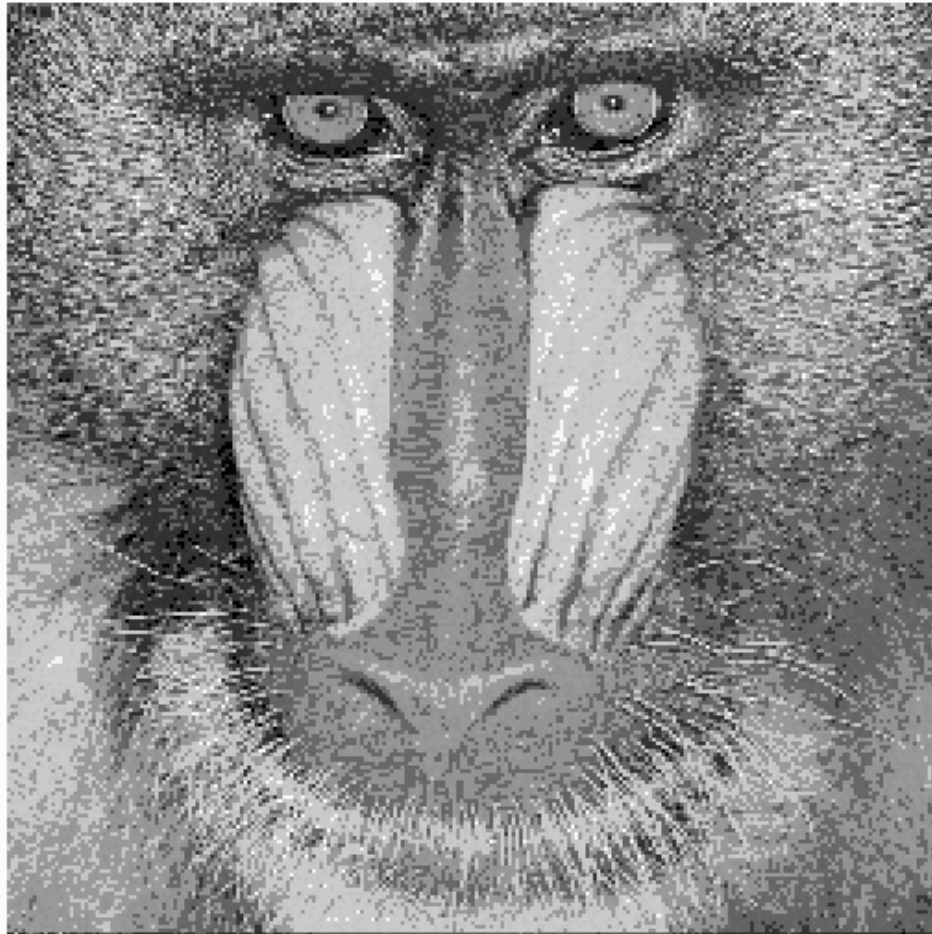


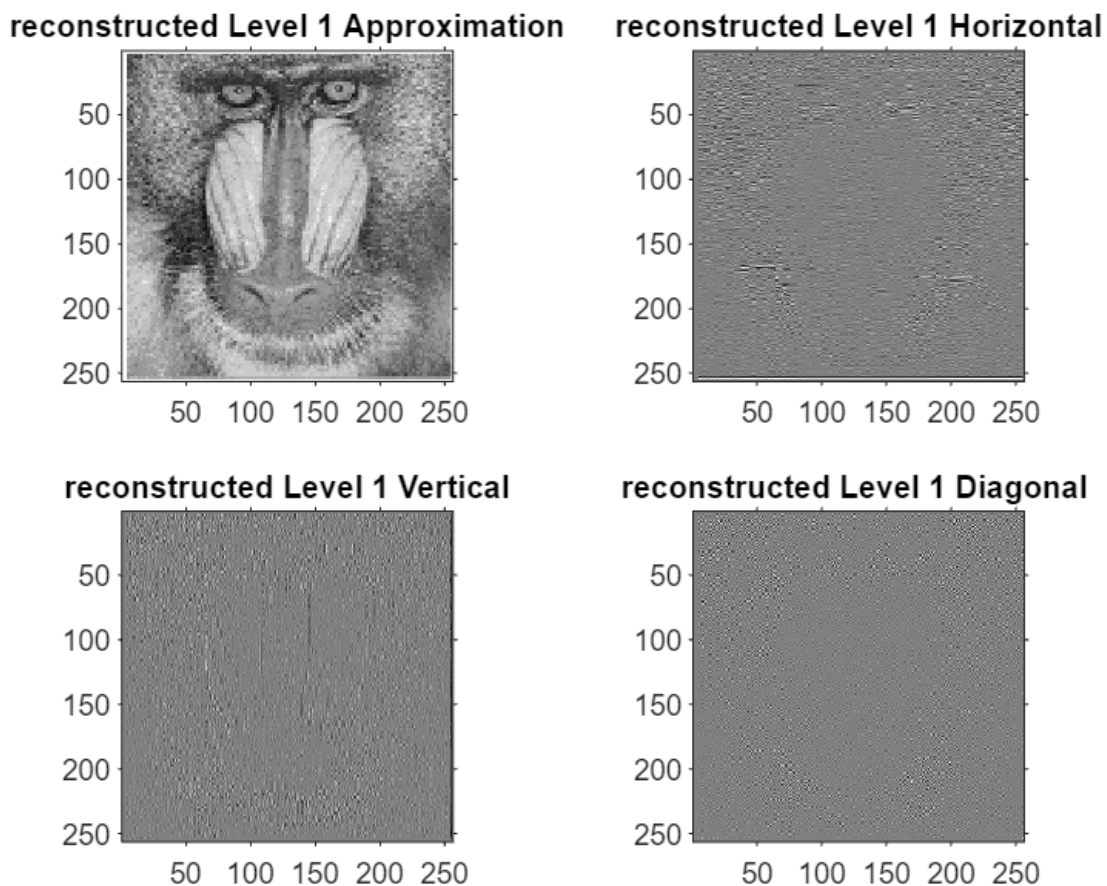
```
%%HW6  
%Elif KIR  
  
%Q1  
img=imread("baboon256.tif");  
imshow(img)  
[c, s]=wavedec2(img,2,'haar')
```



```
%a  
  
Xh = wrcoef2('h',c,s,'haar',1); % reconstucted image using level 1 horizontal  
coefficients  
Xv = wrcoef2('v',c,s,'haar',1); % reconstucted image using level 1 vetical  
coefficients  
Xd = wrcoef2('d',c,s,'haar',1); % reconstucted image using level 1 diagnal  
coefficients
```

```
Xa = wrcoef2('a',c,s,'haar',1); % reconstucted image using level 1 approximate
coefficients

figure;
subplot(2,2,1);imshow((Xa),[]),title('reconstructed Level 1 Approximation'),axis
on
subplot(2,2,2);imshow((Xh),[]),title('reconstructed Level 1 Horizontal'),axis on
subplot(2,2,3);imshow((Xv),[]),title('reconstructed Level 1 Vertical'),axis on
subplot(2,2,4);imshow((Xd),[]),title('reconstructed Level 1 Diagonal '),axis on
```



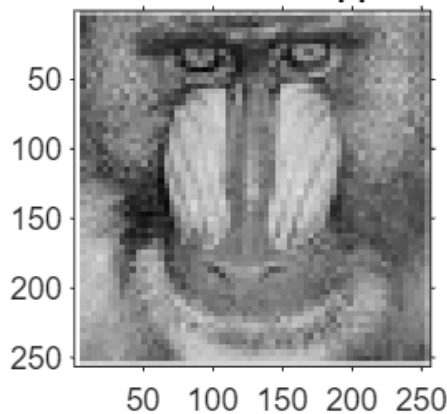
%b

```
Xh2 = wrcoef2('h',c,s,'haar',2); % reconstucted image using level 2 horizontal
coefficients
Xv2 = wrcoef2('v',c,s,'haar',2); % reconstucted image using level 2 vetical
coefficients
Xd2 = wrcoef2('d',c,s,'haar',2); % reconstucted image using level 2 diagnol
coefficients
```

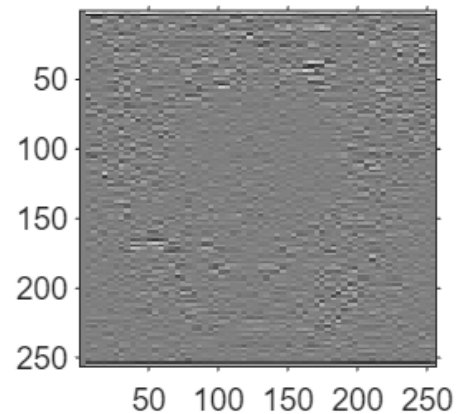
```
Xa2 = wrcoef2('a',c,s,'haar',2); % reconstucted image using level 2 approximate
coefficients

figure;
subplot(2,2,2);imshow((Xh2),[]),title('reconstructed Level 2 Horizontal'),axis
on
subplot(2,2,4);imshow((Xd2),[]),title('reconstructed Level 2 Diagonal '),axis on
subplot(2,2,1);imshow((Xa2),[]),title('reconstructed Level 2 Approximation'),axis
on
subplot(2,2,3);imshow((Xv2),[]),title('reconstructed Level 2 Vertical'),axis on
```

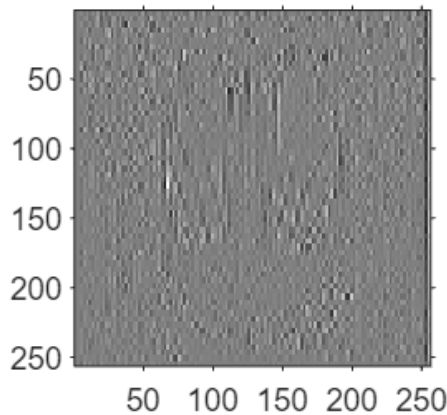
reconstructed Level 2 Approximation



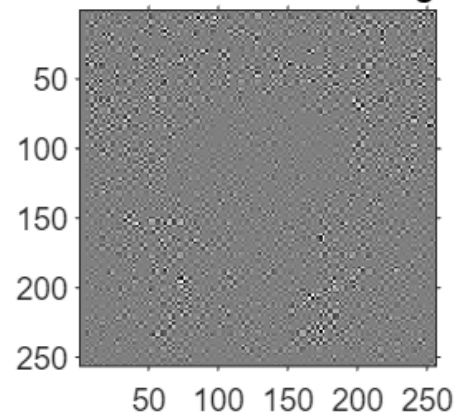
reconstructed Level 2 Horizontal



reconstructed Level 2 Vertical

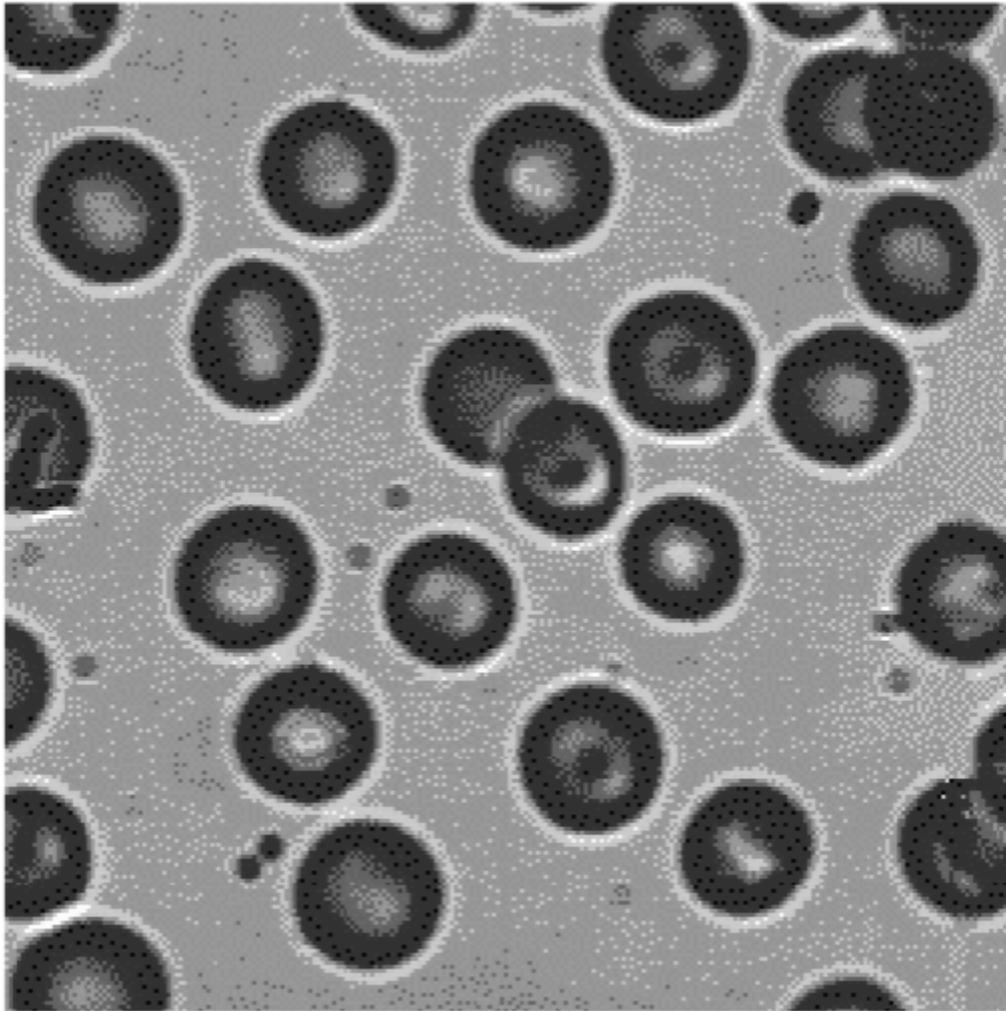


reconstructed Level 2 Diagonal

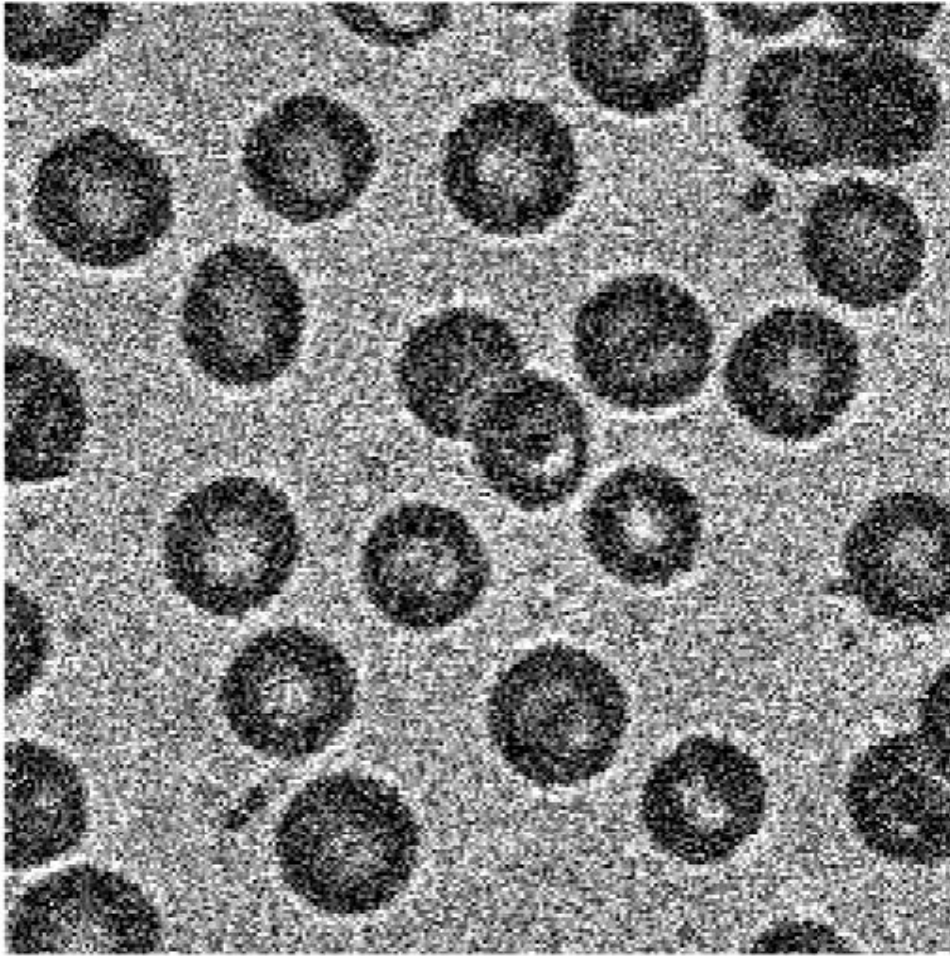


```
%%Q2
%a
img2=imread("blood256.gif");
imshow(img2)
img2_noised=imnoise(uint8(img2),'gaussian',0,0.05);
```

```
imshow(img2_noised)  
%b  
  
[c2, s2]=wavedec2(img2_noised,2,'haar')
```





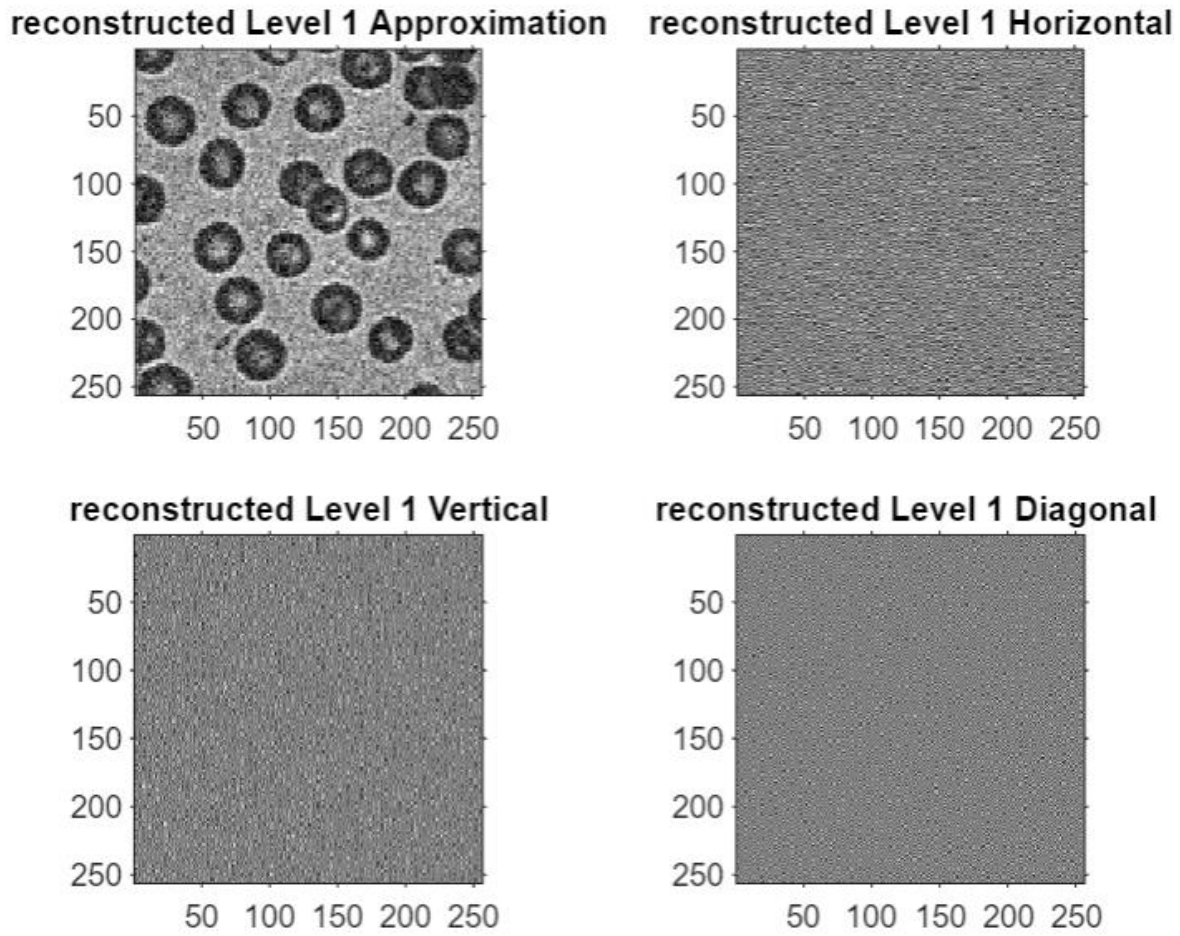


```
%Level1
```

```
Xh3 = wrcoef2('h',c2,s2,'haar',1); % reconstucted image using level 1 horizontal  
coefficients  
Xv3 = wrcoef2('v',c2,s2,'haar',1); % reconstucted image using level 1 vetical  
coefficients  
Xd3 = wrcoef2('d',c2,s2,'haar',1); % reconstucted image using level 1 diagnal  
coefficients  
Xa3 = wrcoef2('a',c2,s2,'haar',1); % reconstucted image using level 1 approximate  
coefficients
```

```
figure;  
subplot(2,2,2);imshow((Xh3),[]),title('reconstructed Level 1 Horizontal'),axis  
on  
subplot(2,2,4);imshow((Xd3),[]),title('reconstructed Level 1 Diagonal '),axis on
```

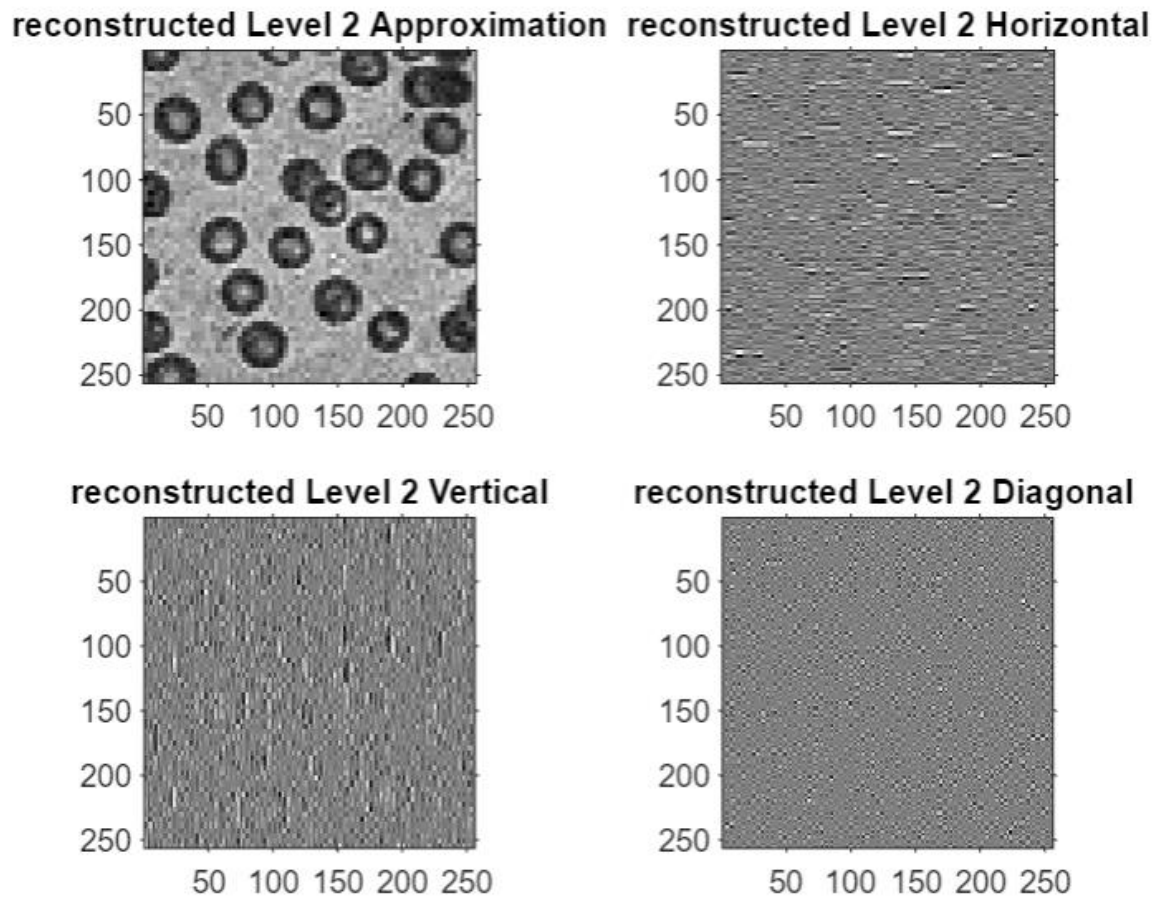
```
subplot(2,2,1);imshow((Xa3),[]),title('reconstructed Level 1 Approximation'),axis on  
subplot(2,2,3);imshow((Xv3),[]),title('reconstructed Level 1 Vertical'),axis on
```



```
%Level2
```

```
Xh4 = wrcoef2('h',c2,s2,'haar',2); % reconstucted image using level 2 horizontal  
coefficients  
Xv4 = wrcoef2('v',c2,s2,'haar',2); % reconstucted image using level 2 vetical  
coefficients  
Xd4 = wrcoef2('d',c2,s2,'haar',2); % reconstucted image using level 2 diagnal  
coefficients  
Xa4 = wrcoef2('a',c2,s2,'haar',2); % reconstucted image using level 2 approximate  
coefficients  
  
figure;
```

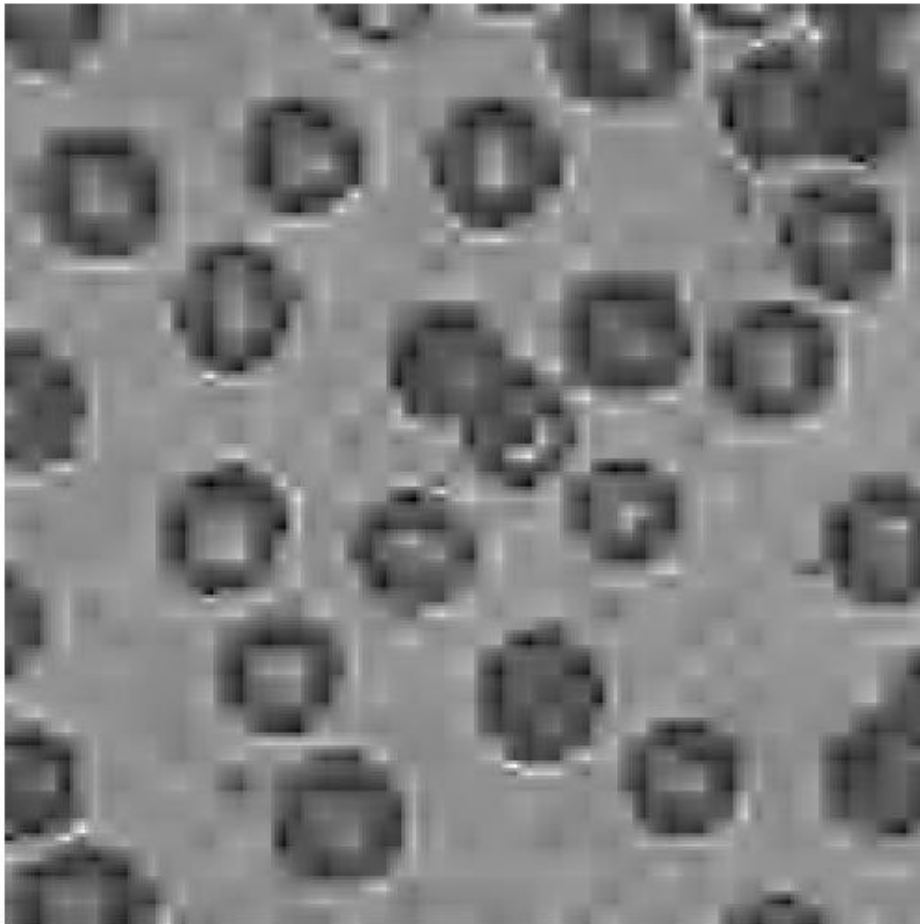
```
subplot(2,2,2);imshow((Xh4),[]),title('reconstructed Level 2 Horizontal'),axis on
subplot(2,2,4);imshow((Xd4),[]),title('reconstructed Level 2 Diagonal '),axis on
subplot(2,2,1);imshow((Xa4),[]),title('reconstructed Level 2 Approximation'),axis on
subplot(2,2,3);imshow((Xv4),[]),title('reconstructed Level 2 Vertical'),axis on
```



%Comment: Since the wavelet transformation is so sensitive the noise, we observe that detail part of the image completely dominated by the noise at both level1 and level2. Since the noise is random and exists everywhere, at the level 1 we can not see anything different than the noise. Only, we go to further details with level 2, we get to see some edge information of the image. In approximation part, since transformation behaves just like low frequency filter, we can see some mitigation in noise effect on the image in a general manner.

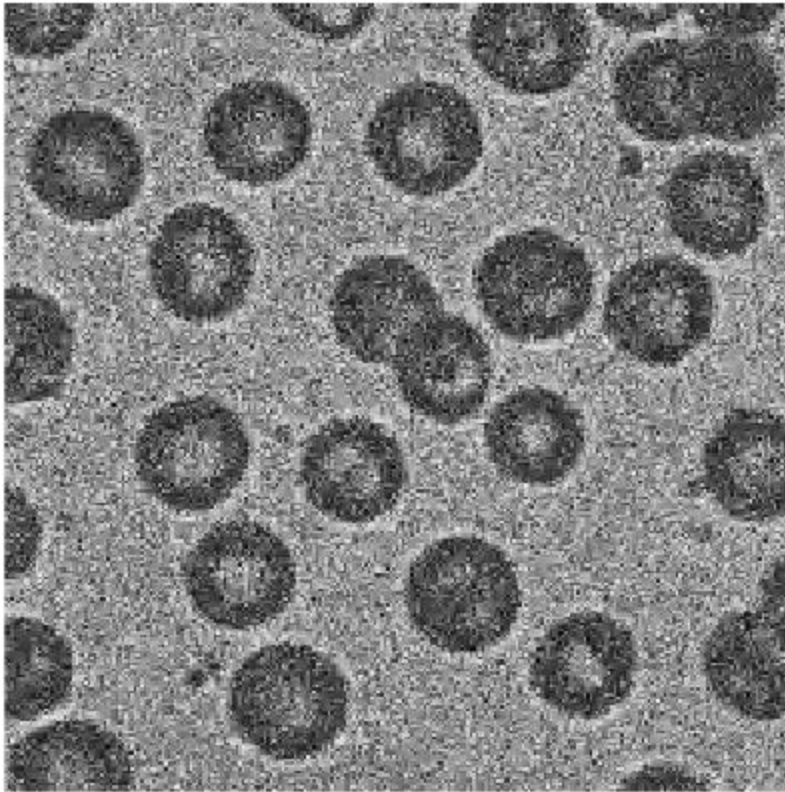
```
%Q3
%close all

%thresholding detail coefficient at 250
b=wdencmp('gb1', img2_noised,'db2', 3, 250, 'h', 1);
imshow(b,[])
```

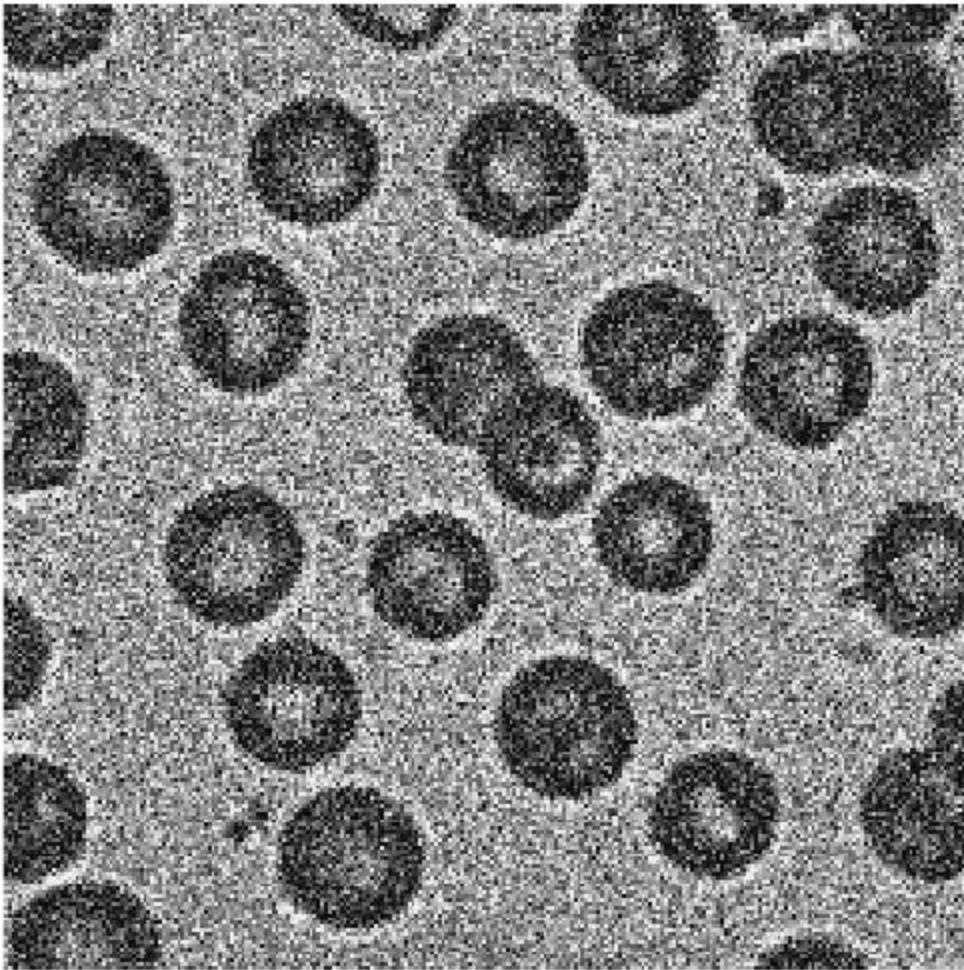


```
%thresholding detail coefficient at 60
b2=wdencmp('gb1', img2_noised,'db2', 3, 60, 'h', 1);
imshow(b2,[])
```





```
%thresholding detail coefficient at 20  
b3=wdencmp('gb1', img2_noised, 'db2', 3,20, 'h', 1);  
imshow(b3,[])
```



%Comment: 20 is too small threshold for detail parts to get rid of the noise but  
at  
%250 we can lose the clarity of blood cells.