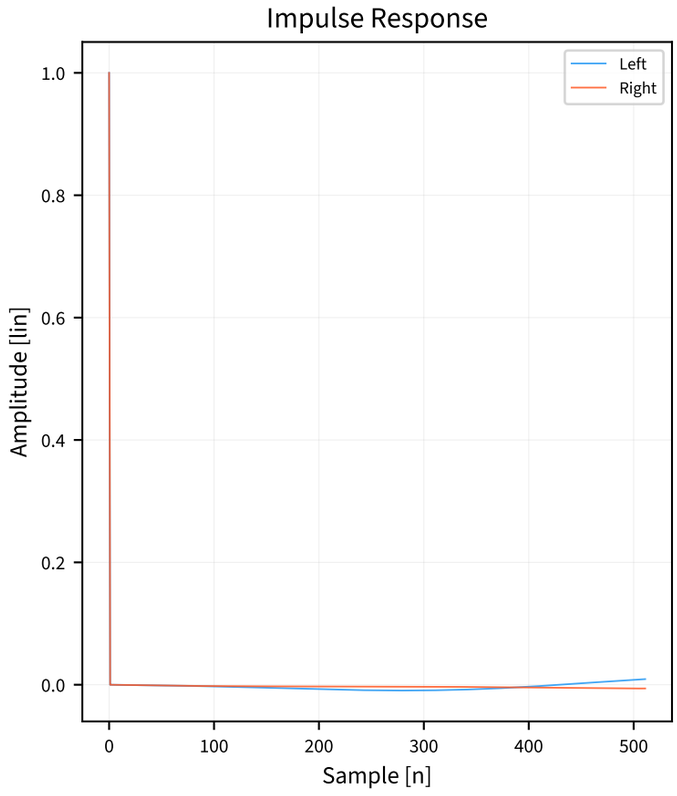
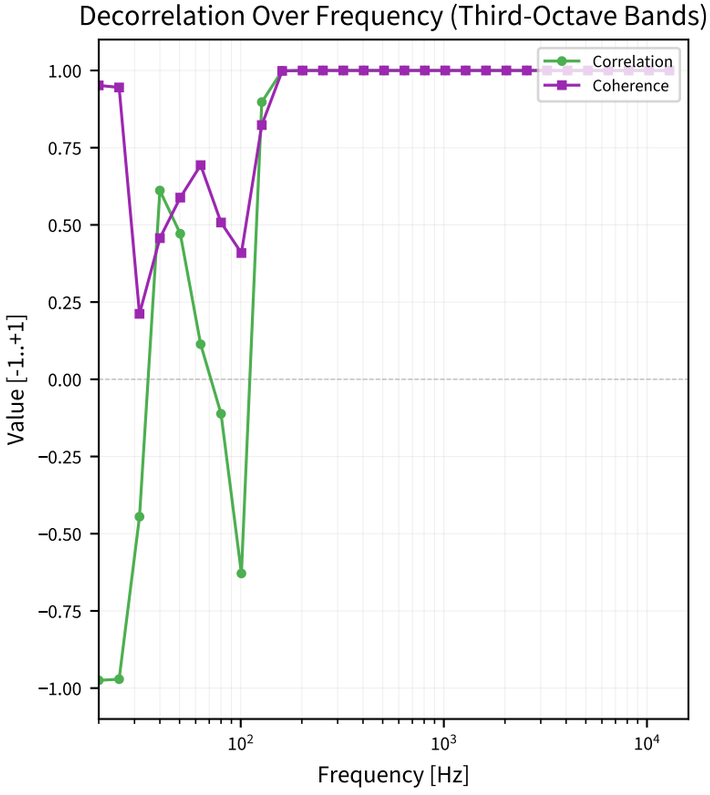
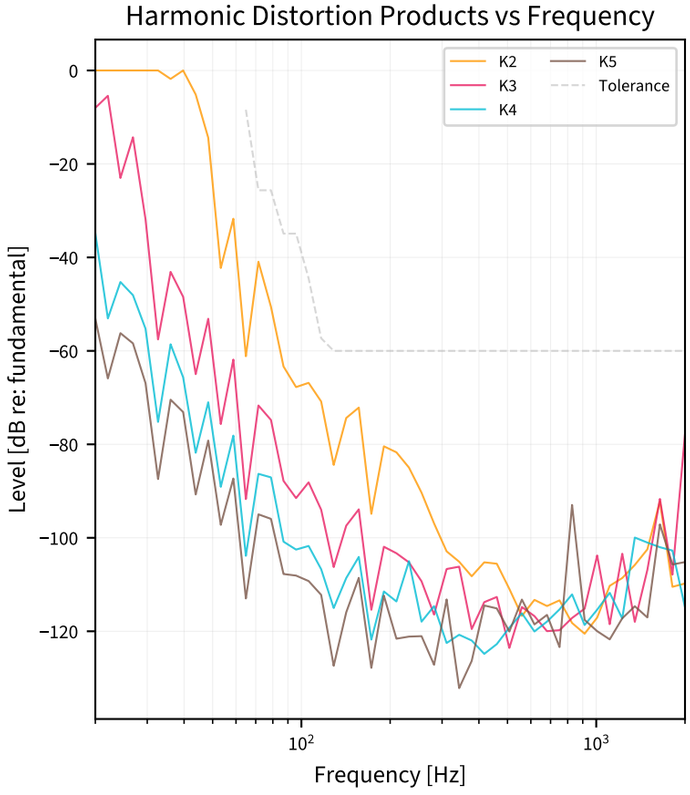
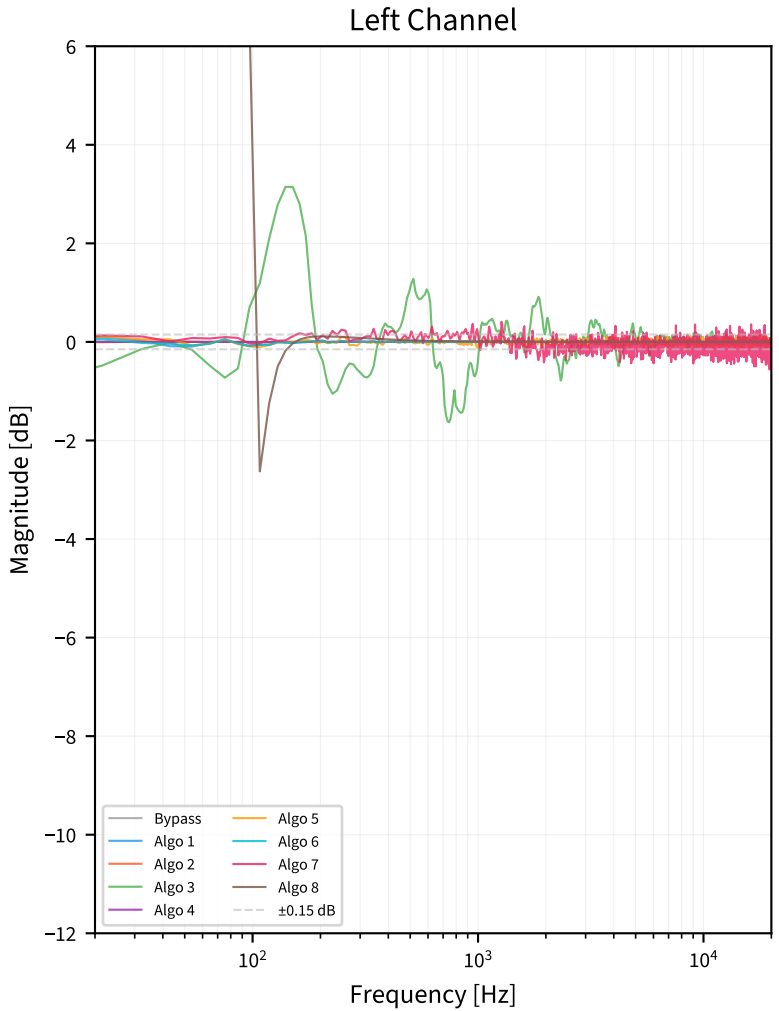


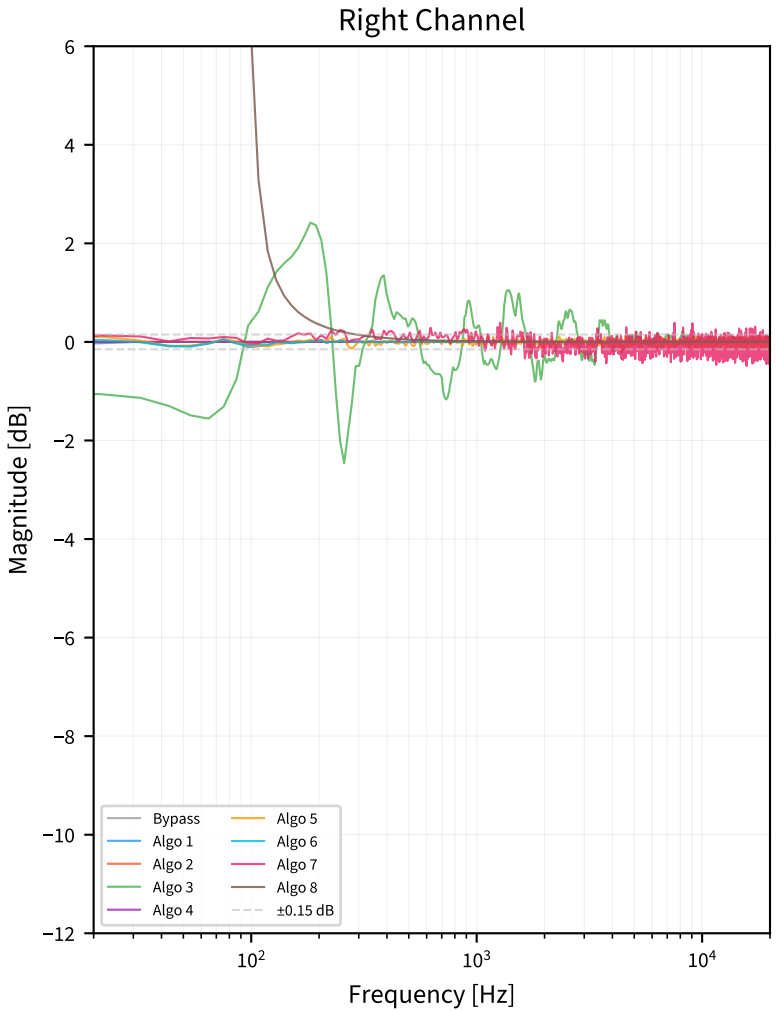






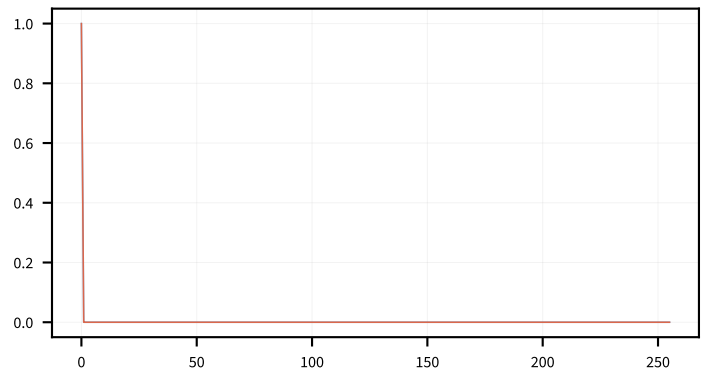
Frequency Response Comparison



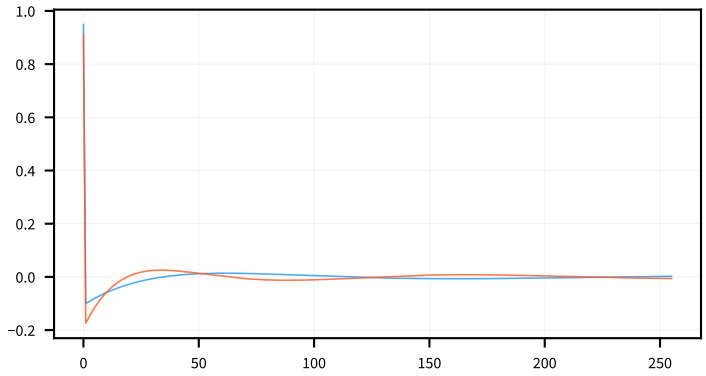


Impulse Response Comparison

Bypass



Algo 1



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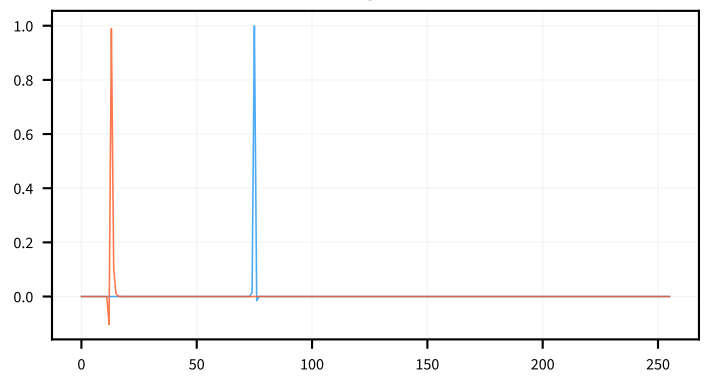

