Experiment: 2

Generation of Various Signals & Sequences (Periodic/Aperiodic), such as Unit Impulse, Unit Step, Square, Sawtooth, Triangular

Scilab code Solution 2.1 Generation Of Unit Impulse and Unit Step Signal and Sequences

```
1 //Experiment Number:2.1
2 //Write a program to generate unit impulse and unit
      step Signals and Sequences
3 //Basic Simulation Laboratory
4 //B.Tech II Year I Sem
5 //Studdent Name:                Enrolement Number:
6 // Course Instructor: Dr.Kantipudi MVV Prasad,
7 // Sreyas Institute Of Engineering & Technlogy,
     Hyderabad.
8 //
```
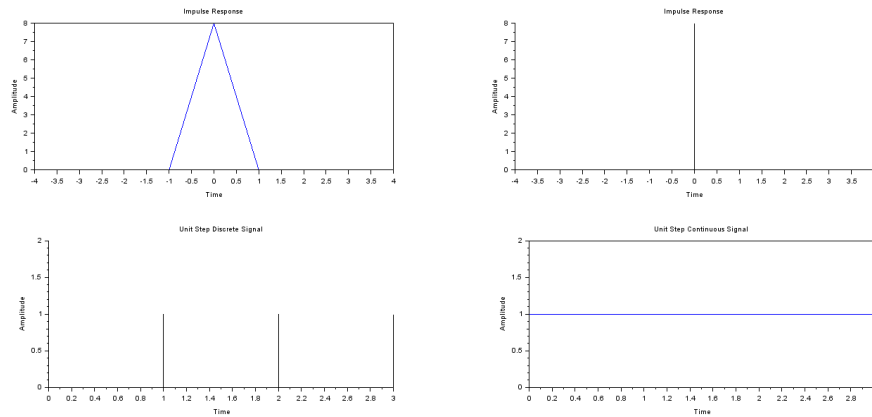
Figure 2.1: Generation Of Unit Impulse and Unit Step Signal and Sequences

_____

```
 9
10  // OS : Windows 10.1
11  // Scilab 6.0.2
12
13
14  clc ;
15  close
16  clear ;
17
18  // Unit Impulse Signal and Sequence
19
20  t = -4:1:4;
21  a=[ zeros (1 ,4) 1 zeros (1 ,4)];
22  k= input (" Enter the Amplitude : "); // reading
       amplitude value from keyboard
23  b=k*a ;
24
25  subplot (2 ,2 ,1) ;
26  plot (t ,b) ;
27  xlabel (" Time ") ;
28  ylabel (" Amplitude ") ;
```

```
29  title (" Impulse  Response");
30
31  subplot (2 ,2 ,2);
32  plot2d3(t,b);
33  xlabel("Time");
34  ylabel("Amplitude");
35  title (" Impulse  Response");
36
37  // Unit  Step  Signal  and  Sequence :
38
39  // Discrete  Signal
40
41  t=0:3;
42  y=ones(1,4);
43
44  subplot (2 ,2 ,3);
45  plot2d3 (t,y);
46  xlabel('Time');
47  ylabel('Amplitude');
48  title ('Unit  Step  Discrete  Signal');
49
50  // Continuous  Signal
51
52  subplot (2 ,2 ,4);
53  plot(t,y);
54  xlabel('Time');
55  ylabel('Amplitude');
56  title ('Unit  Step  Continuous  Signal');
57
58  // Enter  the  Amplitude  : 8
```

Scilab code Solution 2.2 Generation Of Square Wave and Sawtooth Wave Signals and Sequences
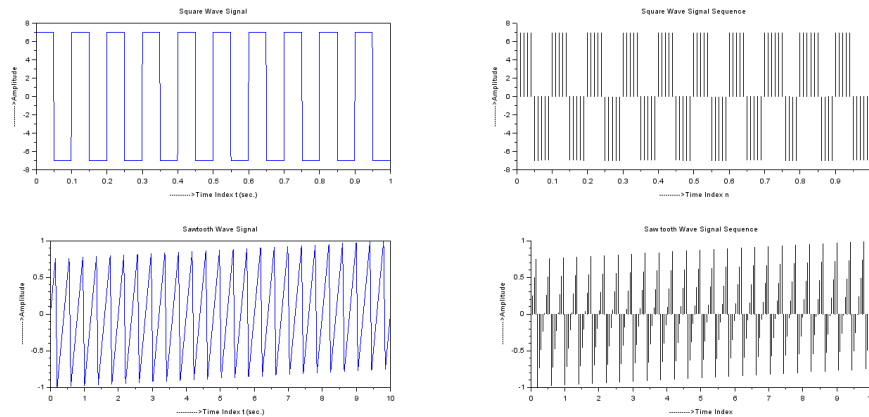
Figure 2.2: Generation Of Square Wave and Sawtooth Wave Signals and Sequences

```
1  //Experiment Number:2.2
2  //Write a program to generate square wave and
       sawtooth wave Signals and Sequences
3  //Basic Simulation Laboratory
4  //B.Tech II Year I Sem
5  //Studdent Name:                    Enrolement Number:
6  // Course Instructor: Dr.Kantipudi MVV Prasad,
7  // Sreyas Institute Of Engineering & Technlogy,
       Hyderabad.
8  //_____

9
10 // OS : Windows 10.1
11 // Scilab 6.0.2
12
13
14 clc;
15 close;
16 clear ;
17
18
```

