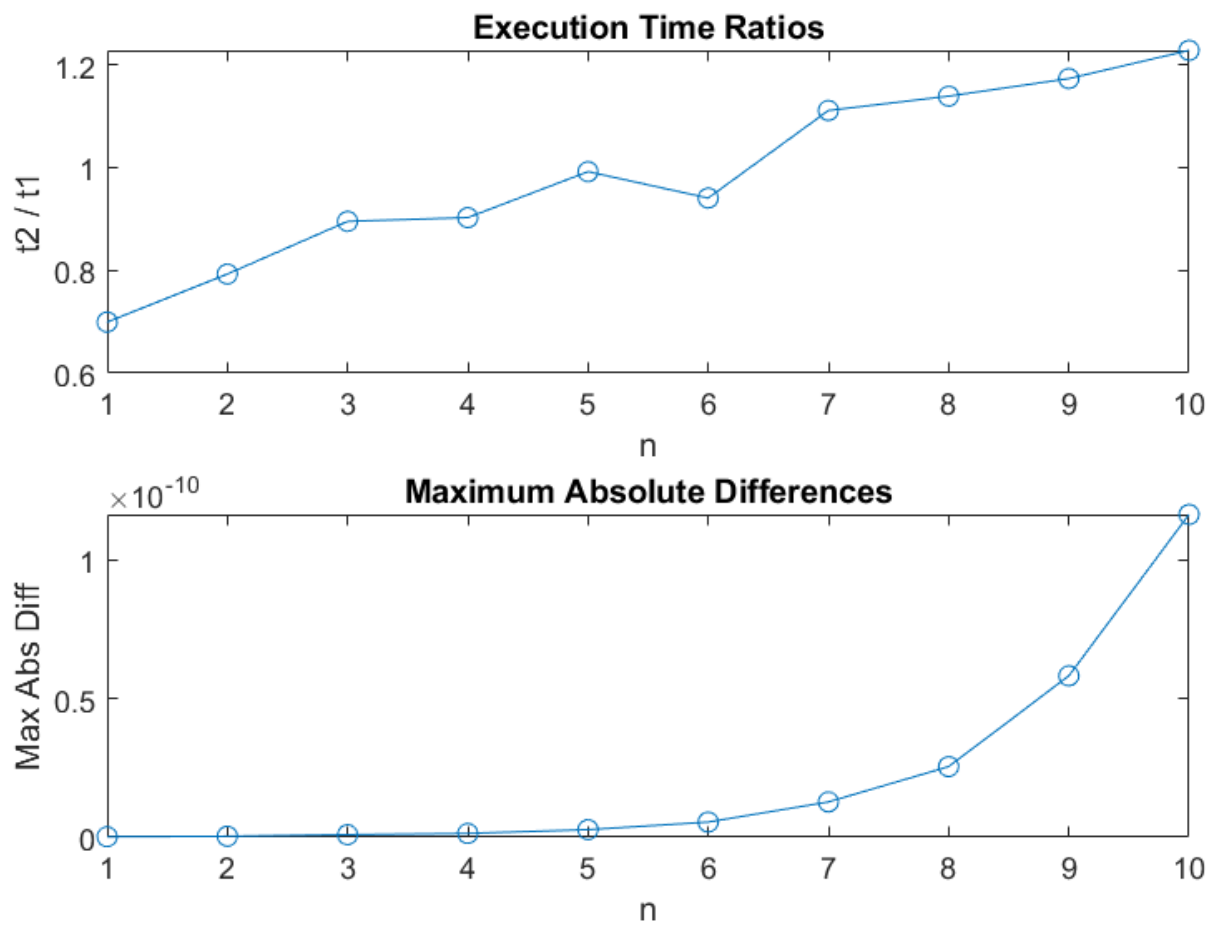


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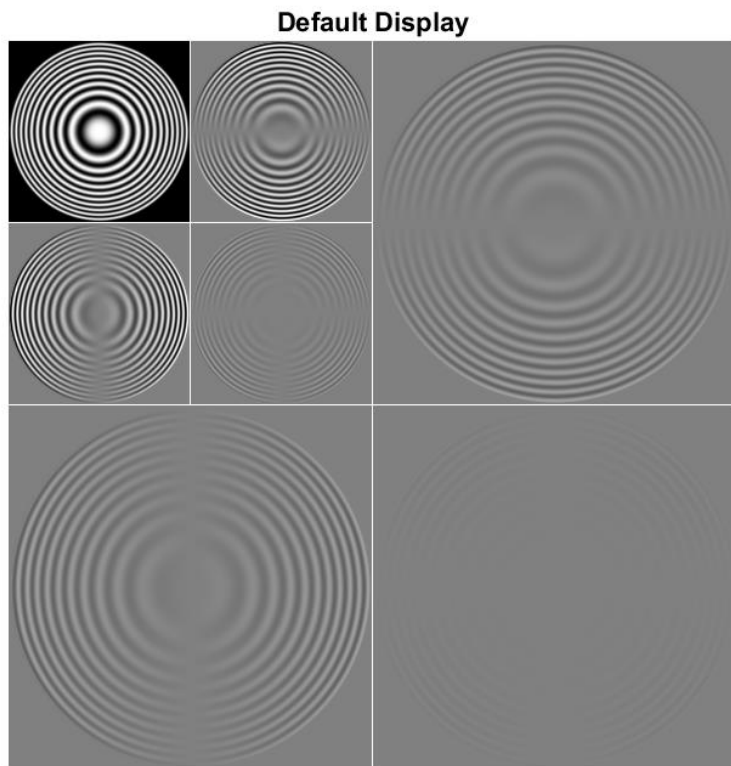
Problem 1

Comparison of wavedec2 and wavefast

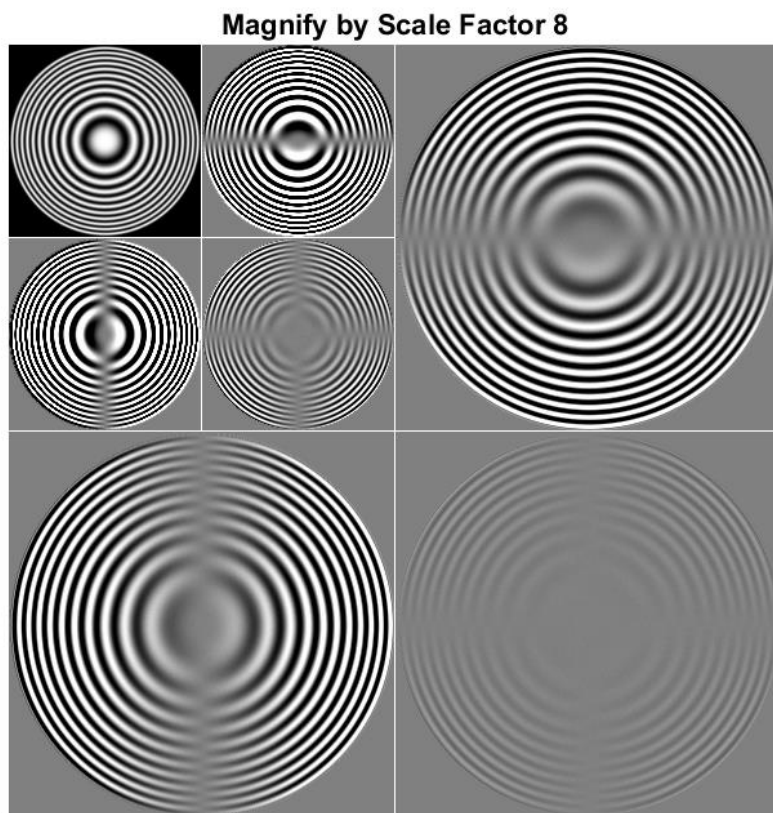


Problem 2

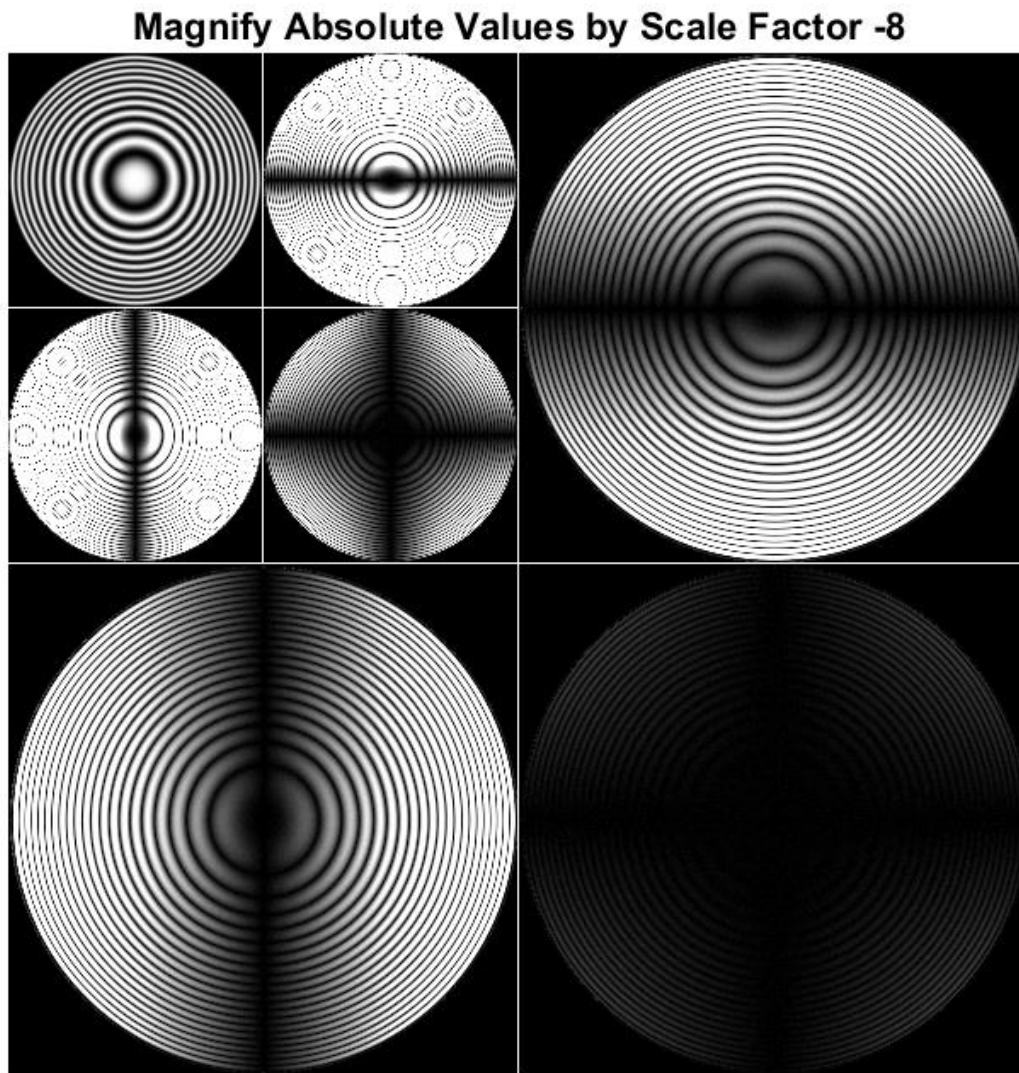
(a) Default



(b) Magnify default by scale of 8



(c) Magnify absolute values by `abs(scale)` with `scale = -8`

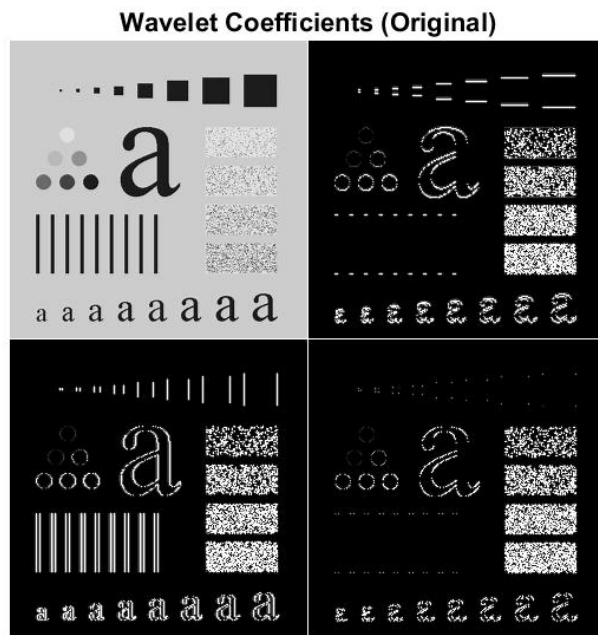


Discussion

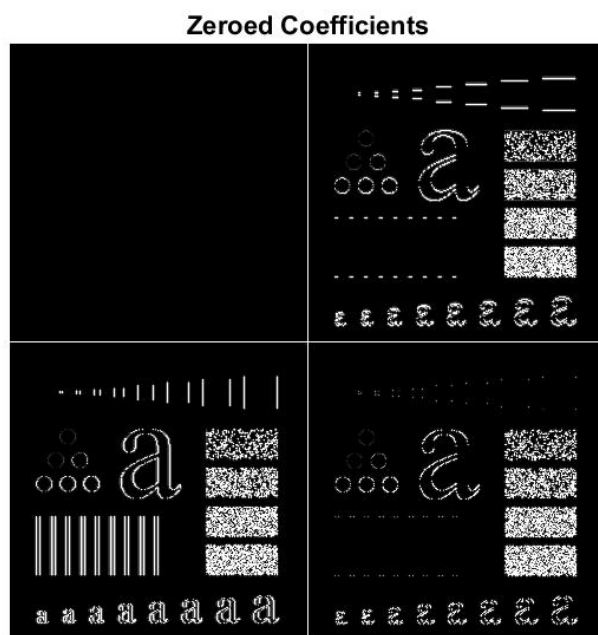
- (a) Default Setting (No Scale): Displays the coefficients without any magnification and provides a standard representation of the wavelet decomposition.
- (b) Magnified by Scale Factor (`scale = 8`): Enlarges the coefficients by a factor of 8 and enhances fine details and highlights small-scale variations in the image.
- (c) Magnify Absolute Values by Negative Scale Factor (`scale = -8`): Magnifies the absolute values of coefficients by a factor of 8 and emphasizes the magnitude of coefficients while potentially revealing features with both positive and negative values.

Problem 3

(a) horizontal, vertical, and diagonal of the original image

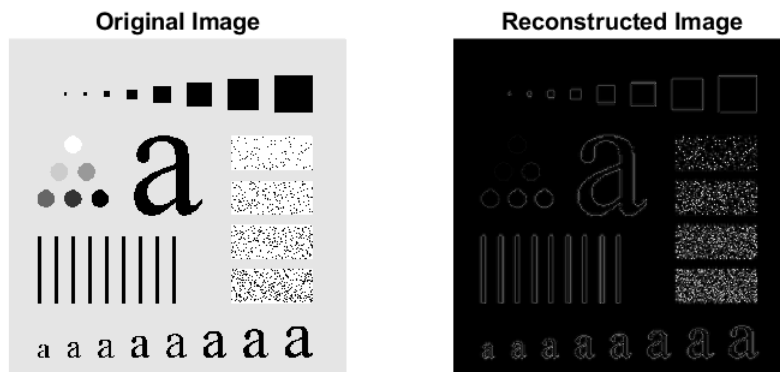


(b) 理論上應該有些係數被捨棄，不過肉眼上似乎看不太出來問題



(c) 可看到幾乎只剩下影像邊緣的部分被留下來，效果有如高通濾波。

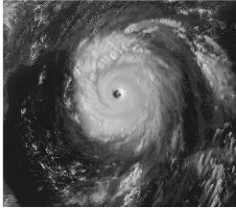
Wavelet Transform and Reconstruction



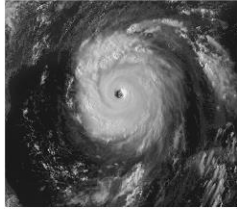
Problem 4

(a)

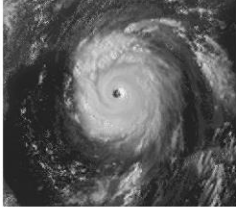
Smoothed Image (Level 1)



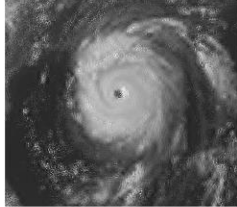
Smoothed Image (Level 2)



Smoothed Image (Level 3)



Smoothed Image (Level 4)



(b)

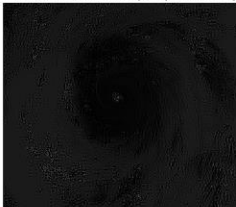
Difference Image (Level 1)



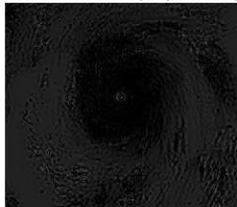
Difference Image (Level 2)



Difference Image (Level 3)



Difference Image (Level 4)



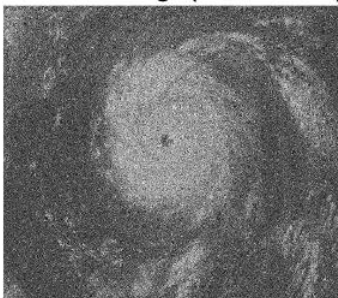
(c) *Best level* = 1, *PSNR* = 14.04

Command Window

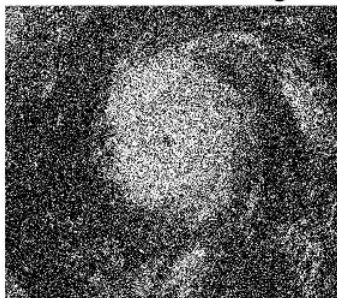
```
Best Level: 1  
PSNR: 14.04
```

fx >>

Denoised Image (Best Level 1)

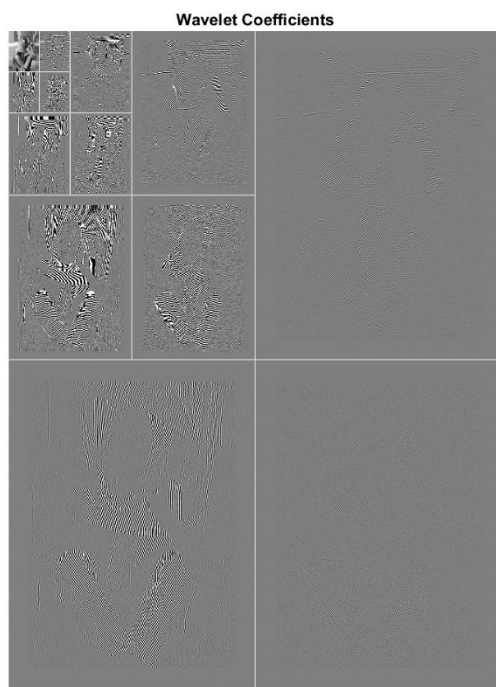


Gaussian Noise Image



Problem 5

Coefficient:



(a)

Resolution level1



Resolution level2



Resolution level3



Resolution level4



Resolution level5



Original Image



(b) 兩張圖片相同

Command Window

```
>> all(difference_image(:)) == 0
```

```
ans =
```

```
logical
```

```
1
```

```
fx >> |
```

Difference Image

