




267: HW#3

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Problem 1

Compute the DCT and IDCT on a 4×4 image matrix, as shown on the slide#7 in the Lecture Note #4.

List your well-commented source code and attach filtered output images.

The MATLAB code is provided in [*one.mat*](#) file.

```
Command Window
Enter the value of N:4
N=
    4

Enter the f matrix:[1 0 1 0;
    2 0 2 0;
    0 1 0 1;
    -1 0 -1 0]
the input matrix is:
    1    0    1    0
    2    0    2    0
    0    1    0    1
   -1    0   -1    0

The P matrix is
    0.5000    0.5000    0.5000    0.5000
    0.6533    0.2706   -0.2706   -0.6533
    0.5000   -0.5000   -0.5000    0.5000
    0.2706   -0.6533    0.6533   -0.2706

After DCT:
    1.5000    0.1913   -0.0000    0.4619
    1.5772    0.8107         0    1.9571
   -1.5000   -0.1913    0.0000   -0.4619
   -0.1121   -0.5429         0   -1.3107

After IDCT:
    1.0000   -0.0000    1.0000   -0.0000
    2.0000   -0.0000    2.0000   -0.0000
   -0.0000    1.0000   -0.0000    1.0000
   -1.0000    0.0000   -1.0000    0.0000
```

Fig.1: The result of IDCT is same as input matrix which proves the accuracy of code.

Problem 2

Do that exercise off finding and plotting 16 bases functions for 4 x 4 DCT, as shown on slide #11 the lecture note #4.

The following figure shows plots of all 16 basis functions and you can see the basis functions by running two.mat.

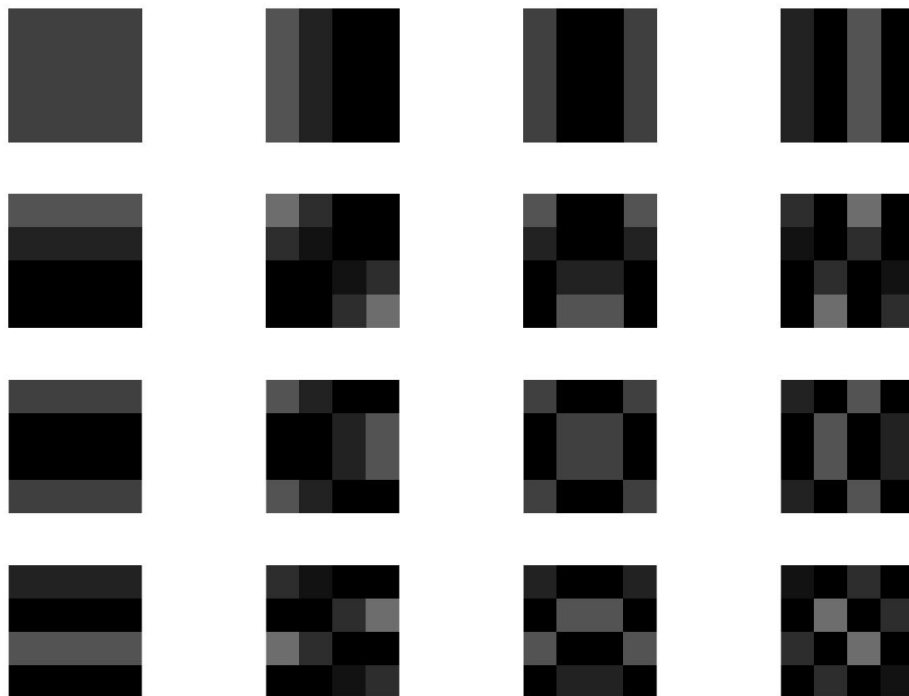


Fig. 2: The plot of all 16 basis functions of 4x4 DCT.

Problem 3

Find and plot 16 basis functions four 4 x 4 Walsh Hadamard transform.

The code is provided in [three.mat](#) file.

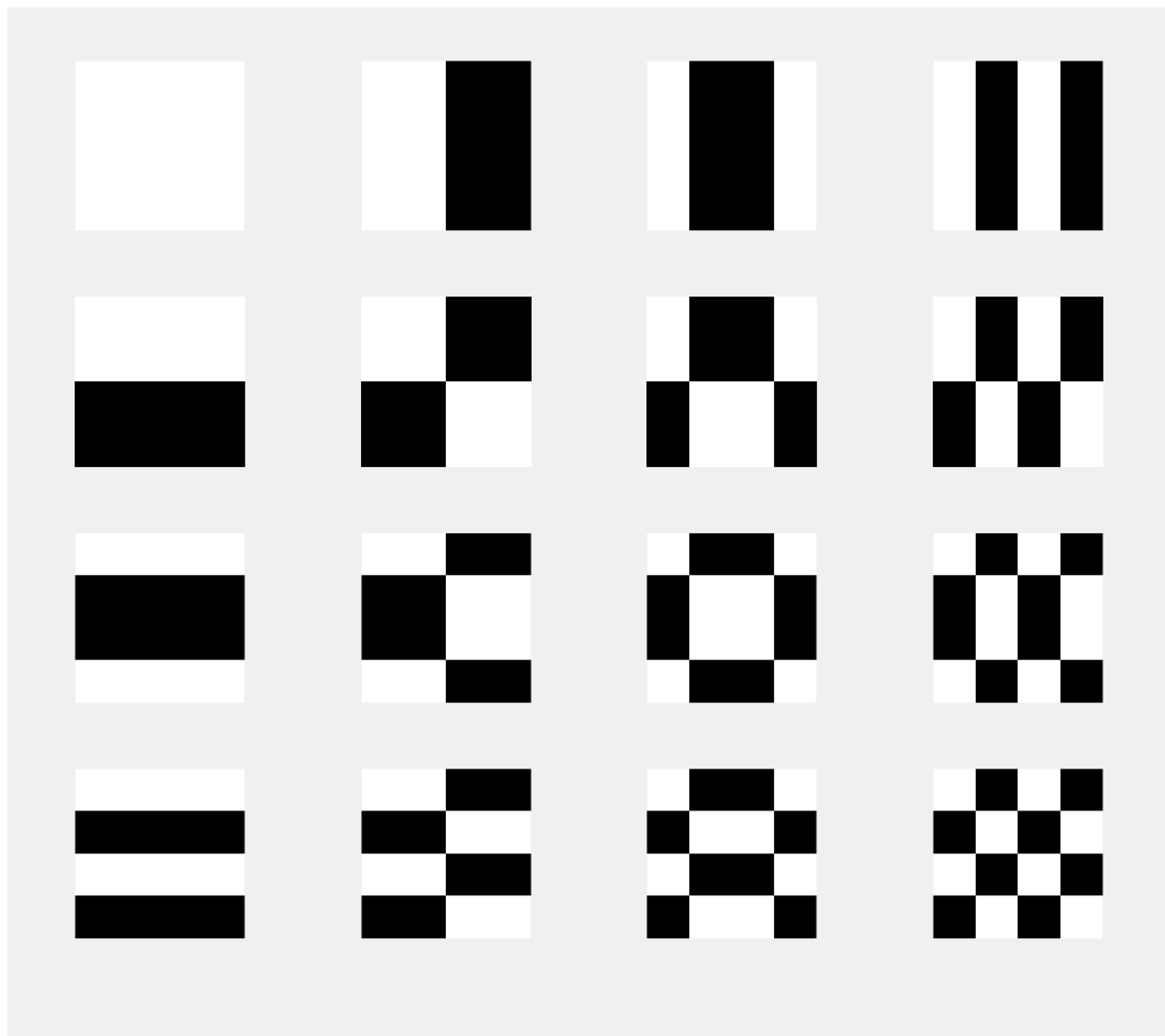


Fig. 3: The plot of all 16 basis functions of 4x4 Walsh Hadamard.