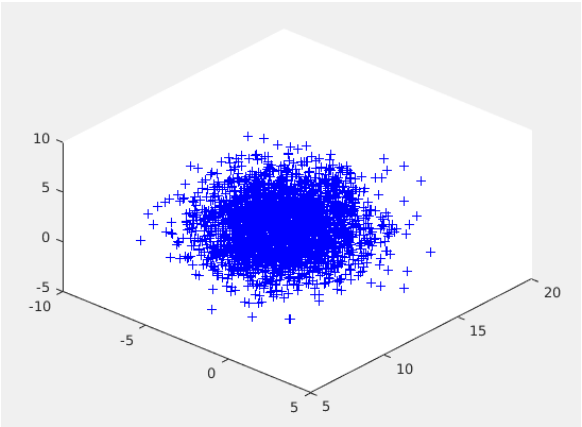
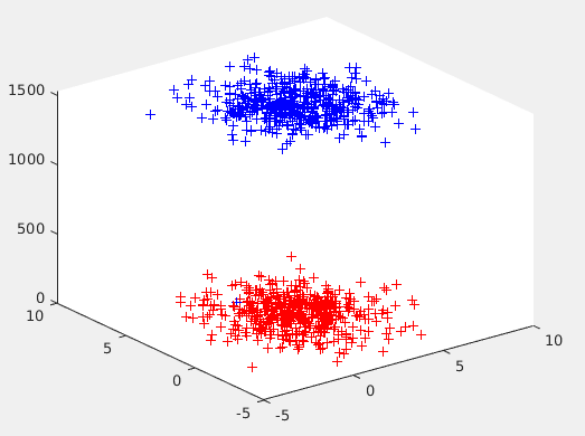
PCA

```
mu = [2 7 4 5 18 9 5 12 1 10];
d=10;
sigma = full(gallery('tridiag',d,-1,2,-1))
n=3000
[a b] = size(sigma);
r=mvnrnd(mu,sigma,n);
moy = zeros(1,10);
red = zeros(n,10);
for i=1:10

    for j=1:n
        moy(i)=moy(i)+r(j,i);
    end
    moy(i)=moy(i)/n
    for j=1:n
        red(i,j)=r(j,i)-moy(i);
    end
end

sigmaestim=zeros(10,10);

for i=1:10
    for j=1:10
        sum=0;
        for k=1:n
            sum=sum+red(i,k)*red(j,k);
        end
        cov=sum/n;
        simgmaestim(j,i)=cov;
    end
end

disp(simgmaestim)
[V,D]=eig(simgmaestim);
[V1,D1]=eig(sigma);
disp(D)
disp(D1)
B=[V(:,8) V(:,9) V(:,10)];
disp(B)
rred=zeros(n,3);
for i=1:3
    for j=1:n
        rred(j,i)=dot(r(j,:),B(:,i));
    end
end
disp(r)
disp(rred)
plot3(rred(:,1),rred(:,2),rred(:,3),'b+')
```

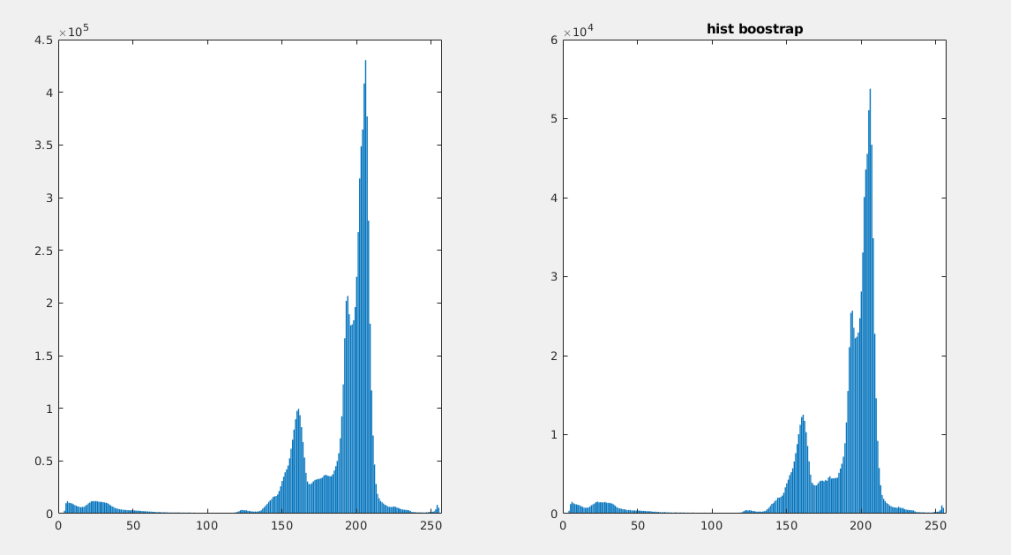


```
mu1 = [2 7 4 5 18 9 5 12 1 10];
mu2 = [100 500 256 248 369 987 214 364 800 123];
d=10;
sigma = full(gallery('tridiag',d,-1,2,-1));
n1=500;
n2=500;
n=n1+n2;
r1=mvnrnd(mu1,sigma,n1);
r2=mvnrnd(mu2,sigma,n2);
R=[r1 ; r2];
size(R);
moy = zeros(1,d);
red = zeros(n,d)
for i=1:10
    for j=1:n
        moy(i)=moy(i)+R(j,i);
    end
    moy(i)=moy(i)/n
    for j=1:n
        red(i,j)=R(j,i)-moy(i);
    end
end
sigmaestim=zeros(d,d);
for i=1:10
    for j=1:10
        sum=0;
        for k=1:n
            sum=sum+red(i,k)*red(j,k);
        end
        cov=sum/n;
        simgmaestim(j,i)=cov;
    end
end
disp(simgmaestim)
[V,D]=eig(simgmaestim);
[V1,D1]=eig(sigma);
disp(D)
disp(D1)
B=[V(:,8) V(:,9) V(:,10)];
disp(B)
rred=zeros(n,3);
for i=1:3
    for j=1:n
        rred(j,i)=dot(R(j,:),B(:,i));
    end
end
disp(R)
disp(rred)
plot3(rred(1:500,1),rred(1:500,2),rred(1:500,3),'r+')
hold on;
plot3(rred(500:1000,1),rred(500:1000,2),rred(500:1000,3),'b+')
```



Histogramme

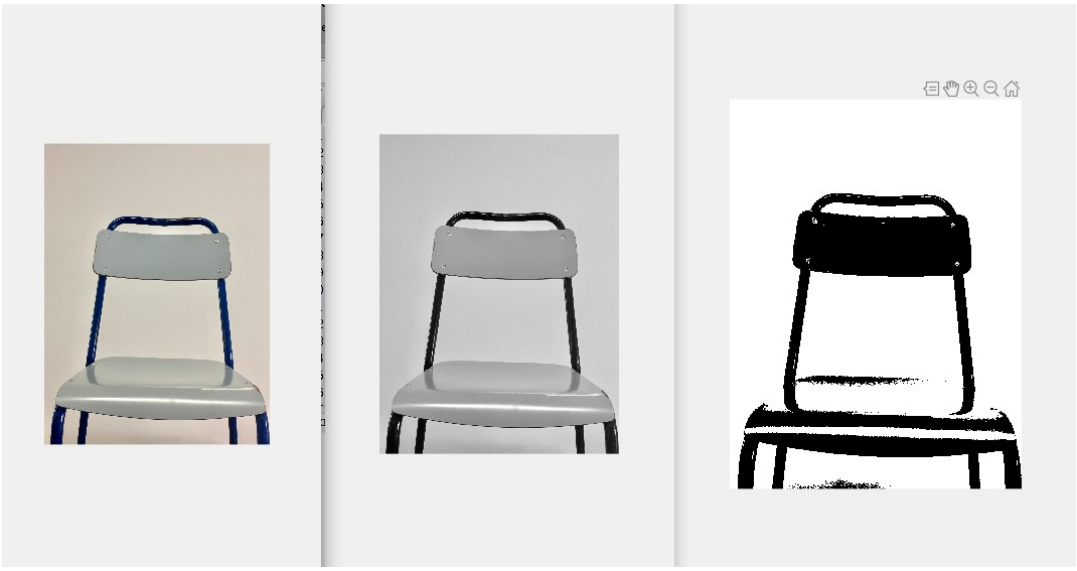
```
M=imread('kl.jpg');


% figure(1),imshow(M)
I= rgb2gray(M);
[a b]=size(I)
% figure(2),imshow(I)
for i=1:a
    for j=1:b
        I(i,j);
    end
end

hist=zeros(1,256);
for i=1:a
   for j=1:b
       hist(I(i,j))=hist(I(i,j))+1;
   end
end
X=0:255
subplot(1,2,1);
bar(hist);

//boostrap hist

n=1000;
for i=1:n
   for j=1:n
       k=randi([1 a],1);
       k2=randi([1 b],1);
       x(i,j)=I(k,k2);
   end
end
histr=zeros(1,256);
for i=1:n
   for j=1:n
       histr(x(i,j))=histr(x(i,j))+1;
   end
end
subplot(1,2,2);
bar(histr)
```



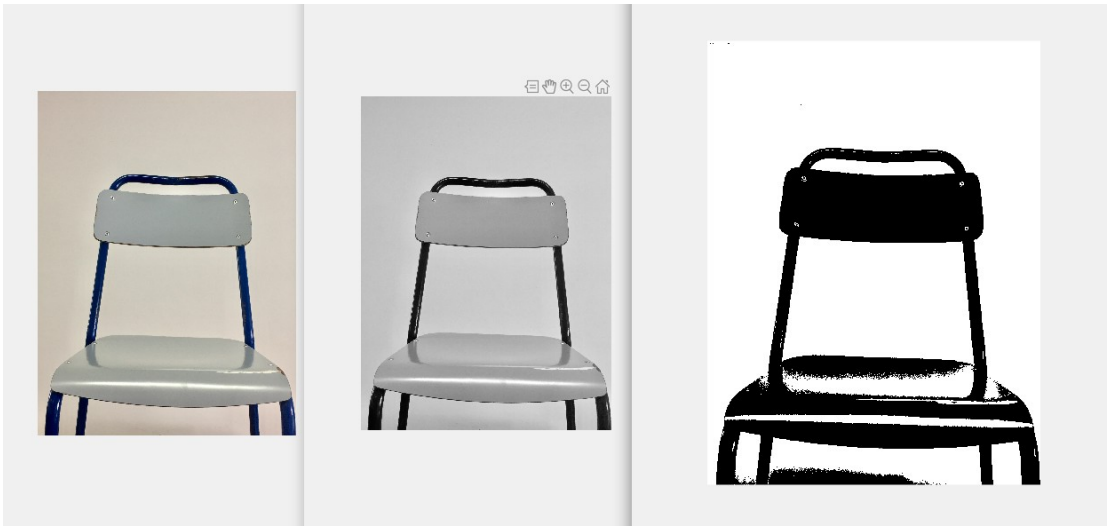
Segmentation par Seuillage

```
y=zeros(a,b);
for i=1:a
   for j=1:b
      if (I(i,j)) < 170
         y(i,j)=0;
      else
         y(i,j)=1;
      end
   end
end
figure(3),imshow(y)
```

seuil=170



seuil=180



Fisher

```
mu1 = [2 7 4];
mu2 = [5 3 6];
mu3=[9 6.2 8];
d=3;
sigma = 2*eye(d);
n1=50;
n2=50;
n3=50;
n=n1+n2+n3;
r1=mvnrnd(mu1,sigma,n1);
r2=mvnrnd(mu2,sigma,n2);
r3=mvnrnd(mu3,sigma,n3);
R=[r1 ; r2 ; r3];
[moy,sig]=moyetsig(R,d,n);
[moy1,sig1]=moyetsig(r1,d,n1);
[moy2,sig2]=moyetsig(r2,d,n2);
[moy3,sig3]=moyetsig(r3,d,n3);
sb1=(n1/n)*(moy1-moy)'*(moy1-moy);
sb2=(n2/n)*(moy2-moy)'*(moy2-moy);
sb3=(n3/n)*(moy3-moy)'*(moy3-moy);
Sb=sb1+sb2+sb3;
sw1=(n1/n)*sig1;
sw2=(n2/n)*sig2;
sw3=(n3/n)*sig3;
sw=sw1+sw2+sw3;
swi=inv(sw);
W=Sb*swi;
[V,D]=eig(W);
wf=[V(:,1),V(:,3)];
Z=R*wf;
plot(Z(:,1),Z(:,2),'r*')
```