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Phase shift Key (PSK) 28/03

Aim- To develop a matlab code for phase shift Keying (PSK).

Software Used - MATLAB 2021b.

Theory- Binary Phase shift Keying (BPSK) is a two phase modulation scheme, where the 0's and 1's in a binary message are represented by two different phase states in the carrier signal : $\theta = 0°$ for binary and $\theta = 180°$ for binary 0.

BPSK is basically a double side band supressed carrier (DB-BSC) modulation scheme for message keying the digital information.

Procedure -

(1) Generate a data signal consisting of zeros and ones.

(2) Generate two carrier signals, one with phase shift of 0° and other with phase shift of 180°.

(3) Let be the BPSK signal.

(4) If the data signal is one over a particular interval of time, assign carrier signal with a phase shift of 0° to b over that particular interval

(5) If the data signal is zero over a particular interval of time, assign carrier signal with a phase shift of 180° to the b over that particular interval of time.

⑥ Continue the above two steps over the length of data signal times

⑦ Hence, we get a BPSK signal.

Result –

The code for PSK was developed and graphs were constructed.

```
clc;
close all;

f=2; % frequency of a carrier signal

b=[];
d=[1 0 1 1 0 1 0 0 1 0]; %Data signal(Bit Stream)

%plot of data signal
figure(1);
subplot(5,1,1);
stairs([d,d(end)]);
title('Data Signal');
xlabel('Time');
ylabel('Amplitude');
ylim([-2 2]);

t=1:0.01:11;

%carrier signal 1
c1= 5.*cos(2*pi*f*t);
%figure(2);
subplot(5,1,2);
plot(t,c1);
title('Carrier Signal 1');
xlabel('Time');
ylabel('Amplitude');

%Carrier signal 2
c2= -1*5.*cos(2*pi*f*t);
%figure(3);
subplot(5,1,3);
plot(t,c2);
title('Carrier Signal 2');
xlabel('Time');
ylabel('Amplitude');

%Implementation of BPSK signal
for i=1:length(d)
    t=i:0.01:i+1
    if d(i)==1
        s=5.*cos(2*pi*f*t);
    else
        s=-1*5.*cos(2*pi*f*t);
    end
    b=[b s];
end

%Plot of BPSK signal
t1= 1:((length(d))/(length(b)-1)):length(d)+1;
%figure(4);
subplot(5,1,4);
plot(t1,b,'m','LineWidth',1);
title('BPSK signal');
```

```
xlabel('Time');
ylabel('Amplitude');

%Demodulation
j=1;
demod=[];
g=[];
while j<length(b)
%length of a carrier signal which we assign to a particular data bit is 101
%we assign a part of it to a in order to find phase angle of it
    a=b(j:j+100);
    p=angle(a);

%phase angle of a carrier signal in an interaval of length 101 are stored in g
    g=[g p(1)];
    j=j+101;
end

for i=1:length(g)
    if(g(i)==0)
        de=1;
    else
        de=0;
    end
    demod=[demod de];
end

%plot of demodulated signal
%figure(5);
subplot(5,1,5);
stairs([demod,demod(end)]);
title('Demodulated signal');
xlabel('Time');
ylabel('Amplitude');
ylim([-2 2]);
```

Figure 1

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