

Scilab Manual for
Analog Communications
by Prof Sanjana Mathew
Others
Sreyas Institute Of Engineering &technology¹

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

June 30, 2026

¹Funded 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>

Contents

List of Scilab Solutions	3
1 To Plot the time domain representation of an Amplitude modulated (AM) wave for overmodulation case	5
2 To plot the time domain representation of a Frequency Modulated wave and calculate its modulation Index.	8
3 To Plot the waveform of a Pulse Amplitude Modulated (PAM) signal.	11
4 To plot the waveform of a Pulse Width modulated (PWM) signal.	13
5 To plot the waveform of a Pulse Position modulated (PPM) signal.	16

List of Experiments

Solution 1.1	To Plot the time domain representation of an Amplitude modulated wave for overmodulation case .	5
Solution 2.1	To plot the time domain representation of a Frequency Modulated wave and calculate its modulation Index	8
Solution 3.1	To Plot the waveform of a Pulse Amplitude Modulated signal	11
Solution 4.1	To plot the waveform of a PWM Signal	13
Solution 5.1	To plot the waveform of a PPM Signal	16

List of Figures

1.1	To Plot the time domain representation of an Amplitude modulated wave for overmodulation case	6
2.1	To plot the time domain representation of a Frequency Modulated wave and calculate its modulation Index	9
3.1	To Plot the waveform of a Pulse Amplitude Modulated signal	12
4.1	To plot the waveform of a PWM Signal	14
4.2	To plot the waveform of a PWM Signal	14
5.1	To plot the waveform of a PPM Signal	17
5.2	To plot the waveform of a PPM Signal	17

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)
```

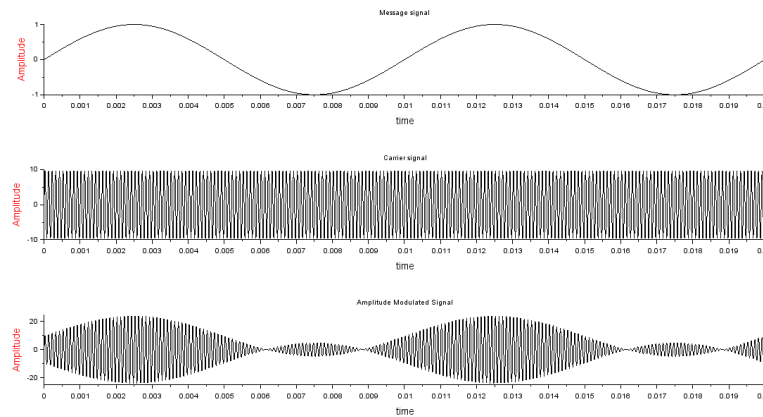


Figure 1.1: To Plot the time domain representation of an Amplitude modulated wave for overmodulation case

```

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 //Experiment 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)
```

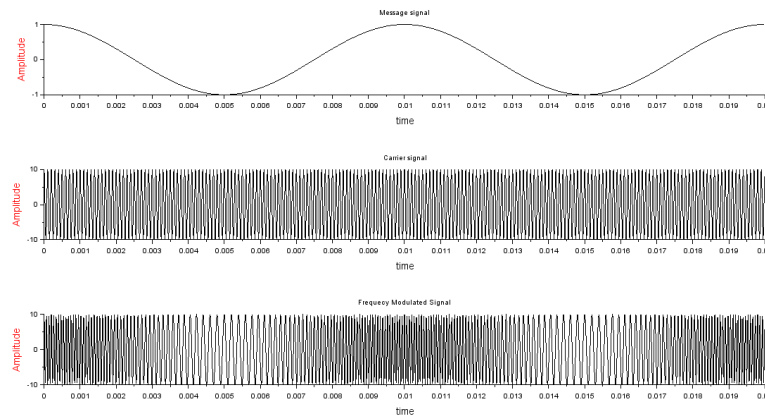


Figure 2.1: To plot the time domain representation of a Frequency Modulated wave and calculate its modulation Index

```

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;
```

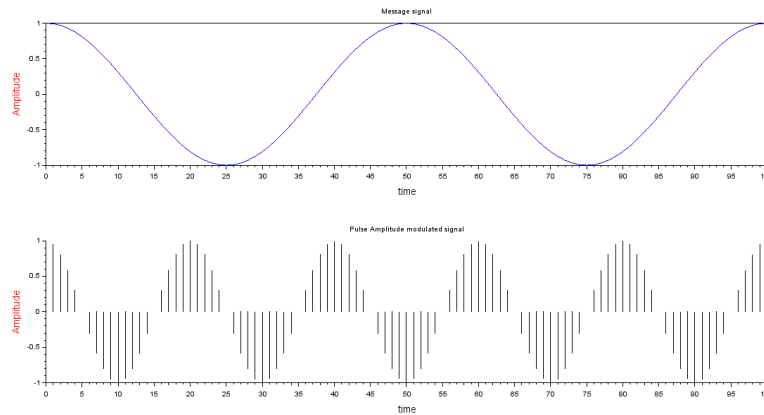


Figure 3.1: To Plot the waveform of a Pulse Amplitude Modulated signal

```

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;
```

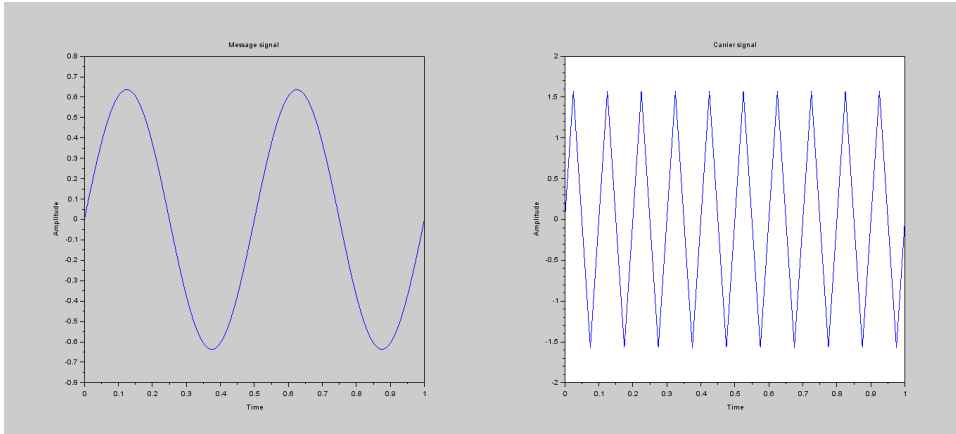


Figure 4.1: To plot the waveform of a PWM Signal

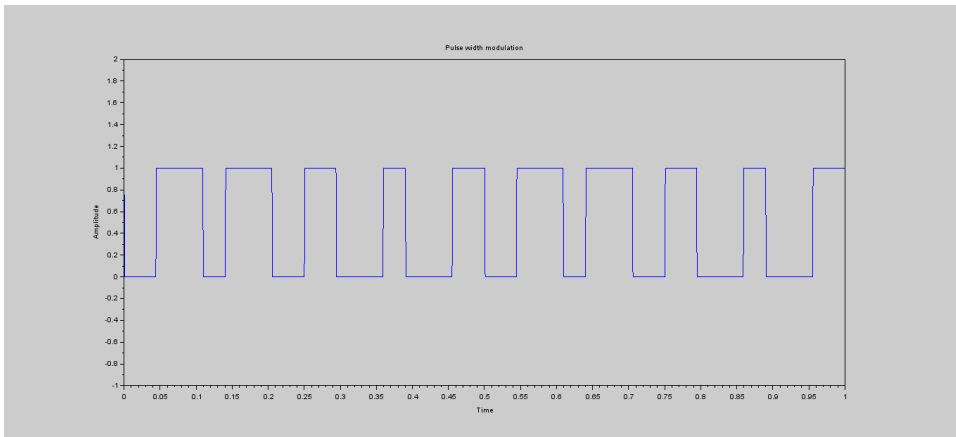


Figure 4.2: To plot the waveform of a PWM Signal

```

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 //Experiment 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;
```

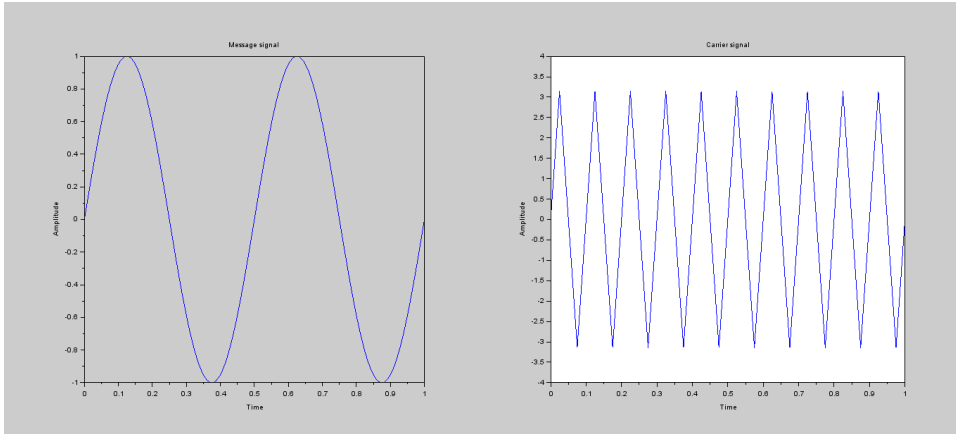


Figure 5.1: To plot the waveform of a PPM Signal

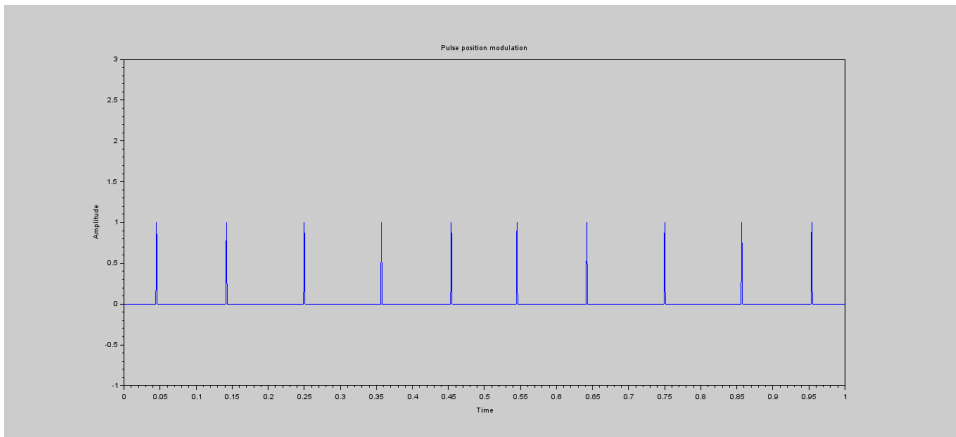


Figure 5.2: To plot the waveform of a PPM Signal

```

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
```
