LAB-SIMULATION OF PULSE CODE MODULATION (PCM)

EEEN 464– DIGITAL COMMUNICATION

Wednesday, 11 June 2025

OBJECTIVE

- To design, simulate the Pulse code modulation and demodulation system and display the waveforms.

MATLAB CODE

```
clc; clear all;
f=2; %Maximum frequency of the signal
fs=20*f;  % Sampling frequency
t=0:1/fs:1;
a=2;  %Amplitude
x=a*sin(2*pi*f*t);
x1=x+a; %level shifting
q_op=round(x1); %Quantization
pcm=de2bi(q_op,'left-msb') %encode to PCM
disp(pcm)
deco=bi2de(pcm,'left-msb'); %Decode PCM value
xr=deco-a; % shift amplitude level to the original value
plot(t,x,'r- ',t,xr,'k+-');
xlabel('Amplitude');
ylabel('original Signal');
legend('original signal','Reconstructed Signal');
```

PCM Output

```
pcm =

     0     1     0
     0     1     1
     0     1     1
     1     0     0
     1     0     0
     1     0     0
     1     0     0
     1     0     0
     0     1     1
     0     1     1
     0     1     0
     0     0     1
     0     0     1
     0     0     0
     0     0     0
     0     0     0
     0     0     0
     0     0     0
     0     0     1
     0     0     1
     0     1     0
     0     1     1
     0     1     1
     1     0     0
```

ORIGINAL & RECONSTRUCTED WAVEFORMS