

Communication and Information Engineering Program

Digital and Wireless communications

(CIE 428)

Assignment 4

It is required to build Matlab simulations to assess 16-QAM and BPSK passband transmission over AWGN as shown in the figure below.

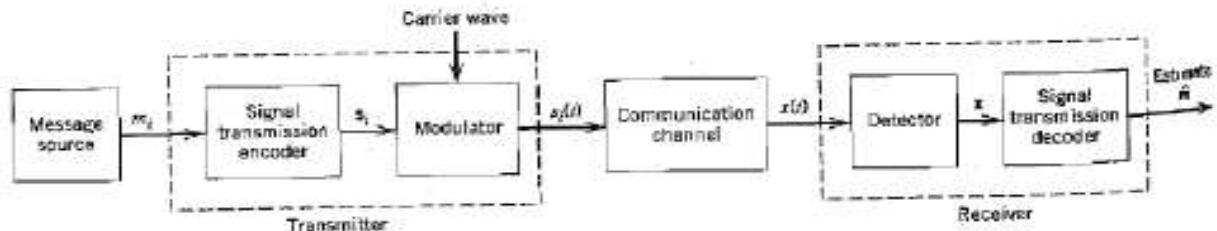


Fig. 1

Description

It is required to generate random binary information stream and send it using **16-QAM** once and using **BFSK** once.

At the receiver side, AWGN $\sim \mathcal{N}(0, N_0/2)$ is added to the information stream. The receiver decodes the received signals using the ML rule.

Deliverables

Deliver the following in **one pdf file**:

- 1) Source codes (.m files with proper comments) of the whole project.
- 2) Figure of the constellation of transmitted 16-QAM symbols - Use a sort of Gray Encoding and Show which symbol each signal point represents.
- 3) Figure of the constellation of received noisy 16-QAM symbols.
- 4) Figure of the constellation of transmitted BFSK symbols.
- 5) Figure of the constellation of received noisy BFSK symbols.
- 6) Figure of PSD of the transmitted baseband 16-QAM signal.
- 7) Figure of PSD of the transmitted baseband BFSK signal.
- 8) Figure of BERs of 16-QAM, BFSK, both theoretical and through simulations.
- 9) Comment on your results.

Additional Deliverables

Refer to the deliverables of the previous project and deliver the following in **one pdf file**:

- 1) Figure of PSD of the transmitted baseband BPSK, QPSK, 16-QAM and BFSK signal - Make sure your axes are normalized properly.
- 2) Figure of the simulation BERs of BPSK, QPSK, 16-QAM and BFSK.
- 3) Comment on your results.

Due date 05/12/2020