



Fachhochschule Nordwestschweiz
Hochschule für Technik

FRONT-END SIGNAL PROCESSING FOR RED PITAYA SPECTRUM ANALYZER

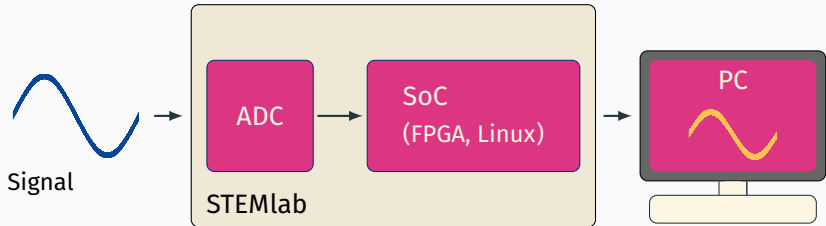
BACHELOR THESIS

Raphael Frey
Noah Hüsser

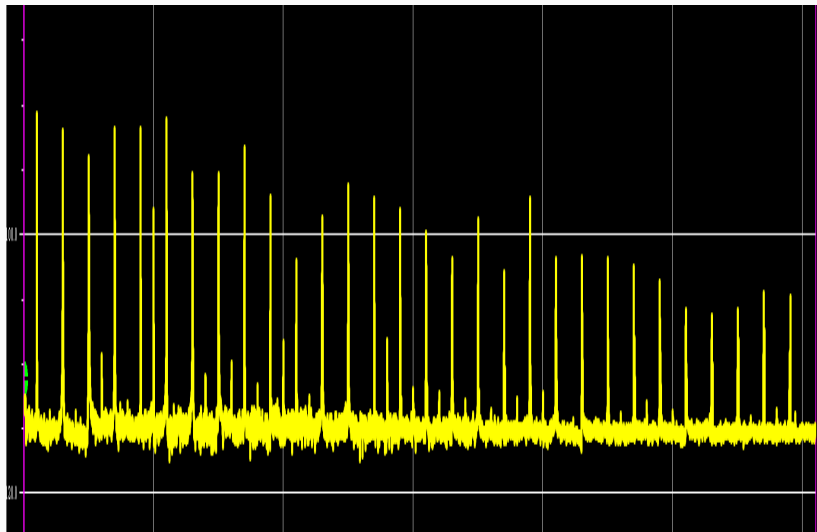
September 15, 2017

rmfrey@runbox.com
yatekii@yatekii.ch

SYSTEM OVERVIEW



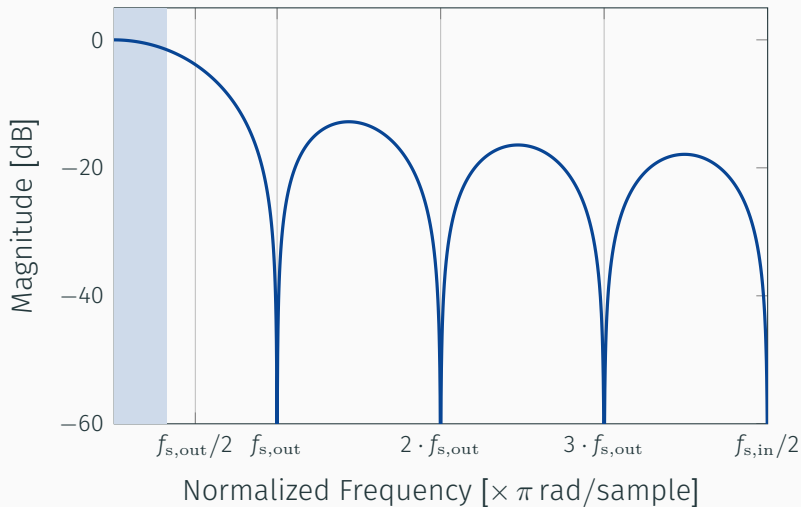
STOPBAND ATTENUATION: STOCK CONFIGURATION



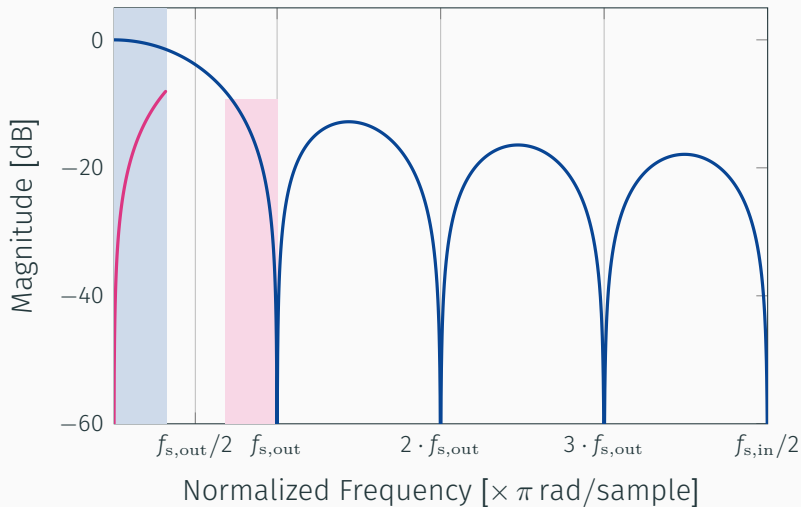
STOPBAND ATTENUATION: OUR RESULT



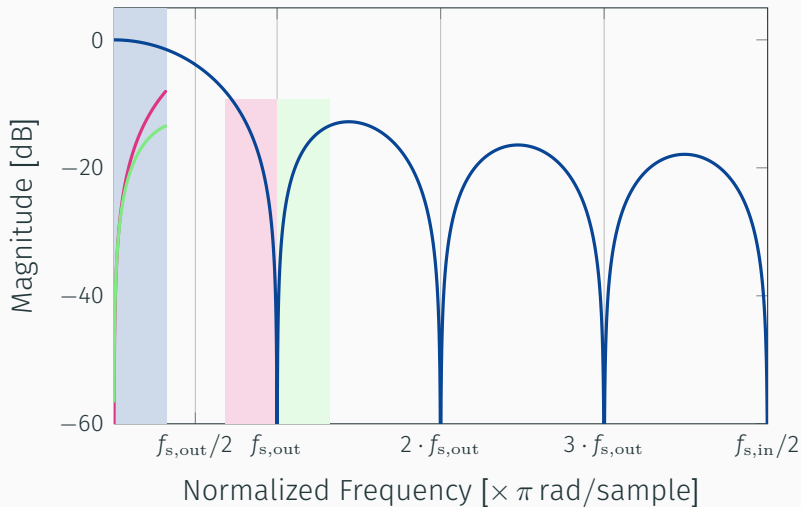
FOLDING BACK: MOVING AVERAGER, $R=8$



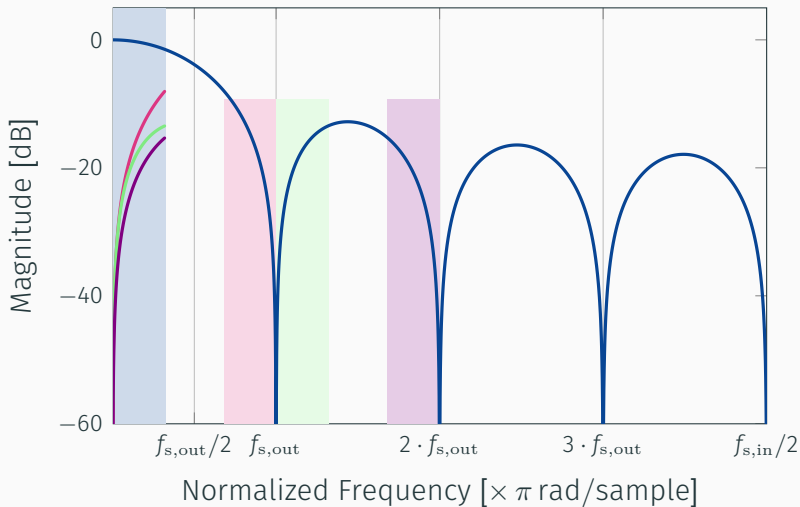
FOLDING BACK: MOVING AVERAGER, $R=8$



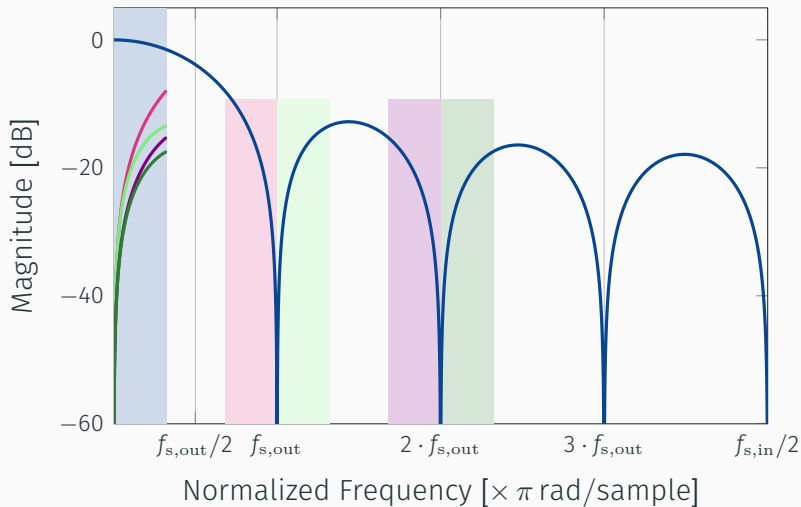
FOLDING BACK: MOVING AVERAGER, $R=8$



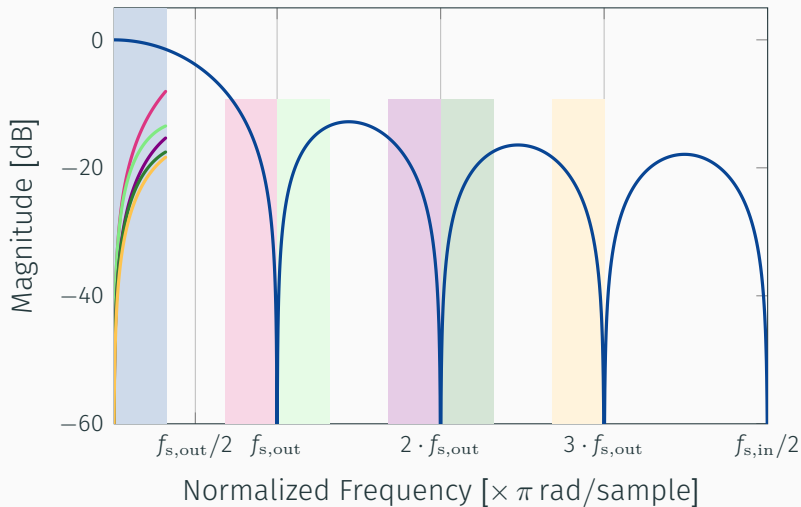
FOLDING BACK: MOVING AVERAGER, $R=8$



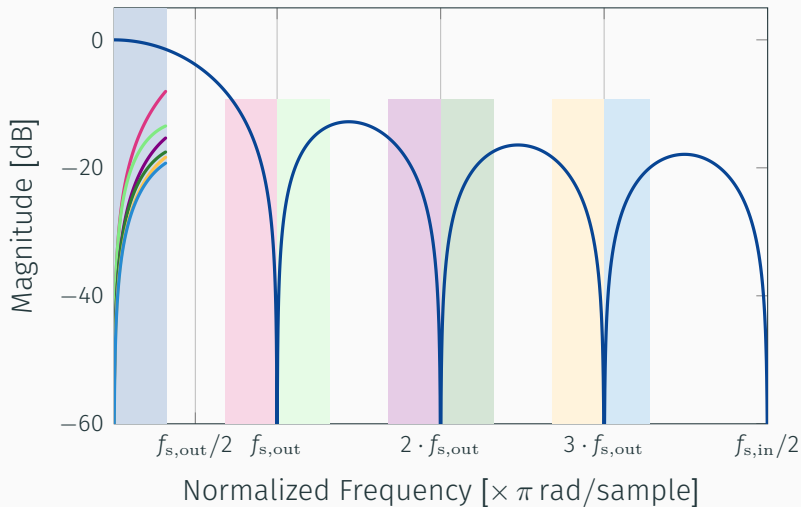
FOLDING BACK: MOVING AVERAGER, $R=8$



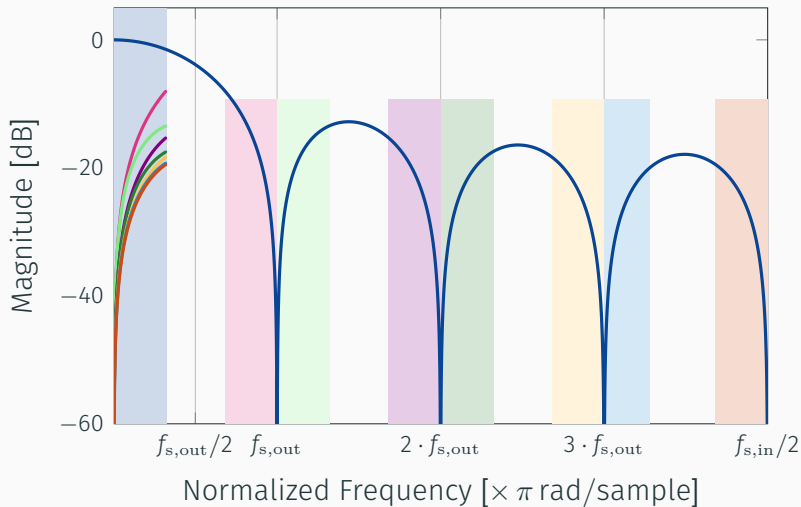
