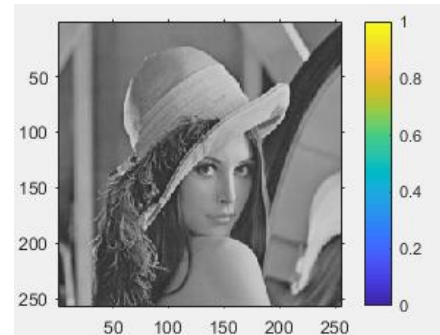


Traitement des images numérique

Première Partie : Manipulation d'image avec Matlab

1-

```
img = imread('LENA.bmp');
figure;
imshow(img)
axis on;
colorbar
```

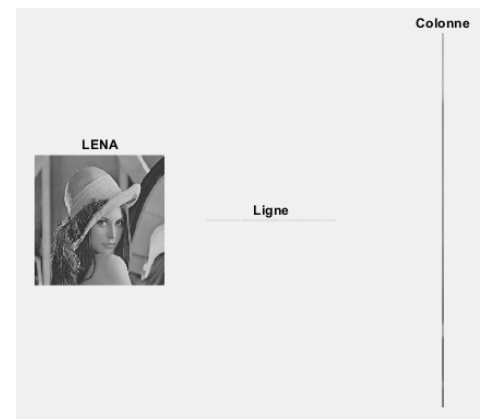


2-

```
imfinfo('LENA.bmp')
```

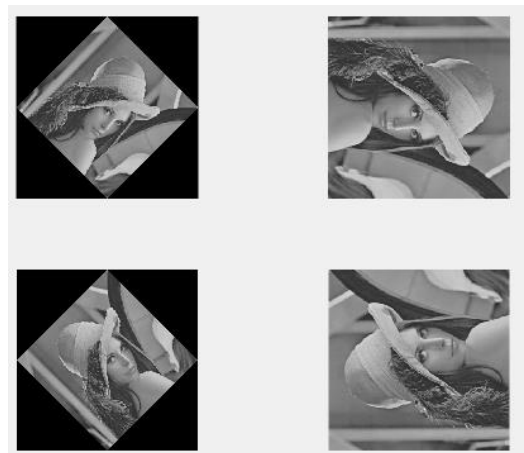
3-

```
close all;
ligne = img(1,:);
colonne = img(:,1);
imwrite(img, 'LENA.jpg');
figure(1);
subplot(1,3,1); imshow(img); title('LENA');
subplot(1,3,2); imshow(ligne); title('Ligne');
subplot(1,3,3); imshow(colonne); title('Colonne');
```



2.1. Transformations géométriques sur une images

```
img = imread('LENA.bmp');
im1 = imrotate(img,-45);
im2 = imrotate(img,-90);
im3 = imrotate(img,45);
im4 = imrotate(img,90);
figure(1);
subplot(2,2,1); imshow(im1);
subplot(2,2,2); imshow(im2);
subplot(2,2,3); imshow(im3);
subplot(2,2,4); imshow(im4);
```

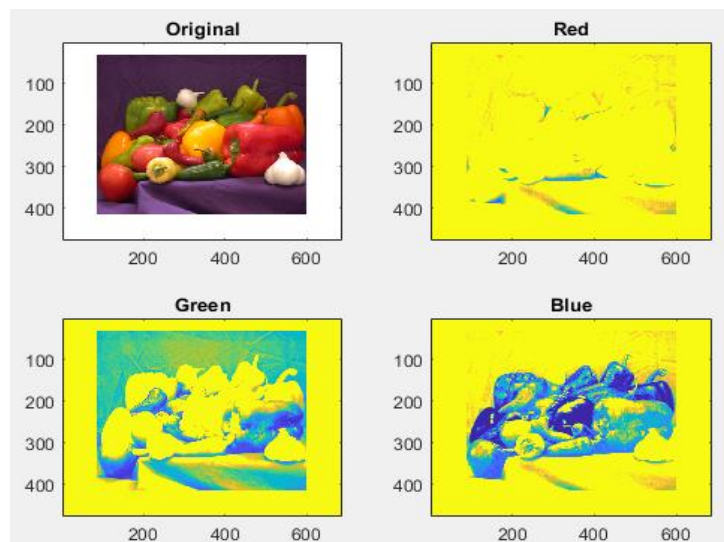


```
b = imresize(img,0.5);
c = imresize(img,0.25);
figure, imshow(img), figure, imshow(b), figure, imshow(c)
```

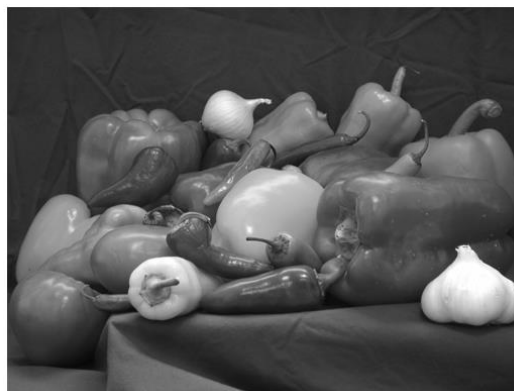


2.2. Séparation de Couleur

```
rgbImage = imread('food.png');
redChannel = rgbImage(:, :, 1);
greenChannel = rgbImage(:, :, 2);
blueChannel = rgbImage(:, :, 3);
figure;
subplot(2,2,1); image(rgbImage);title('Original');
subplot(2,2,2); image(redChannel);title('Red');
subplot(2,2,3); image(greenChannel);title('Green');
subplot(2,2,4); image(blueChannel);title('Blue');
```



```
grayImg = rgb2gray(rgbImage);
figure; imshow(grayImg);
```



2.3. Quantification d'une image

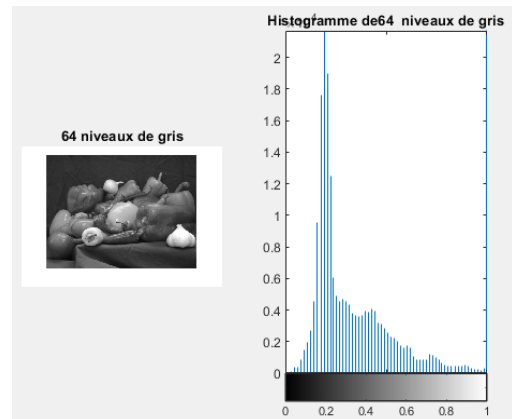
Vue que la fonction **imshow()** avec deux paramètres ne fonctionne pas, nous avons implémentés la quantification avec la fonction suivante :

```

img = imread('food.png');
n=64;
quantification(img,n);
function X = quantification(img,n)
X = rgb2gray(img);
I = double(X)/255;
d = 256/n;
figure(1);
X = floor(I*255/d)/(n-1);
subplot(1,2,1);imshow(X);title(strcat(num2str(n),' niveaux de gris'));
subplot(1,2,2);imhist(X);title(strcat('Histogramme de ', num2str(n),'
niveaux de gris'));
end

```

Pour n=64 niveaux de gris nous avons obtenus l'histogramme suivant :



2.4. Sous-Echantillonnage d'une image :

Avec un facteur de 0.2 :

```

img = imread('lena.bmp');
b = imresize(img,0.2);
figure;
subplot(1,2,1); imshow(img);title('image original');
subplot(1,2,2); imshow(b);title('image après echantionnage');

```



2.5. Image indexée

```

load clown;
X,map
help ind2rgb
rgbImg = ind2rgb(X, map);
imshow(rgbImg);
imwrite(rgbImg, 'clown.jpg')

```



3. Deuxième partie :

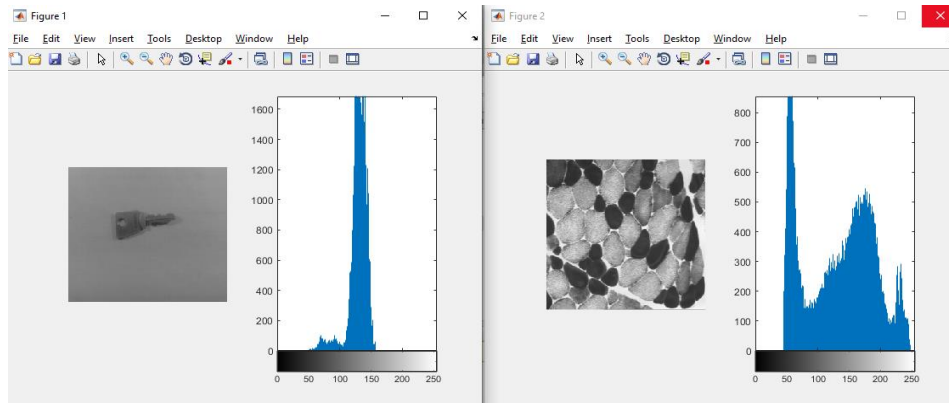
3.1 Histogramme d'une image

```

figure(1);
img1 = imread('clef.pcx');

```

```
subplot(1,2,1); imshow(img1);
subplot(1,2,2); imhist(img1);
figure(2);
img2 = imread('muscle.pcx');
subplot(1,2,1); imshow(img2);
subplot(1,2,2); imhist(img2);
```

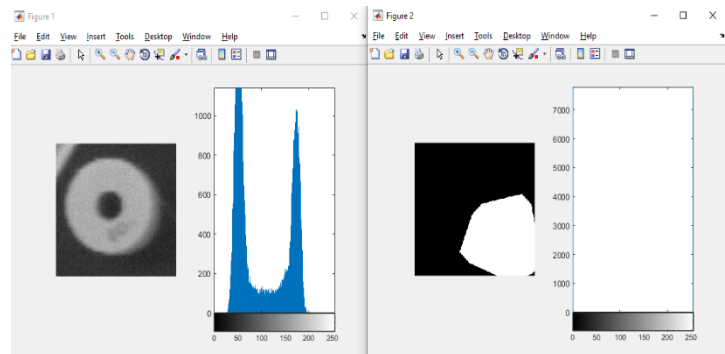


Les niveaux de gris dans l'image de la clé sont concentrés et comprise dans l'intervalle [50, 150], par contre les niveaux de gris dans l'image du muscle sont un peu dispersés dans l'intervalle [50, 250] et qui contient des objets foncés et des objets claires.

3.2 Addition et soustraction d'images

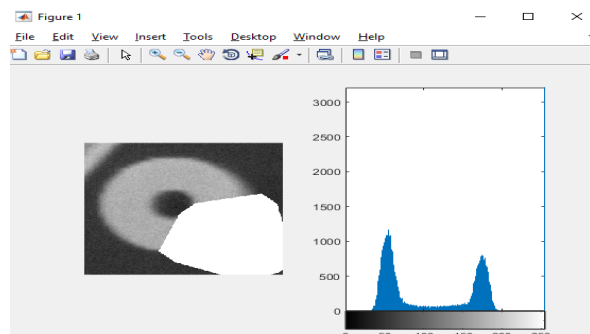
1 - 2.

```
figure(1);
img1 = imread('rondelle.pcx');
subplot(1,2,1); imshow(img1);
subplot(1,2,2); imhist(img1);
figure(2);
img2 = imread('spot.pcx');
subplot(1,2,1); imshow(img2);
subplot(1,2,2); imhist(img2);
```



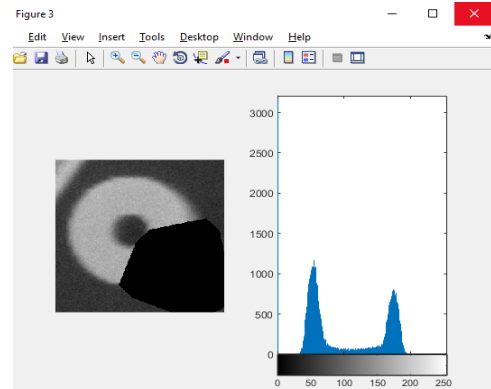
3.

```
img3 = img1 + img2;
close all;
figure
subplot(1,2,1); imshow(img3);
subplot(1,2,2); imhist(img3);
```



4.

```
img4 = img1 - img2;
close all;
figure(3);
subplot(1,2,1); imshow(img4);
subplot(1,2,2); imhist(img4);
```

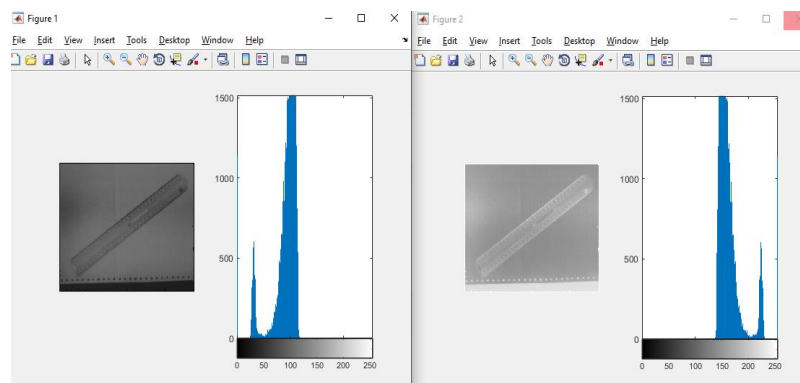


6. Oui, connaissant seulement les histogrammes des images opérantes, il est possible de prévoir l'histogramme de l'image que l'on obtiendra par une opération arithmétique sur ces images opérantes.

3.3. Négatif d'une image

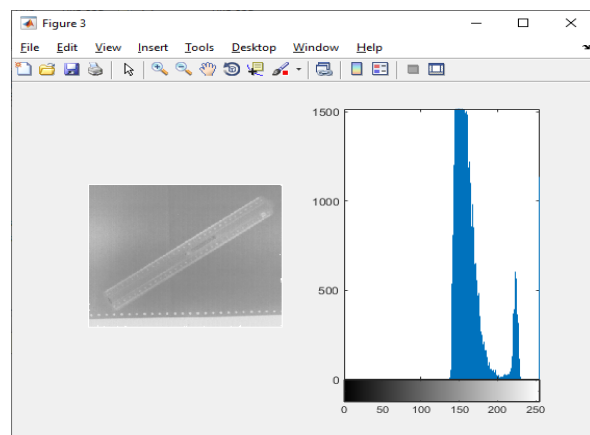
1.

```
img = imread('regle.pcx');
figure(1);
subplot(1,2,1); imshow(img);
subplot(1,2,2); imhist(img);
imgDup = img;
negative = 255 - imgDup;
figure(2);
subplot(1,2,1); imshow(negative);
subplot(1,2,2); imhist(negative);
```



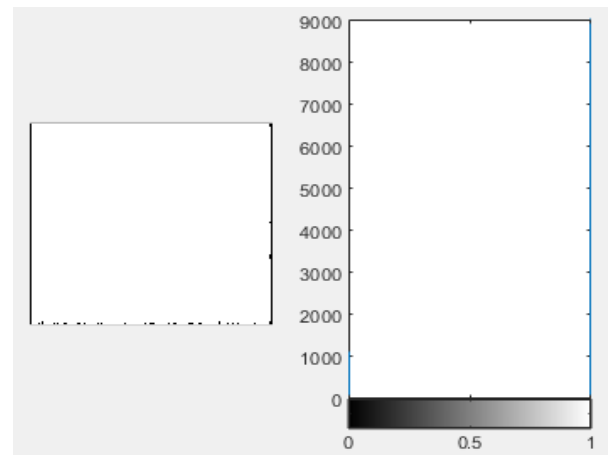
6.

```
gris = img;
gris(:) = 255;
imshow(gris);
res = gris - img;
figure(3);
subplot(1,2,1); imshow(res);
subplot(1,2,2); imhist(res);
```



9.

```
img = imread('REGLE.PCX');
imR = ((double(img)-0)/(255-0))*255;
figure;
subplot(1,2,1);imshow(imR);
subplot(1,2,2);imhist(imR);
```



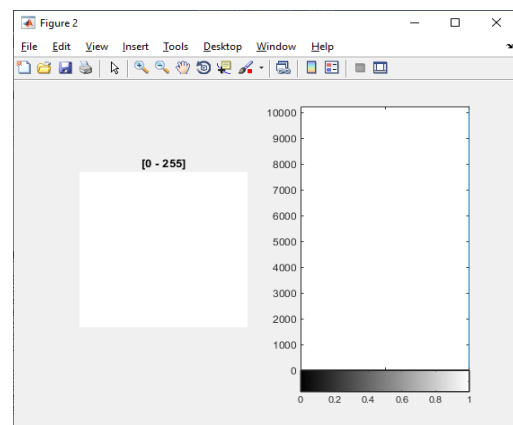
3.4. Recadrage d'histogramme

1.

```
img = imread('quito.pcx');
figure(1);
subplot(1,2,1);imshow(img);
subplot(1,2,2);imhist(img);
im1 = img;
im2 = img;
im3 = img;
```

4.

```
imR = ((double(img)-0)/(255-0))*255;
figure(2);
subplot(1,2,1); imshow(imR);
title('[0 - 255]');
subplot(1,2,2); imhist(imR);
```

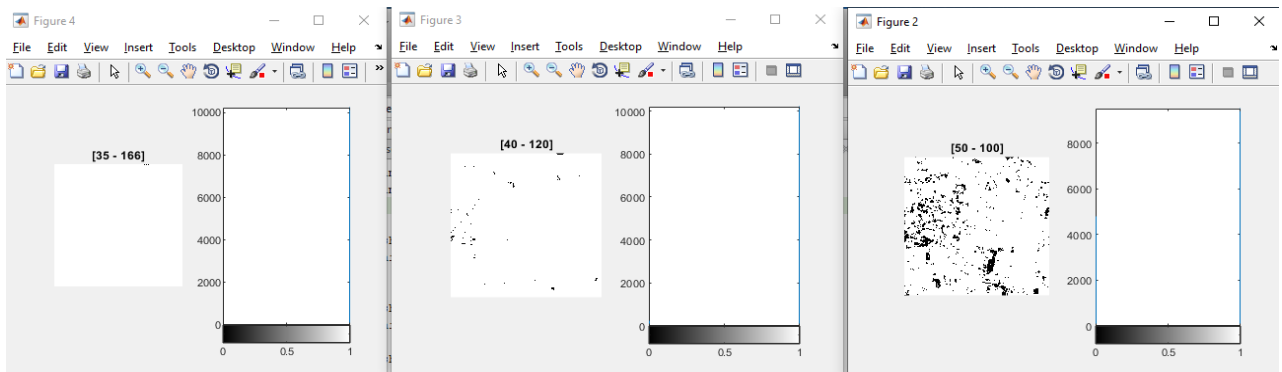


5.

```
imRec1 = ((double(im1)-50)/(100-50))*255;
imRec2 = ((double(im2)-40)/(120-40))*255;
imRec3 = ((double(im3)-35)/(166-35))*255;
```

```
figure(2);
subplot(1,2,1); imshow(imRec1);title('[50 - 100]');
subplot(1,2,2); imhist(imRec1);
```

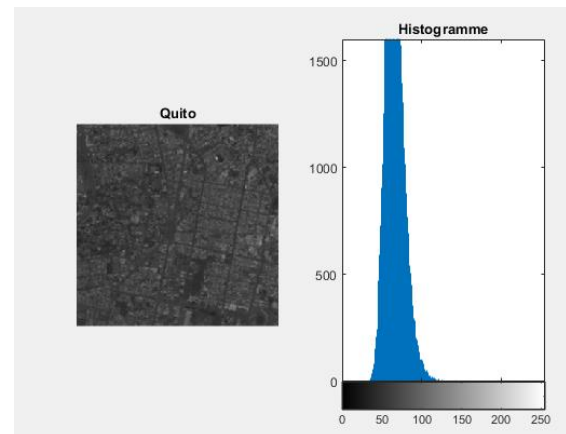
```
figure(3);
subplot(1,2,1); imshow(imRec2);title('[40 - 120]');
subplot(1,2,2); imhist(imRec2);
figure(4);
subplot(1,2,1); imshow(imRec3);title('[35 - 166]');
subplot(1,2,2); imhist(imRec3);
```



3.5. Égalisation d'histogramme

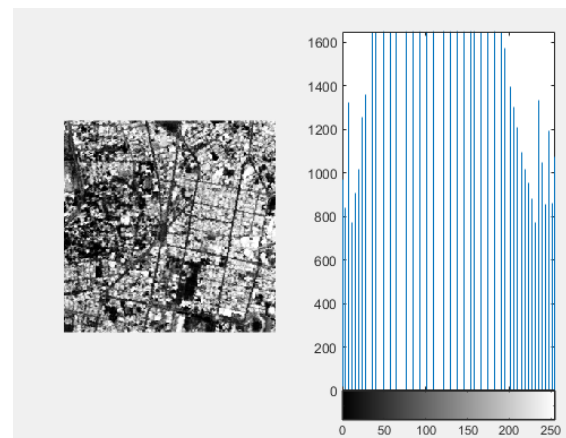
1-2-

```
img = imread('quito.pcx');
figure(1);
subplot(1,2,1); imshow(img);
title('Quito');
subplot(1,2,2); imhist(img);
title('Histogramme');
```



3-

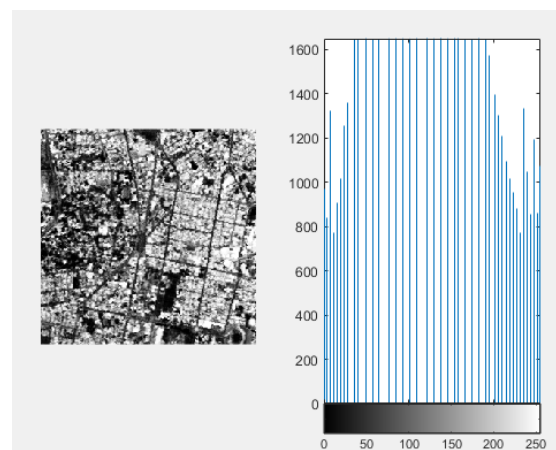
```
j = histeq(img);
figure(2);
subplot(1,2,1); imshow(j);
title('Quito');
subplot(1,2,2); imhist(j);
title('Histogramme');
```



4-

```
k = histeq(j);
figure(3);
subplot(1,2,1); imshow(k);
subplot(1,2,2); imhist(k);
```

On remarque que c'est à peu près que le même résultat que la première égalisation.



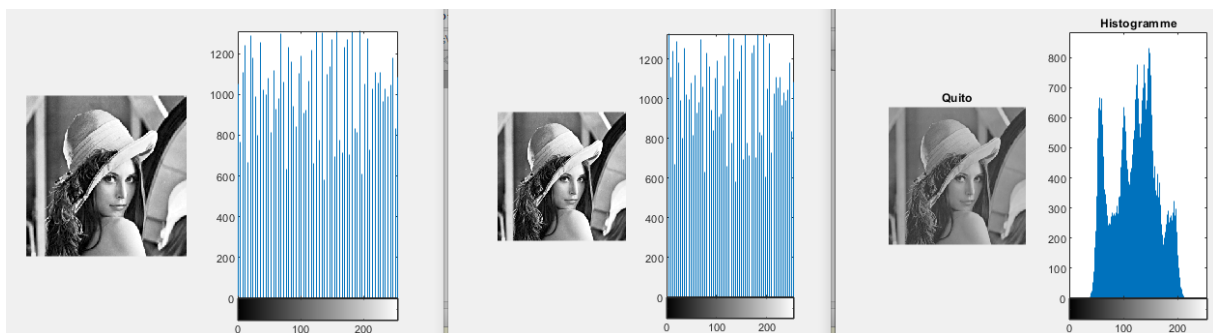
```

5-
clc; close all; clear all;
img = imread('lena.pcx');
figure(1);
subplot(1,2,1); imshow(img); title('Quito');
subplot(1,2,2); imhist(img); title('Histogramme');

j = histeq(img);
figure(2);
subplot(1,2,1); imshow(j);
subplot(1,2,2); imhist(j);

k = histeq(j);
figure(3);
subplot(1,2,1); imshow(k);
subplot(1,2,2); imhist(k);

```

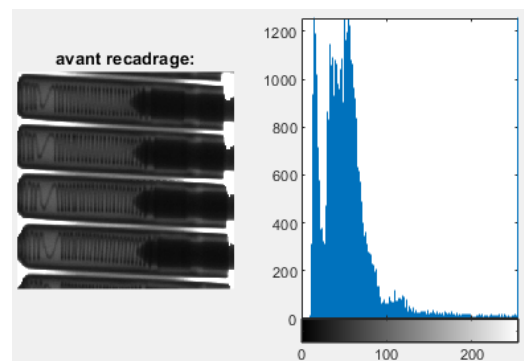


6-

```

%recadrage
img = imread('bougies.pcx');
figure(1);
subplot(1,2,1); imshow(img);
title('avant recadrage:');
subplot(1,2,2); imhist(img);

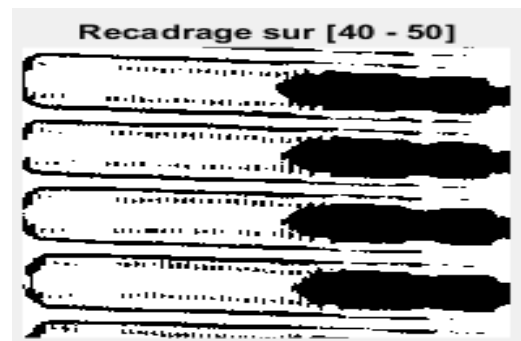
```



```

imR = ((double(img)-40)/(50-40))*255;
figure(2);
subplot(1,2,1); imshow(imR);
title('Recadrage sur [40 - 50]');
subplot(1,2,2); imhist(imR);

```



```

% log
gmax = 255;
[M,N]=size(imR);
for x=1:M

```



```
for y=1:N
    m = double(imR(x,y));
    z(x,y) = (gmax/(log10(double(1+gmax)))).*log10(1+m);
end
end
figure,imshow(z);
```

