Machine Learning for Signal Processing and Pattern Classification.
1D CONVOLUTION

SIMRAN

1.

AIM:

To give the mathematical expression for 1D convolution. To verify the expression with an example and to use the built-in matlab command to verify the convolved sequence.

CODE:

```
x =[1,2,3,4];
h =[1,1];
m = length(x); % length of the x sequence
n = length(h); %length of h sequnce
% making the sequences to same size
X = [x,zeros(1,n)]; %appending remaining length with 0
H = [h,zeros(1,m)]; % appending remaining length with 0
for i=1:m+n-1 % the convolved sequence is of size m+n-1
  Y(i)=0;
  for j=1:m
      if(i-j+1>0)
          Y(i)=Y(i)+X(j)*H(i-j+1); %flipping H multiplying it
with X and adding it to Y
      else
      end
  end
end
Y
```

The 1D convolution mathematical expression is :

$$y[t] = \sum_{n} x[n] * h[t-n]$$

x and h are two discrete sequences

y is the convolved sequence.

OUTPUT:

x =

```
   1    2    3    4

h =

   1    1

Y =

   1    3    5    7    4
```