*Heaven’s Light is Our Guide*

**Rajshahi University of Engineering & Technology**

Department of Electrical & Computer Engineering

Course No: ECE 4124

Course Title: Digital Signal Processing Sessional

Experiment No: 01

Experiment Name: Convolution of Two Signals

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**Theory:**

Convolution is a mathematical way of combining two signals to form a third signal. It is an important technique in Digital Signal Processing. Convolution is a formal mathematical operation, just as multiplication, addition, and integration. Addition takes two numbers and produces a third number, while convolution takes two signals and produces a third signal.

The convolution of two signals is given by,

Or,

Convolution satisfies,

(i) Commutative Law: ,

(ii) Associative Law: and

(iii) Distributive Law:

**Code:**

x = [1, 2, 3, 4];

h = [4, 4, 3, 2];

L = length(x);

M = length(h);

N = L + M - 1;

cv = zeros(1,N);

x1 = [x, zeros(1,L)];

h1 = [h, zeros(1,M)];

for i = 1:N

for j = 1:M

if (i-j+1) > 0

cv(i) = cv(i) + x1(j)\*h1(i-j+1);

end

end

end

disp(cv)

subplot(3,1,1); stem(x); xlabel('n');

ylabel('x[n]'); title('First Signal');

subplot(3,1,2); stem(h); xlabel('n');

ylabel('h[n]'); title('Second Signal');

subplot(3,1,3); stem(cv); xlabel('n');

ylabel('Y[n]'); title('Convoluted Signal');

**Output:**

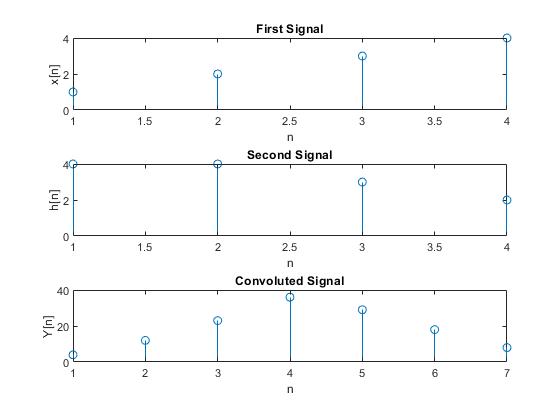
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Fig 1.1: Convolution of Two Signals

**Conclusion:**

In this experiment, convolution was implemented without using any built-in function and the result was plotted.