

A digital guitar
effects pedal
or what the
modern Jimi
Hendrix would
use

JIMI HENDRIX EXPERIENCE

HOLLYWOOD BOWL | AUGUST 18, 1967

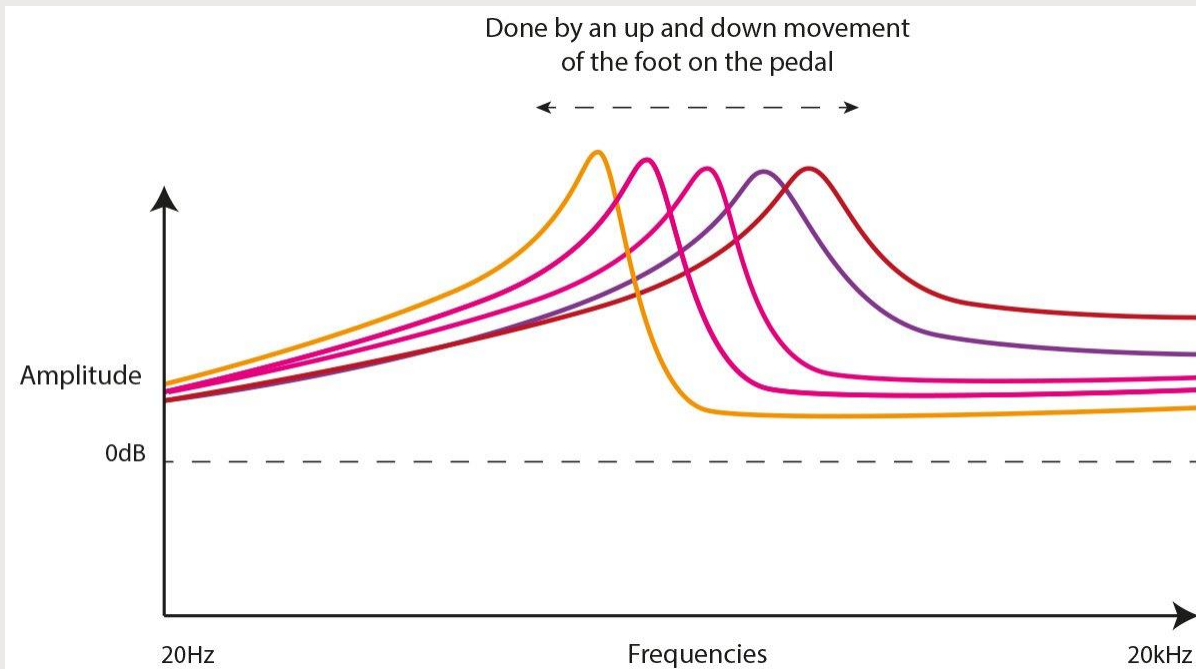


Idea

- Digital replica of Wah-Wah pedal



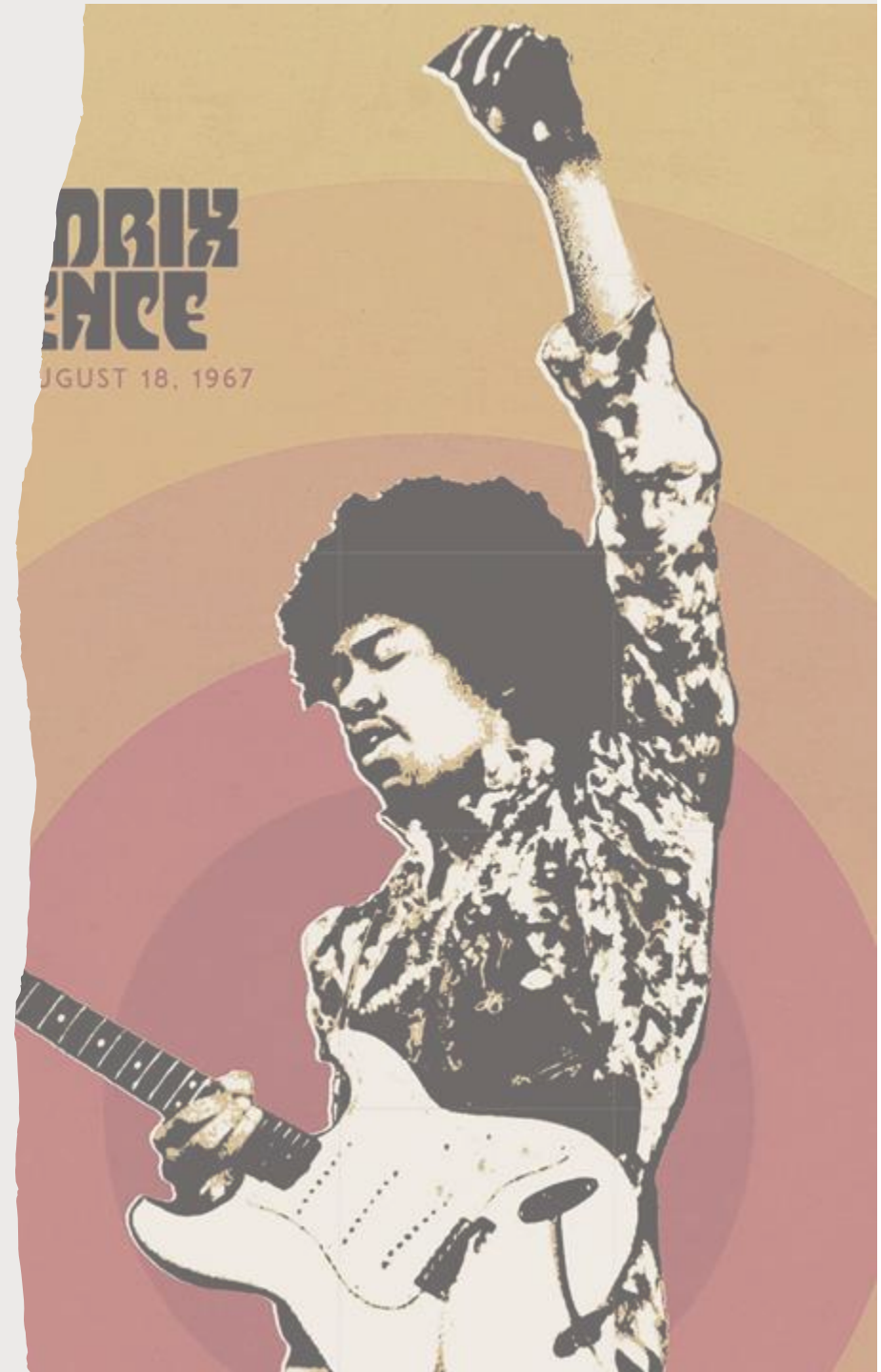
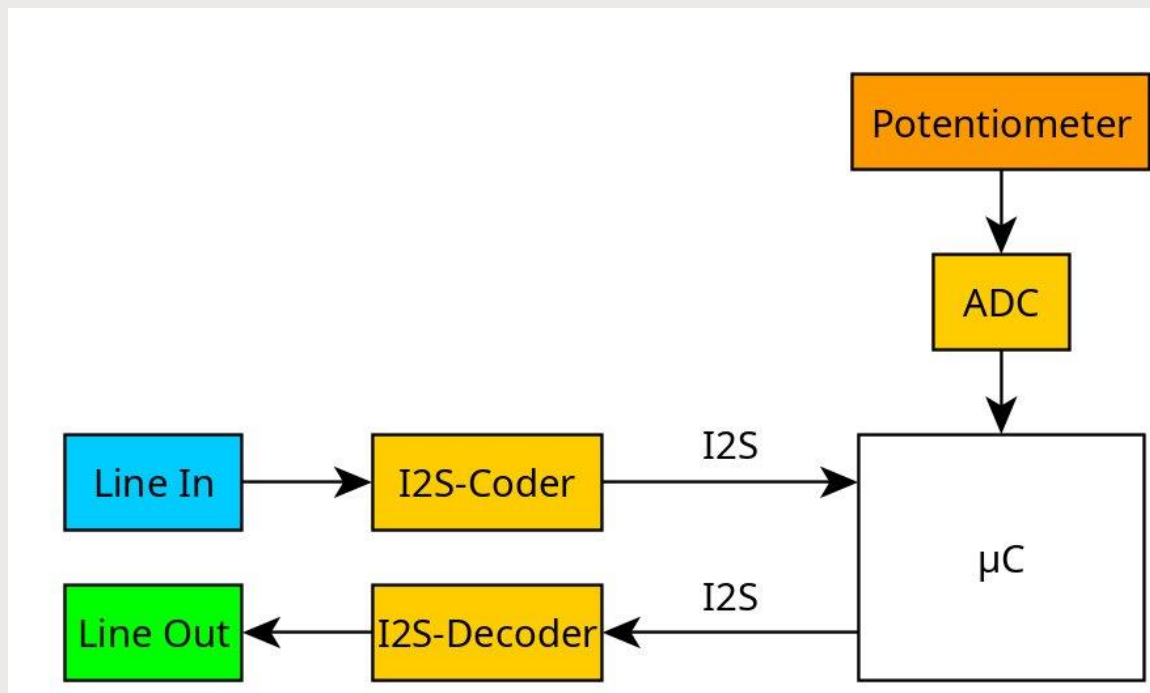
What is the Wah-Wah-effect?



