

To generate an amplitude modulated signal

```
clc;
clear all;
close all;
t=0:0.001:2;
f1=5
m=sin(2*pi*f1*t);
subplot(5,1,1);
plot(t,m);
title('message signal');
xlabel('time');
ylabel('amplitude');
grid on;
f2=50
c=sin(2*pi*f2*t);
subplot(5,1,2);
plot(t,c);
title('carrier signal');
xlabel('time');
ylabel('amplitude');
grid on;
m1=0.5;
s1=(1+(m1*m)).*c;
subplot(5,1,3);
plot(t,s1);
title('under modulation signal');
xlabel('time');
ylabel('amplitude');
grid on;
m2=1;
s2=(1+m2*m).*c;
subplot(5,1,4);
plot(t,s2);
title('critical modulation signal');
xlabel('time');
ylabel('amplitude');
grid on;
m3=1.5
s3=(1+m3*m).*c;
subplot(5,1,5);
plot(t,s3);
title('over modulation signal');
xlabel('time');
ylabel('amplitude');
grid on;
axis([0,2,-2.5,2.5]);
```

to generate a frequency modulated signal

```
clc;
clear all;
close all;
fm=15;
B=5
```

```

t=0:0.0001:0.25;
m=cos(2*pi*fm*t);
subplot(3,1,1);
plot(t,m);
xlabel('time');
ylabel('amplitude');
title('message signal');
axis([0,0.25,-1.5,1.5]);
grid on;
fc=150;
c=sin(2*pi*fc*t);
subplot(3,1,2);
plot(t,c);
xlabel('time');
ylabel('amplitude');
title('carrier signal');
axis([0,0.25,-1.5,1.5]);
grid on;
y=sin(2*pi*fc*t+(B*sin(2*pi*fm*t)));
subplot(3,1,3);
plot(t,y);
xlabel('time');
ylabel('amplitude');
title('frequency modulated signal');
axis([0,0.25,-1.5,1.5]);
grid on;

```

to generate a phase modulated signal

```

clc;
clear all;
close all;
fm=10;
mp=5;
t=0:0.0001:0.50;
m=sin(2*pi*fm*t);
subplot(3,1,1);
plot(t,m,'red');
xlabel('time');
ylabel('amplitude');
grid on;
title('message signal');
fc=100;
c=sin(2*pi*fc*t);
subplot(3,1,2);
plot(t,c,'black');
xlabel('time');
ylabel('amplitude');
title('carrier signal');
grid on;
y=sin(2*pi*fc*t+mp*(sin(2*pi*fm*t)));
subplot(3,1,3);
plot(t,y,'green');
xlabel('time');

```

```

ylabel('amplitude');
title('phase modulated signal');
grid on;

```

to convert an amplitude modulated signal into an amplitude demodulation signal

```

clc;
clear all;
close all;
fm=5;
fc=100;
fs=13000;
t=0:1/fs:0.5;
msg_signal=sin(2*pi*fm*t);
subplot(4,1,1);
plot(t,msg_signal);
title('message signal');
xlabel('time');
ylabel('amplitude');
grid on;
carrier_signal=sin(2*pi*fc*t);
subplot(4,1,2);
plot(t,carrier_signal);
title('carrier signal');
xlabel('time');
ylabel('amplitude');
grid on;
y=ammod(msg_signal,fc,fs);
subplot(4,1,3);
plot(t,y);
title('modulated signal');
xlabel('time');
ylabel('amplitude');
grid on;
%%demodulation
d=demod(y,fc,fs,'am');
subplot(4,1,4);
plot(t,d);
title('demodulated signal');
xlabel('time');
ylabel('amplitude');
grid on;

```

to convert an frequency modulated signal into an frequency demodulation signal

```

clc;
clear all;
close all;
fm=15;
fs=10000;
t=0:1/fs:0.5;
B=5;
m=cos(2*pi*fm*t);
subplot(4,1,1);

```

```

plot(t,m,'black');
xlabel('time');
ylabel('amplitude');
title('message signal');
grid on;
fc=150;
c=sin(2*pi*fc*t);
subplot(4,1,2);
plot(t,c);
xlabel('time');
ylabel('amplitude');
title('carrier signal');
grid on;
y=sin(2*pi*fc*t+(B*sin(2*pi*fm*t)));
subplot(4,1,3);
plot(t,y);
xlabel('time');
ylabel('amplitude');
title('fm signal');
grid on;
x=demod(y,fc,fs,'fm');
subplot(4,1,4);
plot(t,x);
xlabel('time');
ylabel('amplitude');
title('demodulated signal');
grid on;

```

emphasis de amphasis

```

clc;
clear all;
close all;
f1=10;
for f=1:50
    x(f)=(1/sqrt(1+(f1/f)^2))
    f2(f)=f;
end
subplot(2,1,1);
plot(f2,x);
title ('preemphasis wavwform');
for f=1:50
    y(f)=(1/sqrt(1+(f/f1)^2))
    f3(f)=f;
end
subplot(2,1,2);
plot(f3,y);
title ('de emphasis wavwform');

```