FOLDING BACK: MOVING AVERAGER, $R=8$



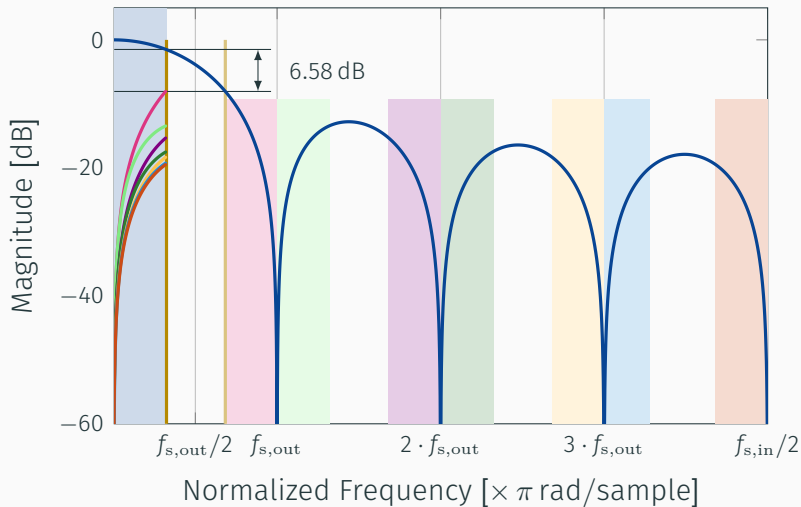
FOLDING BACK: MOVING AVERAGER, $R=8$



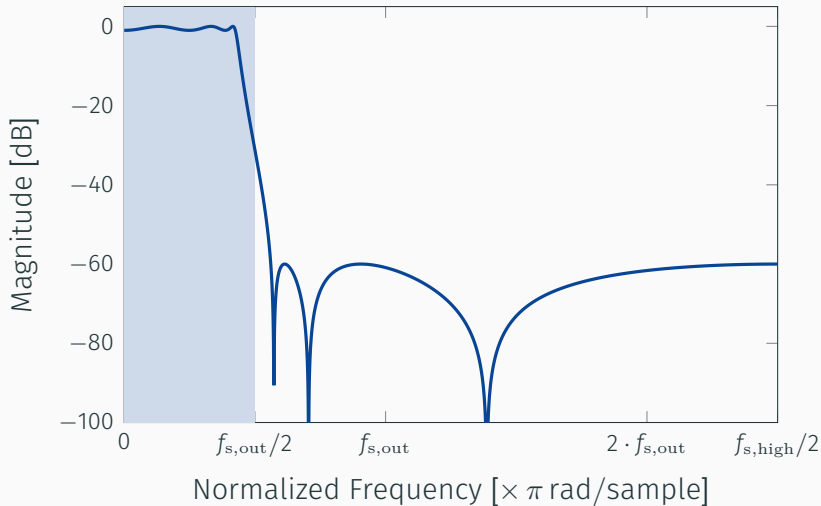
FOLDING BACK: MOVING AVERAGER, $R=8$



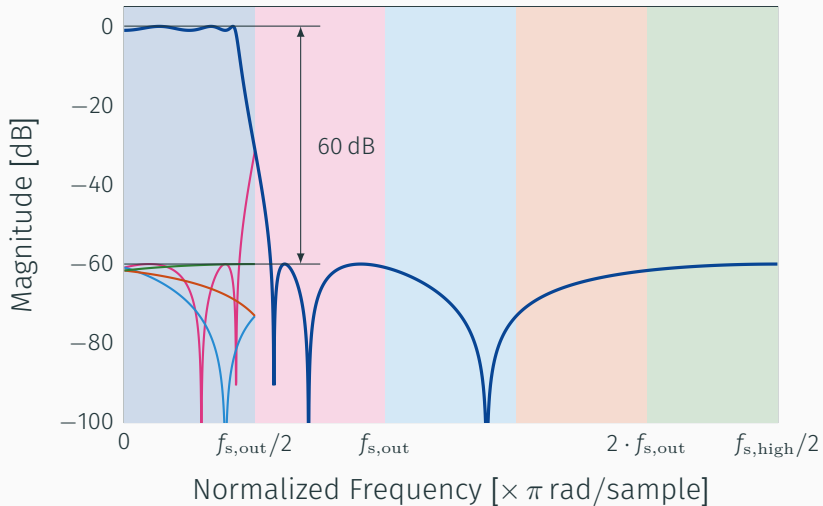
FOLDING BACK: MOVING AVERAGER, R=8



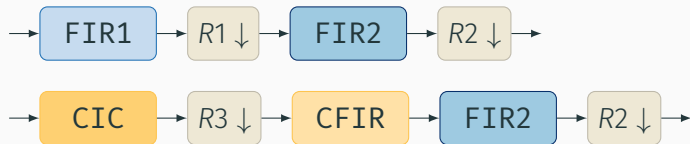
FOLDING BACK: IIR, R=5



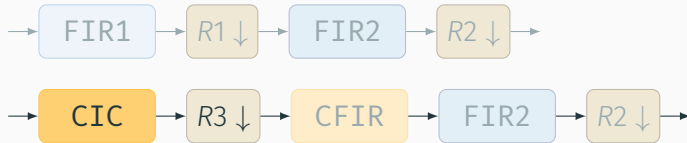
FOLDING BACK: IIR, R=5



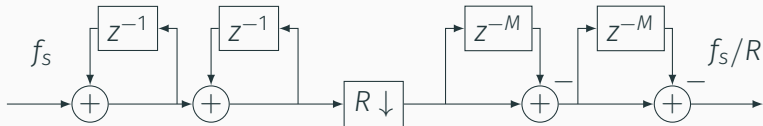
FILTERING CONCEPT



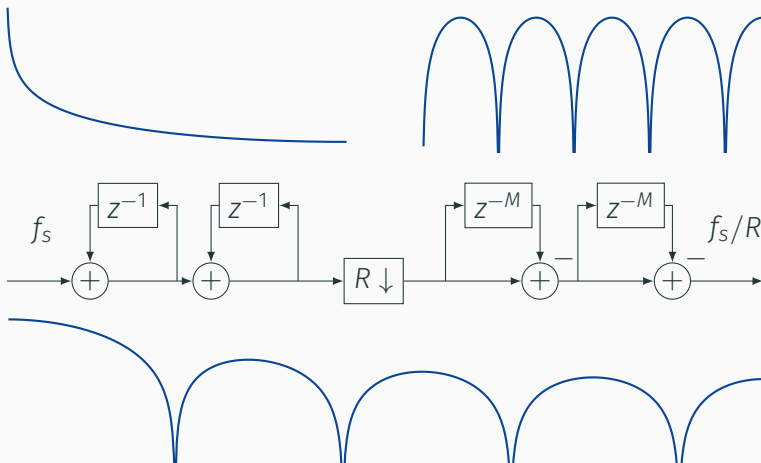
FILTERING CONCEPT



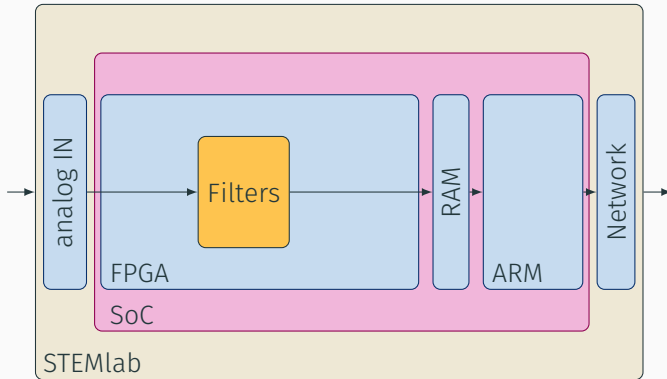
CIC FILTER TOPOLOGY



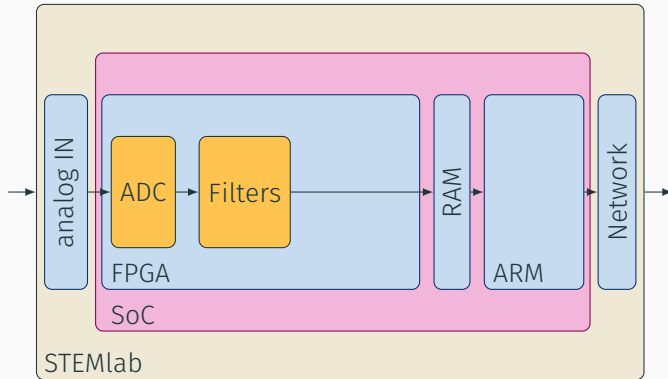
CIC FILTER TOPOLOGY



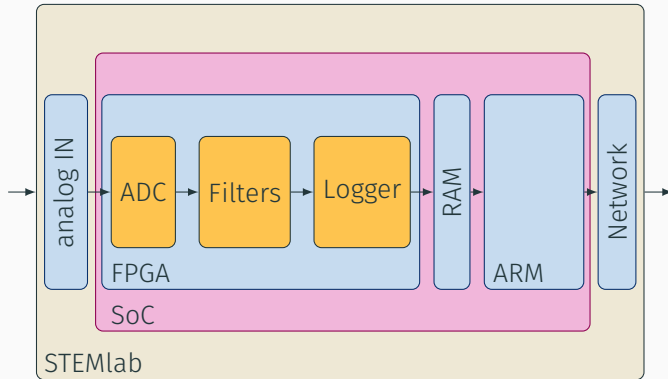
SYSTEM OVERVIEW



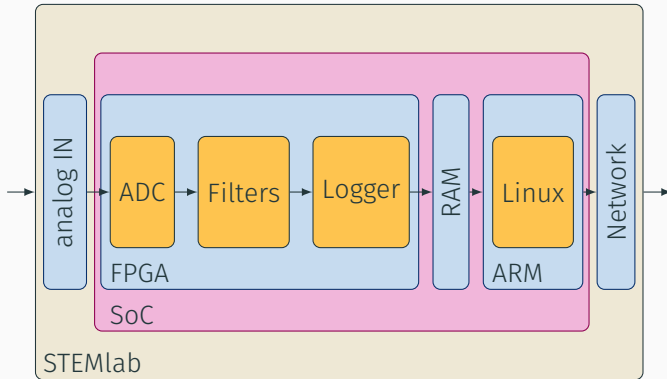
SYSTEM OVERVIEW



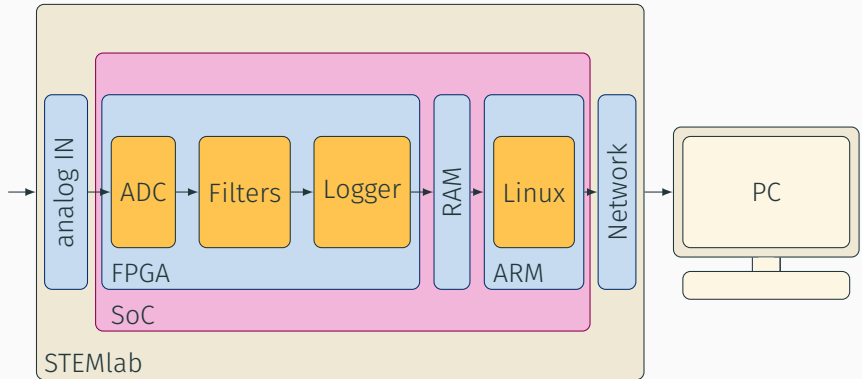
