Scilab Manual for
Analog Communications
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Experiment: 1

To Plot the time domain representation of an Amplitude modulated (AM) wave for overmodulation case

Scilab code Solution 1.1 To Plot the time domain representation of an Amplitude modulated wave for overmodulation case

```
1 //Lab Name: ANALOG COMMUNICATIONS
2 //Experiement No:1 To Plot the time domain
    representation of an Amplitude modulated (AM)
    wave for overmodulation case
3
4 //Student Name:..... Enrollment
    No:.....
5 //Course Instructor: Ms. Sanjana Mathew, Assistant
    Professor
6 //Sreyas Institute of Engineering and Technology(
    SIET),HYDERABAD.
7 //scilab 6.0.2; 64 bit(windows 8)
```

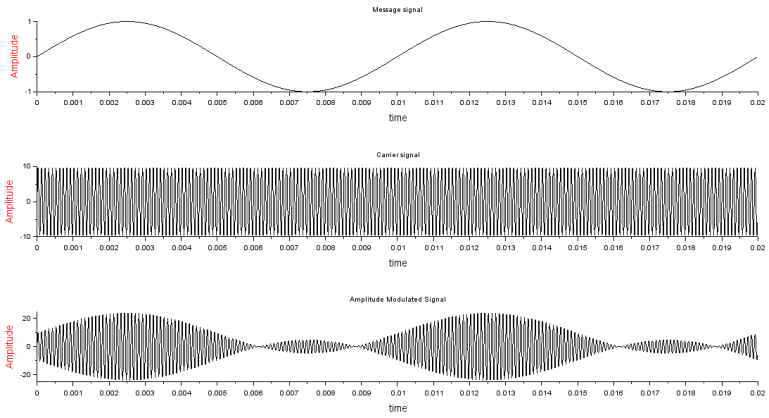

Figure 1.1: To Plot the time domain representation of an Amplitude modulated wave for overmodulation case

```
clf()
clc
Ec=10,ma=1.5,wm=2*%pi*100,wc=2*%pi*10000,fs=100000,f
   =100
x=0:1/fs:((2/f)-(1/fs))

// generation of modulating signal
deff("[m]=f(x)","m=sin(wm*x)")
subplot(3,1,1)
fplot2d(x,f)

xlabel("time", "fontsize", 3);
ylabel("Amplitude", "fontsize", 3, "color", "red");
title("Message signal")

// generation of carrier signal
deff("[c]=f(x)","c=Ec*sin(wc*x)")
subplot(3,1,2)
fplot2d(x,f)
xlabel("time", "fontsize", 3);
ylabel("Amplitude", "fontsize", 3, "color", "red");
title("Carrier signal")
```

```
29
30 // generation of Amplitude Modulated Signal
31 deff("[y]=f(x)","y=Ec*(1+ma*(sin(wm*x)))*sin(wc*x)")
32 subplot(3,1,3)
33 fplot2d(x,f)
34 xlabel("time", "fontsize", 3);
35 ylabel("Amplitude", "fontsize", 3, "color", "red");
36 title("Amplitude Modulated Signal")
```

Experiment: 2

To plot the time domain representation of a Frequency Modulated wave and calculate its modulation Index.

Scilab code Solution 2.1 To plot the time domain representation of a Frequency Modulated wave and calculate its modulation Index

```
1 //Lab Name: ANALOG COMMUNICATIONS
2 //Experiement No:2  To plot the time domain
    representation of a Frequency Modulated wave and
    calculate its modulation Index(mf).
3
4 //Student Name:..... Enrollment
    No:.....
5 //Course Instructor: Ms.Sanjana Mathew,Assistant
    Professor,ECE
6 //Sreyas Institute of Engineering and Technology(
    SIET),HYDERABAD.
7 //scilab 6.0.2; 64 bit(windows 8)
```