Source: <https://www.3d-varius.com/history-of-the-wah/>

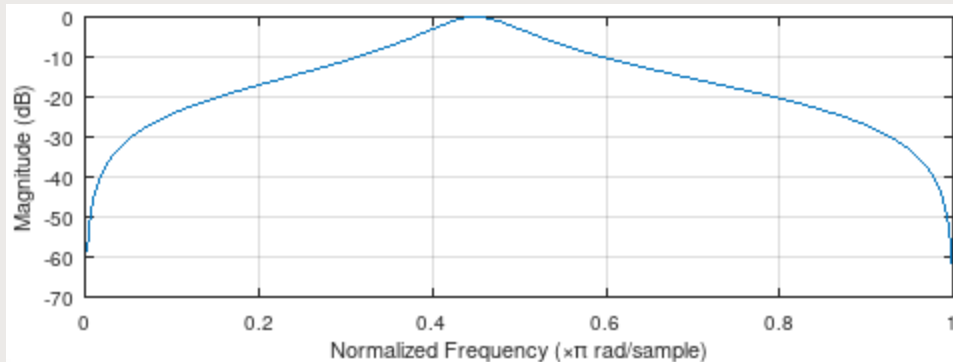
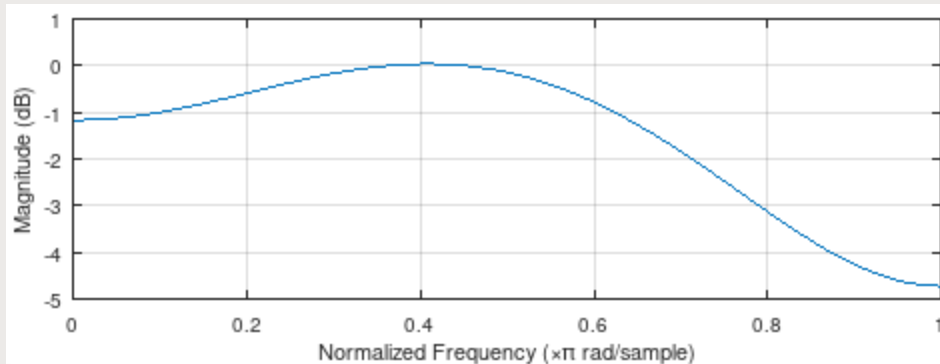


