Department of
Computer Science and Engineering

Title: Implementation of analog to digital conversion and pulse coded transmission.

Data Communication Lab

CSE 308

Green University of Bangladesh

1 Objective(s)

- To attain knowledge on the analog to digital conversion and pulse coded transmission.
- To implement the analog to digital conversion and pulse coded transmission.

2 Problem Analysis

Analog and Digital signal: Analog signal is the signal which is continuous and digital signal is the signal which is discrete. Analog signal is more robust to noise and can easily be recovered, corrected and amplified. So it is more useful to use digital signal. There are two technique to convert analog signal to digital signal. They are Pulse Code Modulation (PCM) and Delta Modulation (DM). PCM is commonly used and it has three steps.

1. Sampling
2. Quantization
3. Binary encoding

Pulse code modulation is a method that is used to convert an analog signal into a digital signal so that a modified analog signal can be transmitted through the digital communication network. PCM is in binary form, so there will be only two possible states high and low(0 and 1). We can also get back our analog signal by demodulation. The Pulse Code Modulation process is done in three steps Sampling, Quantization, and Coding. There are two specific types of pulse code modulations such as differential pulse code modulation (DPCM) and adaptive differential pulse code modulation (ADPCM).

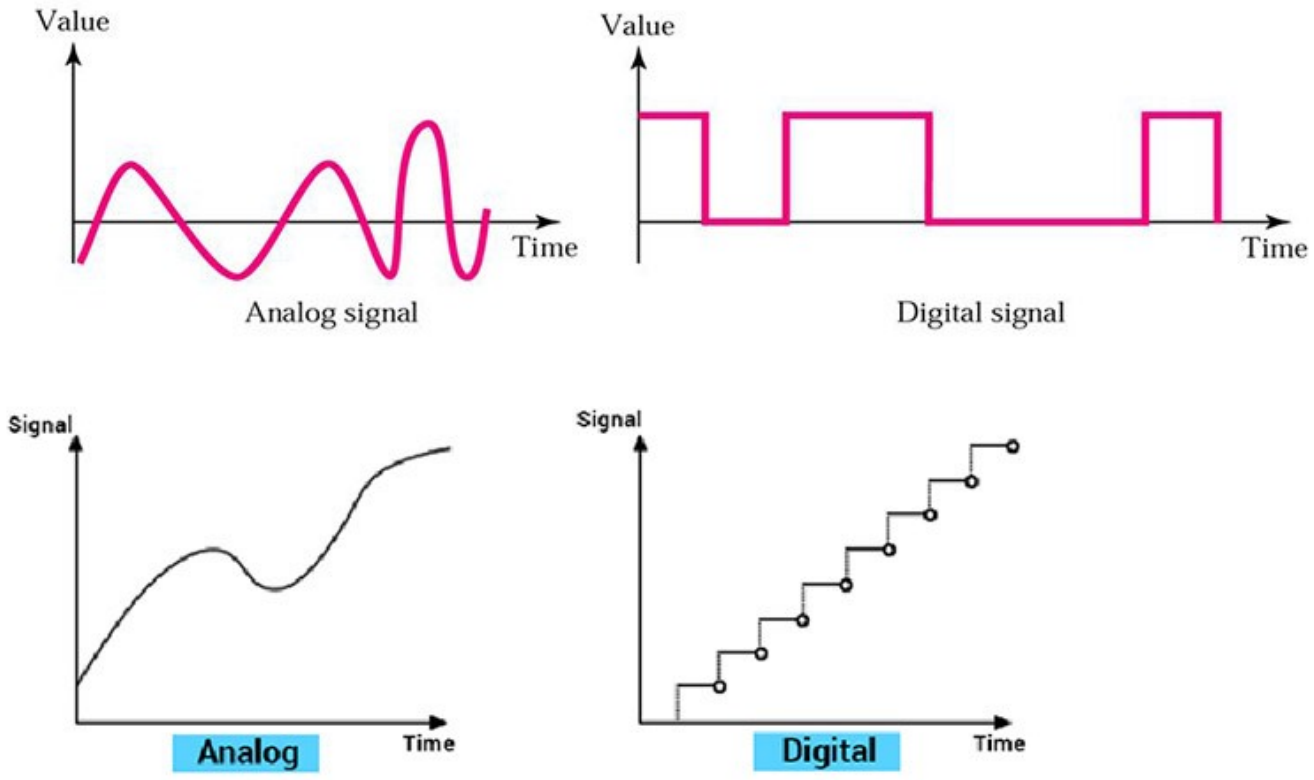

Figure 1: Example of Analog and Digital Signal.