SYSTEM OVERVIEW

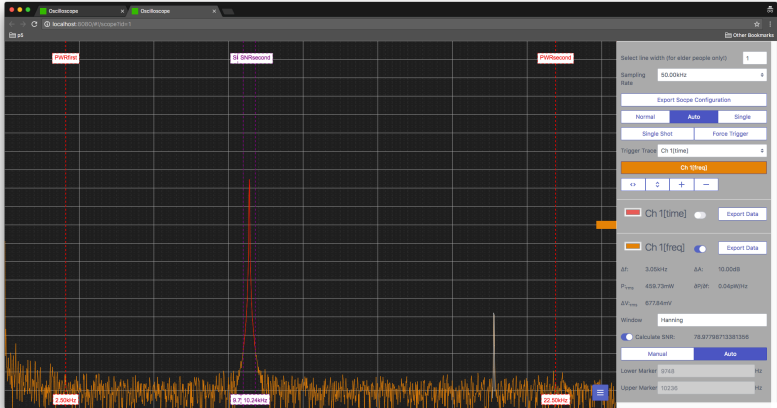


SYSTEM OVERVIEW



SYSTEM OVERVIEW

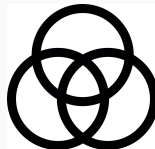




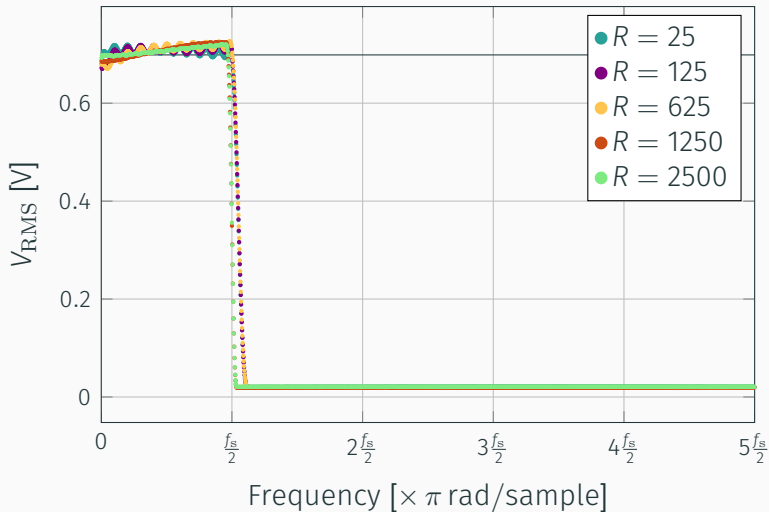
TECHNOLOGIES USED



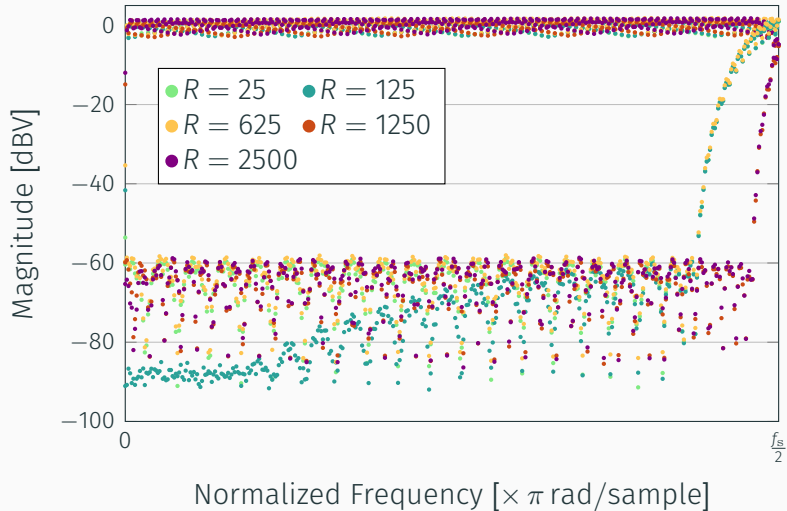
