Digital Signal Processing - Assignment 4a

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January 2023

Introduction

For the mini-project, I opted for the first option: "HDMI video cable eavesdropping". The steps provided are fairly clear, and so I will describe my results more or less in the order that corresponds to the instructions given.

Manual Adjustment of Parameters

Resampling

I initially tried performing perfect sinc interpolation, which worked fine for a test input, but took far too long on the IQ data (even for just a couple of frames).

After looking for more computationally-feasible approaches to resampling, I found a resource that implied that changing "the sampling rate by a rational factor" required interpolating and then decimating [1]. If the rational factor has a very large numerator, this process can require a great deal of memory. To mitigate this, the process can be divided into multiple stages, by splitting the factor into a series of smaller factors with smaller numerators and denominators [1].

TODO mention:

1. you tried

2. cite the source that mentioned you could potentially split the resampling into (potentially multiple) upsampling and downsampling stages

3. mention that the DSP.jl library appears to do just this

4. **TODO** if you get around to it, show and compare different ways of resampling (linear, sinc, kaiser)

Parameter Values

Adjusting by eye, I found that f_p was +0.1% over the expected 25.175 MHz. By vertically joining two separate frames that were several frames apart, I updated my estimate to +0.997%.

Adjusting by **TODO** discuss alignment (achieved by discarding samples).

TODO show code, show figure

Result

Automation Adjustment of Parameters

Mention autocorrelation, how that has worked for you, why it worked. Talk about how you found the range of values for f_s/f_h and f_s/f_v.

TODO Autocorrelation of complex values? Cross correlation between frames?

TODO

Conclusion

References

[1] Resampling, Mar 2017.