INDIAN INSTITUTE OF INFORMATION TECHNOLOGY, NAGPUR

Subject: - Digital communication

Enrollment number : BT19ECE010

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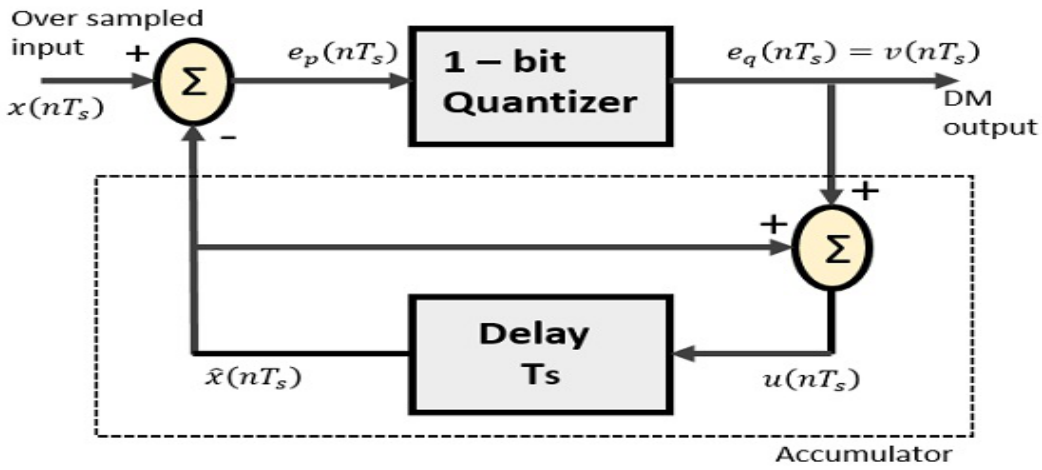
LAB REPORT- 3

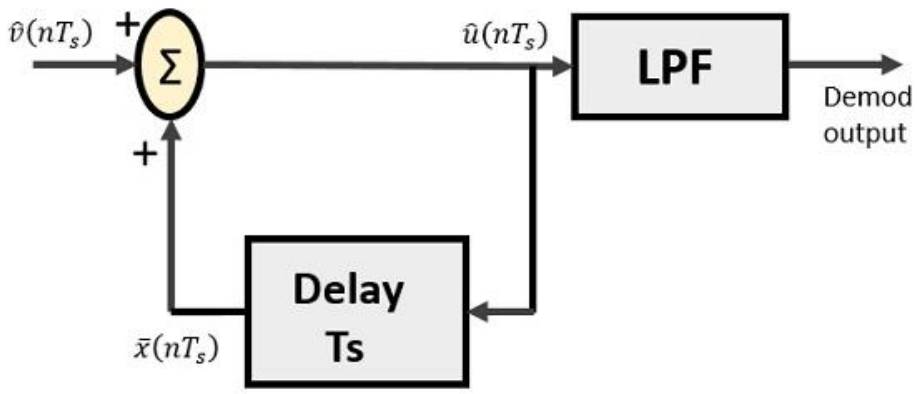
Aim : To derive and get output of delta modulation

Theory :- In Delta modulator we compare present signal with past signal and with fixed step size and therefore transmit only 1 bit per sample.

Delta modulator block diagram



Delta demodulator



Procedure:-

In octave we write code as below:-

```
clc;
clear;
close all;
a=2;
t=0:2*pi/50:2*pi;
x=a*sin(t);
l=length(x);
plot(x,'r', 'linewidth',2);
delta=0.2;
hold on
xn=0; %kp
for i=1:l
  if x(i)>xn(i)
    d(i)=1;
    xn(i+1)=xn(i) + delta;
  else
    d(i)=0;
```

```
    xn(i+1)=xn(i)-delta;
  end
end
stairs (xn, 'b', 'linewidth', 2)
hold on
for i=1:d
 if d(i) >xn(i)
    d(i)=0;
    xn (i+1)=xn(i)-delta;
 else
    d(i) =1;
    xn(i+1)=xn(i)+delta;
 end
end
plot (xn,'g', 'linewidth', 2);
xlabel('TIME');
ylabel ("AMPLITUDE");
title ("DELTA MODULATION",'fontsize', 20);
legend ("input signal","staircase appproximaton","delta modulated signal");
grid on
```