Concept



Digital Filters

- 5 Coefficients
- Passband from 0.4 to 0.6 Hz

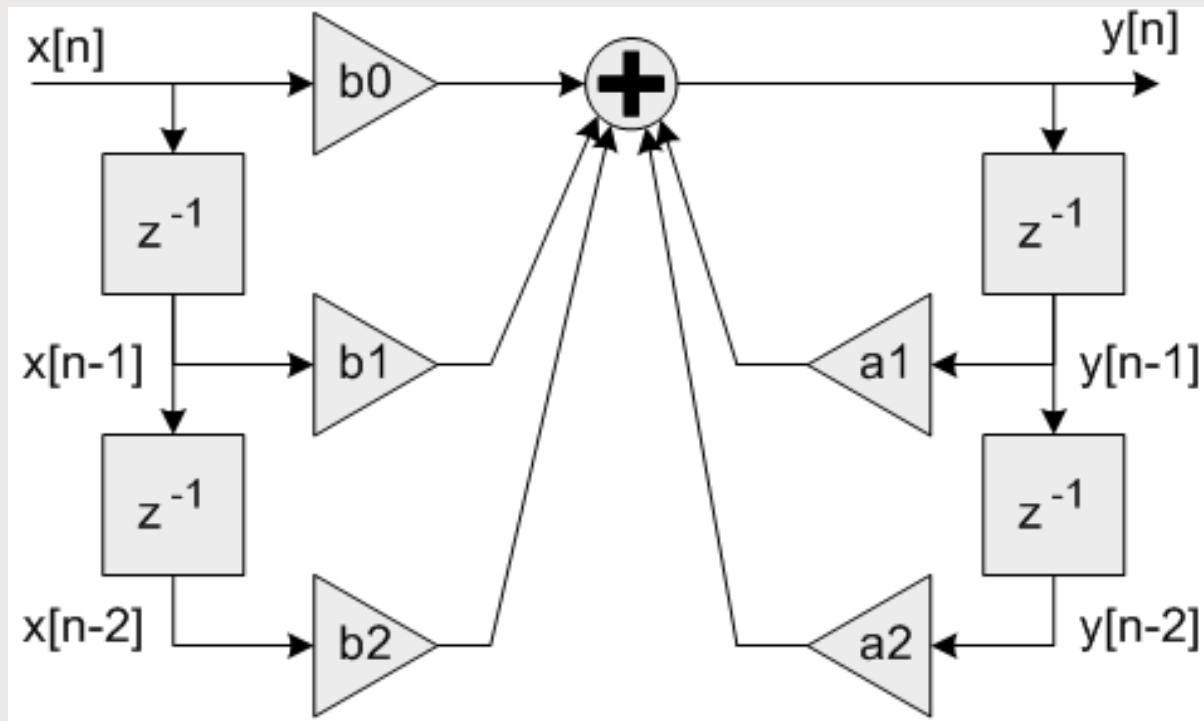


FIR

IIR