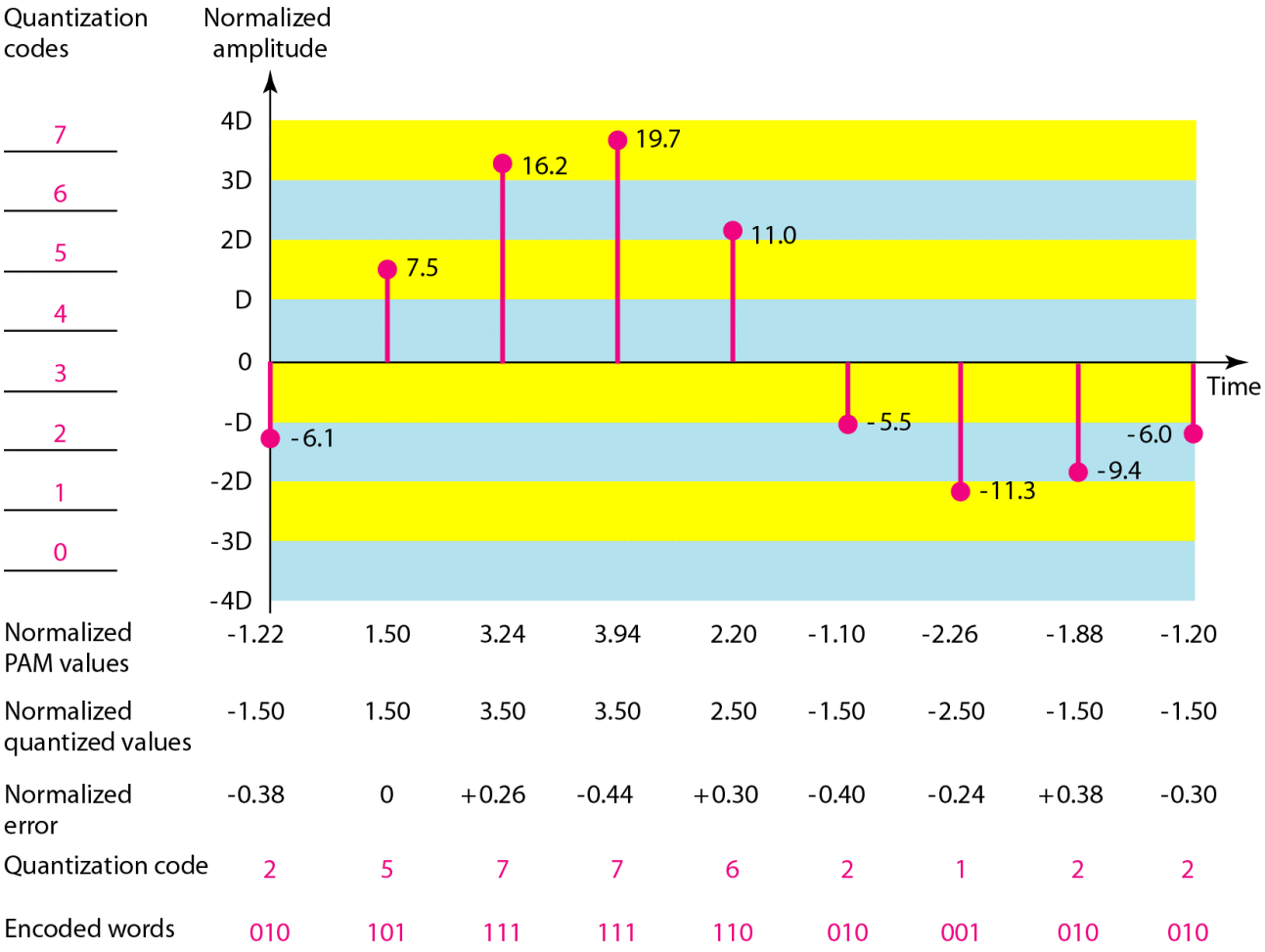

Figure 2: Quantization and encoding of a sampled signal

3 Implementation in MatLAB

3.1 Implementation of Analog to Digital signal using PCM:

```
f = 10
n = 3
q = f/2^(n-1)
t = 0:0.1:10
y = abs(5*sin(t))
x0 = fix(y/q)
y0 = dec2bin(x0,n)
y1 = x0*q
clc
plot(t,y,&#39;r&#39;)
hold on
plot(t, y1,&#39;b&#39;)
hold off
grid on
```

.

4 Output for the code:

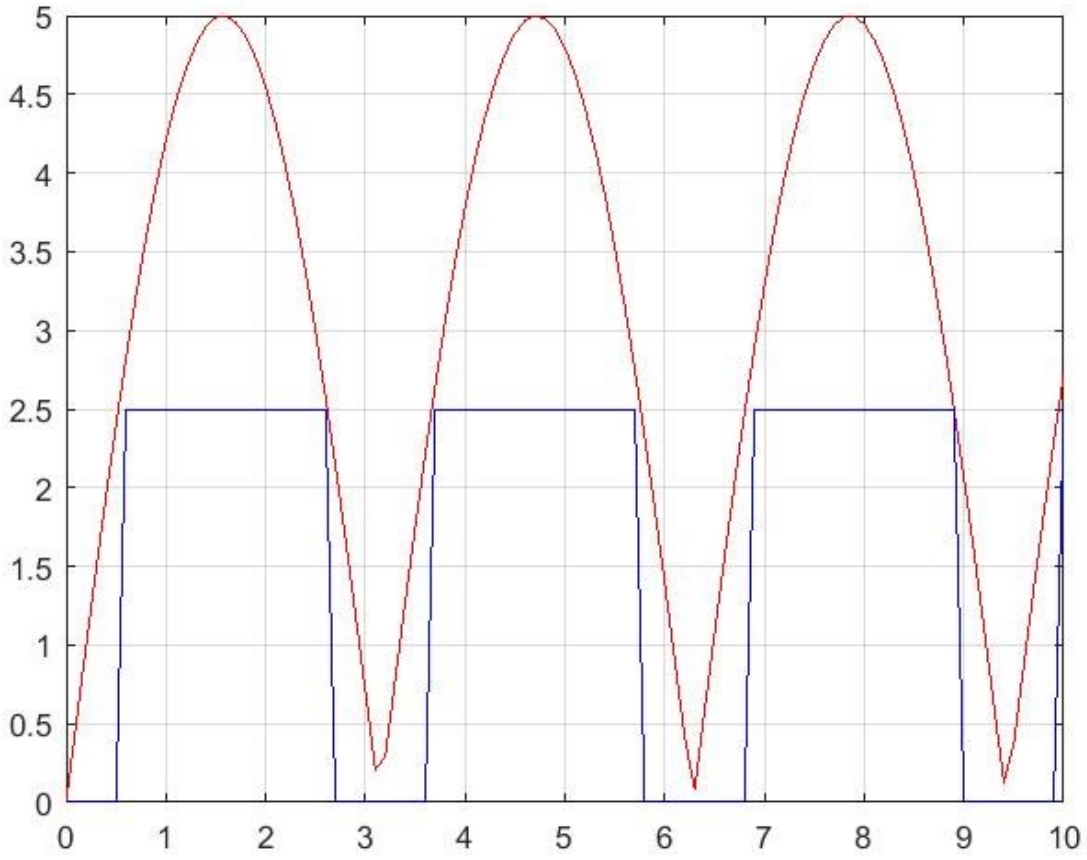

Figure 3: Output for analog to digital conversion

5 Discussion & Conclusion

Based on the focused objective(s) to understand about he analog to digital conversion and pulse coded transmission, the additional lab exercise made me more confident towards the fulfilment of the objectives(s).

6 Lab Task (Please implement yourself and show the output to the instructor)

1. Implement the analog to digital conversion and pulse coded transmission.

7 Lab Exercise (Submit as a report)

Implement the Delta Modulation (DM).

8 Policy

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