



**Rajshahi University of Engineering and Technology**

**DEPT. of Electrical and Computer Engineering**

**Course No:** ECE 4124

**Course Title:** Digital Signal Processing Sessional

Date of the submission: 22.05.23

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1. **Experiment No:** 04
2. **Experiment Date:** 15.05.2023
3. **Experiment Name:** Study and implementation of correlation on a continuous signal with its delayed signal.
4. **Theory:**

In the experiment, we worked with correlation and autocorrelation of signals. Autocorrelation is the correlation of a time series and its lagged version over time. Although similar to correlation, autocorrelation uses the same time series twice. Financial analysts and traders use autocorrelation to examine historical price movements and predict future ones. It is used to compare multiple time series and objectively determine how well they match up with each other and, in particular, at what point the best match occurs.

#### 5. Required Software: MATLAB

#### 6. Code with Output:

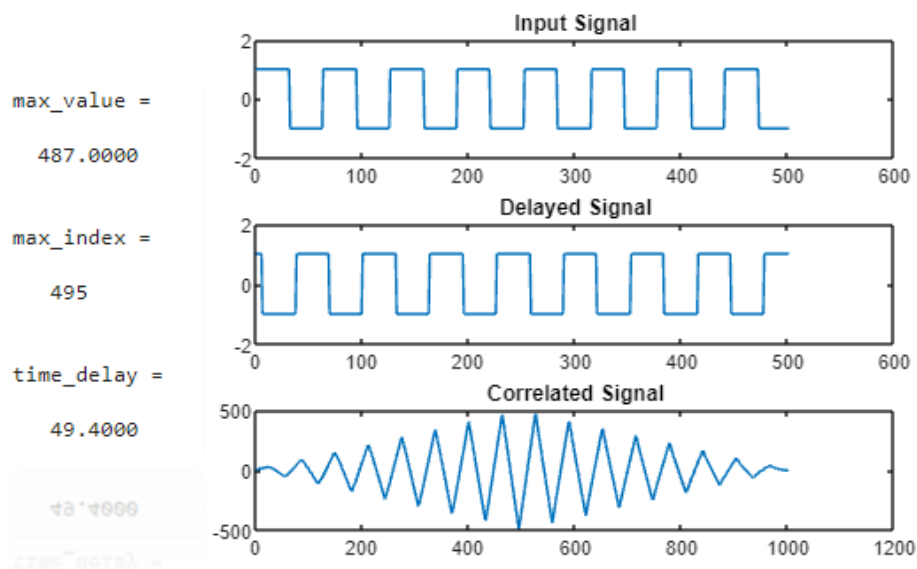
```

clc;
clear all;
close all;
t= 0:0.1:500;
x = square(t);
y = square(t-10);
subplot(3,1,1)
plot(x)
axis([0 600 -2 2])
title('Input Signal')
subplot(3,1,2)
plot(y)
axis([0 600 -2 2])
title('Delayed Signal')
z = xcorr(x,y);
t_1 = length(x)+1:length(x)-1;
subplot(3,1,3)
plot(z)
title('Correlated Signal')

[max_value, max_index] = max(abs(z))
time_delay = (max_index-1)/10

```

Output:



#### 7. Conclusion:

In the experiment, we have plotted all the signals correctly. So, we can say, the experiment is done successfully and the desired output is achieved.