JNTUH COLLEGE OF ENGINEERING HYDERABAD

MATLAB

1.BASIC OPERATIONS ON MATRICES

- a=[1 3 4;2 5 1;6 9 5]

```
a =

     1     3     4
     2     5     1
     6     9     5
b=[2 8 5;4 8 2;8 0 3];
>> a+b

ans =

     3    11     9
     6    13     3
    14     9     8

>> a-b

ans =
```

```
     -1     -5     -1
     -2     -3     -1
     -2      9      2

>> a*b

ans =

     46     32     23
     32     56     23
     88    120     63

>> a.*b

ans =

      2     24     20
      8     40      2
     48      0     15

>> a/b

ans =

     0.9167   -0.5417    0.1667
    -0.0167    0.6417   -0.0667
```

```
    0.5833    0.5417    0.3333

>> a./b

ans =

    0.5000    0.3750    0.8000
    0.5000    0.6250    0.5000
    0.7500       Inf    1.6667

>> a\b

ans =

    0.4545   -6.7273   -1.6136
    0.6364    4.1818    0.8409
   -0.0909    0.5455    1.0227

>> a.\b

ans =

    2.0000    2.6667    1.2500
    2.0000    1.6000    2.0000
    1.3333         0    0.6000

>> a^2
```

```
ans =

    31    54    27
    18    40    18
    54   108    58

>> a.^2

ans =

     1     9    16
     4    25     1
    36    81    25

>> a'

ans =

     1     2     6
     3     5     9
     4     1     5

>> a.'
ans =

     1     2     6
```

```
     3     5     9
     4     1     5
```

- EXTRACTION OF MATRICES

```
>> b(1:1,1:3)

ans =

     2     8     5

>> b(1:3,1:1)

ans =

     2
     4
     8

>> b(1:2,1:2)

ans =

     2     8
     4     8

>> b(2:3,2:3)
```

```
ans =

     8     2
     0     3

>> inv(b)

ans =

   -0.1000    0.1000    0.1000
   -0.0167    0.1417   -0.0667
    0.2667   -0.2667    0.0667

>> size(b)

ans =

     3     3

>> det(b)

ans =

  -240
```

- SOLVING LINEAR EQUATIOS

```
a =
```

```
     3     4    -2     2
     4     9    -3     5
    -2    -3     7     5
     1     4     6     7

>> b=[2;8;10;2];
>> x=inv(a)*b

x =

   -2.4000
   -2.0857
   -3.7429
    5.0286

a =

     2     8     5
     4     8     2
     8     0     3

>> e=eig(a)

e =
```

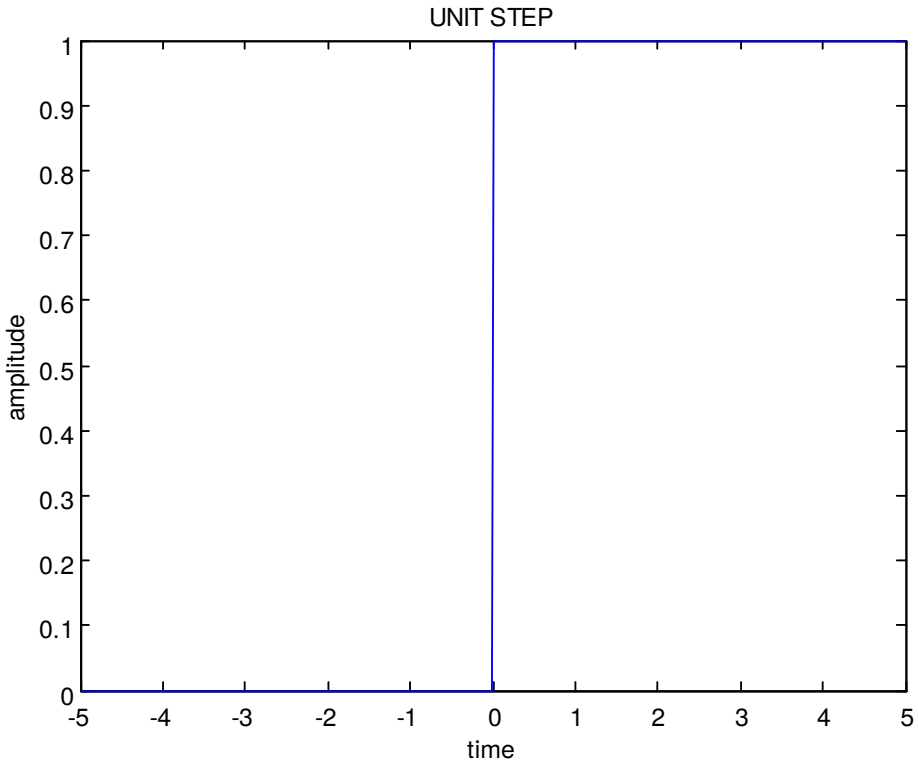
```
-4.5172

13.6149

 3.9023
```

2.BASIC GENERATION OF SIGNALS

- UNIT STEP

  - t=-5:.01:5;

  - a=[zeros(1,500) ones(1,501)];
  - plot(t,a);
  - xlabel('time')
  - ylabel('amplitude')
  - title('UNIT STEP')
  -

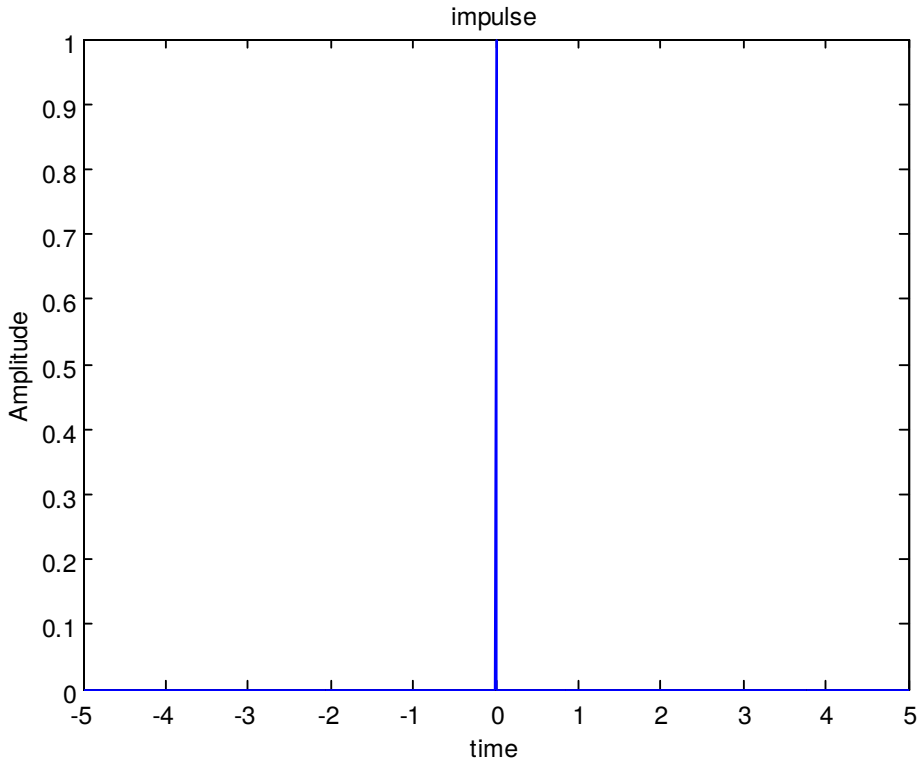


- UNIT IMPLUSE

  -

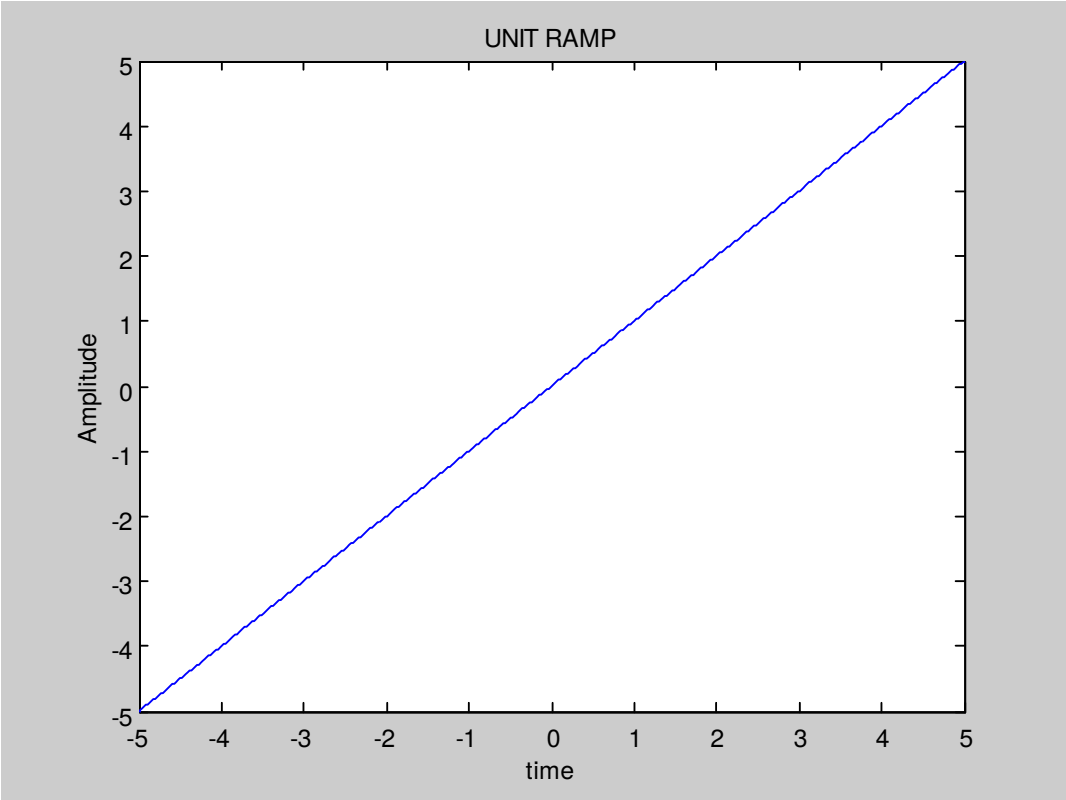
- t=-5:.01:5;
- y=[zeros(1,500) ones(1) zeros(1,500)];

- `xlabel('time');`
- `ylabel('Amplitude');`
- `title('impulse');`
- `plot(t,y);`
-



