EXP 4 ***CORRELATION***

14/7/2014

AIM:

To study cross-correlation and auto-correlation in Matlab.

PROGRAM:

*CROSS-CORRELATION*

clc;

clear all;

close all;

fprintf('\nTHE SEQUENCE y[n]');

disp('');

n11=input('\nENTER THE VALUE FOR n1 ');

n12=input('\nENTER THE VALUE FOR n2 ');

n=n11:1:n12;

m1=numel(n);

e=n11;

disp(' ');

disp('ENTER THE SEQUENCE y[n]');

for i=1:1:m1

fprintf('y[%d] ',e);

y(i)=input('');

e=e+1;

end

figure

n=n11:n12;

stem(n,y);

title('y[n]');

axis([n11-3 n12+3 min(y)-5 max(y)+5]);

fprintf('THE SEQUENCE x[n]');

disp('')

n21=input('\nENTER THE VALUE FOR n1 ');

n22=input('\nENTER THE VALUE FOR n2 ');

n=n21:1:n22;

m2=numel(n);

e=n21;

disp(' ');

disp('ENTER THE SEQUENCE');

for i=1:1:m2

fprintf('x[%d] ',e);

x(i)=input('');

e=e+1;

end

figure

n=n21:n22;

stem(n,x);

title('x[n]');

axis([n21-3 n22+3 min(x)-5 max(x)+5]);

%time reversing y[n]

i=1;

for z=0:m1-1

yr(i)=y(m1-z);

i=i+1;

end

y1=zeros(numel(yr),m1+m2-1);

yr=[yr,zeros(1,m1+m2-1-numel(yr))];

for i=1:4

y1(i,:)=yr;

yr=circshift(yr,[0 1]);

end

g=y1'\*x';

fprintf('THE CORRELATED OUTPUT IS');

disp(g');

n1=n11+n21;

figure

n2=m1+m2+n1-2;

n3=n1:n2;

stem(n3,g);

title('CORRELATED OUTPUT');

axis([n1-2 n2+2 min(g)-2 max(g)+2]);

*OUTPUT:*

*THE SEQUENCE y[n]*

*ENTER THE VALUE FOR n1 0*

*ENTER THE VALUE FOR n2 3*

*ENTER THE SEQUENCE y[n]*

*y[0] 1*

*y[1] 1*

*y[2] 2*

*y[3] 1*

*THE SEQUENCE x[n]*

*ENTER THE VALUE FOR n1 0*

*ENTER THE VALUE FOR n2 3*

*ENTER THE SEQUENCE*

*x[0] 1*

*x[1] 2*

*x[2] 1*

*x[3] 1*

*THE CORRELATED OUTPUT IS 1 4 6 6 5 2 1*







*AUTO-CORRELATION*

clc;

clear all;

close all;

fprintf('THE SEQUENCE x[n]');

disp('')

n21=input('\nENTER THE VALUE FOR n1 ');

n22=input('\nENTER THE VALUE FOR n2 ');

n=n21:1:n22;

m2=numel(n);

e=n21;

disp(' ');

disp('ENTER THE SEQUENCE');

for i=1:1:m2

fprintf('x[%d] ',e);

x(i)=input('');

e=e+1;

end

figure

n=n21:n22;

stem(n,x);

title('x[n]');

axis([n21-3 n22+3 min(x)-5 max(x)+5]);

%time reversing x[n]

i=1;

for z=0:m2-1

xr(i)=x(m2-z);

i=i+1;

end

r=numel(xr);

y1=zeros(numel(xr),m2+m2-1);

xr=[xr,zeros(1,m2+m2-1-numel(xr))];

for i=1:r

y1(i,:)=xr;

xr=circshift(xr,[0 1]);

end

g=y1'\*x';

fprintf('THE CORRELATED OUTPUT IS');

disp(g');

n11=-n22;

n12=-n21;

n1=n11+n21;

figure

n2=m2+m2+n1-2;

n3=n1:n2;

stem(n3,g);

title('CCORRELATED OUTPUT');

axis([n1-2 n2+2 min(g)-2 max(g)+2]);

OUTPUT:

THE SEQUENCE x[n]

ENTER THE VALUE FOR n1 0

ENTER THE VALUE FOR n2 3

ENTER THE SEQUENCE

x[0] 1

x[1] 2

x[2] 1

x[3] 1

THE CORRELATED OUTPUT IS

1 3 5 7 5 3 1

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RESULT:

Thus cross-correlation and auto-correlation has been studied and the result is obtained.