Digital Signal Processing Lab

Computation of Auto Correlation and Cross correlation

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26 August 2021

Experiment 2 :

(Auto Correlation)

Program Code :

```
close();
clear();
x = input("Enter the input sequence : ");
[z, lag] = xcorr(x);
disp(z);
subplot(2,1,1);
stem(x);
xlabel('n');
ylabel('x[n]');
title('Input Sequence');
subplot(2,1,2);
stem(lag,z);
xlabel('n');
ylabel('x[n]');
title('Auto-Correlated Sequence');
```

Output :

Command Window

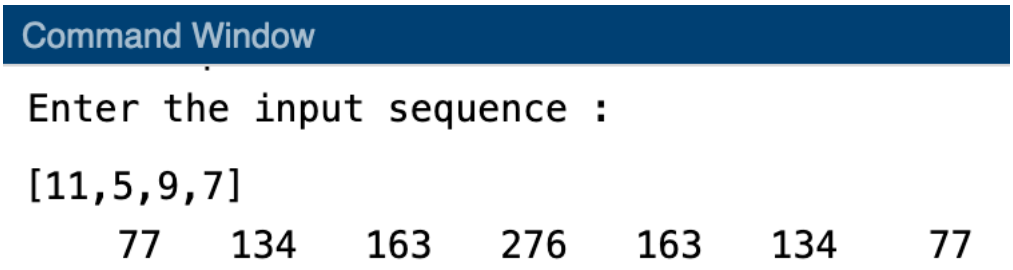
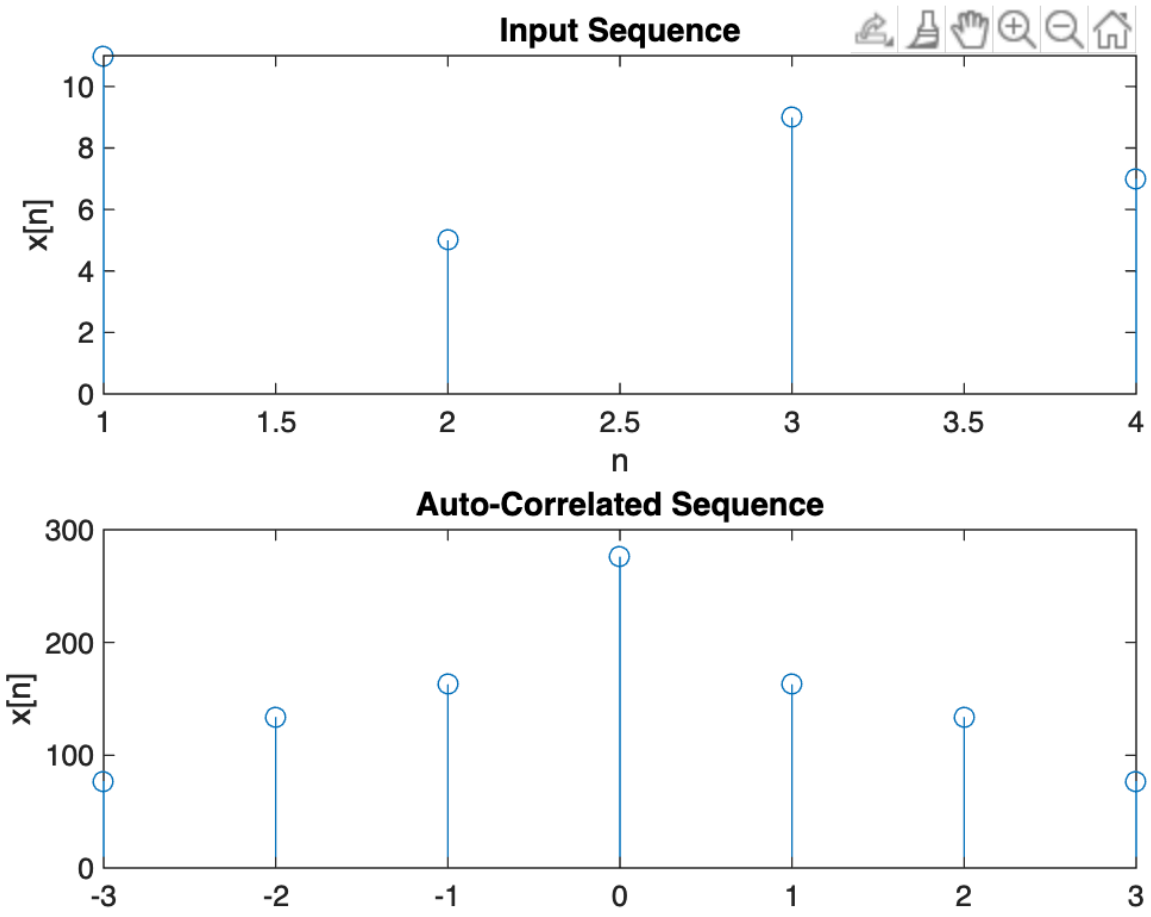


