**Course Code CSE 260**

**Data and Telecommunication Laboratory**

**LAB Report 01**

**Quantization and PCM of Baseband Signal**

**Date of Submission: 21-12-21**

**Submitted by**

**Name:** Meraj al Maksud

**Class Roll:** 2247

**Submitted to**

Dr. Abu Sayed Md. Mostafizur Rahaman

*Professor*

*Department of Computer Science and Engineering*

*Jahangirnagar University*

*Savar, Dhaka*



**Department of Computer Science and Engineering**

**Jahangirnagar University**

**Savar, Dhaka, Bangladesh**

**Title:** Quantization and PCM of Baseband Signal

**Statement of the Problem:**

Here we are trying to answer about quantization and PCM of baseband signal for different sample signal.

**Hypothesis:**

Quantization is the process of converting a continuous range of values into a finite range of discreet values. In this problem we are going to get the adjusting amplitude of the signal. We will use matlab and python to implement our problem. We will note the partition quantization levels and samples and get the quantized value. By converting this quantized value into binary we will get the PCM

**Materials:**

**Matlab**

**Google Colab**

**Procedure:**

**Results in MATLAB (Code with figure):**

quantization=[1 2 3 4];

partition=[1.5 2.5 3.5];

S=[-0.7 1.6 1.2 3.4 3.1 3.9 4.2];

[I,Q]=quantiz(S, partition,quantization)

dec2bin(Q)

abs(Q-S)

stem(S,'r\*')

hold on

stem(Q,'b>')

grid on

legend('Sample','Quantized')

xlabel('T')

ylabel('x(nT)')

I =

0 1 0 2 2 3 3

Q =

1 2 1 3 3 4 4



q=[-3.25 -2.5 -1.5 -.5 0.5 1.5 2.5 3.5];

p=[-3 -2 -1 0 1 2 3];

t=0:0.1:2\*pi;

S=4\*sin(pi\*t);

[I,Q]=quantiz(S,p,q);

stem(t,S,'b')

hold on

stem(t,Q,'r\*')

legend('Baseband','Sampled value')

xlabel('time')

ylabel('Amplitude')

grid on



>> q=[-3.25 -2.5 -1.5 -.5 0.5 1.5 2.5 3.5];

>> p=[-3 -2 -1 0 1 2 3];

>> t=0:0.1:2\*pi;

>> S=4\*sin(pi\*t);

>> [I,Q]=quantiz(S,p,q);

>> Er=S-Q;

>> plot(t,Er,'k')

xlabel('time')

ylabel('Error')



load mtlb;

X=mtlb;

>> S=X(1200:1300);

>> q=[-3.25 -2.5 -1.5 -.5 0.5 1.5 2.5 3.5];

>> p=[-3 -2 -1 0 1 2 3];

>> [I,Q]=quantiz(S,p,q);

>> stem(Q,'r')

>> hold on

>> stem(S,'b\*')

>> legend('Baseband','Sampled value')

>> xlabel('Index of sample')

>> ylabel('Amplitude')

>> grid on



>> figure

>> Er=S-Q;

>> plot(Er,'k')

>> xlabel('time')

>> ylabel('Error')

>> grid on



**Results in PYTHON (Code with figure):**

**Conclusions:**

After the experiment we saw the sample values and quantized values to see the change graphically. Again we saw the the absolute error by substituting quantized value from sample value.