AMERICAN INTERNATIONAL UNIVERSITY – BANGLADESH

FACULTY OF SCIENCE & TECHNOLOGY

Course Title: Data Communication

Lab Report-3

Submitted by:

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SECTION: G

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PROGRAM: BSc CSE

COURSE TITLE: Data Communication

Submitted to:

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Performance Task for Lab Report: (your ID = AB-CDEFG-H)

x(t) = (H+5)*cos(2π((D+E+5)*10)t) + (H+7)*sin(2π((E+F+10)*10)t)

Q: Apply uniform quantization on signal 'x(t)' using both of the manual quantization methods learnt in this manual. Use ($2^{H} + 2$) levels for first method and use ($12 - 2^{H}$) levels for the second one. Attach codes and necessary figures in your report.

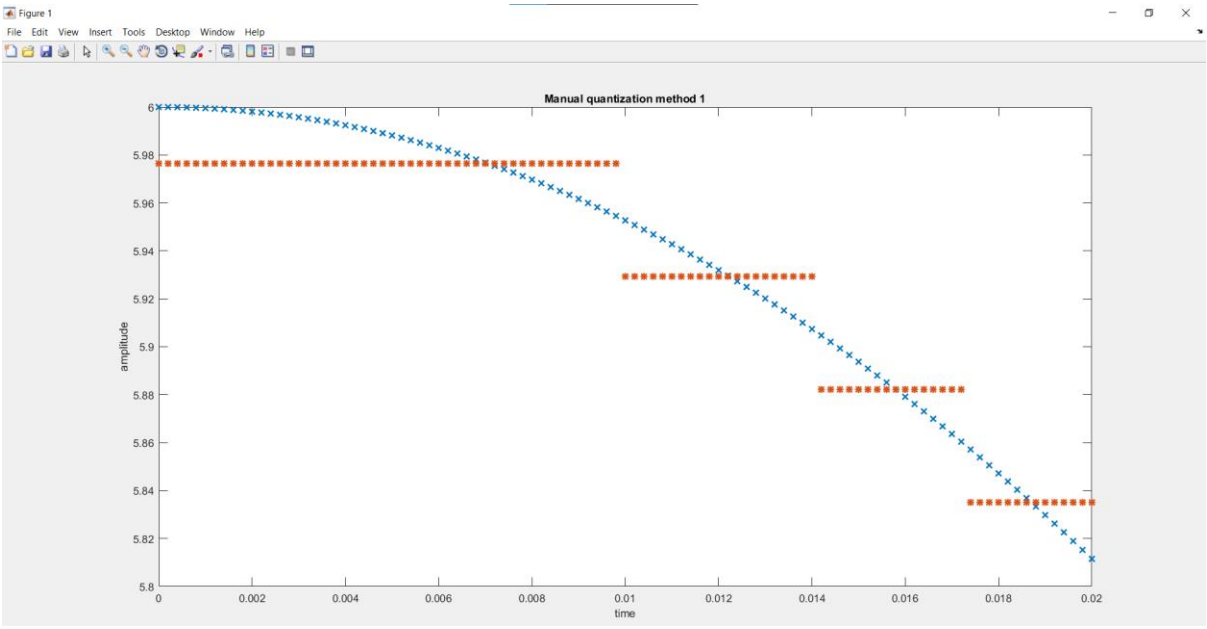
Method 1:

Code:

```
A=2;
B=0;
C=4;
D=2;
E=4;
F=7;
G=5;
H=1;
a = (D+E+5)*10;
b = (E+F+10)*10;
bit = 3;
f = 50;
fs = 5000;
t = 0:1/fs:1/f;
y = (H+5)*cos(2*pi*A*t) + (H+7)*sin(2*pi*B*t);
Nsamples=length(y);
quantised_out=zeros(1,Nsamples);
c = max(y)-min(y);
del = c/(2^H+2);
```

```
Llow = min(y)+del/2;
Lhigh = max(y)-del/2;
for i=Llow:del:Lhigh
for j=1:Nsamples
if(((i-del/2)<=y(j))&&(y(j)<=(i+del/2)))
quantised_out(j)=i;
end
end
end
plot(t,y,'x', 'linewidth',1.5);
hold on;
plot(t,quantised_out,'*', 'linewidth',1.5);
xlabel('time')
ylabel('amplitude')
title('Manual quantization method 1')
```

Output:



Method -2:

Code:

```
A=2;
B=0;
C=4;
D=2;
E=4;
F=7;
G=5;
H=1;

fs= 50000;
t=0:1/fs:0.1;
xt= (H+5)*cos(2*pi*((D+E+5)*10)*t) +
(H+7)*sin(2*pi*((E+F+10)*10)*t);
level=12-2^H;
delta= (max(xt)-min(xt))/(level-1);
xq=min(xt)+(round((xt-min(xt))/delta)).*delta;
plot(t,xt,'r-.', 'linewidth',1.5);
hold on;
plot(t,xq,'b-.', 'linewidth',1.5);
xlabel('time');
ylabel('amplitude');
title('Manual quantization method
2');
legend('original signal','quantized signal');
```

Output:

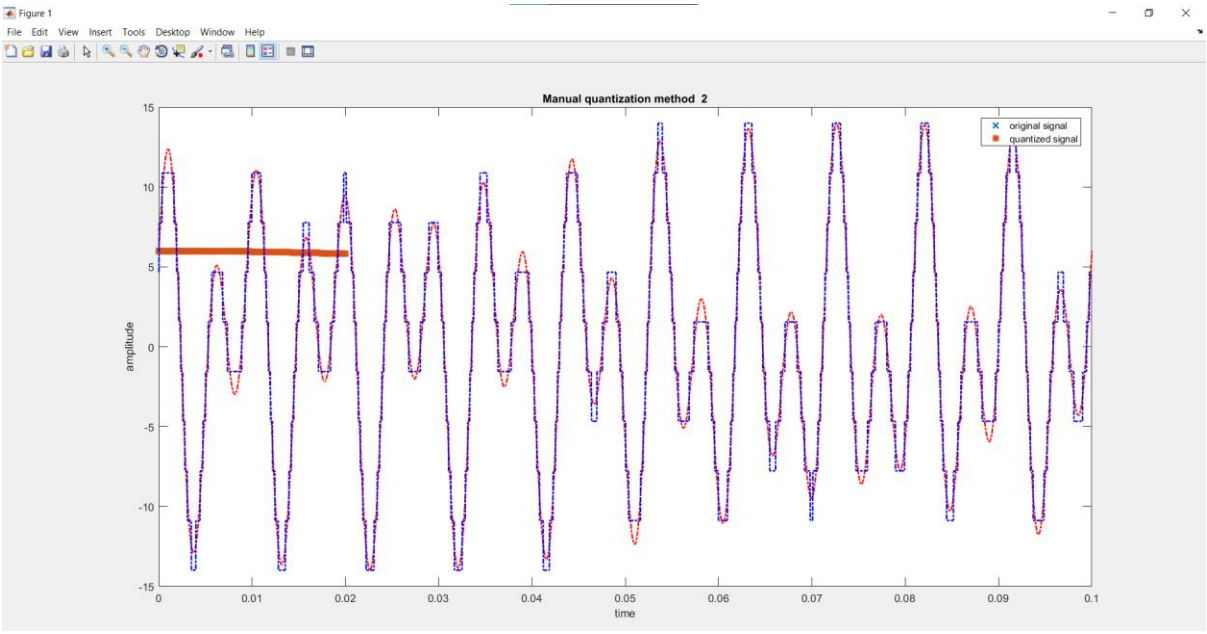


Figure 1
File Edit View Insert Tools Desktop Window Help
Manual quantization method 2
original signal
quantized signal
amplitude
time
15
10
5
0
-5
-10
-15
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1