

**Experiment No:** 01

**Experiment Date:** 19-03-2023

**Experiment Name:** Study of Convolution of Two Signals using MATLAB

**Theory:** Convolution is a mathematical tool for combining two signals to form a third signal.

Therefore, in signals and systems, the convolution is very important because it relates the input signal and the impulse response of the system to produce the output signal from the system. In other words, the convolution is used to express the input and output relationship of an LTI system. Convolution of two signal is given by:

$$y(n) = \sum x(n) * h(n-k) \text{ for } k = -\infty \text{ to } +\infty$$

**Code:**

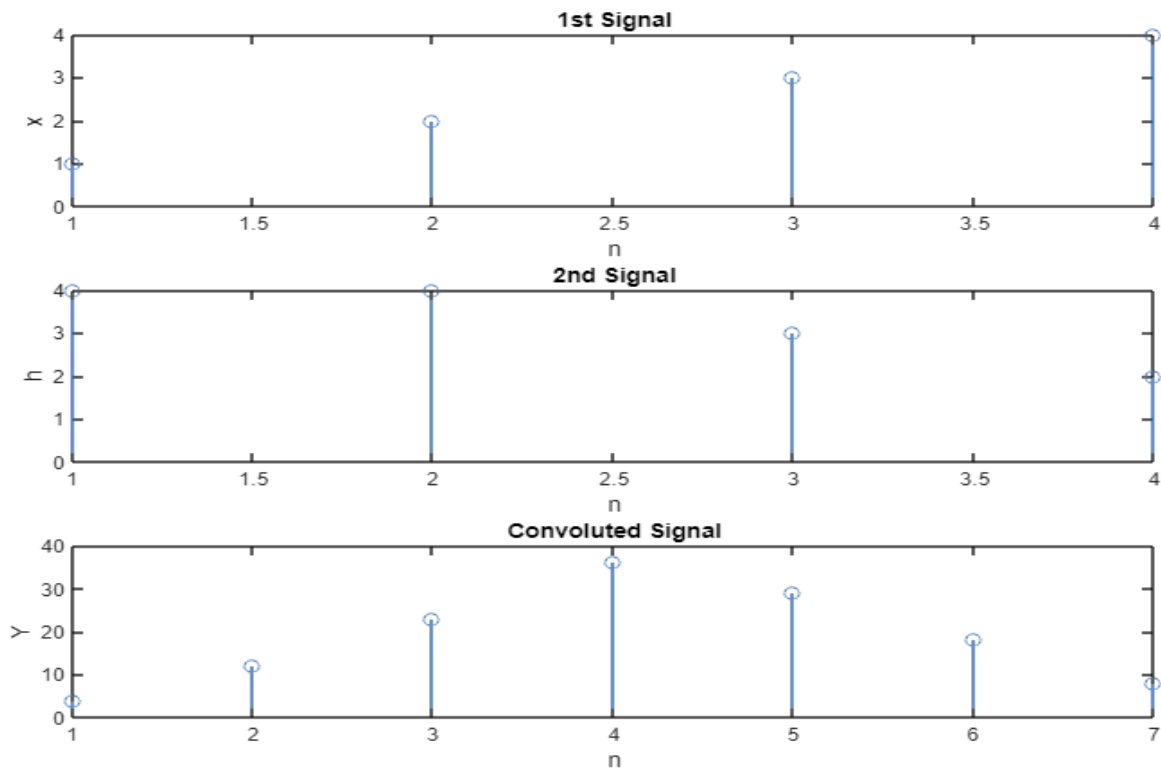
```
x = [ 1 2 3 4];
h = [ 4 4 3 2];
m=length(x);
l=length(h);
X=[x,zeros(1,l)];
H=[h,zeros(1,m)];
z=[];
for i=1:m
    g=h.*x(i);
    z=[z,g];
end
[r c] = size(z);
k = r+c;
t=2;
Y=[];
cd=0;
while(t<=k)
    for i=1:r
        for j=1:c
            if((i+j)==t)
                cd = cd+ z(i,j);
            end
        end
    end
    t = t+1;
    Y = [Y cd];
    cd=0;
end
subplot(3,1,1);
```

```

stem(x);
xlabel('n');
ylabel('x');
title('1st Signal');
subplot(3,1,2);
stem(h);
xlabel('n');
ylabel('h');
title('2nd Signal');
subplot(3,1,3);
stem(Y);
xlabel('n');
ylabel('Y');
title('Convolved Signal');

```

**Output:**



**Figure 01:** Output of convolved signal

**Discussion and Conclusion:** Here, we convoluted two signals without using the conv() function. The conv() function was also used to check whether the previous output was similar or not. The obtained result was same in both the cases. The experiment was carried out successfully.