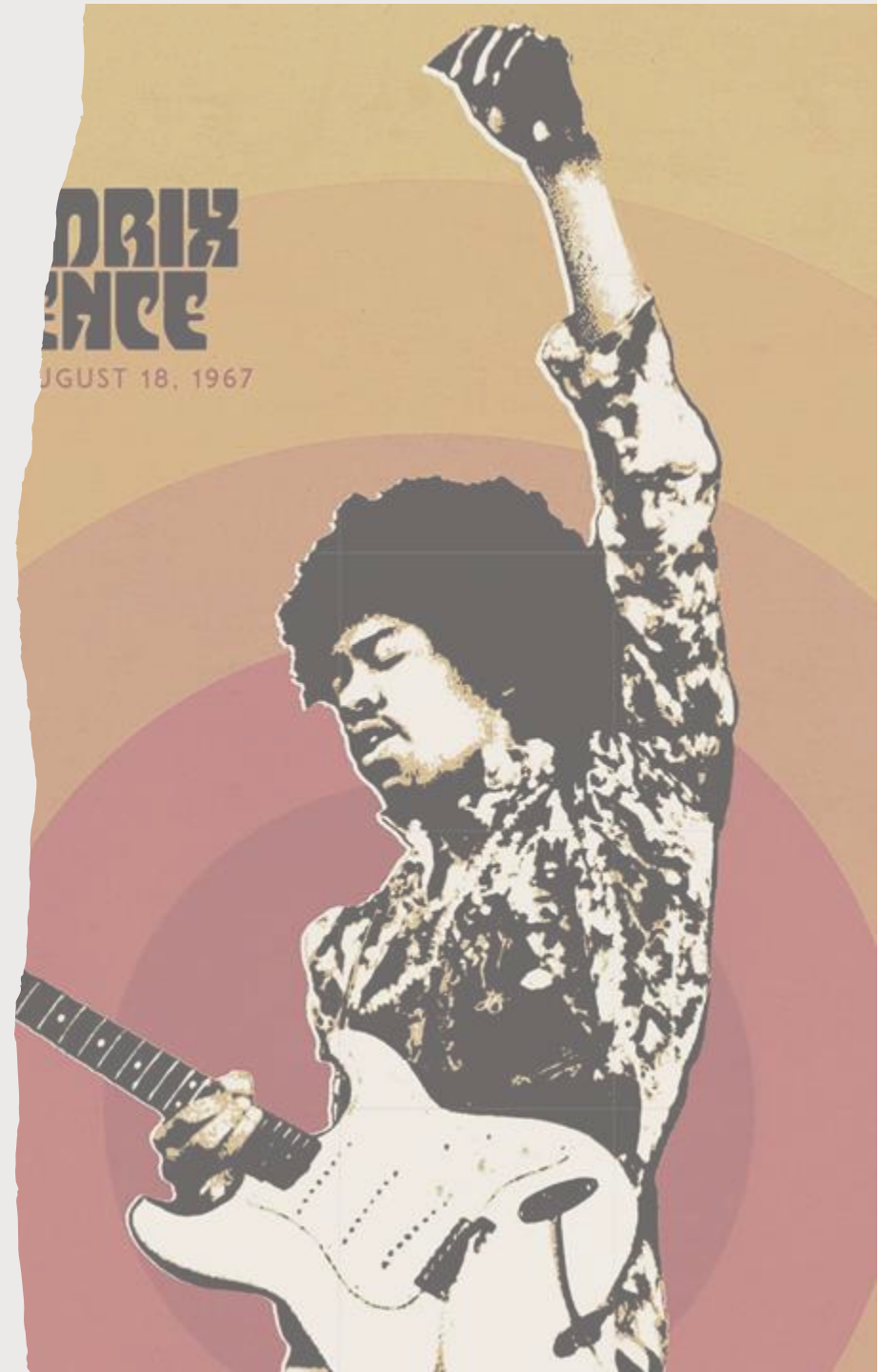
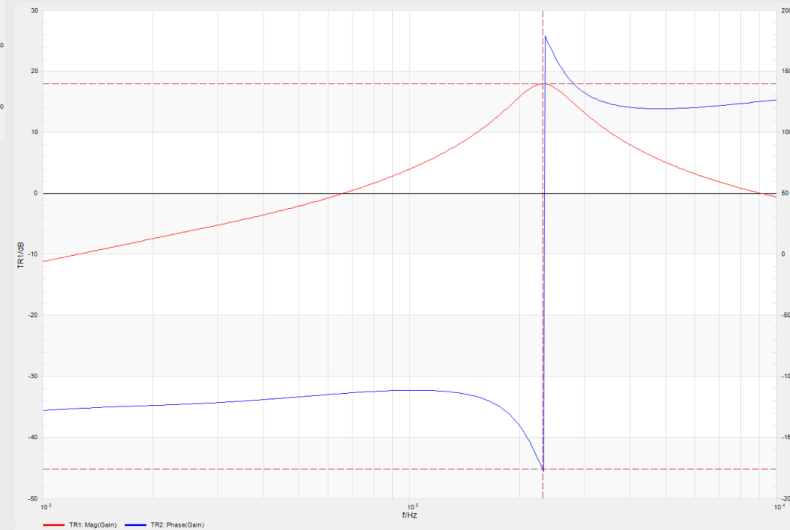
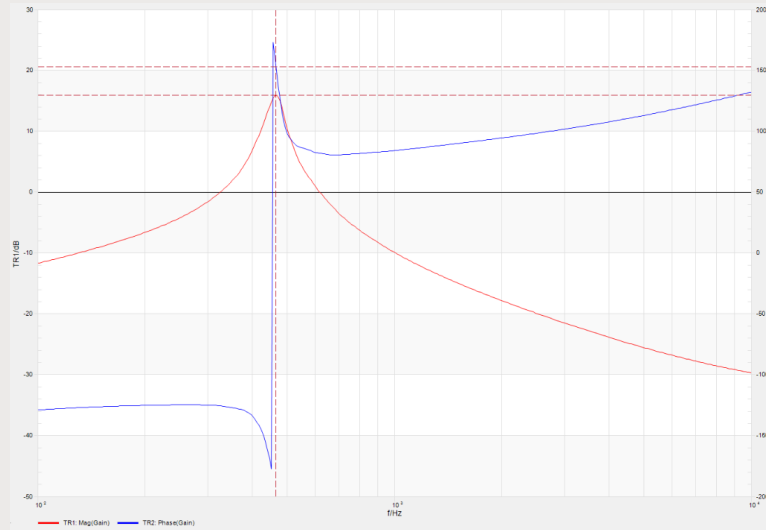
Biquad Filters