μWebSockets

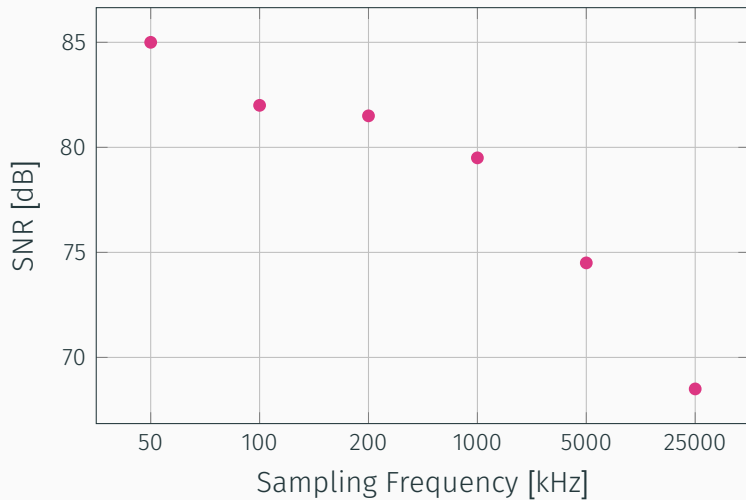


RMS FOR DIFFERENT HARMONICS



FOLDING BACK (NORMALIZED TO 0 dB)





SUCCESS!

SUCCESS!

Future Potential:

- Measurements and Analysis
- Optimize FPGA Resource Usage
- Scope
- Additional Front-Ends

QUESTIONS?