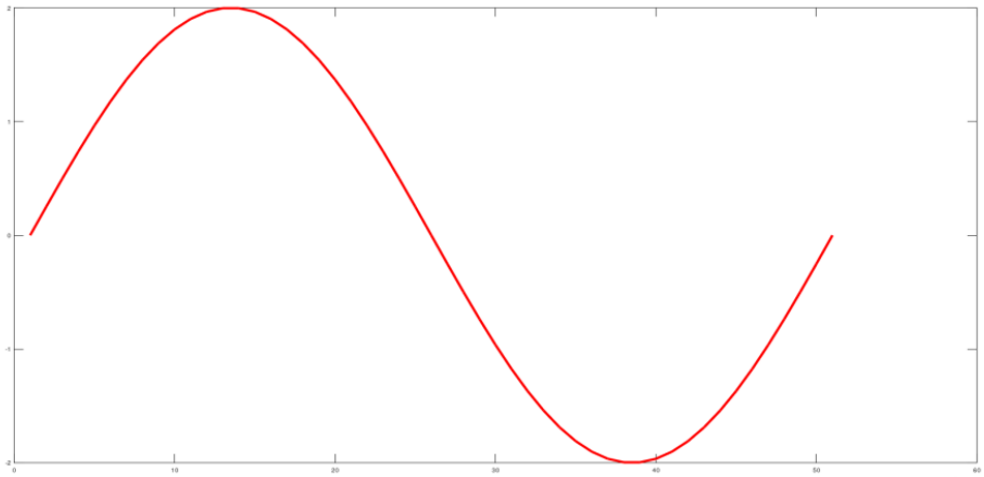
Screenshot:

lab2_DC.m

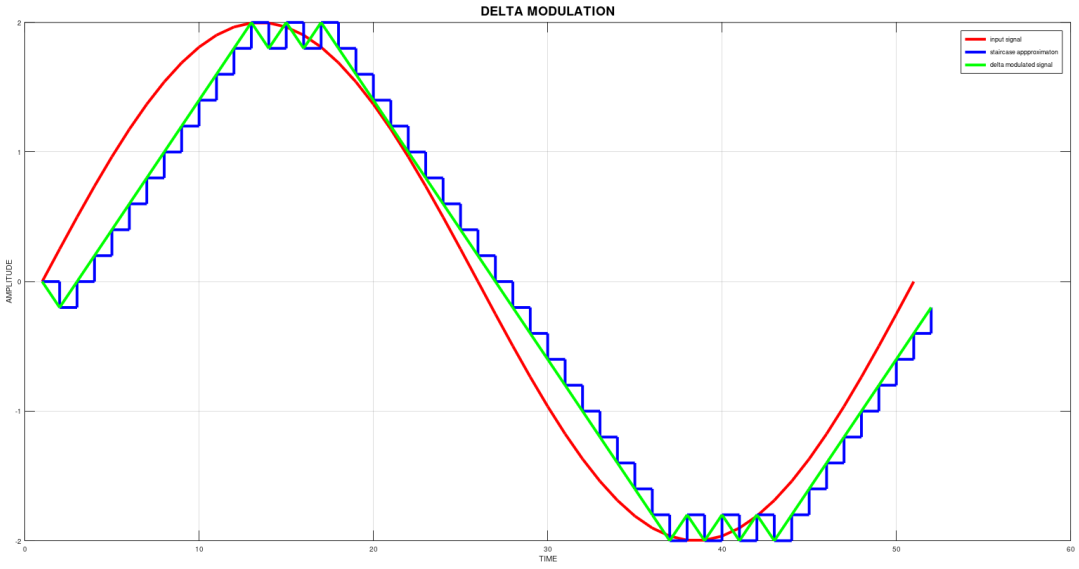
```
clc;
clear;
close all;
a=2;
t=0:2*pi/50:2*pi;
x=a*sin(t);
l=length(x);
plot(x,'r', 'linewidth',2);
delta=0.2;
hold on
xn=0; %kp
for i=1:l
   if x(i)>xn(i)
      d(i)=1;
      xn(i+1)=xn(i) + delta;
   else
      d(i)=0;
      xn(i+1)=xn(i)-delta;
   end
end
stairs (xn, 'b', 'linewidth', 2)
hold on
for i=1:d
  if d(i) >xn(i)
      d(i)=0;
      xn (i+1)=xn(i)-delta;
  else
      d(i) =1;
      xn(i+1)=xn(i)+delta;
  end
end
plot (xn,'g', 'linewidth', 2);
xlabel('TIME');
ylabel ("AMPLITUDE");
```

Result:-

Input signal:



We find the output of delta modulation using octave



Results and Discussion :

We can observe three curves in the output graph input signal staircase approximation and delta modulated signal and verified it with practical outputs.

Conclusion:-

We successfully get output of delta modulation using octave and observed it.