Source:
https://www.keil.com/pack/doc/CMSIS_Dev/DSP/html/group__BiquadCascadeDF1.html



Analog reference



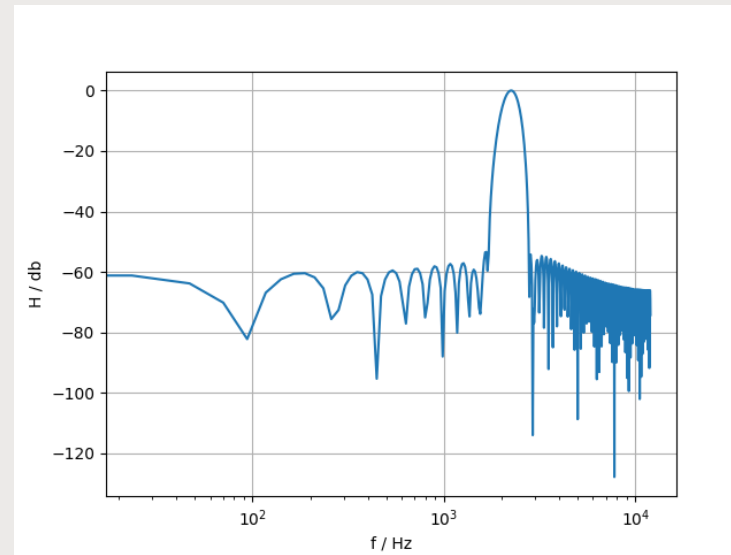
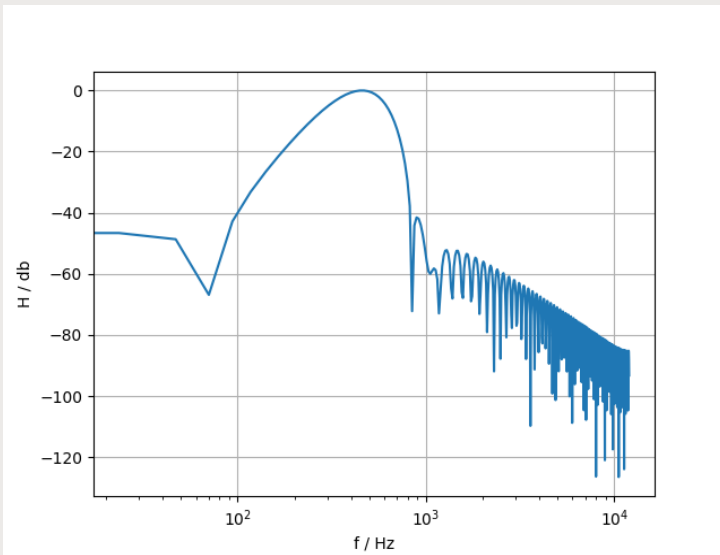
Filterdesign

- Constant quality factor 5
- 460 Hz to 2.3 kHz



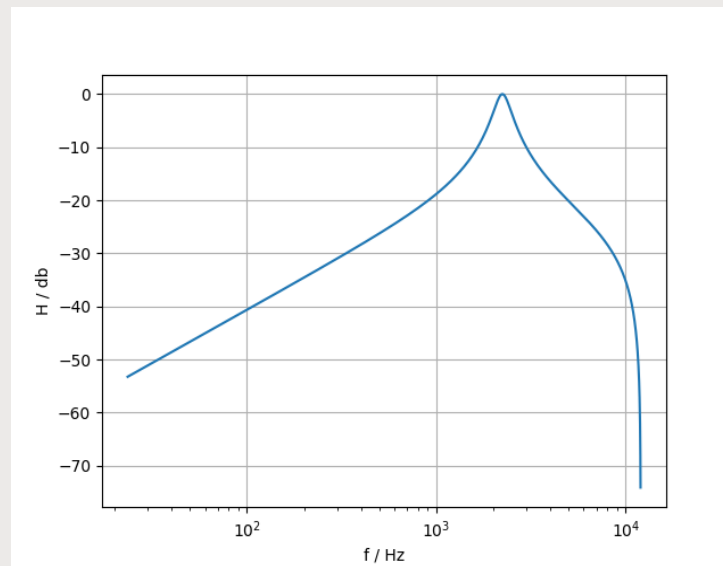
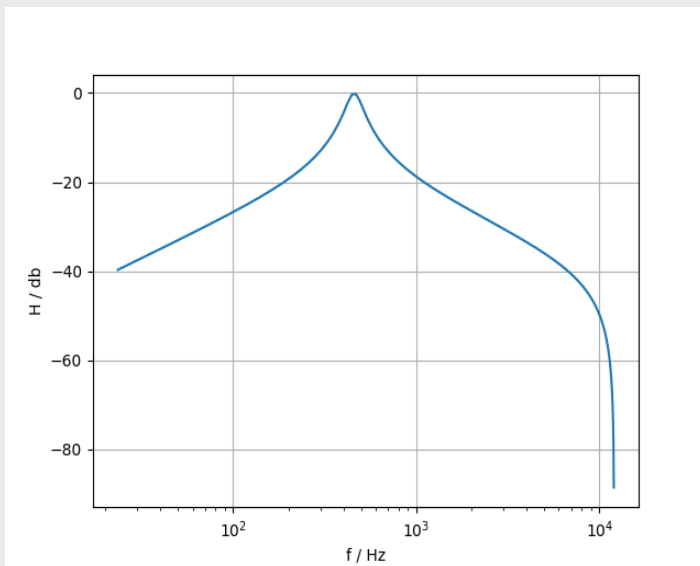
FIR Implementation