14

```scilab
19  // continuous square wave Signal:
20
21  a=input('Enter Amplitude : ');
22  t=0:0.001:1;
23  d=a*squarewave(2*%pi*10*t);
24
25  subplot(2,2,1);
26  plot(t,d);
27  xlabel ("-------------->Time Index t (sec.)");
28  ylabel ("------------>Amplitude");
29  title (" Square Wave Signal ");
30
31  // discrete square wave signal
32
33  //a=input('Enter amplitude');
34  n=0 : 0.01 :1;
35  d=a*squarewave(2*%pi*10*n);
36
37  subplot(2,2,2);
38  plot2d3(n,d);
39  xlabel ("------------>Time Index n");
40  ylabel ("------------>Amplitude");
41  title ("Square Wave Signal Sequence");
42
43  // Sawtooth Wave Signal
44
45  Fs = 20; // samples per second
46  t_total = 10; // seconds
47  n_samples = Fs * t_total;
48  t = linspace(0, t_total, n_samples);
49  f=500; // sound frequency
50
51  saw_wave=2*(f*t-floor(0.5+f*t));
52
53  subplot(2,2,3);
54  plot(t,saw_wave);
55  xlabel ("-------------->Time Index t (sec.)");
56  ylabel ("-------------->Amplitude");
```

```
57  title (" Sawtooth Wave Signal ");
58
59  // sawtooth wave sequence
60
61  Fs = 20; // samples per second
62  t_total = 10; // seconds
63  n_samples = Fs * t_total;
64  n = linspace(0, t_total, n_samples);
65  f=500; // sound frequency
66
67  saw_wave=2*(f*n-floor(0.5+f*n));
68
69  subplot(2,2,4);
70
71  plot2d3(n,saw_wave);
72  xlabel ("——————————>Time Index ");
73  ylabel ("——————————>Amplitude");
74  title ("Saw tooth Wave Signal Sequence");
75
76
77  // Input Parameters
78  //   Enter Amplitude : 7
```

