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194107 ECE-A

CS. LAB Assignment

Amplute Shift keeping

Aim- To develop a MATLAB program for an amplitude shift keying (ASK) of an analog message signal

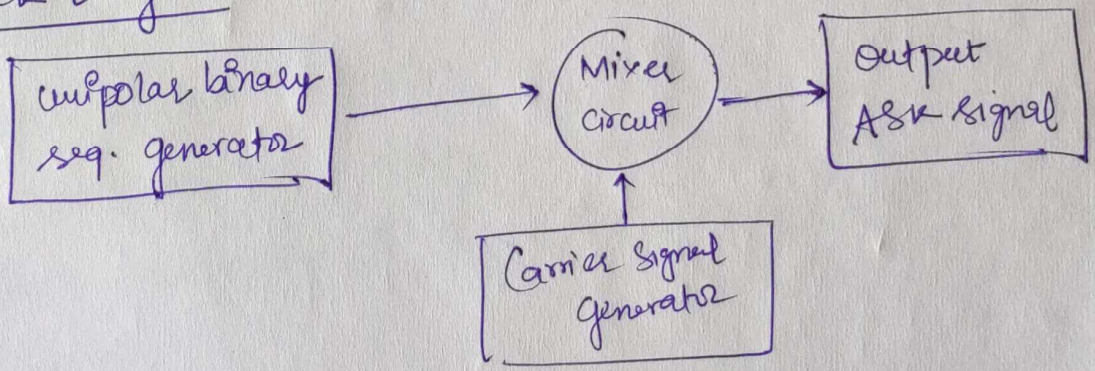
Software Used- MATLAB 2021 B.

Theory- ASK is a form of amplitude modulation that represents digital data as variable in the amplitude of a carrier wave. In ASK, the Input binary signal is multiplied with the carrier signal along with its time Intervals.

Between the first time Interval of Input binary signal multiplied with the first time Interval of carrier signal voltage and the same process continues for all time Interval.

In a given Interval, if the data signal is 1 then we get a carrier signal of that particular Interval of carrier signal voltage 1.

Block Diagram-



Procedure -

1. Generate a data signal consisting of zeros and one's
2. Generate a carrier wave (cosine wave) of freq. $f = 20Hz$ with an amplitude of 1.
3. Let s be the ASK signal.
4. If over a certain period, period of time, data signal is 1. then assign carrier signal over that period of time to the s otherwise assign zero to the s.
5. Continue the 4th step for the length of data signal times.
6. Hence we got an ASK signal.

Explanation -

1. Input signal for the digital data to be transmitted is shown in graph 1.
2. The ASK modulation of digital data is shown is graph 2.
3. The recovered data signal is in graph 3.

Result

The code for ASK modulation was written and the graphs were constructed in MATLAB.

```
clc;
close all;
x=[ 1 0 0 1 1 0 1]; % Binary Information
bp=.000001; % bit period
disp(' Binary information at Trans mitter :' );
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) -.5 1.5]);
ylabel('amplitude(volt)');
xlabel(' time(sec)');
title('transmitting information as digital signal' );

%Binary-ASK modulation
A1=10; % Amplitude of carrier signal for information 1
A2=5; % Amplitude of carrier signal for information 0
br=1/bp; % bit rate
f=br*10; % carrier frequency
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);
xlabel('time(sec)');
ylabel('amplitude(volt)');
title('waveform of binary ASK modulation coresponding binary information');

% Binary ASK demodulation
mn=[];
for n=ss:ss:length(m)
    t=bp/99:bp/99:bp;
    y=cos(2*pi*f*t); % carrier siignal
```

```
    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>7.5) % logic level = (A1+A2)/2=7.5
        a=1;
    else
        a=0;
    end
    mn=[mn a];
end

disp(' Binary information at Reciver :' );
disp(mn);
% Representation of binary information as digital signal
% which achived after ASK demodulation
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) -.5 1.5]);
ylabel('amplitude(volt)');
xlabel(' time(sec)');
title('recived information as digital signal after binary ASK demodulation' );
```

Figure 1

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