- 130 coefficients

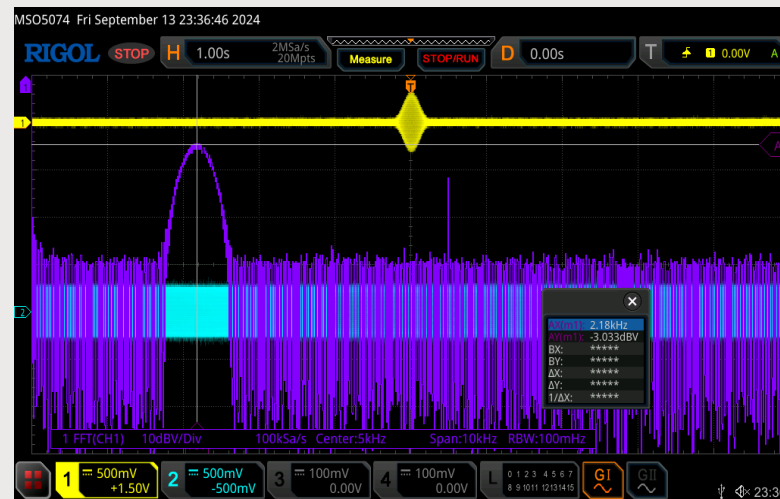
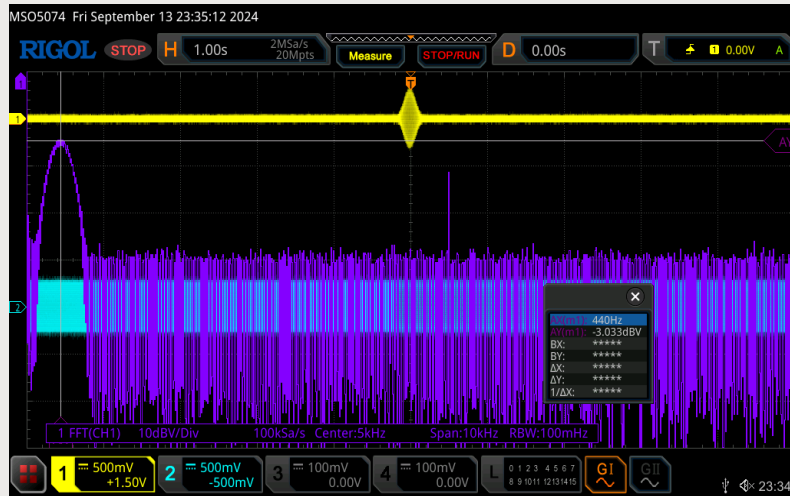


IIR Implementation

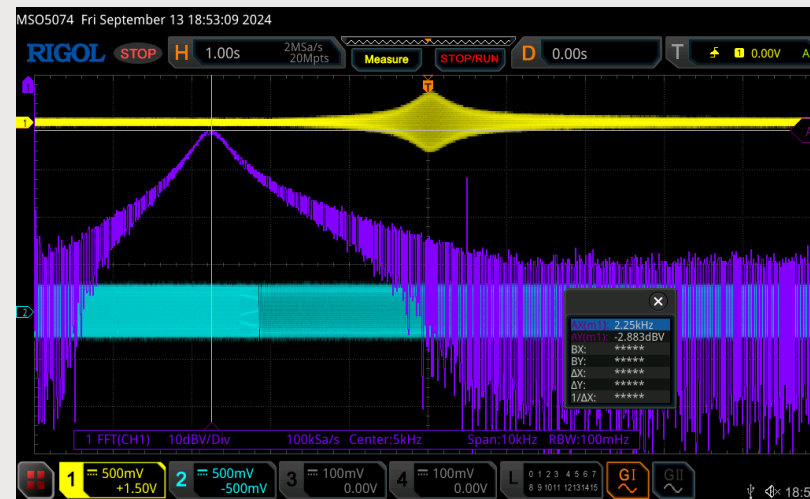
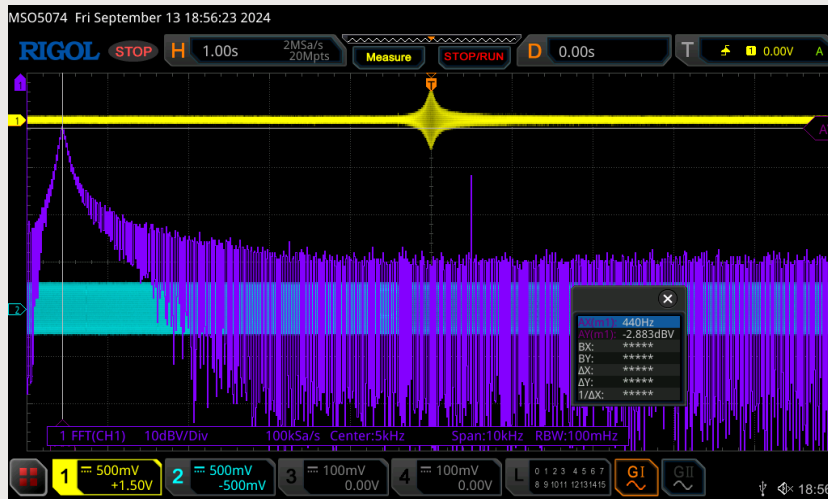
- Biquad filter
- 5 coefficients



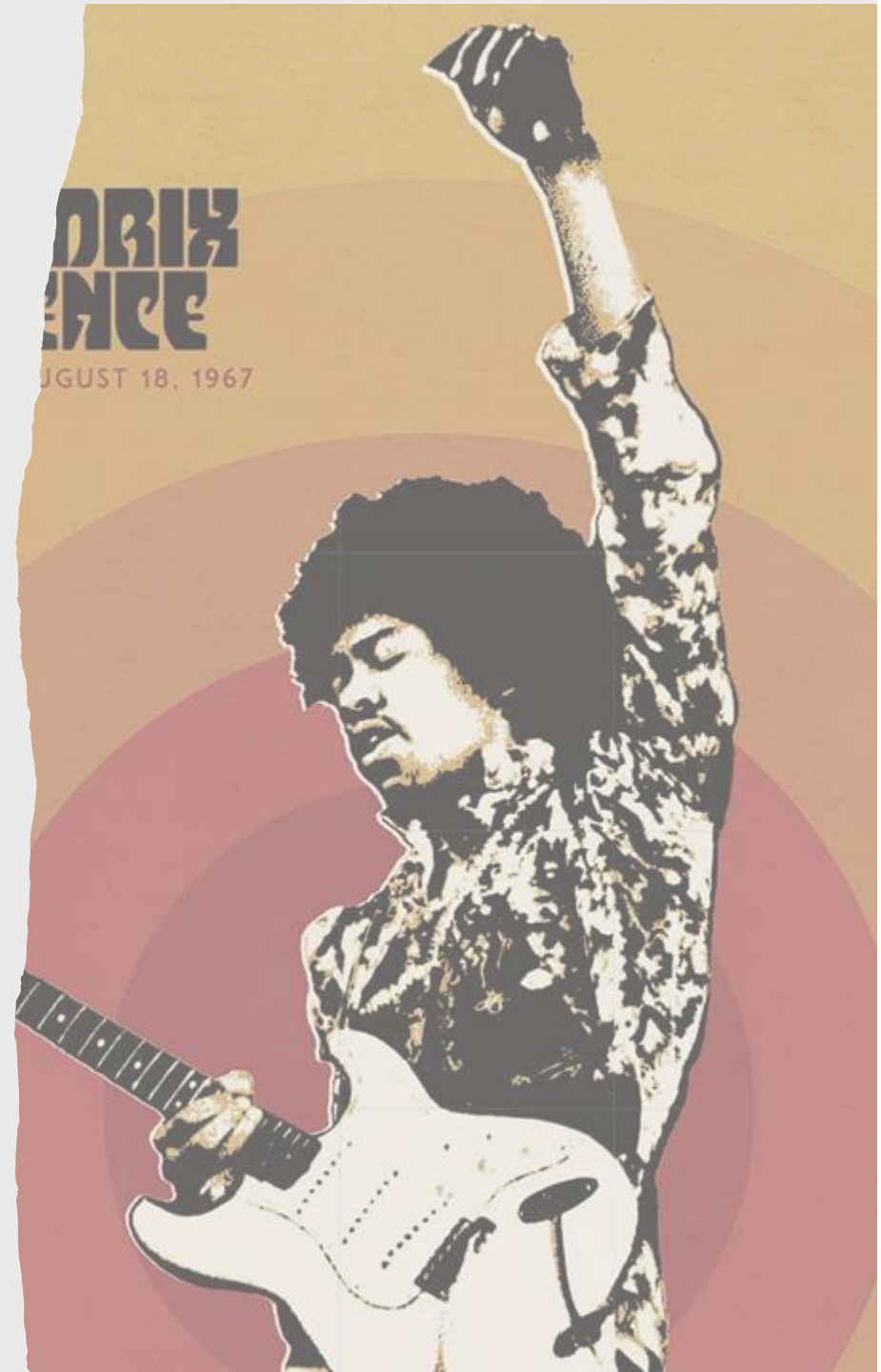
FIR Implementation - Measurement



IIR Implementation - Measurement



Demo



Conclusion

- Replica of Wah-Wah-pedal successful
- FIR not suitable
- Single-stage biquad filter provide appropriate results
- Base for additional effects

