Experiment No. 8

Title: *To perform and simulate ASK, FSK & PSK modulation techniques on Scilab.*

Name:

Roll No.:

***Date:* ____ / ____ / ________**

Subject In-charge Sign:

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Experiment No. 8

Aim: *To perform and simulate ASK, FSK & PSK modulation techniques on Scilab*

Apparatus/Tools: Simulating software SCILAB_6.1.1

Theory:

Amplitude-shift keying (ASK), frequency-shift keying (FSK), and phase-shift keying (PSK) are digital modulation schemes.

ASK refers to a type of amplitude modulation that assigns bit values to discrete amplitude levels. The carrier signal is then modulated among the members of a set of discrete values to transmit information.

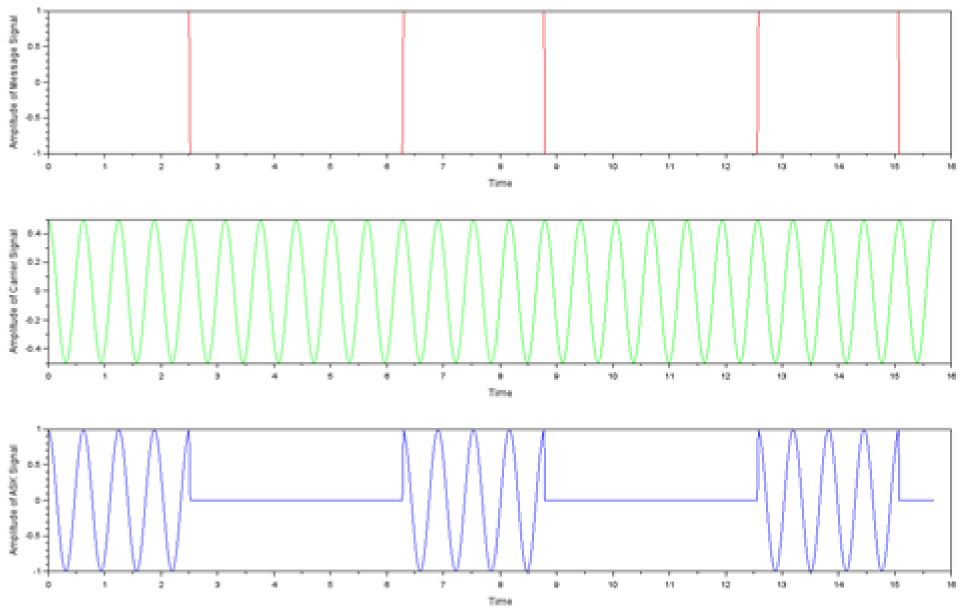
FSK refers to a type of frequency modulation that assigns bit values to discrete frequency levels. FSK is divided into no coherent and coherent forms. In no coherent forms of FSK, the instantaneous frequency shifts between two discrete values termed the "mark" and "space" frequencies. In coherent forms of FSK, there is no phase discontinuity in the output signal. FSK modulation formats generate modulated waveforms that are strictly real values, and thus tend not to share common features with quadrature modulation schemes.

PSK in a digital transmission refers to a type of angle modulation in which the phase of the carrier is discretely varied—either in relation to a reference phase or to the phase of the immediately preceding signal element—to represent data being transmitted. For example, when encoding bits, the phase shift could be 0 degree for encoding a "0," and 180 degrees for encoding a "1," or the phase shift could be –90 degrees for "0" and +90 degrees for a "1," thus making the representations for "0" and "1" a total of 180 degrees apart. Some PSK systems are designed so that the carrier can assume only two different phase angles, each change of phase carries one bit of information, that is, the bit rate equals the modulation rate. If the number of recognizable phase angles is increased to four, then 2 bits of information can be encoded into each signal element; likewise, eight phase angles can encode 3 bits in each signal element.

Program: ASK

```
clc;clear all;clf;
t=[0:0.02:5*%pi];
fc=10;
A=1;

Vm=squarewave(t,40); // The second parameter in the squarewave
//function is the percent of the period in
//which the signal is positive.

Vc=A/2.*cos(fc.*t);
Va=(1+Vm).*(Vc);

subplot(3,1,1);
plot(t,Vm,'red');
xlabel("Time")
ylabel("Amplitude of Message Signal")

subplot(3,1,2);
plot(t,Vc, 'green');
xlabel("Time")
ylabel("Amplitude of Carrier Signal")

subplot(3,1,3);
plot(t,Va, 'blue');
xlabel("Time")
ylabel("Amplitude of ASK Signal")
```

