# Department of Information and Communication Engineering

## ICE-3206 (Digital Communication Sessional)

## Session: 2019-2020, Date: 25/02/2024

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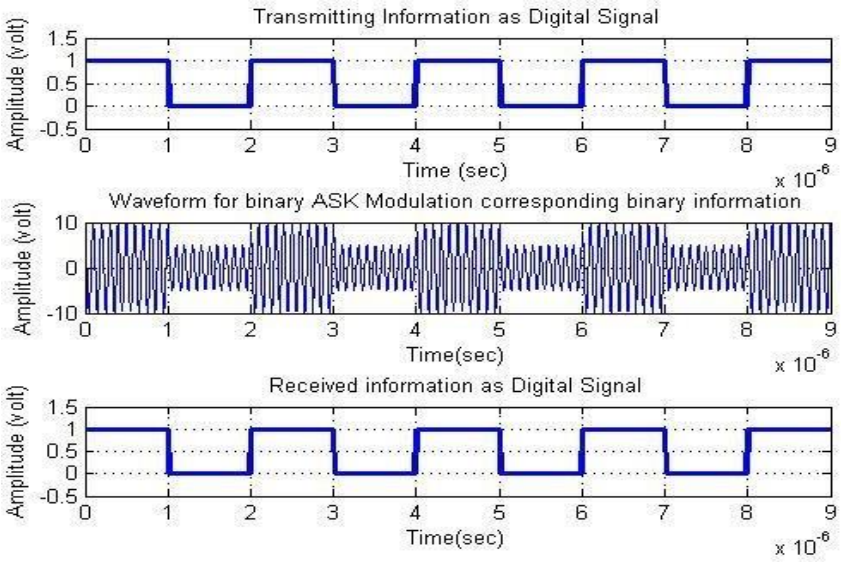
## Lab-01:

## 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:

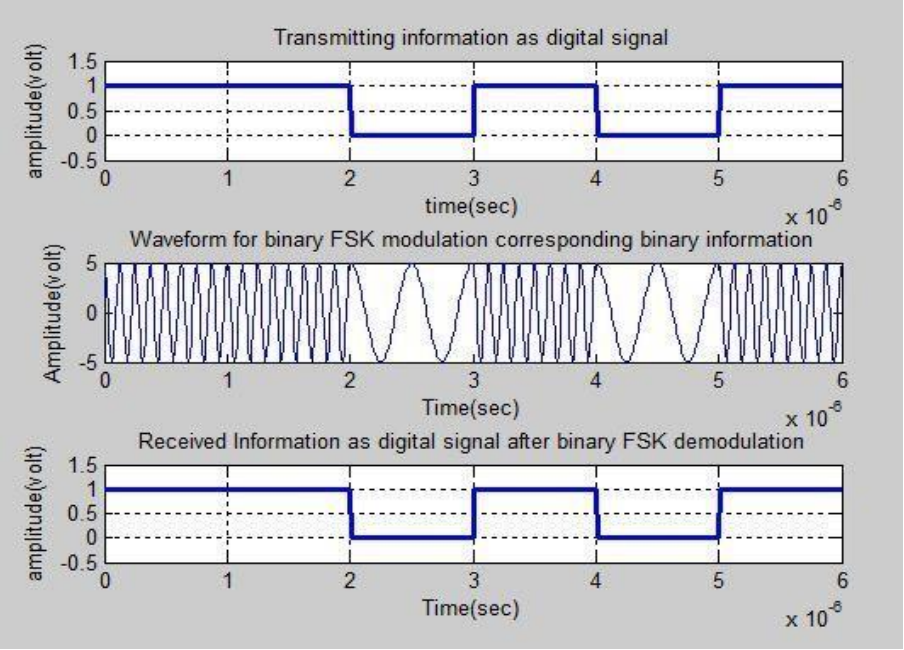


# Lab-02:
# FSK Source Code:

```
%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:



# Lab-03:
# 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: