clc;

close all;

clear all;

n=10;

b=[1 0 0 1 1 1 0 1 0 1];

f1=1;

f2=2;

t=0:1/30:1-1/30;

%ASK

sa1=sin(2\*pi\*f1\*t);

E1=sum(sa1.^2);

sa1=sa1/sqrt(E1);

sa0=0\*sin(2\*pi\*f1\*t);

%FSK

sf0=sin(2\*pi\*f1\*t);

E0=sum(sf0.^2);

sf0=sf0/sqrt(E0);

sf1=sin(2\*pi\*f2\*t);

E1=sum(sf1.^2);

sf1=sf1/sqrt(E1);

%PSK

sp=sin(2\*pi\*f1\*t);

E1=sum(sp.^2);

sp0=-sin(2\*pi\*f1\*t)/sqrt(E1);

sp1=sin(2\*pi\*f1\*t)/sqrt(E1);

%MODULATION

ask=[];psk=[];fsk=[];

for i=1:n

if b(i)==1

ask=[ask sa1];

psk=[psk sp1];

fsk=[fsk sf1];

else

ask=[ask sa0];

psk=[psk sp0];

fsk=[fsk sf0];

end

end

figure(1)

subplot(411)

stairs(0:10,[b(1:10) b(10)],'linewidth',1.5)

axis([0 10 -0.5 1.5])

title('Message Bits'); grid on

xlabel('Time');

ylabel('Amplitude')

subplot(412)

tb=0:1/30:10-1/30;

plot(tb, ask(1:10\*30),'b','linewidth',1.5)

title('ASK Modulation'); grid on

xlabel('Time');

ylabel('Amplitude')

subplot(413)

plot(tb, fsk(1:10\*30),'r','linewidth',1.5)

title('FSK Modulation'); grid on

xlabel('Time');

ylabel('Amplitude')

subplot(414)

plot(tb, psk(1:10\*30),'k','linewidth',1.5)

title('PSK Modulation'); grid on

xlabel('Time');

ylabel('Amplitude')