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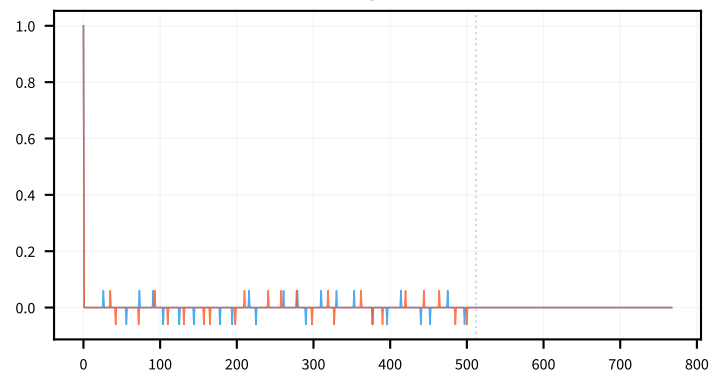

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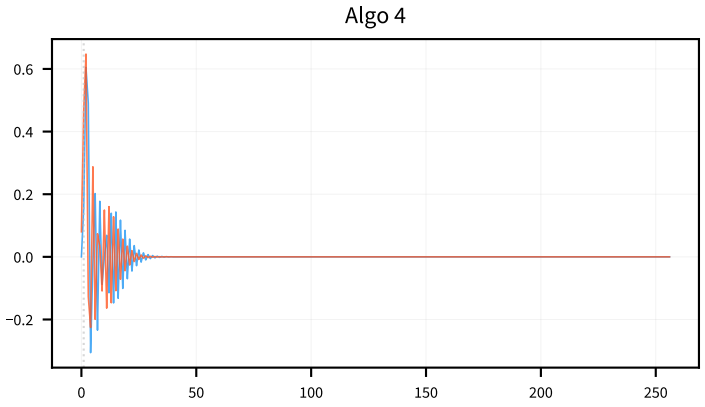

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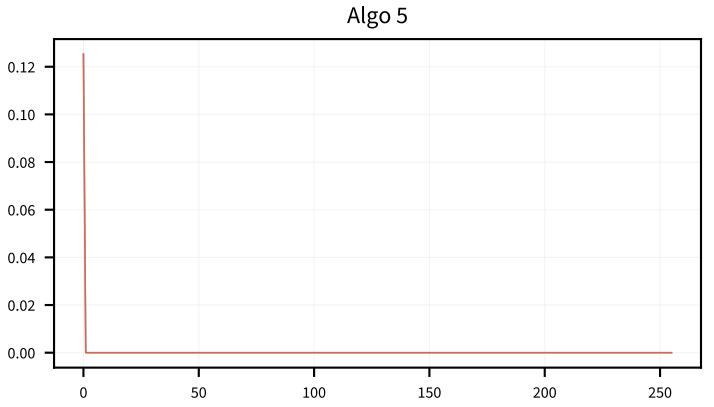

