

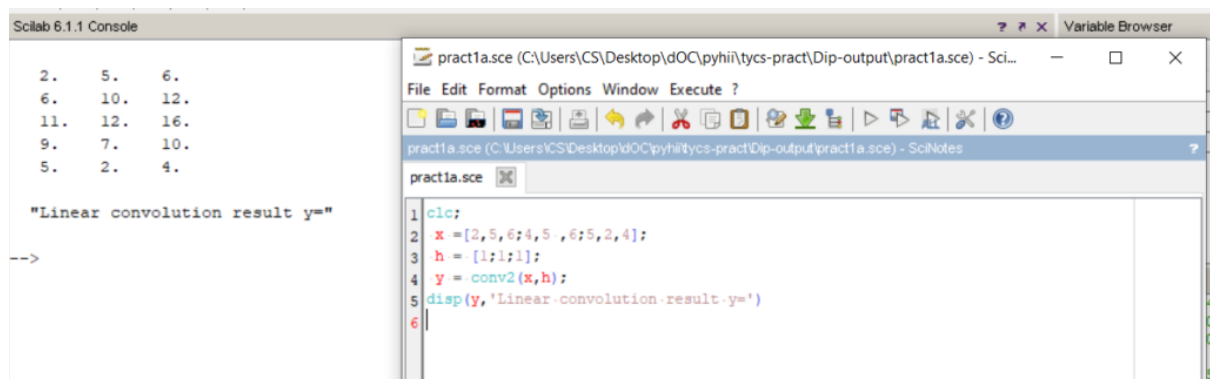
SEM-6-PRACTICALS-DIGITAL IMAGE PROCESSING

2D Linear Convolution, Circular Convolution between two 2D matrices.

a. Linear Convolution

code:

```
clc;
x = [2,5,6;4,5,6;5,2,4];
h = [1;1;1];
y = conv2(x,h);
disp(y,'Linear convolution result y=')
```



b. Circular Convolution between two 2D matrices.

code:

```
//Write a program for Circular Convolution between two 2D matrices.
clc ;
x = [5,6;2,8];
```

```

h = [4 ,6;7 ,8];
X =fft2 ( x ) ; // 2D FFT of x ma t r i x
H =fft2 ( h ) ; // 2D FFT of h ma t r i x
Y = X .* H ; // Elemen t by Elemen t m u l t i p l i c a t i o n
y = fft2 ( Y ) ;
disp (y , ' Circular Convolution Result y = ');

```

Output:-

The screenshot shows two windows from a MATLAB environment. The left window, titled 'Scilab 6.1.1 Console', displays the output of the program: a 2x2 matrix of complex numbers. The first row contains 536. and 504., and the second row contains 556. and 504. Below the matrix, the text 'Circular Convolution Result y = ' is displayed. The right window, titled 'pract1b.sce (C:\Users\CS\Desktop\dip\pract1b.sce) - SciNotes', shows the source code of the program. The code defines two 2x2 matrices, x and h, computes their 2D FFTs (X and H), performs element-wise multiplication (Y = X .* H), and then computes the 2D inverse FFT (y = fft2(Y)). The final result y is displayed using the disp function.

```

536.    504.
556.    504.

" Circular Convolution Result y = "

-->

```

```

pract1b.sce (C:\Users\CS\Desktop\dip\pract1b.sce) - SciNotes
File Edit Format Options Window Execute ?
pract1b.sce (C:\Users\CS\Desktop\dip\pract1b.sce) - SciNotes
pract1b.sce  pract1a.sce
1 //Write a program for Circular Convolution between two 2D matrices.
2 clc ;
3 x = [5,6;2,8];
4 h = [4 ,6;7 ,8];
5 X =fft2 ( x ) ; // 2D FFT of x ma t r i x
6 H =fft2 ( h ) ; // 2D FFT of h ma t r i x
7 Y = X .* H ; // Elemen t by Elemen t m u l t i p l i c a t i o n
8 y = fft2 ( Y ) ;
9 disp (y , ' Circular Convolution Result y = ');
10

```

← PREVIOUS

NEXT →

practical 2

Practical 1

Practical 1

Practical 2

Practical 3

Practical 4

Practical 5

Practical 6

Practical 7

Practical 8

Practical 9

Practical 10

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-> To err is human, but to really foul things up you need a computer.

-> "Imagination is more important than knowledge."

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