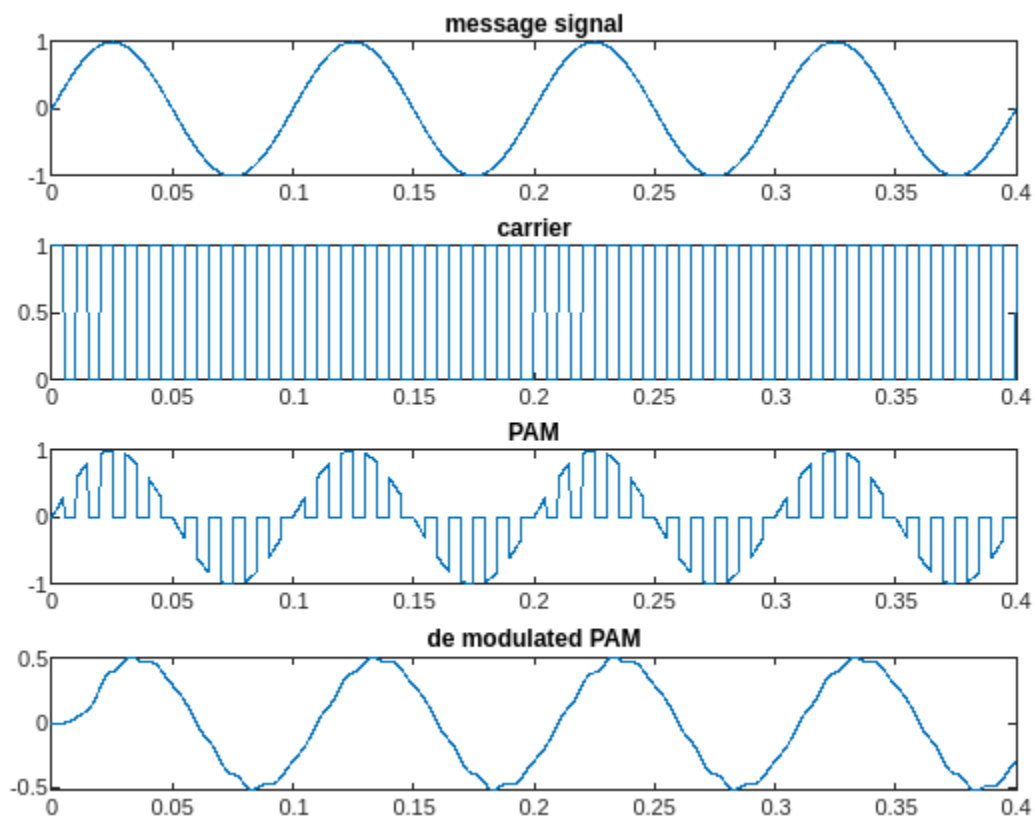## PAM

```
clc;close all;clear all;
fc=100;fm=10;fs=10000;
t=0:(1/fs):4/fm;
m=sin(2*pi*fm*t);
ct=0.5*square(2*pi*fc*t)+0.5;
st=m.*ct;
subplot(4,1,1);
plot(t,m);
title("message signal")
subplot(4,1,2);
plot(t,ct);
title('carrier');
subplot(4,1,3);
plot(t,st);
title('PAM');
[b,a]=butter(5,0.01);
demod=filter(b,a,st);
subplot(4,1,4);
plot(t,demod);
title('de modulated PAM')
```

PWM

```matlab
close all;clear all;
fm=10;fc=100;fs=10000;
t=0:(1/fs):4/fm;
m=sin(2*pi*fm*t);
c=sawtooth(2*pi*fc*t);
mod=[];

for i=1:length(c)
    if m(i)>c(i)
        mod=[mod,1];
    else
        mod=[mod,0];
    end
end
demod=[];
demod(1)=0;
for i=2:length(mod)
    if(mod(i)==1)
        demod=[demod,(demod(i-1)+0.00278)];
    elseif(mod(i)==0)
        demod=[demod,(demod(i-1)-0.00278)];
    end
end

[b,a]=butter(5,0.01);
demod=filter(b,a,demod);
subplot(4,1,1);
plot(t,m);
title('message signal');
subplot(4,1,2);
plot(t,c);
title('carrier');
subplot(4,1,3);
plot(t,mod);
title('PWM');
subplot(4,1,4);
plot(t,demod);
title('de modulated PWM');
```