# Scilab Manual for
# Analog Communications
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July 16, 2024

[1]Funded by a grant from the National Mission on Education through ICT, http://spoken-tutorial.org/NMEICT-Intro. This Scilab Manual and Scilab codes written in it can be downloaded from the "Migrated Labs" section at the website http://scilab.in

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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)
```

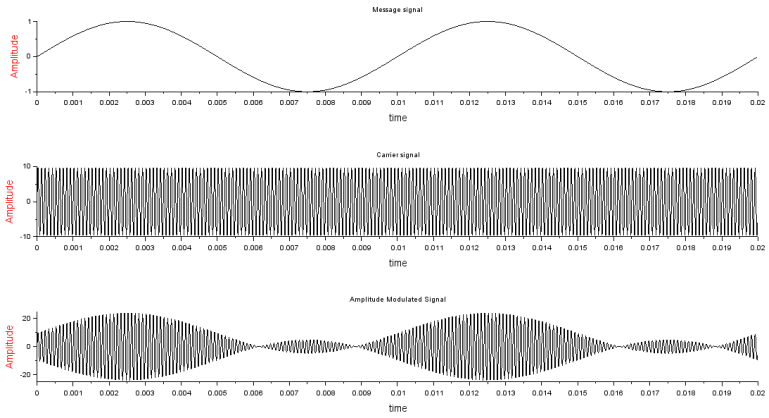


Figure 1.1: To Plot the time domain representation of an Amplitude modulated wave for overmodulation case

```
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)
```

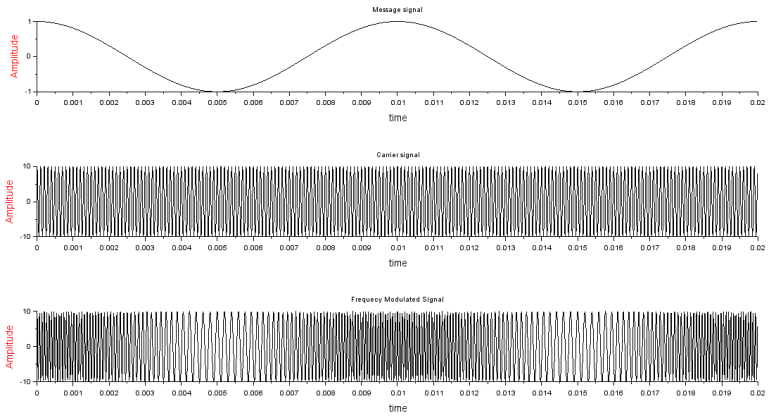


Figure 2.1: To plot the time domain representation of a Frequency Modulated wave and calculate its modulation Index

```
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;
```

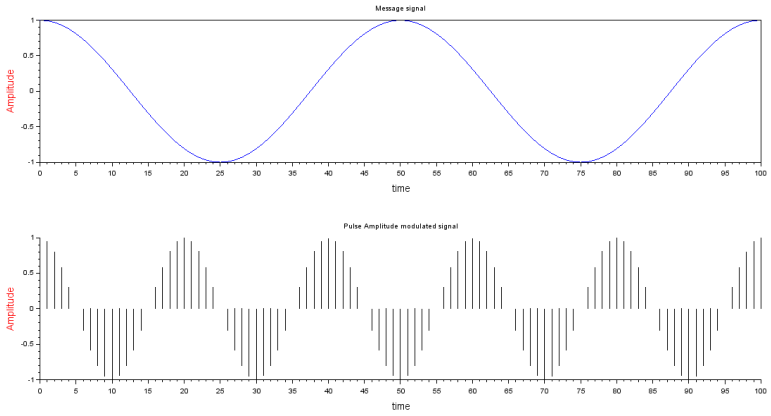


Figure 3.1: To Plot the waveform of a Pulse Amplitude Modulated signal

```
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;
```

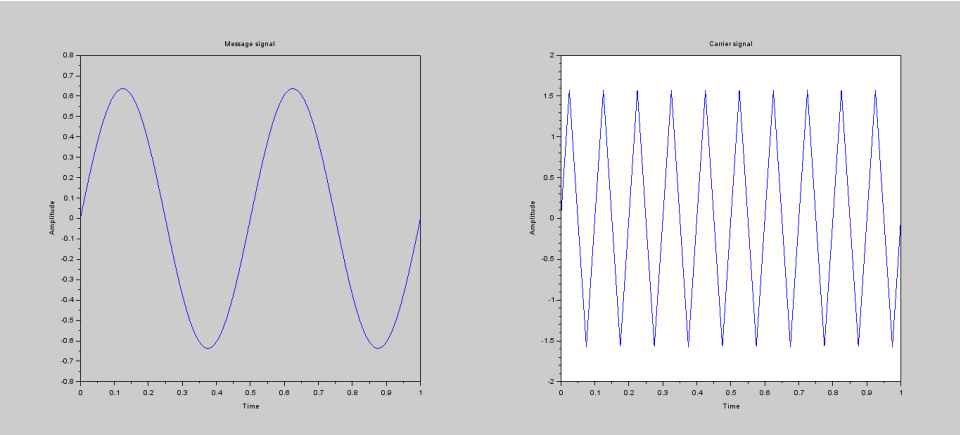


Figure 4.1: To plot the waveform of a PWM Signal

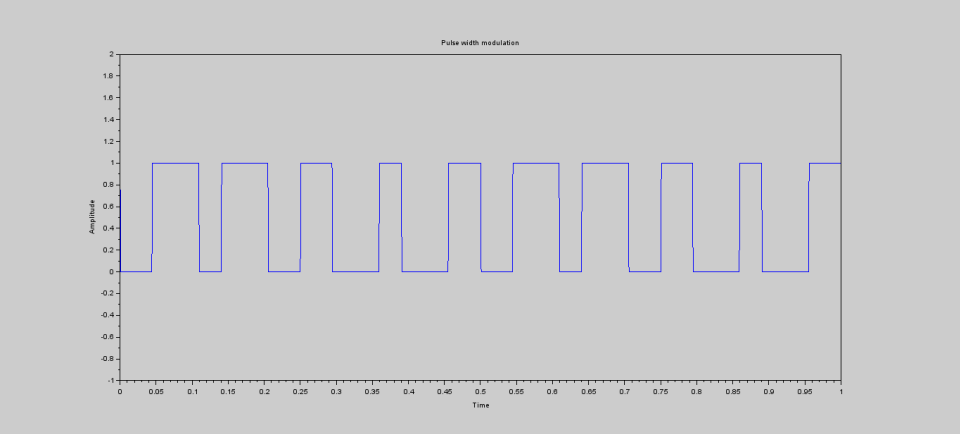


Figure 4.2: To plot the waveform of a PWM Signal

```
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;
```

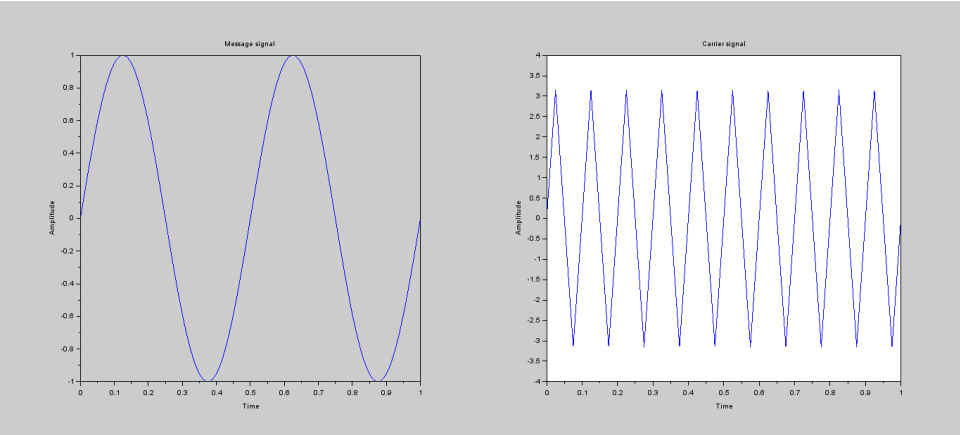


Figure 5.1: To plot the waveform of a PPM Signal

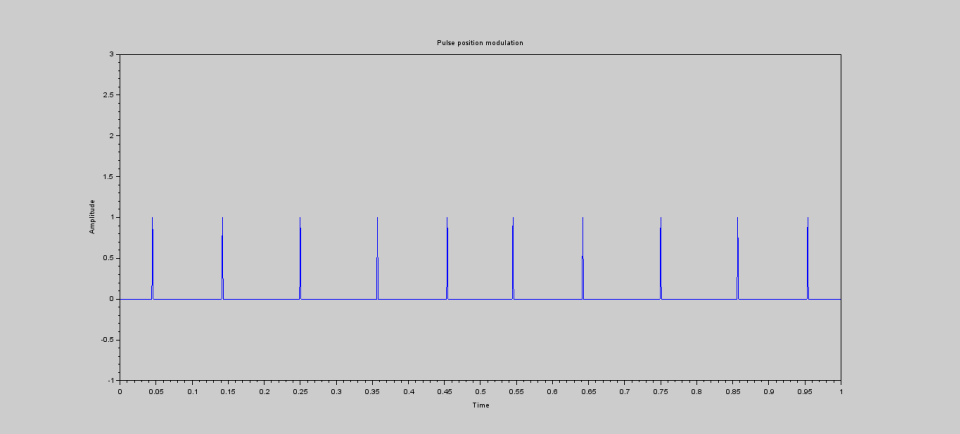


Figure 5.2: To plot the waveform of a PPM Signal

```
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
```