Figure (Plot)



Manual Calculation Auto Correlation Using Matrix Method

Experiment 2 :

(Cross Correlation)

Program Code :

```
close();
clear();
x = input("Enter the first input sequence : ");
y = input("Enter the second input sequence : ");
[z, lag] = xcorr(x, y);
disp(z);
subplot(3,1,1);
stem(x);
xlabel('n');
ylabel('x[n]');
title('First Input Sequence');
subplot(3,1,2);
stem(y);
xlabel('n');
ylabel('y[n]');
title('Second Input Sequence');
subplot(3,1,3);
stem(lag,z);
xlabel('n');
ylabel('x[n]');
title('Cross-Correlated Sequence');
```

Output :

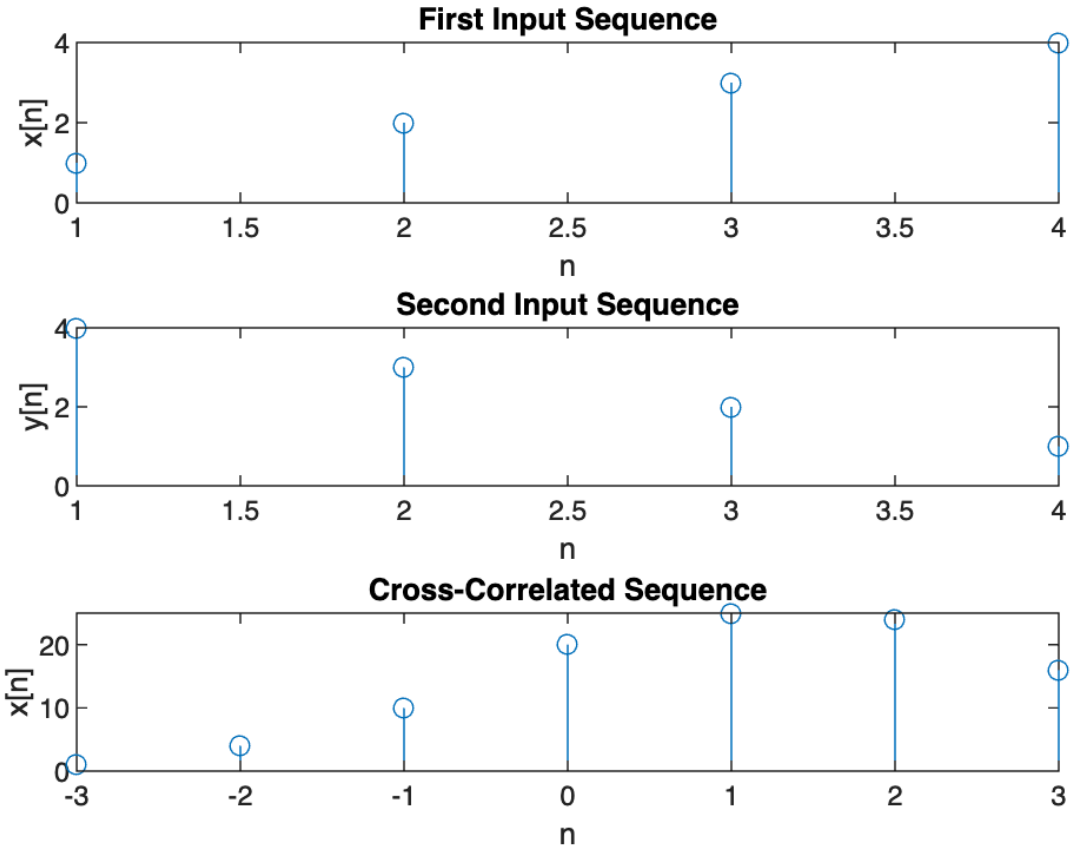
Command Window

```
Command Window
>> DSPExp3
Enter the first input sequence :

[1,2,3,4]
Enter the second input sequence :

[4,3,2,1]
    1.0000    4.0000   10.0000   20.0000   25.0000   24.0000   16.0000
```

Figure (Plot)


First Input Sequence
x[n]
n
Second Input Sequence
y[n]
n
Cross-Correlated Sequence
x[n]
n

Manual Calculation of Cross Correlation Matrix Method