**CODE:**

close all

clear all

clc

fs=8000;

fm=20;

fc=500;

Am=1;

Ac=1;

t=(0:0.1\*fs)/fs;

m=Am\*cos(2\*pi\*fm\*t);

c=Ac\*cos(2\*pi\*fc\*t);

ka=0.5;

u=ka\*Am;

s1=Ac\*(1+u\*cos(2\*pi\*fm\*t)).\*cos(2\*pi\*fc\*t);

subplot(4,3,1:3);

plot(t,m);

title('Modulating signal(fm=20Hz)');

subplot(4,3,4:6);

plot(t,c);

title('Carrier signal(fc=500Hz)');

subplot(4,3,7);

plot(t,s1);

title('Under Modulated signal(ka.Am=0.5)');

ka1=1;

u1=ka1\*Am;

s2=Ac\*(1+u1\*cos(2\*pi\*fm\*t)).\*cos(2\*pi\*fc\*t);

subplot(4,3,8);

plot(t,s2);

title('Exact Modulated signal(ka.Am=1)');

ka2=2;

u2=ka2\*Am;

s3=Ac\*(1+u2\*cos(2\*pi\*fm\*t)).\*cos(2\*pi\*fc\*t);

subplot(4,3,9);

plot(t,s3);

title('Over Modulated signal(ka2.Am=2)');

r1=s1.\*c;

r2=s2.\*c;

r3=s3.\*c;

[b,a]=butter(1,0.01);

mr1=filter(b,a,r1);

mr2=filter(b,a,r2);

mr3=filter(b,a,r3);

subplot(4,3,10);

plot(t,mr1);

title('Demodulated signal(U)')

subplot(4,3,11);

plot(t,mr2);

title('Demodulated signal(E)')

subplot(4,3,12);

plot(t,mr3);

title('Demodulated signal(O)')