Department of Information and Communication Engineering

ICE-3206 (Sessional based on Digital Communication)

Session: 2018-2019

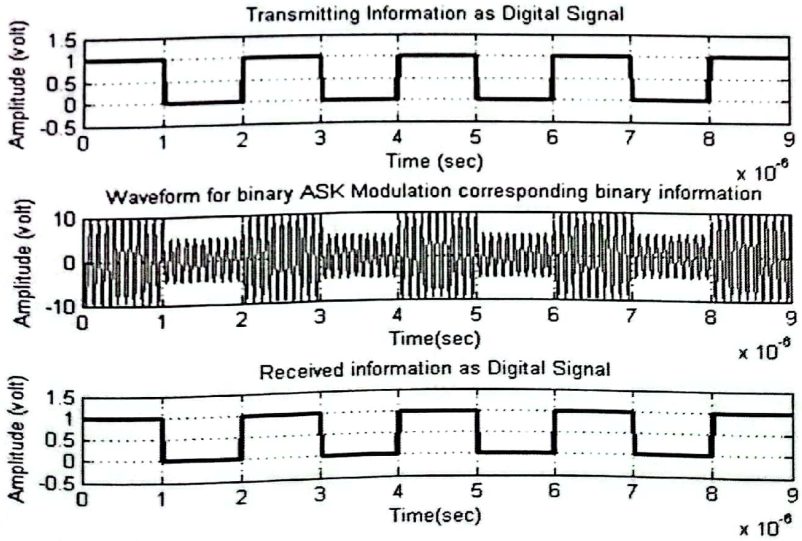
Lab-01:

ASK Source Code:

```
clc;
clear all;
close all;
x=[1 0 1 0 1 0 1 0 1];
bp=0.000001;
disp('Binary Information at transmitter');
disp(x);

%Representation of Transmitting binary information as digital signal
bit=[];
for n=1:1:length(x)
    if x(n)==1;
        se=ones(1,100);
    else
        x(n)==0;
        se=zeros(1,100);
    end
    bit=[bit se];
end

t1=bp/100:bp/100:100*length(x)*(bp/100);
subplot(3,1,1)
plot(t1,bit,'linewidth',2.5);
grid on;
axis([0 bp*length(x) -0.5 1.5]);
ylabel('Amplitude (volt)');
xlabel('Time (sec)');
title('Transmitting Information as Digital Signal');

%Binary ASK Modulation
A1=10;
A2=5;
br=1/bp;
f=br*10;
t2=bp/99:bp/99:bp;
ss=length(t2);
m=[];
for(i=1:1:length(x))
    if x(i)==1;
        y=A1*cos(2*pi*f*t2);
    else
        y=A2*cos(2*pi*f*t2);
    end
    m=[m y];
end

t3=bp/99:bp/99:bp*length(x);
subplot(3,1,2)
plot(t3,m);
grid on;
xlabel('Time(sec)');
```

```
ylabel('Amplitude (volt)');
title('Waveform for binary ASK Modulation corresponding binary information');

%Binary ASK Demodulation
mn=[];
for n=ss:ss:length(m)
    t=bp/99:bp/99:bp;
    y=cos(2*pi*f*t);
    mm=y.*m((n-(ss-1)):n);
    t4=bp/99:bp/99:bp;
    z=trapz(t4,mm);
    zz=round((2*z/bp));
    if(zz>7.5)
       a=1;
    else
       a=0;
    end
    mn=[mn a];
end
disp('Binary Information at Receiver');
disp(mn);

%Represntation of Binary data into Digital signal
bit=[];
for n=1:length(mn)
        if mn(n)==1;
        se=ones(1,100);
    else
      se=zeros(1,100);
    end
    bit=[bit se];
end
t4=bp/100:bp/100:100*length(mn)*(bp/100);
subplot(3,1,3)
plot(t4,bit,'linewidth',2.5);
grid on;
axis([0 bp*length(mn) -0.5 1.5]);
xlabel('Time(sec)');
ylabel('Amplitude (volt)');
title('Received information as Digital Signal');
```

Output:

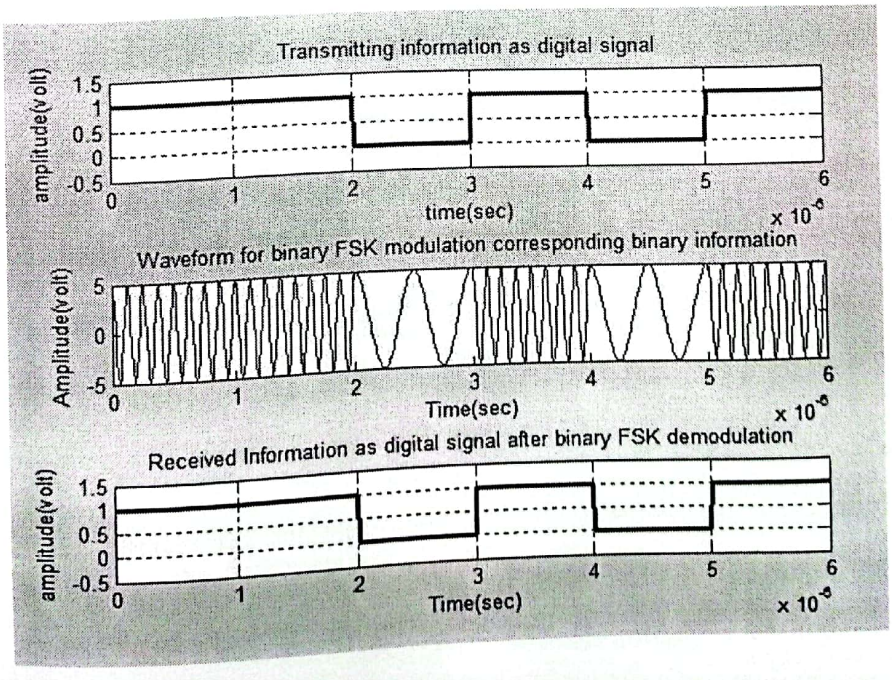


Lab-02:
FSK Source Code:

```
%FSK Modulation and Demodulation by Tarun Debnath

clc;
clear all;
close all;

x=[1 1 0 1 0 1];
bp= 0.000001;
disp('Binary information at transmitter');
disp(x);

% Representation of Transmitting binary information as digital signal
bit=[];
for n=1:1:length(x)
    if x(n)==1;
        se=ones(1,100);
    else x(n)==0;
        se=zeros(1,100);
    end
    bit=[bit se];
end

t1=bp/100:bp/100:100*length(x)*(bp/100);
subplot(3,1,1);
plot(t1,bit,'linewidth',2.5);
grid on;
axis([0 bp*length(x) -0.5 1.5]);
ylabel('amplitude(volt)');
xlabel('time(sec)');
title('Transmitting information as digital signal');

%Binary FSK Modulation
A=5;
br=1/bp;
f1=br*8;
f2=br*2;
t2=bp/99:bp/99:bp;
ss=length(t2);
m=[];
for(i=1:1:length(x))
    if(x(i)==1)
        y=A*cos(2*pi*f1*t2);
    else
        y=A*cos(2*pi*f2*t2);
    end
    m=[m y];
end

t3=bp/99:bp/99:bp*length(x);
subplot(3,1,2);
plot(t3,m);
xlabel('Time(sec)');
ylabel('Amplitude(volt)');
title('Waveform for binary FSK modulation corresponding binary information');

% Binary FSK Demodulation
mn=[];
for n=ss:ss:length(m)
    t=bp/99:bp/99:bp;
    y1=cos(2*pi*f1*t)
    y2=cos(2*pi*f2*t)
```

```
    mm=y1.*m((n-(ss-1)):n);
    mmm=y2.*m((n-(ss-1)):n);
    t4=bp/99:bp/99:bp;
    z1=trapz(t4,mm)
    z2=trapz(t4,mmm)
    zz1=round(2*z1/bp)
    zz2=round(2*z2/bp)
    if(zz1>A/2)%logic level=(0+A)/2 or (A+0)/2 or 2.5 in this case
        a=1;
    else(zz2>A/2)
        a=0;
    end
    mn=[mn a];
end

disp('Binary information at Receiver');
disp(mn);

%Representation of Binary Information as digital signal
bit=[];
for n=1:length(mn);
    if(mn(n)==1);
        se=ones(1,100);
    else mn(n)==0;
        se=zeros(1,100);
    end
    bit=[bit se];
end

t4=bp/100:bp/100:100*length(mn)*(bp/100);
subplot(3,1,3);
plot(t4,bit,'Linewidth',2.5);
grid on;
axis([0 bp*length(mn) -0.5 1.5]);
ylabel('amplitude(volt)');
xlabel('Time(sec)');
title('Received Information as digital signal after binary FSK demodulation');
```

Output:



PSK Source Code:

```
clc;
clear all;
close all;
x=[1 0 1 0 1 0 1 0 1];
bp=0.000001;
disp('Binary Information at transmitter');
disp(x);

%Representation of Transmitting binary information as digital signal
bit=[];
for n=1:1:length(x)
    if x(n)==1;
        se=ones(1,100);
    else
        x(n)==0;
        se=zeros(1,100);
    end
    bit=[bit se];
end

t1=bp/100:bp/100:100*length(x)*(bp/100);
subplot(3,1,1)
plot(t1,bit,'linewidth',2.5);
grid on;
axis([0 bp*length(x) -0.5 1.5]);
ylabel('Amplitude (volt)');
xlabel('Time (sec)');
title('Transmitting Information as Digital Signal');

%Binary PSK Modulation
A=5;
br=1/bp;
f=br*2;
t2=bp/99:bp/99:bp;
ss=length(t2);
m=[];
for(i=1:1:length(x))
    if x(i)==1;
        y=A*cos(2*pi*f*t2);
    else
        y=A*cos(2*pi*f*t2+pi);  %Acos(2*pi*f*t+pi) means -Acos(2*pi*f*t)
    end
    m=[m y];
end

t3=bp/99:bp/99:bp*length(x);
subplot(3,1,2);
plot(t3,m);
grid on;
xlabel('Time(sec)');
ylabel('Amplitude (volt)');
title('Waveform for binary PSK Modulation corresponding binary information');

%Binary FSK Demodulation
mn=[];
for n=ss:ss:length(m)
    t=bp/99:bp/99:bp;
    y=cos(2*pi*f*t);        %Carrier signal
    mm=y.*m((n-(ss-1)):n);
    t4=bp/99:bp/99:bp;
    z=trapz(t4,mm);         %Intregation
```

```
    zz=round(2*z/bp);
    if(zz>0)
        a=1;
    else
       a=0;
    end
    mn=[mn a];
end

disp('Binary Information at Receiver After PSK Demodulation');
disp(mn);

%Represntation of Binary data into Digital signal
bit=[];
for n=1:length(mn)
        if mn(n)==1;
        se=ones(1,100);
    else
      se=zeros(1,100);
    end
    bit=[bit se];
end
t4=bp/100:bp/100:100*length(mn)*(bp/100);
subplot(3,1,3)
plot(t4,bit,'linewidth',2.5);
grid on;
axis([0 bp*length(mn) -0.5 1.5]);
xlabel('Time(sec)');
ylabel('Amplitude (volt)');
title('Received information as Digital Signal');
```

Output: