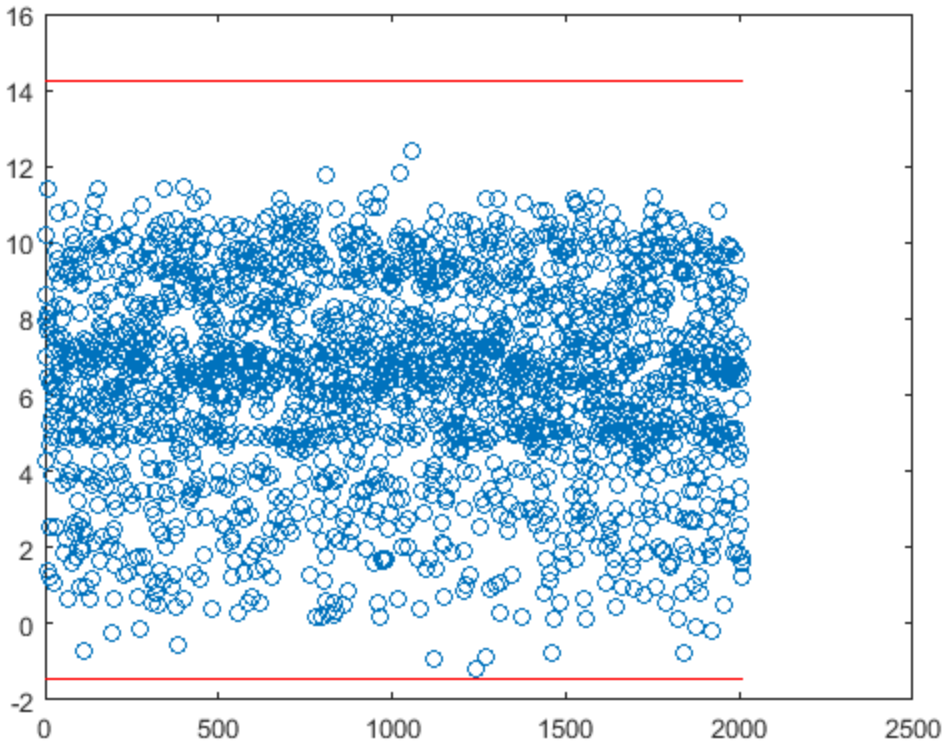
Table of Contents

Importer le fichier CSV point anomalysynthetic sous la forme d'une matrice numerique 2010*50

```
%(penser à le mettre dans le path)
load('PointAnomalySynthetic.data.csv')
% load('PointAnomalySynthetic.label.csv')
```

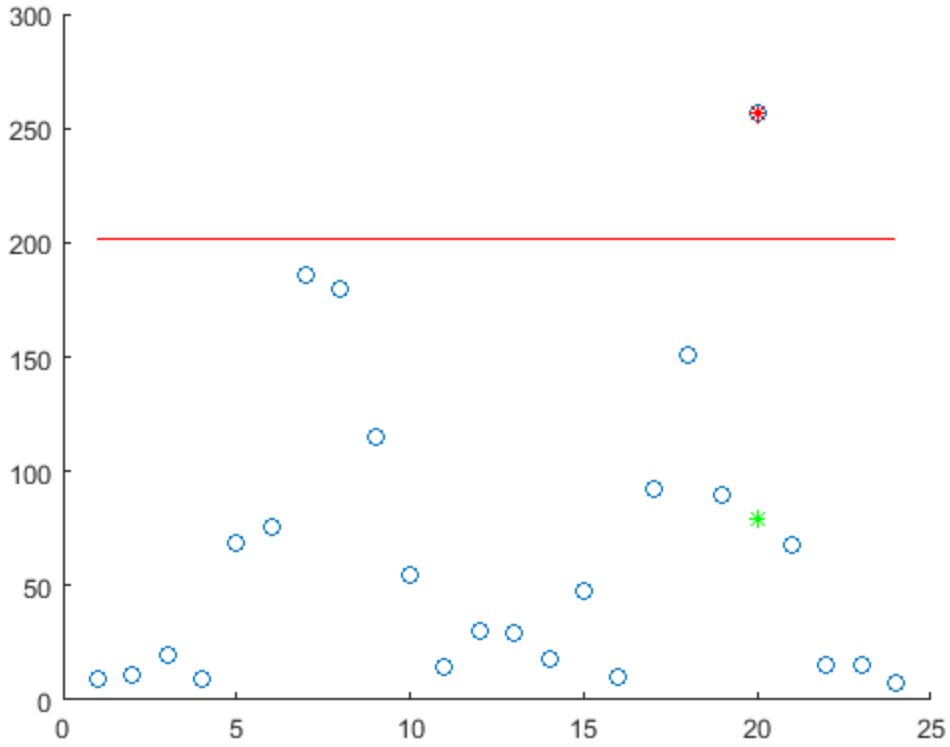
Simple ecart à la moyenne 1D sur données synthétiques.

```
V=PointAnomalySynthetic_data(1:2010,40);
figure;plot(V,'o');hold on
MV=mean(V);
EcartType=std(V);
plot(MV+3*EcartType*ones(1,length(V)),'r');
plot(MV-3*EcartType*ones(1,length(V)),'r');
```