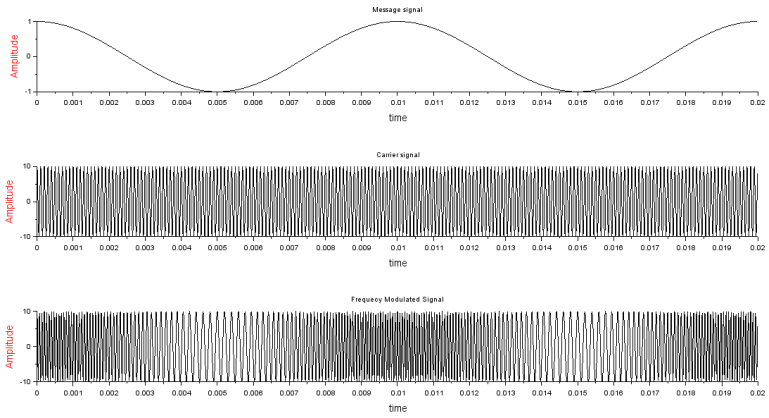

Figure 2.1: To plot the time domain representation of a Frequency Modulated wave and calculate its modulation Index

```
8  clear;
9  clc;
10 close;
11 Ec=10,wm=2*%pi*100,wc=2*%pi*10000,f=100;//Defining
      then amplitude and frequencies of message signal
      and carrier signal
12 fs=100000;
13 kf= input('Enter the frequecy deviation constant(kf
      )of FM in KHz/volt:=')
14 Em=input('Enter the amplitude of message signal:=')
15 de1= kf*Em
      ;.....................................................//
      Calculating the frequency deviation of FM
16 x=0:1/fs:((2/f)-(1/fs))
      ;.....................................//Setting the
      time axis
17 mf=de1/f
      ;.....................................................
      //Calculating the modulation index of FM
18 disp(mf, 'Modulation index of FM')
19
20 //Generation of Modulating(message)signal
```

```
previousprot = funcprot(1)
deff("[m]=f(x)","m=cos(wm*x)")
subplot(3,1,1)
fplot2d(x,f)
xlabel("time", "fontsize", 3);
ylabel("Amplitude", "fontsize", 3, "color", "red");
title("Message signal")

//Generation of Carrier signal
funcprot(0)
deff("[c]=f(x)","c=Ec*cos(wc*x)")
subplot(3,1,2)
fplot2d(x,f)
xlabel("time", "fontsize", 3);
ylabel("Amplitude", "fontsize", 3, "color", "red");
title("Carrier signal")

//Generation of Frequency Modulated (FM) Signal
funcprot(0)
deff("[y]=f(x)","y=Ec*cos((wc*x)+mf*sin(wm*x))")
subplot(3,1,3)
fplot2d(x,f)
xlabel("time", "fontsize", 3);
ylabel("Amplitude", "fontsize", 3, "color", "red");
title("Frequecy Modulated Signal")

//TEST CASE
//   Input:Enter the frequecy deviation constant(kf
   )of FM in Hz/volt:=1000
//         :Enter the amplitude of message signal:=5
// Output: Modulation index of FM is: 50
```

Experiment: 3

To Plot the waveform of a Pulse Amplitude Modulated (PAM) signal.

Scilab code Solution 3.1 To Plot the waveform of a Pulse Amplitude Modulated signal

```
1  //Lab Name: ANALOG COMMUNICATIONS
2  //Experiement No:3   To Plot the waveform of a Pulse
       Amplitude Modulated (PAM) signal
3
4  //Student Name:..... Enrollment
       No:.....
5  //Course Instructor: Ms. Sanjana Mathew, Assistant
       Professor ,ECE
6  //Sreyas Institute of Engineering and Technology(
       SIET) ,HYDERABAD.
7  //scilab 6.0.2; 64 bit(windows 8)
8  clear;
9  clc;
10 close;
```

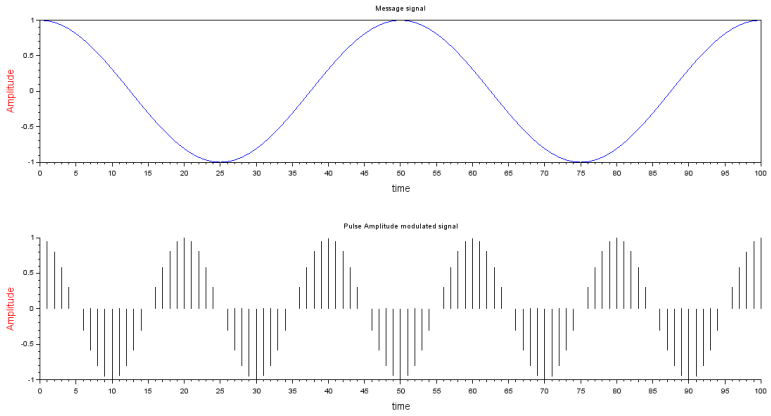

Figure 3.1: To Plot the waveform of a Pulse Amplitude Modulated signal

```
11 t=0:1:100;//Defining the time instants
12 fm=input('Enter the message frequency:=');
13 x=cos(2*%pi*fm*t);
14 subplot(2,1,1);
15 plot(t,x);
16 xlabel("time", "fontsize", 3);
17 ylabel("Amplitude", "fontsize", 3, "color", "red");
18 title('Message signal');
19 fs3=input('Enter the sampling frequency:=')
20 x3=cos(2*%pi*fm*t/fs3);
21 subplot(2,1,2);
22 plot2d3(t,x3)
23 xlabel("time", "fontsize", 3);
24 ylabel("Amplitude", "fontsize", 3, "color", "red");
25 title('Pulse Amplitude modulated signal');
26
27 //TEST CASE
28 //fm= Enter the message frequency(in Hz):=.02
29 //fs3= Enter the sampling frequency (in Hz): = 0.4
```

Experiment: 4

To plot the waveform of a Pulse Width modulated (PWM) signal.

Scilab code Solution 4.1 To plot the waveform of a PWM Signal

```
1 //Lab Name: ANALOG COMMUNICATIONS
2 //Experiement No:4 To plot the waveform of a Pulse
    Width modulated (PWM) signal.
3
4 //Student Name:..... Enrollment
    No:.....
5 //Course Instructor: Ms.Sanjana Mathew, Assistant
    Professor
6 //Sreyas Institute of Engineering and Technology(
    SIET),HYDERABAD.
7 //scilab 6.0.2; 64 bit(windows 8)
8 clc;
9 close;
```

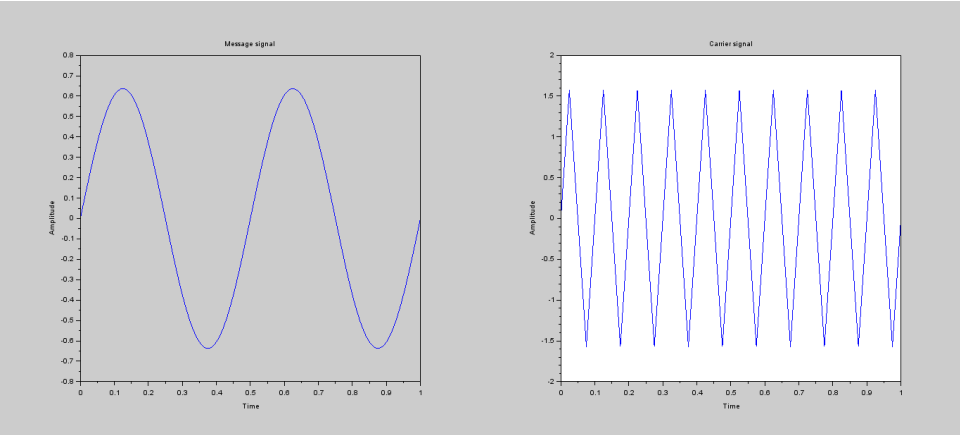

Figure 4.1: To plot the waveform of a PWM Signal

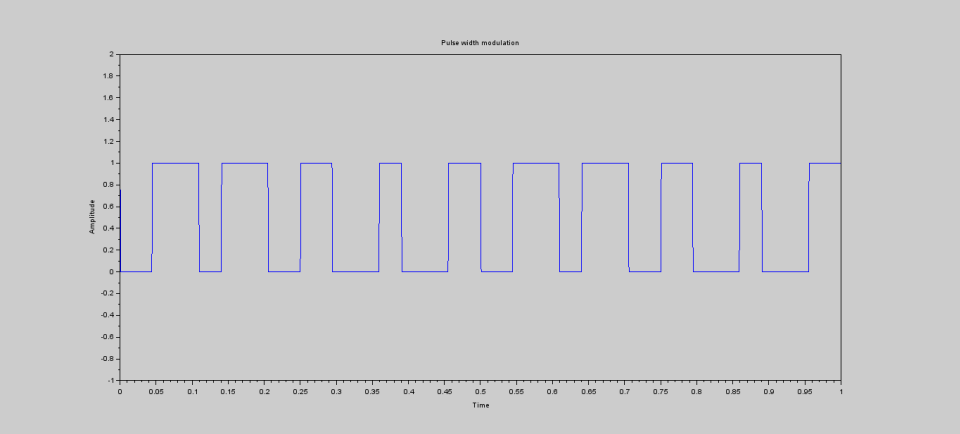

Figure 4.2: To plot the waveform of a PWM Signal

```
clear;
t=0:0.001:1;
f=input("Enter frequency of carrier");
c=asin(sin(2*%pi*f*t));
f1=input("Enter frequency of message");
m=(2/%pi)*sin(2*%pi*f1*t);
n=length(c);
for i=1:n
if m(i)>=c(i)
pwm(i)=1;
else m(i)<=c(i)
pwm(i)=0;
end
end
figure(1);
subplot(1,2,1);
plot(t,m);
xlabel("Time");
ylabel("Amplitude");
title("Message signal");
subplot(1,2,2);
plot(t,c);
xlabel("Time");
ylabel("Amplitude");
title("Carrier signal");
figure(2);
plot(t,pwm');
xlabel("Time");
ylabel("Amplitude");
replot([0 -1 1 2]);
xlabel("Time");
ylabel("Amplitude");
title("Pulse width modulation");

//Output:-
//Enter frequency of carrier 10
//Enter frequency of message 2
```

Experiment: 5

To plot the waveform of a Pulse Position modulated (PPM) signal.

Scilab code Solution 5.1 To plot the waveform of a PPM Signal

```
1 //Lab Name: ANALOG COMMUNICATIONS
2 //Experiement No:5 To plot the waveform of a Pulse
    Position modulated (PPM) signal.
3
4 //Student Name:..... Enrollment
    No:.....
5 //Course Instructor: Ms.Sanjana Mathew, Assistant
    Professor
6 //Sreyas Institute of Engineering and Technology(
    SIET),HYDERABAD.
7 //scilab 6.0.2; 64 bit(windows 8)
8 clc;
9 close;
```

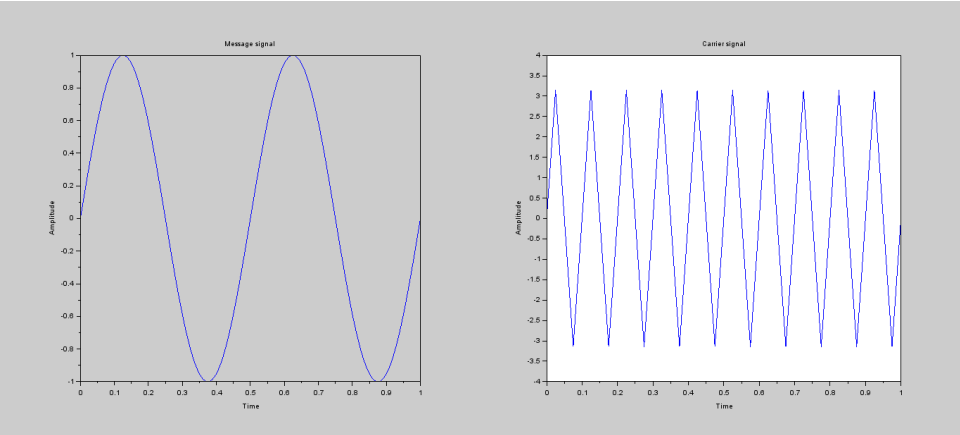

Figure 5.1: To plot the waveform of a PPM Signal

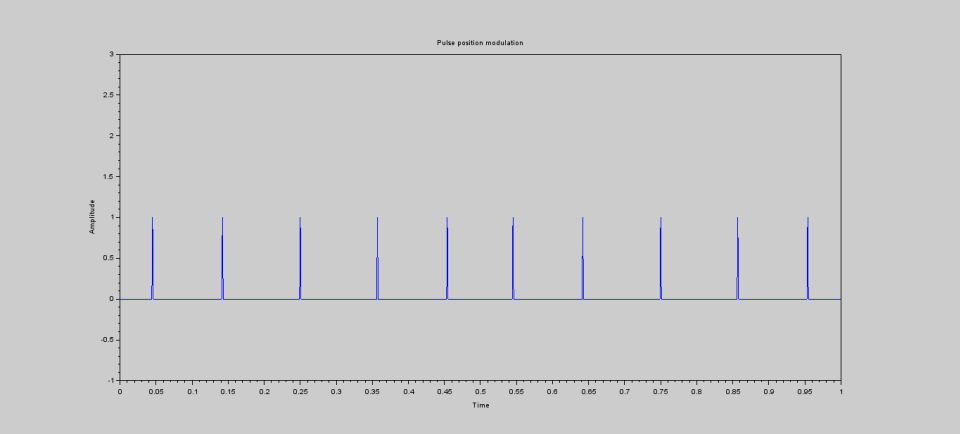

Figure 5.2: To plot the waveform of a PPM Signal

```
clear;
t=0:0.001:1;
f=input("Enter frequency of carrier");
c=(2)*asin(sin(2*%pi*f*t));
f1=input("Enter frequency of message");
m=sin(2*%pi*f1*t);
n=length(c);
for i=1:n
if m(i)>=c(i)
ppm(i)=0;
else m(i)<=c(i)
ppm(i)=1;
end
end
figure(1);
subplot(1,2,1);
plot(t,m);
xlabel("Time");
ylabel("Amplitude");
title("Message signal");
subplot(1,2,2);
plot(t,c);
xlabel("Time");
ylabel("Amplitude");
title("Carrier signal");
for i=1:n
if (ppm(i)==1 && ppm(i+1)==0)
ppm(i)=1;
else
ppm(i)=0;
end
end
figure(2)
plot(t,ppm');
xlabel("Time");
ylabel("Amplitude");
replot([0 -1 1 3]);
xlabel("Time");
```

```
48 ylabel("Amplitude");
49 title("Pulse position modulation");
50 //Output:-
51 //Enter frequency of carrier 10
52 //Enter frequency of message 2
```