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Digital Communications Lab

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Prelab 4

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Abstract

In this prelab we shall study the linear digital modulations, we shall begin with implementing a function which generates and returns the constellation points for **M-PAM**, **M-PSK** and **M-QAM** modulations.(only **M-PAM** in this prelab)

In the next part we go on to design a function which creates a triangular pulse and plots the frequency response of the said pulse in frequency and time domain.

1 Requirements of transmitter implementation

1.1 Part A : Creating Signal Constellations

Here we write a function *constellation.m* which creates the constellation points for **M-PAM**, **M-PSK** and **M-QAM** modulations(only **M-PAM** in this prelab), we do this by the knowledge we obtained in the Digital communications course.

We then go on to plot the constellation points for **4-PAM** and **16-PAM** accordingly.

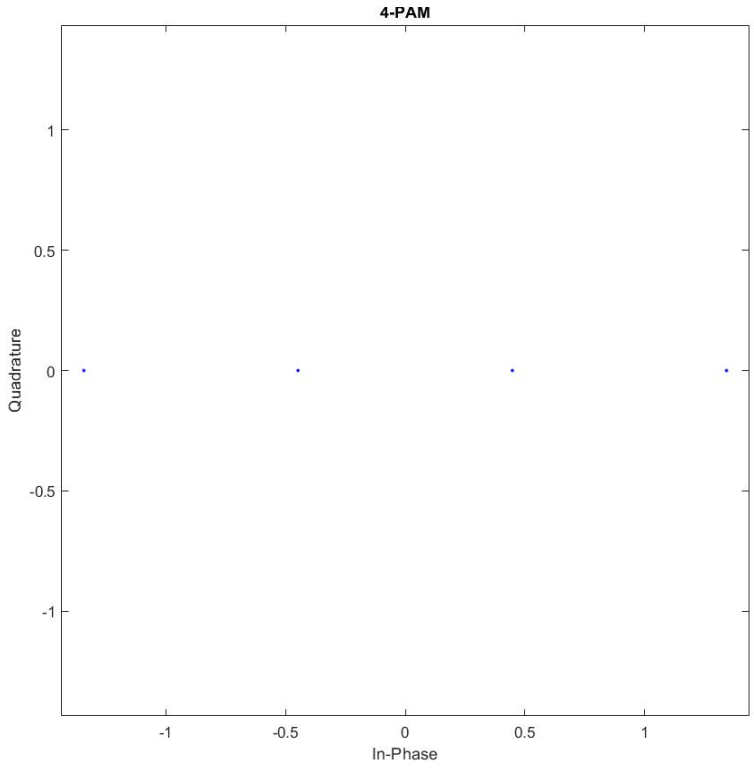

Figure 1: **4-PAM** constellation

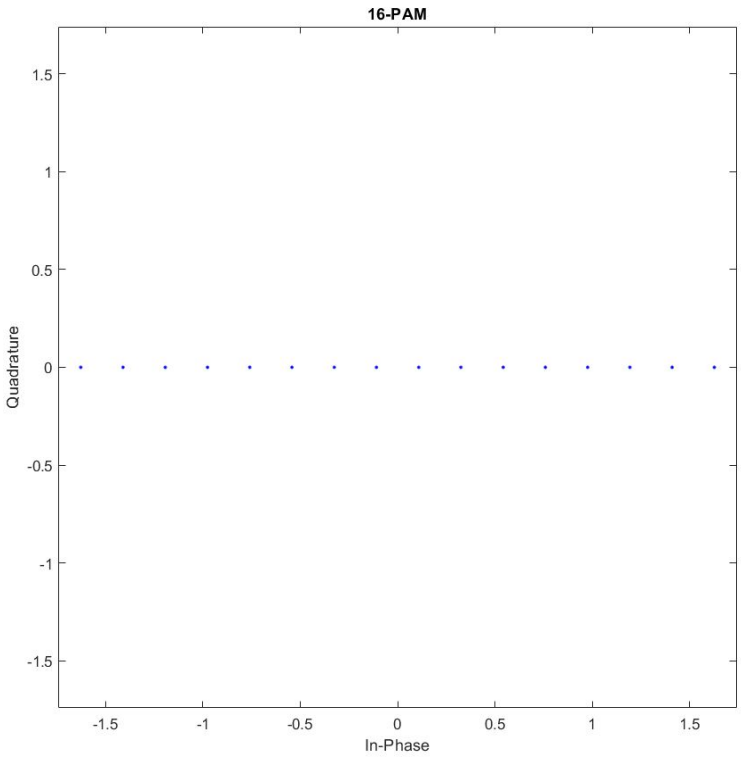

Figure 2: **16-PAM** constellation

It is also important to note that we have been careful that $E_{s,avg} = 1$

1.2 Part B : Pulse Shaping

In this part we write a function which generates a triangular pulse as instructed in the lab manual.

We then proceed to plot the frequency response and time domain diagram of this pulse.

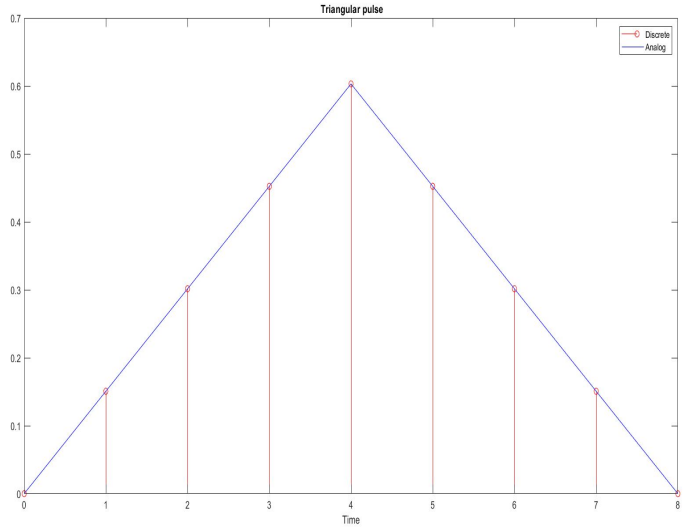

Figure 3: Triangular pulse in time domain

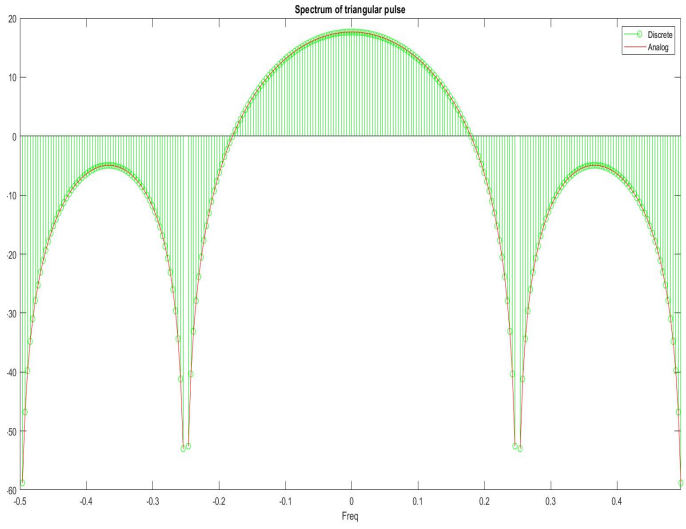

Figure 4: Triangular pulse spectrum

References

[1] Ali Olfat, *Digital Communication Systems lecture notes, Spring 96*

[2] Amirmasoud Rabiei, *Digital Communication Systems lecture notes, Spring 01*