Scilab code Solution 2.3 Generation Of Triangular and Sinusoidal Signal and Sequences

```
1  //Experiment Number:2.3
2  //Write a program to generate Triangular and
       Sinusoidal Signals and Sequences
3  //Basic Simulation Laboratory
4  //B.Tech II Year I Sem
5  //Studdent Name:                Enrolement Number:
6  // Course Instructor: Dr.Kantipudi MVV Prasad,
```
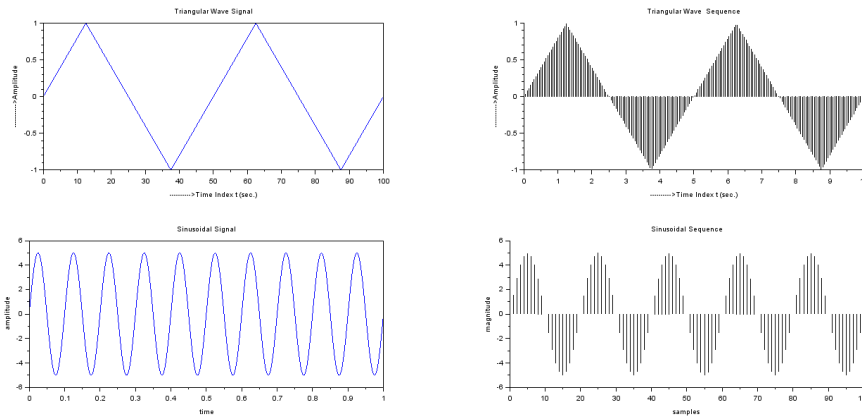
Figure 2.3: Generation Of Triangular and Sinusoidal Signal and Sequences

```scilab
 7  // Sreyas Institute Of Engineering & Technlogy ,
        Hyderabad .
 8  //
        _____


 9
10
11  // OS : Windows 10.1
12  // Scilab 6.0.2
13
14
15  clc ;
16  close ;
17  clear ;
18
19  // Triangular Wave Signal
20
21  Fs = 20; // samples per second
22  t_total = 100; // seconds
23  n_samples = Fs * t_total ;
24  t = linspace (0 , t_total , n_samples );
25  f =40; // sound frequency
26
```

```
27  tri_wave=(2/%pi)*asin(sin(2*%pi*f*t));
28
29  subplot(2,2,1);
30
31  plot(t,tri_wave);
32  xlabel ('------------>Time  Index  t  ( sec . ) ' );
33  ylabel ('------------>Amplitude');
34  title ('Triangular  Wave  Signal ');
35
36  // traiangular  wave  sequence
37
38  Fs = 20; // samples per second
39  t_total = 10; // seconds
40  n_samples = Fs * t_total;
41  n = linspace(0, t_total, n_samples);
42  f=40; // sound frequency
43
44  tri_wave=(2/%pi)*asin(sin(2*%pi*f*n));
45
46  subplot(2,2,2);
47  plot2d3(n,tri_wave);
48  xlabel ('------------>Time  Index  t  ( sec . ) ' );
49  ylabel ('------------>Amplitude');
50  title ('Triangular  Wave   Sequence');
51
52
53  // continuous  Sinusoidal  Signal
54
55  a=input('Enter  amplitude  for  Sinusoidal  Signal:  ');
56  t=0:0.001:1;
57  p=a*sin(2*%pi*10*t);
58
59  subplot(2,2,3);
60  plot(t,p);
61  title('Sinusoidal  Signal');
62  xlabel('time');
63  ylabel('amplitude');
64
```
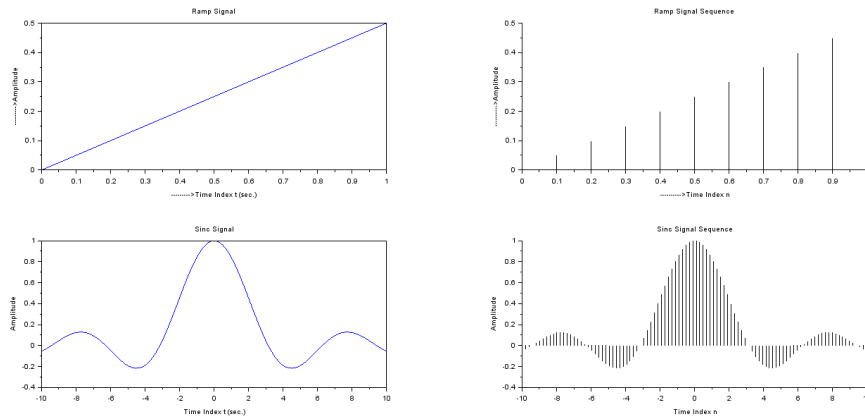
Figure 2.4: Generation Of Ramp and Sinc Signals and Sequences

```
65  // discrete  sinuoidal  signal
66
67  //a=input('Enter  magnitude');
68  n = 0:100;
69  x =a*sin(((2*0.05)*%pi)*n);
70
71  subplot(2,2,4);
72  plot2d3(n,x);
73  title("Sinusoidal  Sequence");
74  xlabel("samples");
75  ylabel("magnitude");
76
77  // After  Getting  Trainagular  wave  output  ,vist  the
         command  window  to  enter  Input  Parameters
78  //   Enter  amplitude  for  Sinusoidal  Signal: 5
```

Scilab code Solution 2.4 Generation Of Ramp and Sinc Signals and Sequences

19

```
1  //Experiment Number:2.4
2  //Write a program to generate ramp and sinc Signals
       and Sequences
3  //Basic Simulation Laboratory
4  //B.Tech II Year I Sem
5  //Studdent Name:                    Enrolement Number:
6  // Course Instructor: Dr.Kantipudi MVV Prasad,
7  // Sreyas Institute Of Engineering & Technlogy,
       Hyderabad.
8  //_____

9
10  // OS : Windows 10.1
11  // Scilab 6.0.2
12
13
14  clc;
15  close
16  clear ;
17
18  //continuous ramp signal
19
20  t = 0 : 0.001 : 1;
21  y = 0.5 * t;
22
23  subplot(2,2,1);
24  plot( t , y );
25  xlabel ('--------->Time Index t (sec.)');
26  ylabel ('--------->Amplitude');
27  title ('Ramp Signal');
28
29  //discrete ramp signal
30
31  n = 0 : 0.1 : 1;
32  y = 0.5 * n;
33
34  subplot(2,2,2);
```

```
35  plot2d3(n,y);
36  xlabel ('——————>Time Index n');
37  ylabel ('——————>Amplitude');
38  title ('Ramp Signal Sequence');
39
40  //continuous sinc signal
41
42  t=linspace(-10 , 10);
43  y=sinc(t);
44
45  subplot(2,2,3);
46  plot(t,y);
47  xlabel("Time Index t (sec.)");
48  ylabel("Amplitude");
49  title("Sinc Signal ");
50
51  //discrete sinc signal
52
53  n =linspace(-10 , 10);
54  y =sinc(n);
55
56  subplot(2,2,4);
57  plot2d3(n,y);
58  xlabel("Time Index n");
59  ylabel("Amplitude");
60  title("Sinc Signal Sequence");
```