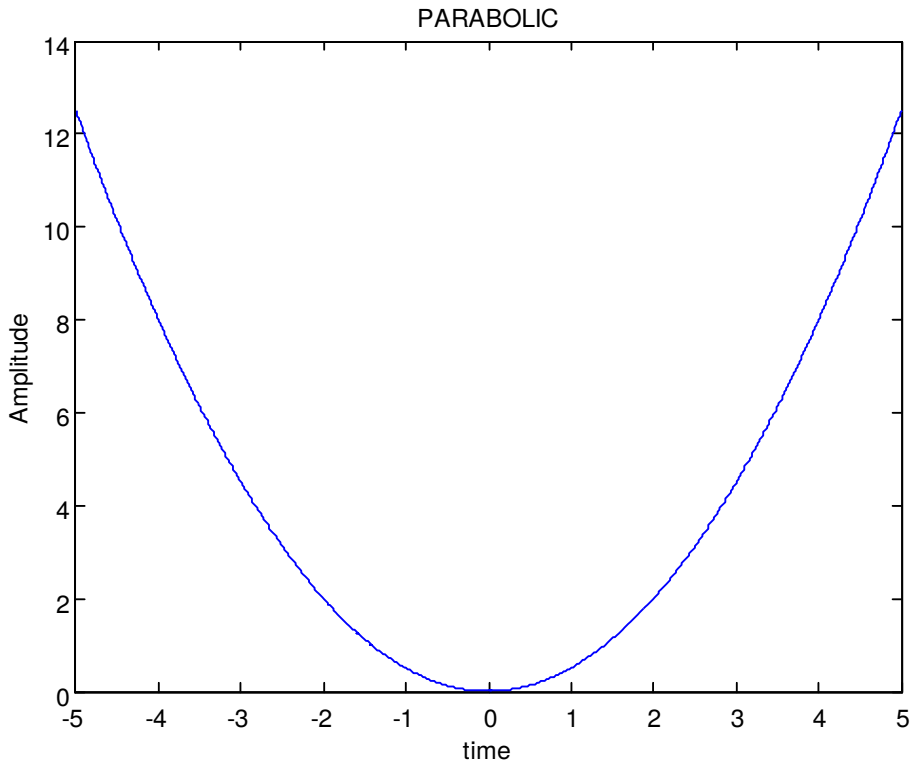
- # UNIT RAMP

- `t=0:.01:5;`
- `y=t;`
-
- `plot(t,y);`
-
- `xlabel('time');`
- `ylabel('Amplitude');`
- `title('impulse');`



- # PARABOLIC FUNCTION

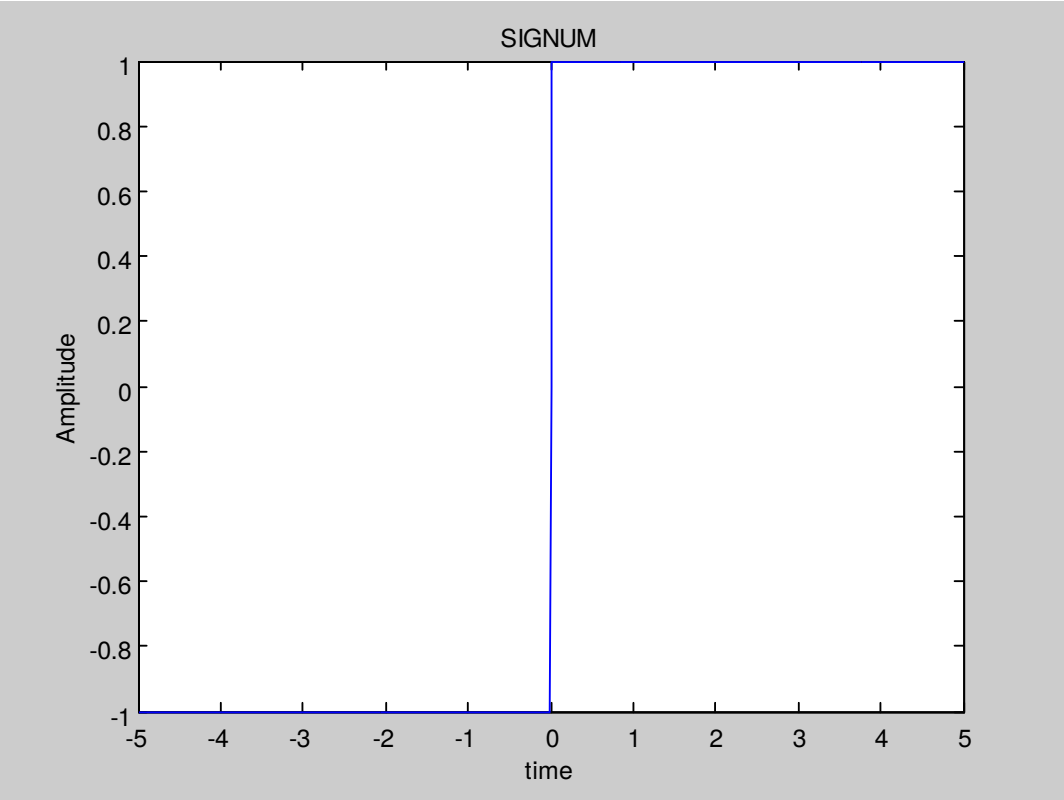
```
t=-5:.01:5;
y=t.^2/2;

plot(t,y);

xlabel('time');
ylabel('Amplitude');
title('parabolic');
```



-
-
-
-
-

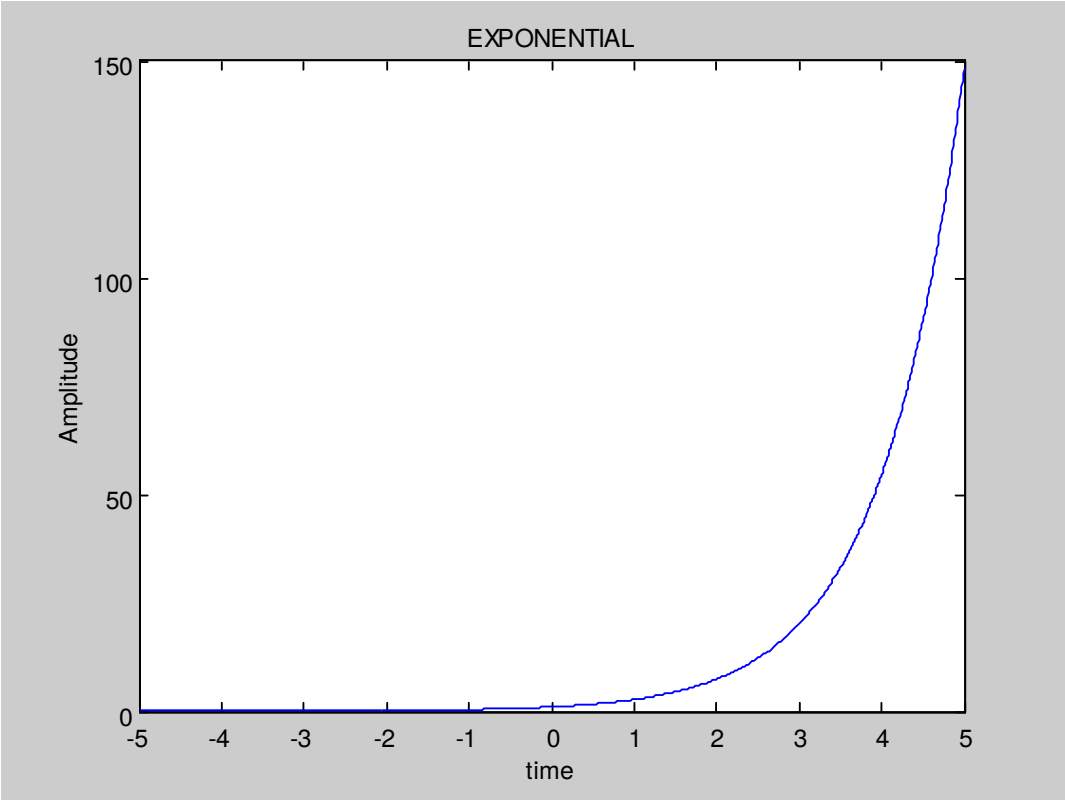
SIGNUM FUNCTION

```
t=-5:.01:5;
y=sign(t);

plot(t,y);

xlabel('time');
ylabel('Amplitude');
title('SIGNUM');
```



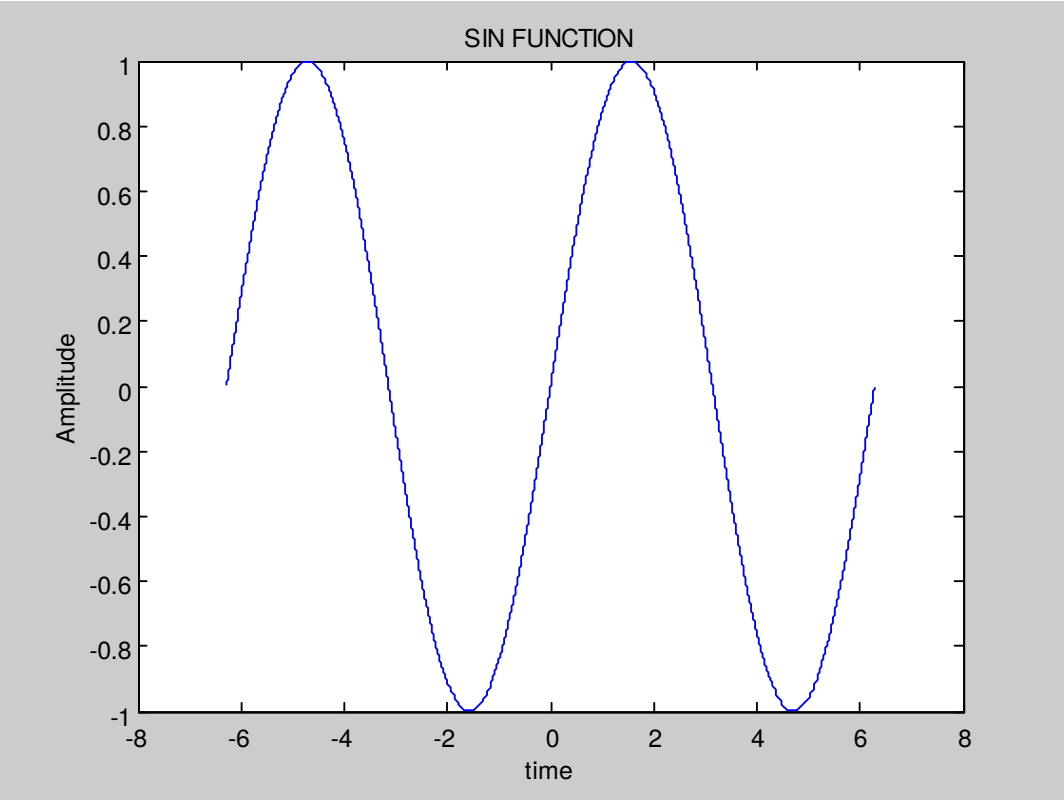
- # EXPONENTIAL FUNCTION

```
t=-5:.01:5;
y=exp(t);

plot(t,y);

xlabel('time');
ylabel('Amplitude');
title('EXPONENTIAL');
```



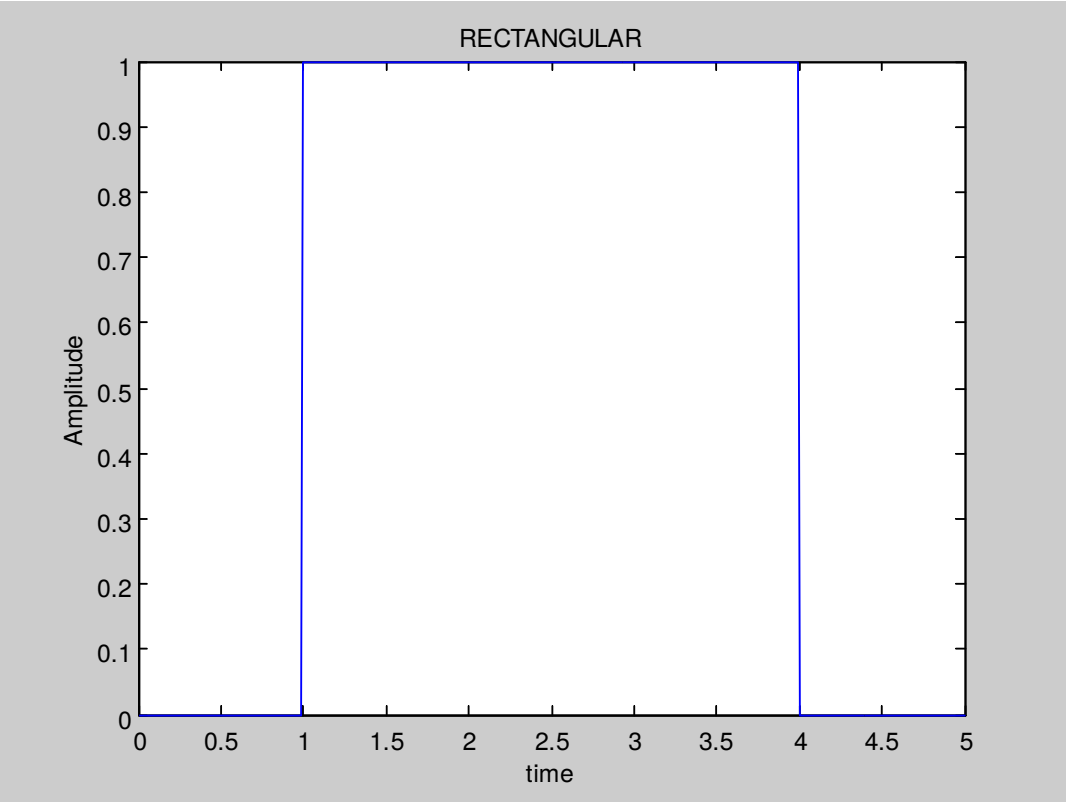
- # SIN FUNCTION

```
t=-2*pi:.001:2*pi;
y=sin(t);

plot(t,y);

xlabel('time');
ylabel('Amplitude');
title('SIN FUNCTION')
```



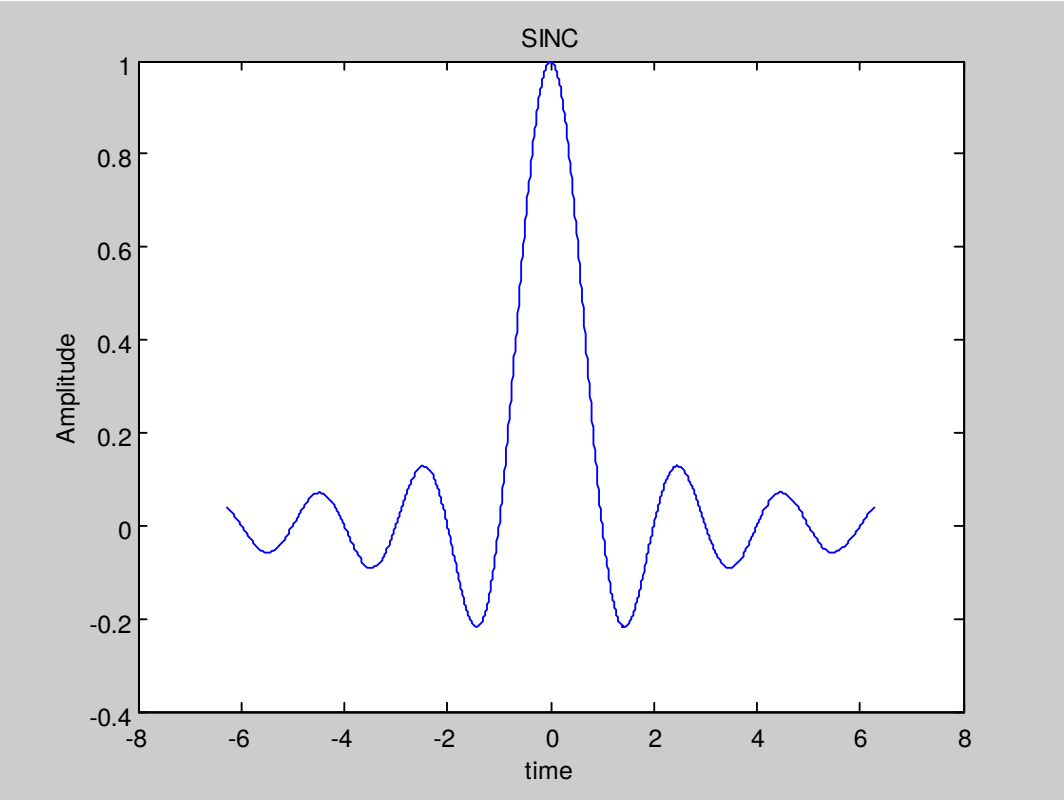
- RECTANGULAR FUNCTION

```
t=0:.01:5;
y=[zeros(1,100) ones(1,300) zeros(1,101)];

plot(t,y);

xlabel('time');
ylabel('Amplitude');
title('RECTANGULAR');
```



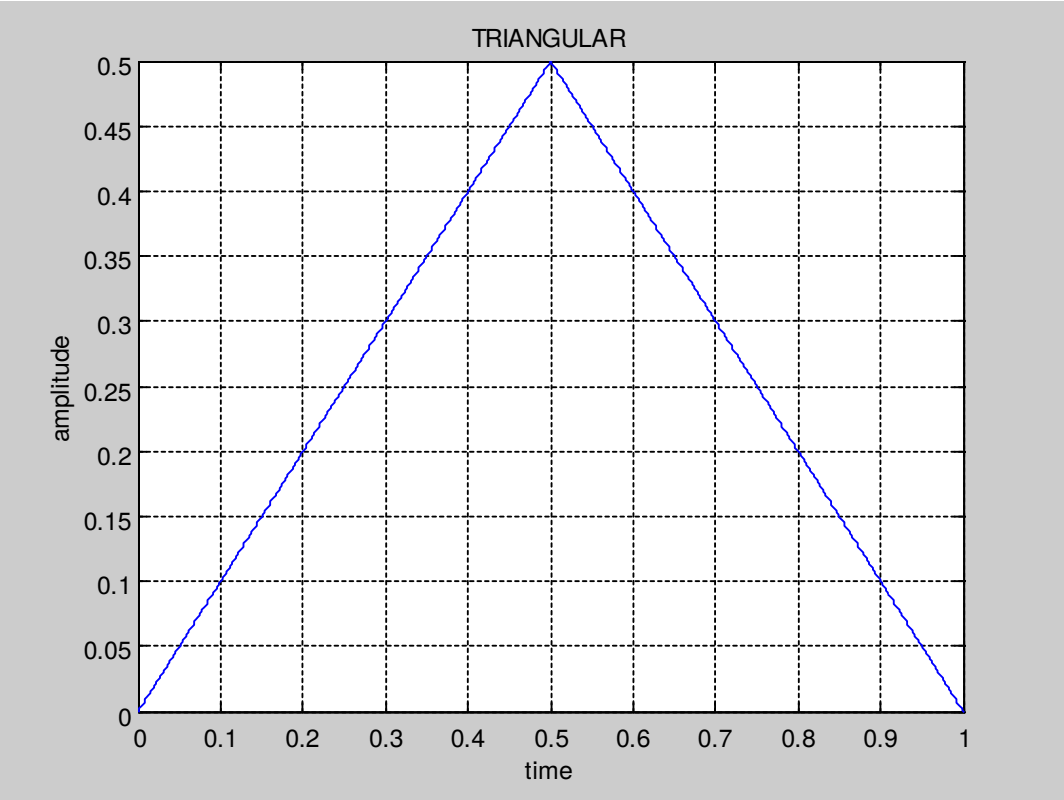
- SINC FUNCTION

```
t=-2*pi:.01:2*pi;
y=sinc(t);

plot(t,y);

xlabel('time');
ylabel('Amplitude');
title('SINC');
```



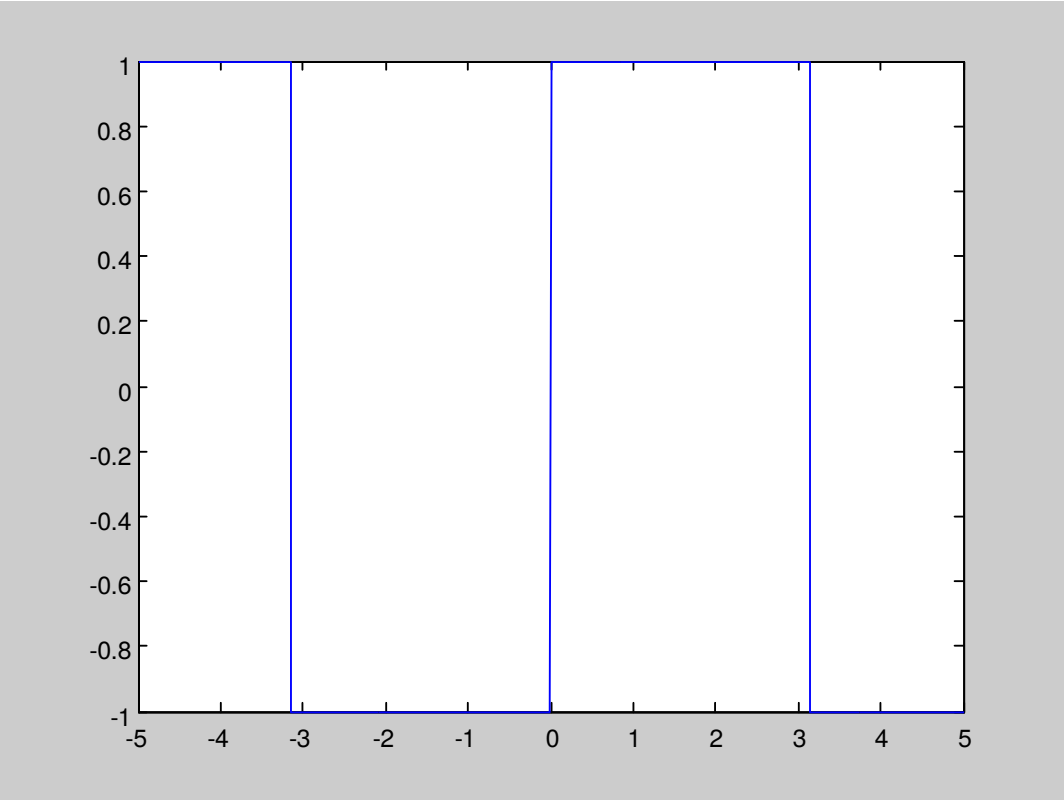
- TRIANGULAR FUNCTION

```
clc
clear all
close all
t=0:0.001:1;
l=length(t);
for i=1:l;
    if t(i)<.5
        u(i)=t(i);
    elseif t(i)>=.5
        u(i)=1-t(i);
    end
end
plot(t,u);
xlabel('time')
ylabel('amplitude')
title('TRIANGULAR')
```



- SQUARE FUNCTION

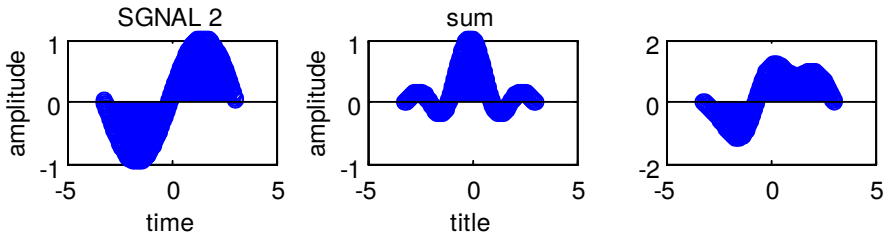
```
t=-5:.001:5;
y=square(t);

xlabel('time');
ylabel('Amplitude');
title('SQUARE FNCTION');
plot(t,y);
```

- 

3.SUM OF THE SIGNALS

```
clear all;
n=input('c=');
t=-n:.01:n;
a=input('enyer the first signal');
b=input('enter the 2nd signal');
out=a+b;
disp('out');
xlabel('time');
ylabel('amplitude');
title('SIGNAL 1');
subplot(3,3,1);
stem(t,a);
xlabel('time');
ylabel('amplitude');
title('SGNAL 2');

subplot(3,3,2);
stem(t,b);
xlabel('title');
ylabel('amplitude');
title('sum');
subplot(3,3,3);
stem(t,out);
```

-
- c=pi
- enyer the first signalsin(t)
- enter the 2nd signalsinc(t)
- out
-
-



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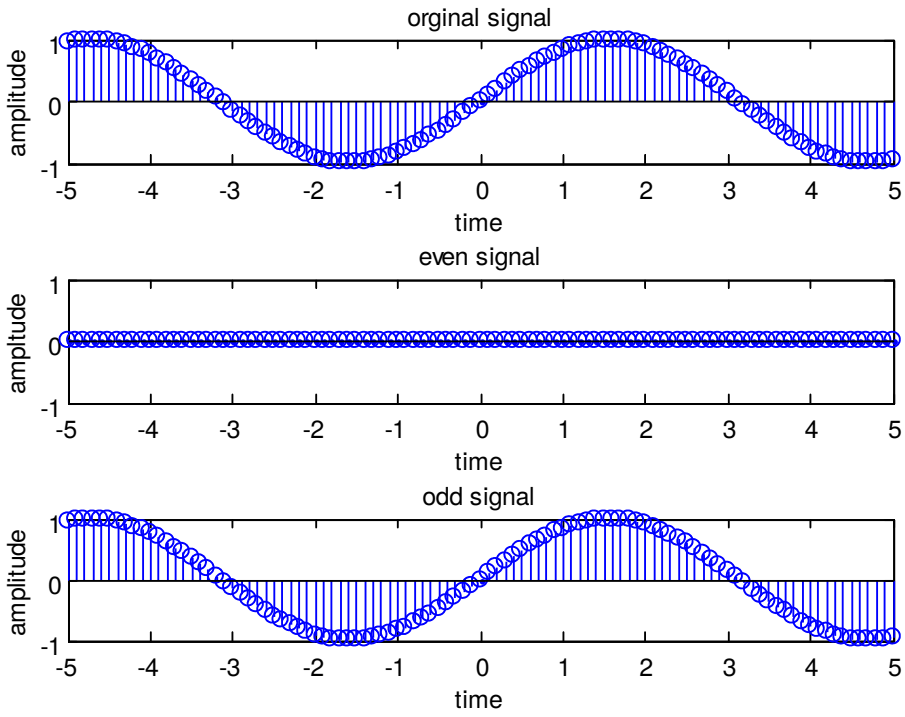
4.ODD AND EVEN PARTS OF A SIGNAL

```
n=input('c=');
t=-n:.1:n;
a=input('enter the signal')
xlabel('time');
ylabel('amplitude');
title('orginal signal');
subplot(3,1,1);
stem(t,a);
b=fliplr(a);
d=(a+b)*.5;
xlabel('time');
ylabel('ampltude');
title('even signal');
```

