AUTO CORRELATION AND CROSS CORRELATION OF TWO SEQUENCES

NAME : MANOJ KUMAR.CM

SRN:PES2UG20EC047

findconv.m

```
function [y,ny]=findconv(x,nx,h,nh)
    nybegin=nx(1)+nh(1);
    nyend=nx(length(nx))+nh(length(nh));
    ny=nybegin:nyend;
    y=conv(x,h);
end
```

CROSSCORR.m

```
x=input("Enter the input sequence x[n]");
nx=input("Enter the input indices");

y=input("Enter the input sequence y[n]");
ny=input("Enter the input indices");

[rxy,nrxy]=findconv(x,nx,flip(y),-flip(ny));
disp("rxy")
disp(rxy)
disp(nrxy)

[ryx,nryx]=findconv(y,ny,flip(x),-flip(nx));
disp("ryx")
disp(ryx)
disp(nryx)

%property1
if(rxy==flip(ryx))
    disp("Rxy(l)==Ryx(-l)")
else
    disp("Not Satisfied")
end

%property2
if(rxy(ceil(length(rxy)/2)==0))
    disp("Sequence Orthogonal")
else
    disp("Sequence Not orthogonal")
end

%plots
subplot(2,2,1);
stem(nx,x);
xlabel('n');
ylabel('x[n]');
```

```
subplot(2,2,2);
stem(ny,y);
xlabel('n');
ylabel('y[n]');

subplot(2,2,3);
stem(nrxy,rxy);
xlabel('n');
ylabel('rxy[n]');

subplot(2,2,4);
stem(nryx,ryx);
xlabel('n');
ylabel('ryx[n]');
```
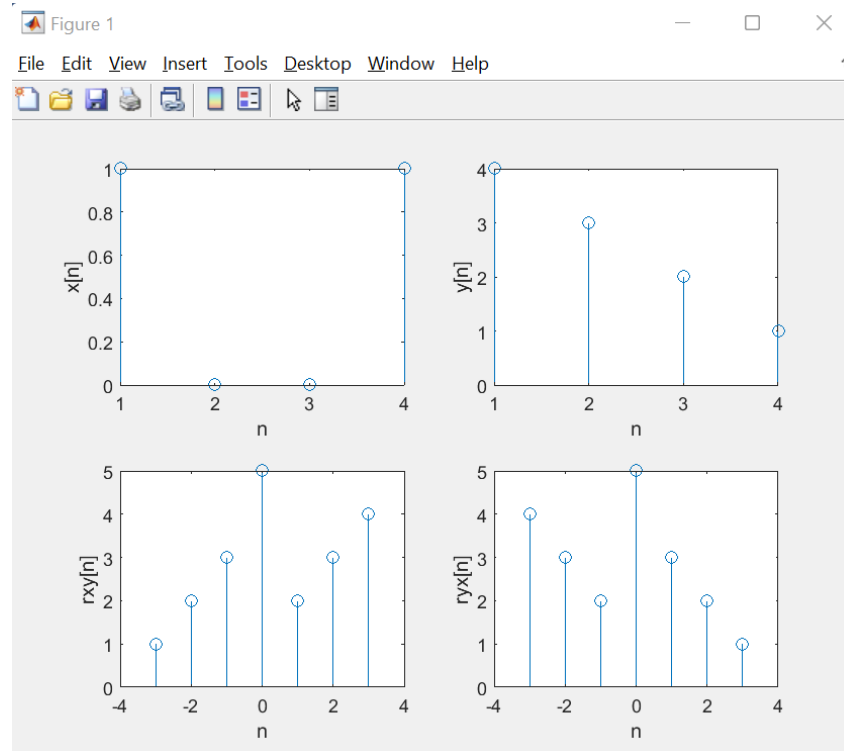
TERMINAL OUTPUT:

```
Command Window
>> CROSSCORR
Enter the input sequence x[n][1 0 0 1]
Enter the input indices[1 2 3 4]
Enter the input sequence y[n][4 3 2 1]
Enter the input indices[1 2 3 4]
rxy
     1     2     3     5     2     3     4

    -3    -2    -1     0     1     2     3

ryx
     4     3     2     5     3     2     1

    -3    -2    -1     0     1     2     3

Rxy(1)==Ryx(-1)
Sequence Not orthogonal
fx >>
```

PLOT:

AUTOCORR.m

```matlab
x=input("Enter the input sequence x[n]");
nx=input("Enter the input indices");

[rxx,nrxx]=findconv(x,nx,flip(x),-flip(nx));

%property1
if(rxx==flip(rxx))
    disp("Symmetry property satisfied")
end

%property2
if(rxx(ceil(length(rxx)/2))==max(rxx))
    disp("Center value is maximum")
else
    disp("Center value is not maximum")
end

%plots
subplot(2,1,1);
stem(nx,x);
xlabel('n');
ylabel('x[n]');

subplot(2,1,2);
stem(nrxx,rxx);
xlabel('n');
ylabel('rxx[n]');
```

TERMINAL OUTPUT:

```
Command Window
  >> AUTOCORR
  Enter the input sequence x[n][2 0 2 0]
  Enter the input indices[1 2 3 4]
  Symmetry property satisfied
  Center value is maximum
fx >>
```

PLOT: