

Scilab Manual for  
Analog Communications  
by Prof Sanjana Mathew  
Others  
Sreyas Institute Of Engineering &technology<sup>1</sup>

Solutions provided by  
Prof Sanjana Mathew  
Others  
Sreyas Institute Of Engineering &technology

June 10, 2026

<sup>1</sup>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)
```

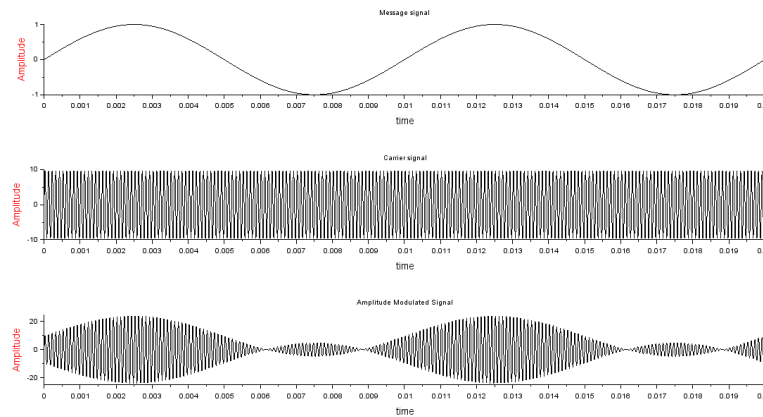


Figure 1.1: To Plot the time domain representation of an Amplitude modulated wave for overmodulation case

```

8  clf()
9  clc
10 Ec=10,ma=1.5,wm=2*%pi*100,wc=2*%pi*10000,fs=100000,f
    =100
11 x=0:1/fs:((2/f)-(1/fs))
12
13 // generation of modulating signal
14 deff (" [m]=f(x)", "m=sin(wm*x)")
15 subplot(3,1,1)
16 fplot2d(x,f)
17
18 xlabel("time", "fontsize", 3);
19 ylabel("Amplitude", "fontsize", 3, "color", "red");
20 title("Message signal")
21
22 // generation of carrier signal
23 deff (" [c]=f(x)", "c=Ec*sin(wc*x)")
24 subplot(3,1,2)
25 fplot2d(x,f)
26 xlabel("time", "fontsize", 3);
27 ylabel("Amplitude", "fontsize", 3, "color", "red");
28 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)
```

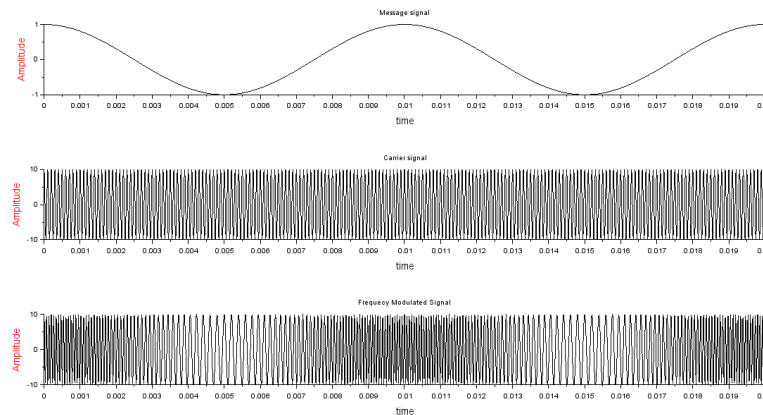


Figure 2.1: To plot the time domain representation of a Frequency Modulated wave and calculate its modulation Index

```

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 frequency 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

```

```

21 previousprot = funcprot(1)
22 deff(" [m]=f(x)", "m=cos(wm*x)")
23 subplot(3,1,1)
24 fplot2d(x,f)
25 xlabel("time", "fontsize", 3);
26 ylabel("Amplitude", "fontsize", 3, "color", "red");
27 title("Message signal")
28
29 //Generation of Carrier signal
30 funcprot(0)
31 deff(" [c]=f(x)", "c=Ec*cos(wc*x)")
32 subplot(3,1,2)
33 fplot2d(x,f)
34 xlabel("time", "fontsize", 3);
35 ylabel("Amplitude", "fontsize", 3, "color", "red");
36 title("Carrier signal")
37
38 //Generation of Frequency Modulated (FM) Signal
39 funcprot(0)
40 deff(" [y]=f(x)", "y=Ec*cos((wc*x)+mf*sin(wm*x))")
41 subplot(3,1,3)
42 fplot2d(x,f)
43 xlabel("time", "fontsize", 3);
44 ylabel("Amplitude", "fontsize", 3, "color", "red");
45 title("Frequency Modulated Signal")
46
47 //TEST CASE
48 //   Input:Enter the frequency deviation constant(kf
      )of FM in Hz/volt:=1000
49 //   :Enter the amplitude of message signal:=5
50 //   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 //Experiment 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;
```

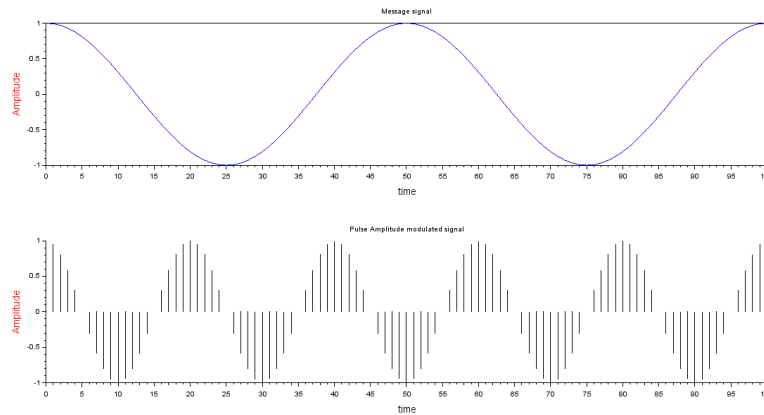


Figure 3.1: To Plot the waveform of a Pulse Amplitude Modulated signal

```

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 //Experiment 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;
```

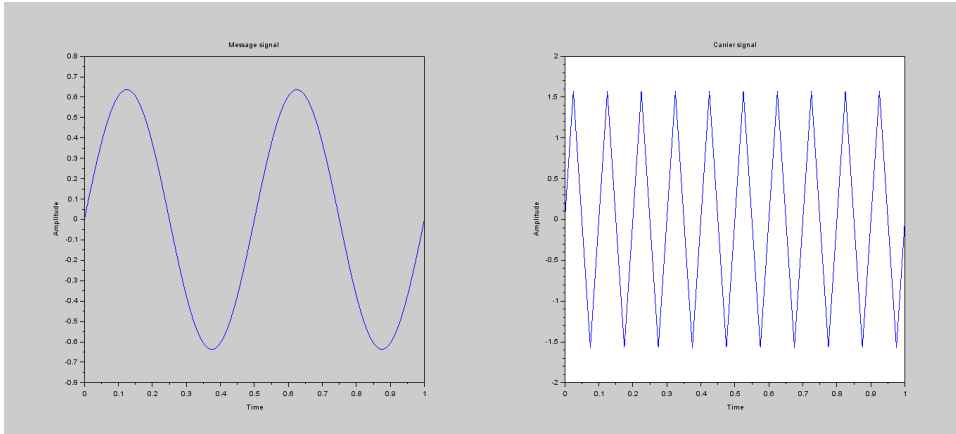


Figure 4.1: To plot the waveform of a PWM Signal

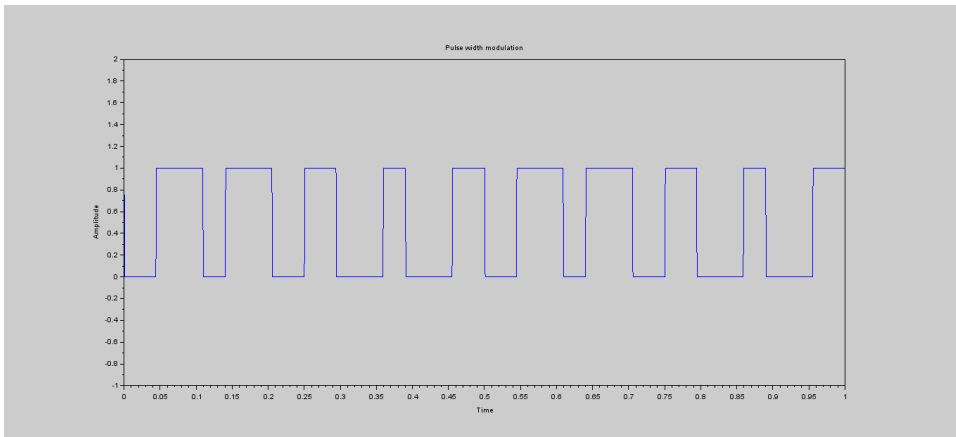


Figure 4.2: To plot the waveform of a PWM Signal

```

10 clear;
11 t=0:0.001:1;
12 f=input("Enter frequency of carrier");
13 c=asin(sin(2*pi*f*t));
14 f1=input("Enter frequency of message");
15 m=(2/pi)*sin(2*pi*f1*t);
16 n=length(c);
17 for i=1:n
18 if m(i)>=c(i)
19 pwm(i)=1;
20 else m(i)<=c(i)
21 pwm(i)=0;
22 end
23 end
24 figure(1);
25 subplot(1,2,1);
26 plot(t,m);
27 xlabel("Time");
28 ylabel("Amplitude");
29 title("Message signal");
30 subplot(1,2,2);
31 plot(t,c);
32 xlabel("Time");
33 ylabel("Amplitude");
34 title("Carrier signal");
35 figure(2);
36 plot(t,pwm');
37 xlabel("Time");
38 ylabel("Amplitude");
39 replot([0 -1 1 2]);
40 xlabel("Time");
41 ylabel("Amplitude");
42 title("Pulse width modulation");
43
44 //Output:–
45 //Enter frequency of carrier 10
46 //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;
```

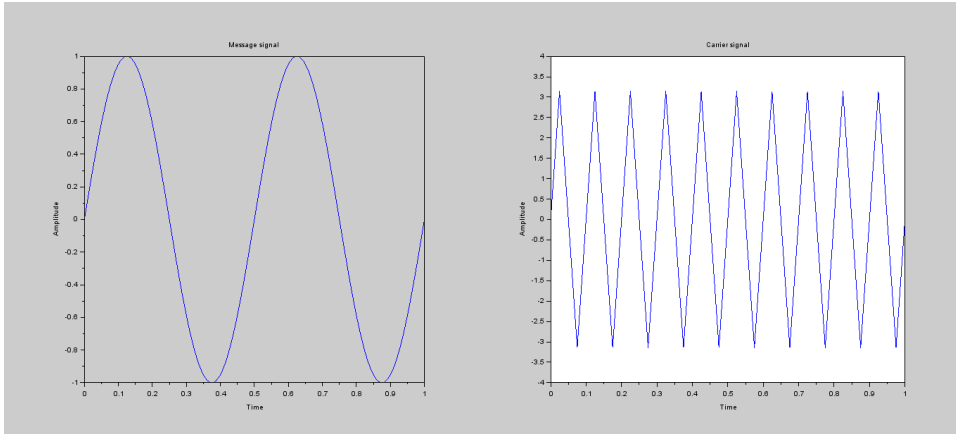


Figure 5.1: To plot the waveform of a PPM Signal

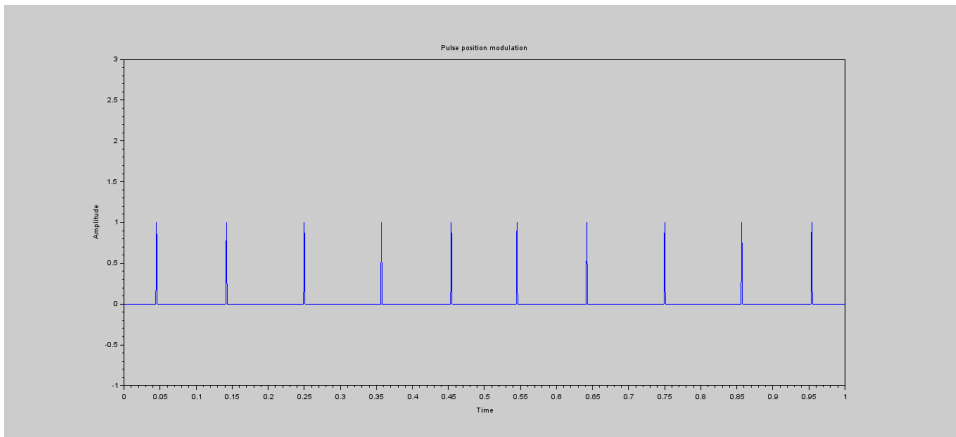


Figure 5.2: To plot the waveform of a PPM Signal

```

10 clear;
11 t=0:0.001:1;
12 f=input("Enter frequency of carrier");
13 c=(2)*asin(sin(2*%pi*f*t));
14 f1=input("Enter frequency of message");
15 m=sin(2*%pi*f1*t);
16 n=length(c);
17 for i=1:n
18 if m(i)>=c(i)
19 ppm(i)=0;
20 else m(i)<=c(i)
21 ppm(i)=1;
22 end
23 end
24 figure(1);
25 subplot(1,2,1);
26 plot(t,m);
27 xlabel("Time");
28 ylabel("Amplitude");
29 title("Message signal");
30 subplot(1,2,2);
31 plot(t,c);
32 xlabel("Time");
33 ylabel("Amplitude");
34 title("Carrier signal");
35 for i=1:n
36 if (ppm(i)==1 && ppm(i+1)==0)
37 ppm(i)=1;
38 else
39 ppm(i)=0;
40 end
41 end
42 figure(2)
43 plot(t,ppm');
44 xlabel("Time");
45 ylabel("Amplitude");
46 replot([0 -1 1 3]);
47 xlabel("Time");

```

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

---