- subplot(3,1,2);
- stem(t,d);
- e=(a-b)*.5;
- xlabel('time');
- ylabel('amplitude');
- title('odd signal');
-
- subplot(3,1,3);
- stem(t,e);
-

- c=5

- enter signalsin(t)



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5.ORTHOGNALITY OF TWO SIGNALS

```
claer all;
syms t
a=input('ist signal');
b=input('2nd=');
t1=input('tmin=');
t2=input('tmax=');
x1=int(a*b,t1,t2);
if(x1==0)
    disp('orthogonal');
else
    disp('not orthogonal');
```

```
end;
```

1st signalsin(2*pi*t)

2nd=cos(3*pi*t/2)

tmin=0

tmax=3

non orthogonal

6.SHIFTING OF GENERAL SIGNALS

-

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=0,if shifted n=');
if n==0;
t1=n1+n:.001:n2+n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1+n:.001:n2+n;
 t1=t2;
y=x;
end;
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
title('SHIFTED SIGNAL');
```

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=0,if shifted n=');
if n==0;
t1=n1+n:.001:n2+n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1+n:.001:n2+n;
 t1=t2;
y=x;
end;
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
```

```
title('SHIFTED SIGNAL');
```

```
min=0
max=10
for orginal n=0,if shifted n=0
signal=(t1/2.5).*(t1<2.5)+((5-t1)/2.5).*(t1>=2.5&t1<5)+((5-
t1)/2.5).*(t1>=5&t1<7.5)+((t1-10)/2.5).*(t1>=7.5&t1<=10)
for orginal n=0,if shifted n=10
```

-

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=0,if shifted n=');
if n==0;
t1=n1+n:.001:n2+n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1+n:.001:n2+n;
 t1=t2;
y=x;
end;
```

```
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
title('SHIFTED SIGNAL');
```

-

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=0,if shifted n=');
if n==0;
t1=n1+n:.001:n2+n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1+n:.001:n2+n;
```

```
 t1=t2;
y=x;
end;
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
title('SHIFTED SIGNAL');
```

min=0

max=8

for orginal n=0,if shifted n=0

signal=t1.*(t1<2+n)+2.*(t1>=2+n&t1<4+n)+(t1-2).*(t1>=4+n&t1<6+n)-5.*(t1>=6+n&t1<8+n)

for orginal n=0,if shifted n=10

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=0,if shifted n=');
if n==0;
t1=n1+n:.001:n2+n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1+n:.001:n2+n;
 t1=t2;
y=x;
end;
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
title('SHIFTED SIGNAL');
```

7.SCALING OF GENERAL SIGNALS

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=1,if not scaled n=');
if n==1;
t1=n1*n:.001:n2*n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1*n:.01:n2*n;
 t1=t2;
y=x;
end;
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
title('SCALED');
```

min=0

max=10

for orginal n=1,if not scaled n=1

signal=1.*(t1<5*n)-1.*(t1>=5*n&t1<10*n)

for orginal n=1,if not scaled n=10

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=1,if not scaled n=');
if n==1;
t1=n1*n:.001:n2*n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1*n:.01:n2*n;
 t1=t2;
y=x;
end;
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
title('SCALED');
```

min=0

max=10

for orginal n=1,if not scaled n=1

signal=(t1/2.5).*(t1<2.5)+((5-t1)/2.5).*(t1>=2.5&t1<5)+((5-t1)/2.5).*(t1>=5&t1<7.5)+((t1-10)/2.5).*(t1>=7.5&t1<=10)

for orginal n=1,if not scaled n=10

-

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=1,if not scaled n=');
if n==1;
t1=n1*n:.0001:n2*n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1*n:.001:n2*n;
```

```
 t1=t2;
y=x;
end;
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
title('SCALED');
```

```
min=0
max=8
for orginal n=1,if not scaled n=1

signal=1.*(t1<2*n)+2.*(t1>=2*n&t1<4*n)-2.*(t1>=4*n&t1<6*n)-
1.*(t1>=6&t1<8)
for orginal n=1,if not scaled n=10
```

-

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=1,if not scaled n=');
if n==1;
t1=n1*n:.001:n2*n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1*n:.01:n2*n;
 t1=t2;
y=x;
end;
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
title('SCALED');
```

```
min=0
max=8
for orginal n=1,if not scaled n=1
signal=t1.*(t1<2*n)+2.*(t1>=2*n&t1<4*n)+(t1-2).*(t1>=4*n&t1<6*n)-
5.*(t1>=6*n&t1<8*n)
for orginal n=1,if not scaled n=10
```

```
clear all;
n1=input('min=');
n2=input('max=');
for i=1:2
n=input('for orginal n=1,if not scaled n=');
if n==1;
t1=n1*n:.0001:n2*n;
x=input('signal=');
a=x;
b=t1;
else
 t2=n1*n:.001:n2*n;
 t1=t2;
y=x;
end;
end;
subplot(2,1,1);
plot(b,a);
xlabel('time');
ylabel('amplitude');
title('MAIN SIGNAL');
subplot(2,1,2);
plot(t2,y);
xlabel('time');
ylabel('amplitude');
title('SCALED');
```

```
min=0
max=15
for orginal n=1,if not scaled n=1
```

```
signal=t1/5.*(t1<5*n)+1.*(t1>=5*n&t1<10*n)+((15-
t1)/5).*(t1>=10*n&t1<=15*n)
for orginal n=1,if not scaled n=10
```