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Vellore Institute of Technology

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WINTER SEMESTER 2019-2020
COURSE NAME: DIGITAL COMMUNICATION SYSTEMS
COURSE CODE: ECE4001
LAB MANUAL
TASK 6
MATLAB SIMULATIONS-PCM

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LAB SLOT: L23+L24

SIMULATION OF PULSE CODE MODULATION AND DEMODULATION

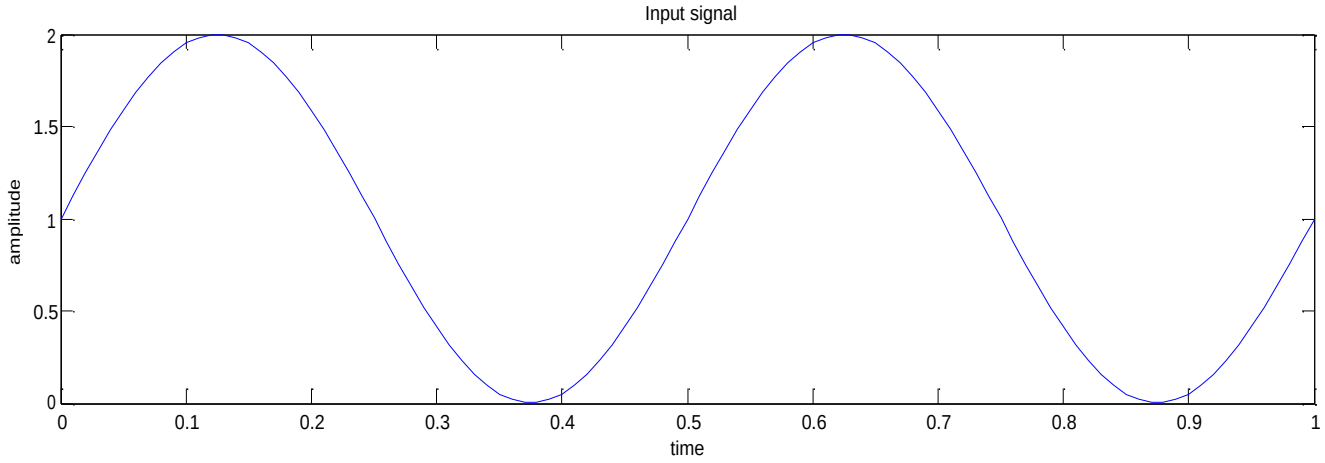
AIM: To Simulate Pulse Code Modulation and Demodulation.

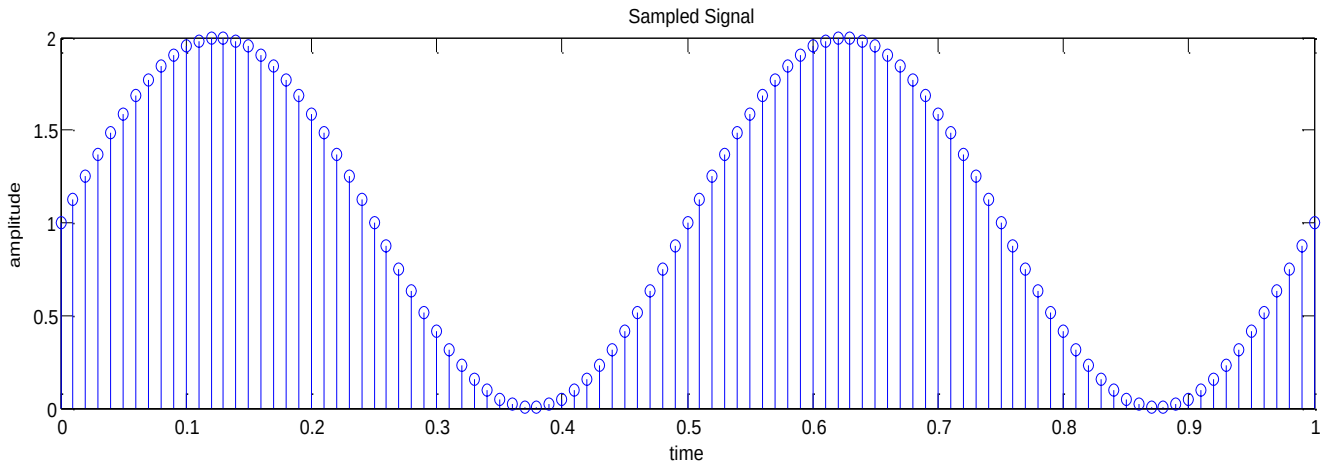
PROGRAM:

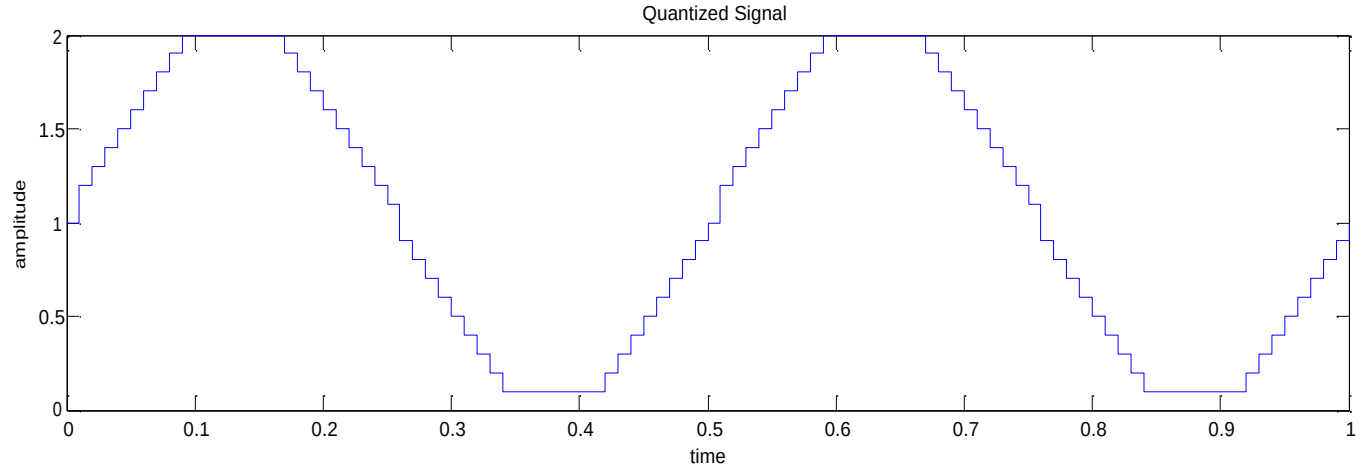
```
clc;
clear all;
close all;

%Signal amplitude and Frequency
a=1;
f=2;

t=0:0.01:1;
x=a*sin(2*pi*f*t)+a;

%plot message signal

subplot(2,1,1);
plot(t,x);
title('Input signal');
xlabel('time');
ylabel('amplitude');

%plot sampled signal

subplot(2,1,2);
stem(t,x);
title('Sampled Signal');
xlabel('time');
ylabel('amplitude');

%modulation process

partition=[0:0.1:2*a];
codebook=[0:0.1:((2*a)+0.1)];
[index,d]=quantiz(x,partition,codebook);

%plot quantized DM signal

figure;
subplot(2,1,1);
stairs(t,d);
title('Quantized Signal');
xlabel('time');
ylabel('amplitude');
```

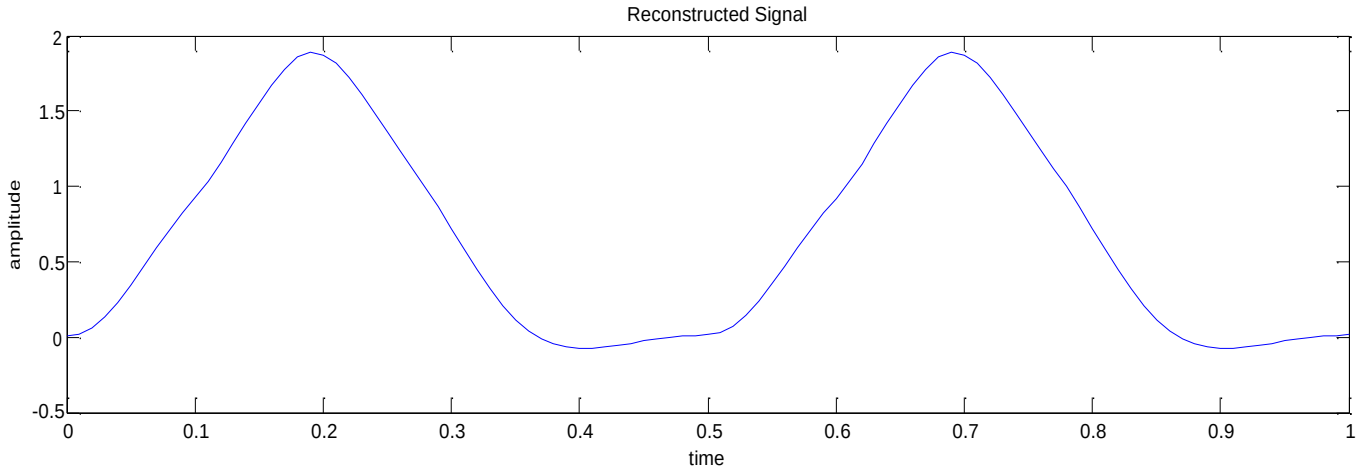
```
%plot 1-bit encoder output

pcm=dec2bin(d);
display(pcm);

%Demodulation process

deco=bin2dec(pcm);
[b,a]=butter(3,0.1,'low');
recovered=filter(b,a,deco);

%plot the reconstucted signal

subplot(2,1,2);
plot(t,recovered);
title('Reconstructed Signal');
xlabel('time');
ylabel('amplitude');
```

MODEL GRAPH:









PCM output

01,01,01,01,01,01,01,01,01,10,10,10,10,10,10,10,10,01,01,01,01,01,01,01,01,01,00,00,00,
00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,01,01,01,01,01,01,01,01,
01,10,10,10,10,10,10,10,10,01,01,01,01,01,01,01,01,01,00,00,00,00,00,00,00,00,00,00,00,
00, 00,00,00,00,00,00,00,00,00,00,00,00,01

RESULT: Simulation of Pulse Amplitude Modulation and Demodulation is done.