P3 - Comparison of ZF and MMSE in bandlimited AWGN channels

Final Report Outline

-Introduction

I would start with an explanation of a communication system and the roles that equalizers have in it.

Give a brief summary about equalizers used in communication systems. The types of equalizers and general properties of them.

How ZF and MMSE differs from other equalization methods and why?

Give some examples of ZF and MMSE use in AWGN channels with proper referencing.

Summarize your project before concluding the introduction

-Communication system design

Put your block diagram and explain all of the parts of a communication system briefly.

-Modulation (subchapter/title) harun

Start with a brief summary of modulation as a concept. And then explain the modulation method you used with proper theoretical explanations. (you can reference the course book since this is a theory and same in everywhere ☺)

-Channel (subchapter/title) mustafa

Explain channels as a concept (what does it mean in a communication system)

Narrate your explanation to bandlimited AWGN channels, explain the properties and effects (to received signal) of AWGN channels (emphasis on the effect of ISI caused by channel)

-Demodulation (subchapter/title) yigit

Again, start with a general description of demodulation process. Which type of demodulators are used and suitable for your mod-demod scheme.

Then, explain the applied demodulator.

-Equalizers

Brief explanation of general equalizer concept.

Narrate your explanation to ZF and MMSE and explain the theory of them (you can reference the course book and use whichever figure or block diagram you want. Visualization is good for presentation.)

-BER Analysis

Explain what BER is and why is it an important merit for assessing communication systems.

Give the proper theoretical explanation of BER for choosen mod-demod scheme

-Results

You should include the figures of input signal, transmitted signal, received signal, equalized signal and P_e (does not have to be just one figure, you can express your results whichever way you want (subplots and all that jazz.)) Make sure to add an explanation to each figure and properly reference them in the text.

You should analyze the P_e figure in detail.

Comment on the effect of SNR.

Since you are using images, explain the effect of ISI on images. What is expected and what did you get?

Compare the performances of ZF and MMSE as equalizer for an image transmission scheme.

-Conclusion

Conclusions are like a paraphrased versions of introductions.

You can briefly explain your project.

Mention the advantages and disadvantages of equalizers (in particular ZF and MMSE)

Normally, you would add future perspectives in conclusion part of the reports but in this case you can assess whether or not ZF and/or MMSE is a suitable equalization method when transmitting images over bandlimited AWGN channels.