Output: ASK

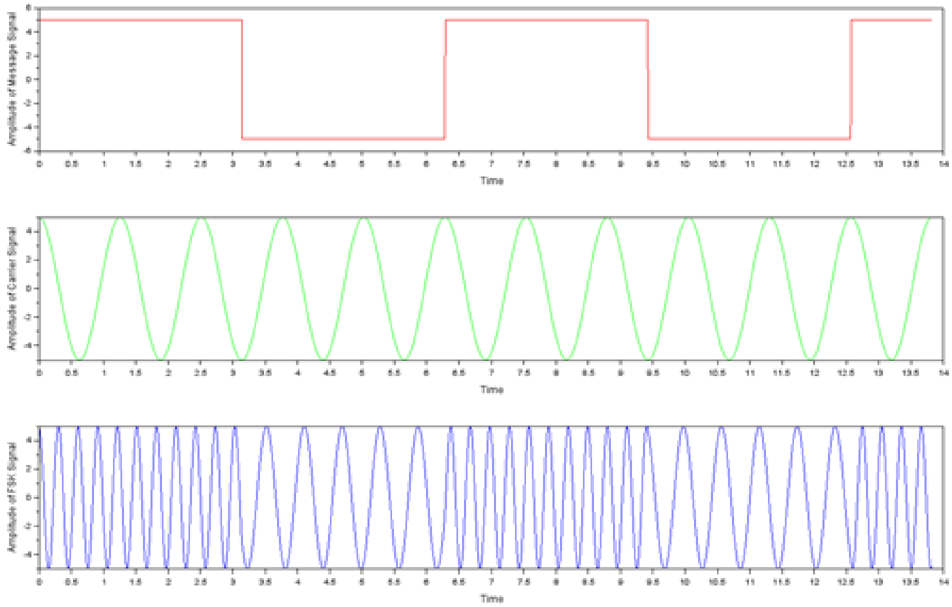


Program: FSK

```
clc;clear all;clf;
t=[0:0.01:4.4*%pi];
A=5;
wc=5;
```

```
Vm=A.*squarewave(t);
Vc=A.*cos(wc.*t);
fc=wc/(2*%pi);

subplot(3,1,1);
plot(t,Vm, 'red');
xlabel("Time")
ylabel("Amplitude of Message Signal")

subplot(3,1,2);
plot(t,Vc, 'green');
xlabel("Time")
ylabel("Amplitude of Carrier Signal")

fd=0.5; //frequency deviation
subplot(3,1,3);
Vf=A.*cos(2.*%pi.*(fc+Vm.*fd).*t);
plot(t,Vf, 'blue');
xlabel("Time")
ylabel("Amplitude of FSK Signal")
```

Output: FSK

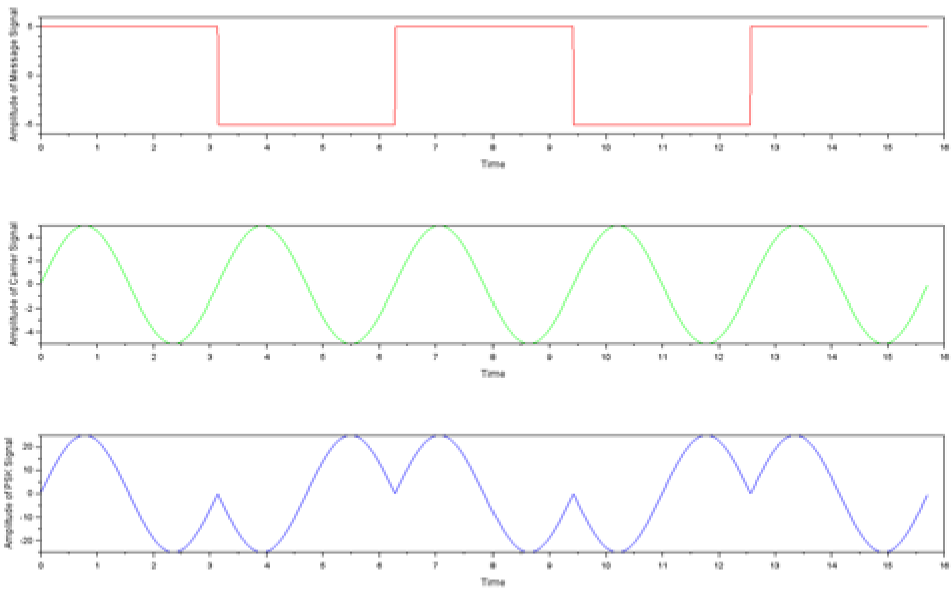


Program: PSK

```
clc;clear all;clf;
t=[0:0.01:5*%pi];
A=5;
fc=2;

Vm=A.*squarewave(t);
Vc=A.*sin(fc.*t);
Vp= Vm.*Vc;

subplot(3,1,1);
plot(t,Vm, 'red');
xlabel("Time")
```

```
ylabel("Amplitude of Message Signal")

subplot(3,1,2);
plot(t,Vc, 'green');
xlabel("Time")
ylabel("Amplitude of Carrier Signal")

subplot(3,1,3);
plot(t,Vp, 'blue');
xlabel("Time")
ylabel("Amplitude of PSK Signal")
```

Output: PSK



Conclusion:

Thus we have studied and performed the simulation for digital modulation techniques such as ASK, FSK & PSK using SCILAB_6.1.1 simulation software