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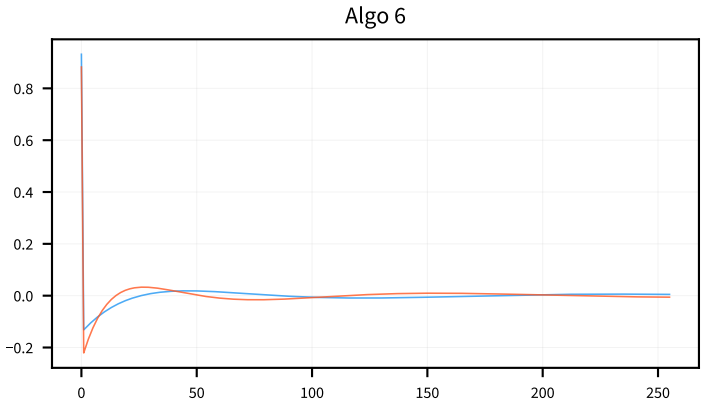
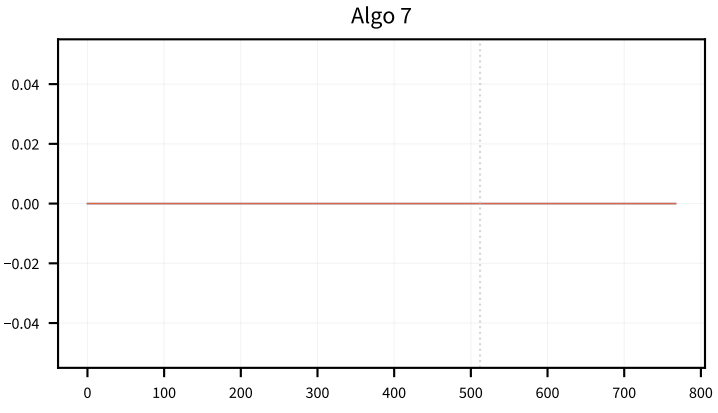
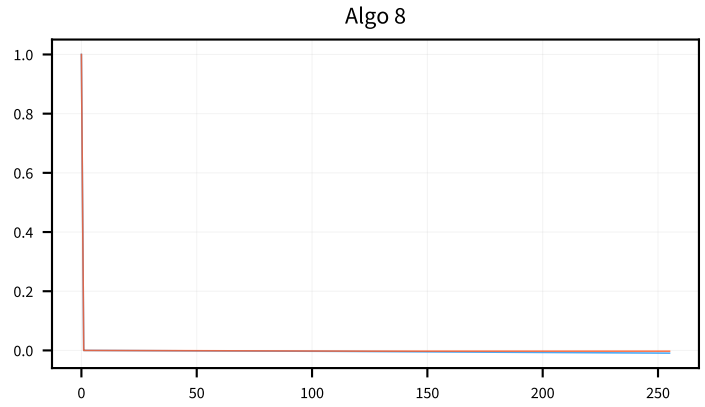


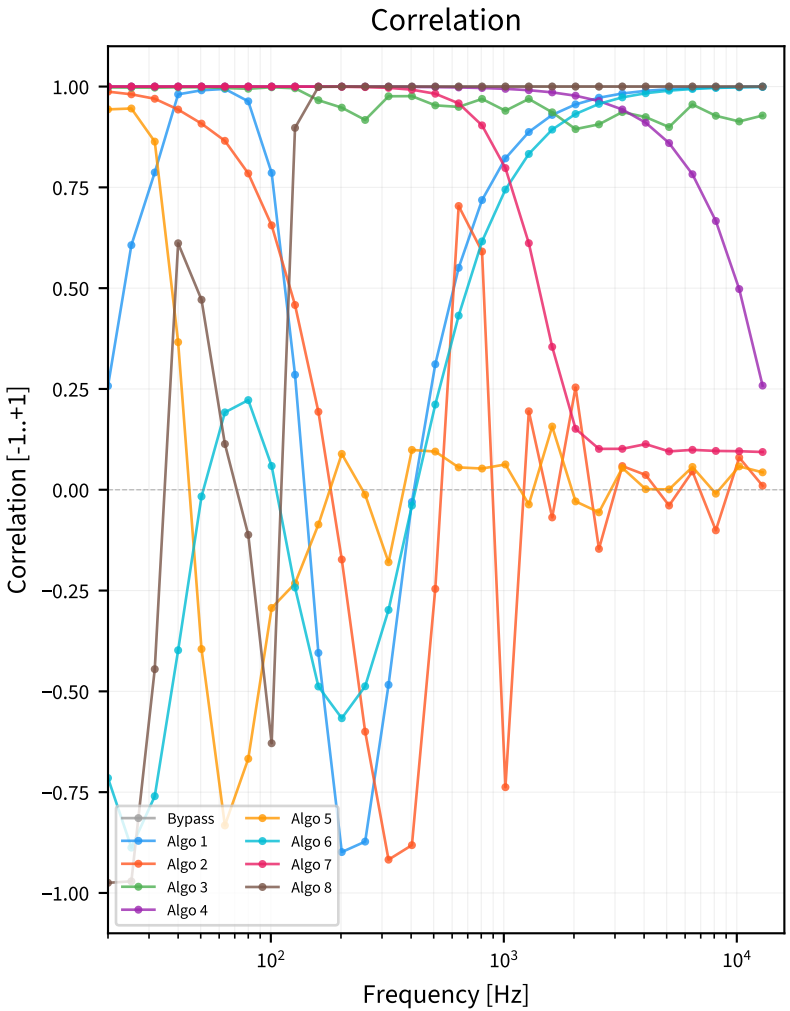
Algo 7

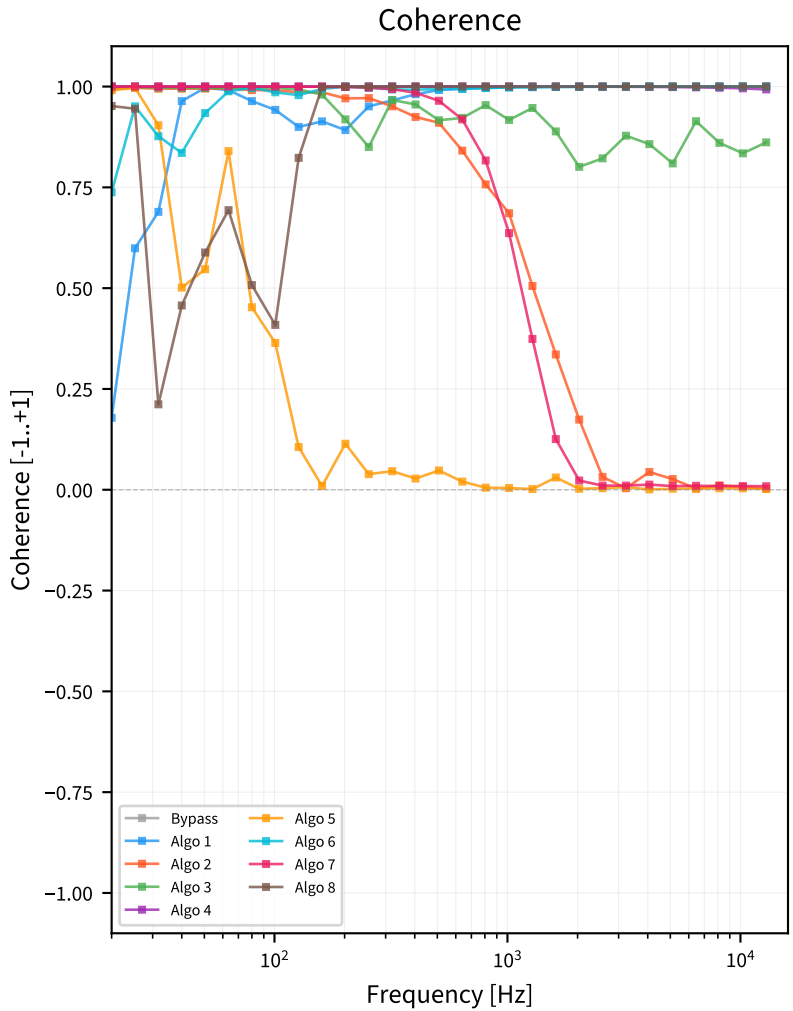


Algo 8



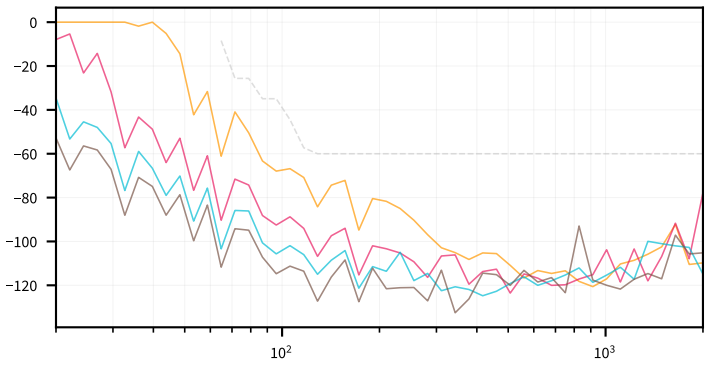
Decorrelation Comparison



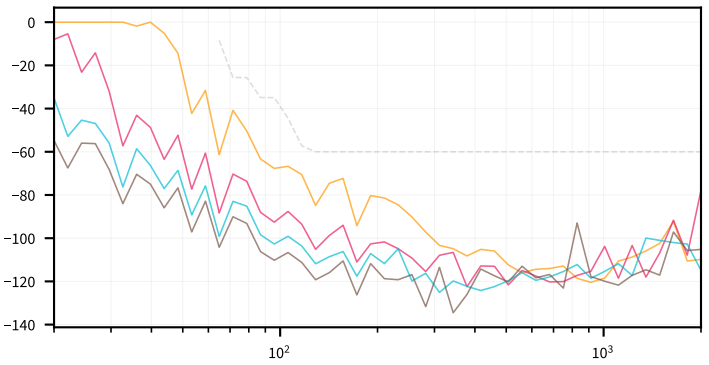


Harmonic Distortion Products Comparison

Bypass



Algo 1



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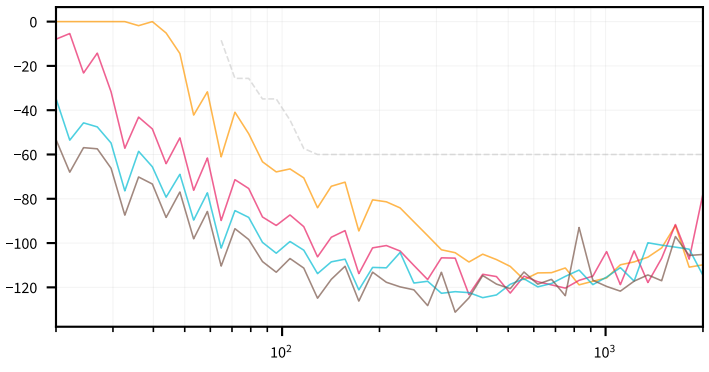
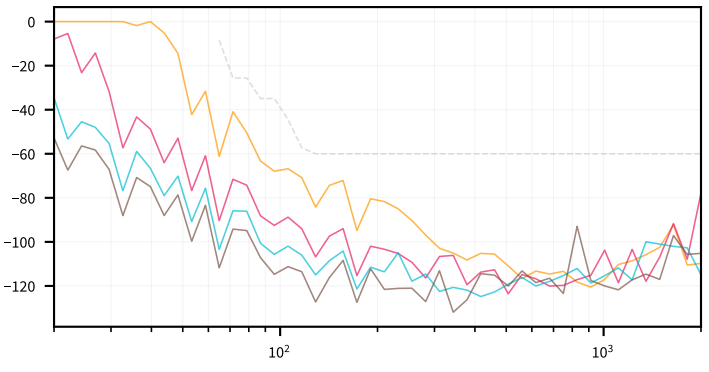
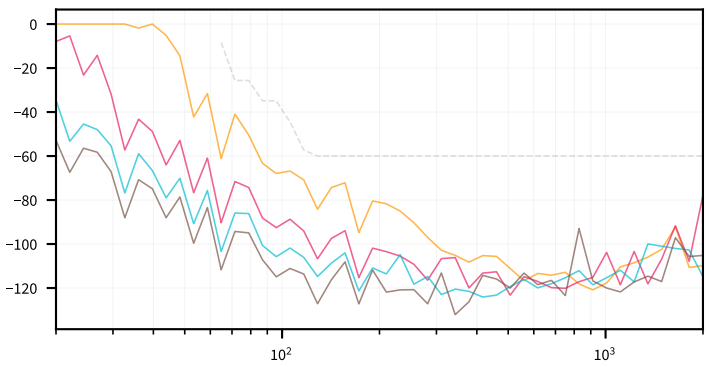


Algo 3



Algo 4



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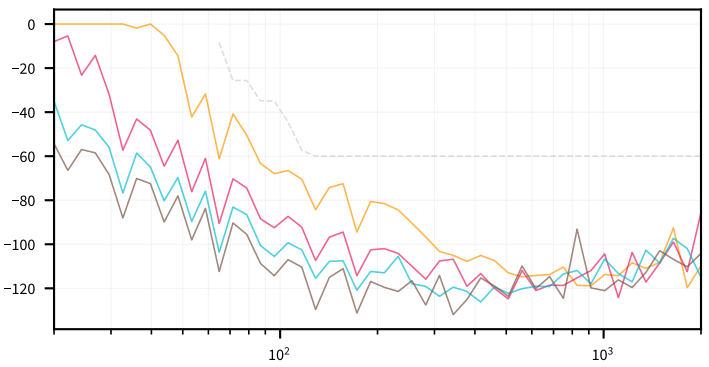

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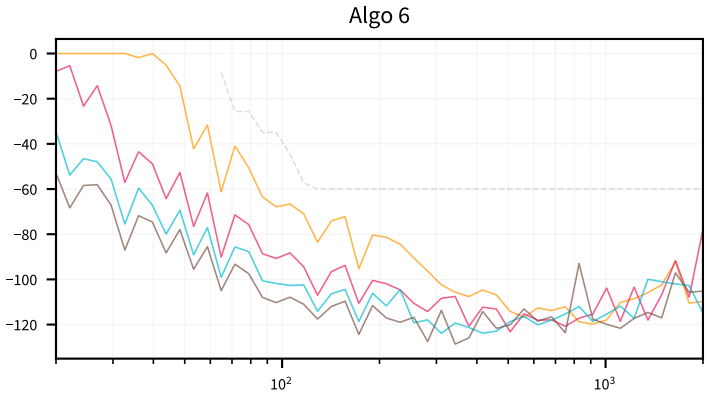
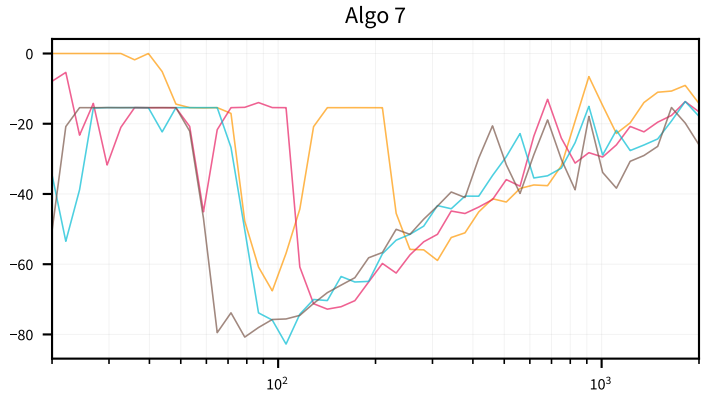


Algo 7



Algo 8