Simple ecart à la moyenne 1D sur données réelles.

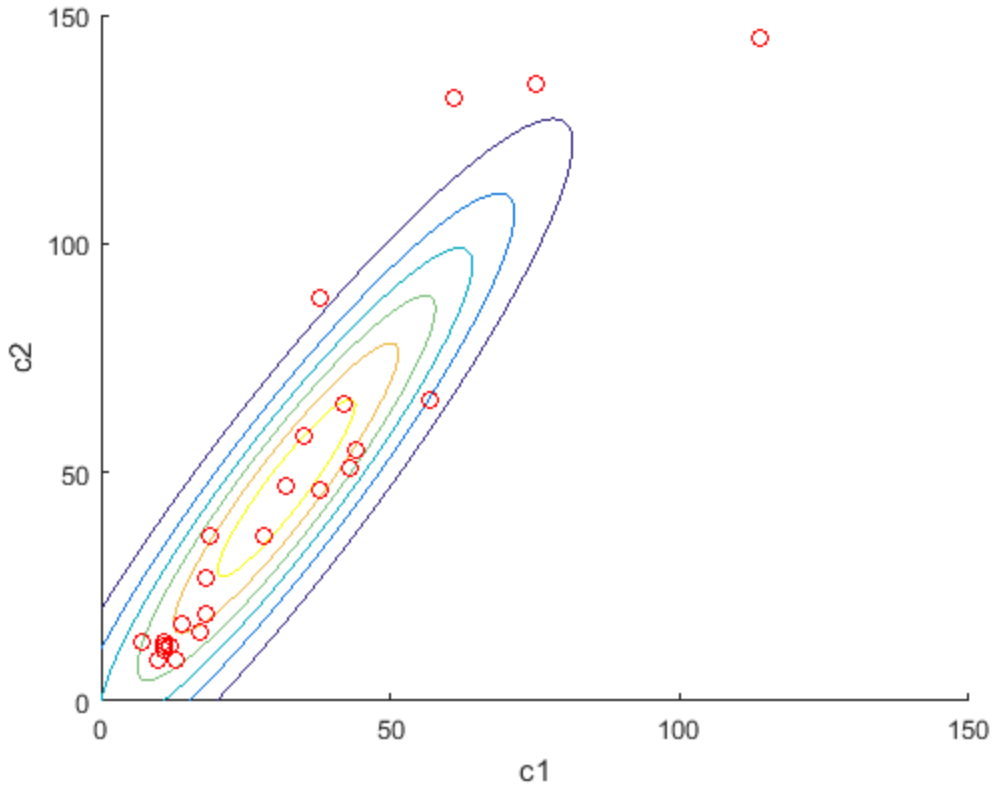
```
load count.dat;
c3=count(:,3);
Mc3=mean(c3);
stdc3=std(c3);
seuil=2;
index_outliers=find(c3>Mc3+seuil*stdc3);
figure;hold on;
plot(c3,'o');
plot(Mc3+seuil*stdc3*ones(1,length(c3)),'r');
plot(index_outliers,c3(index_outliers),'r*')
c4=c3;
c4(index_outliers)=(c3(max(1,index_outliers-1))+c3(min(index_outliers
+1,length(c3))))/2;
plot(index_outliers,c4(index_outliers),'g*')
```

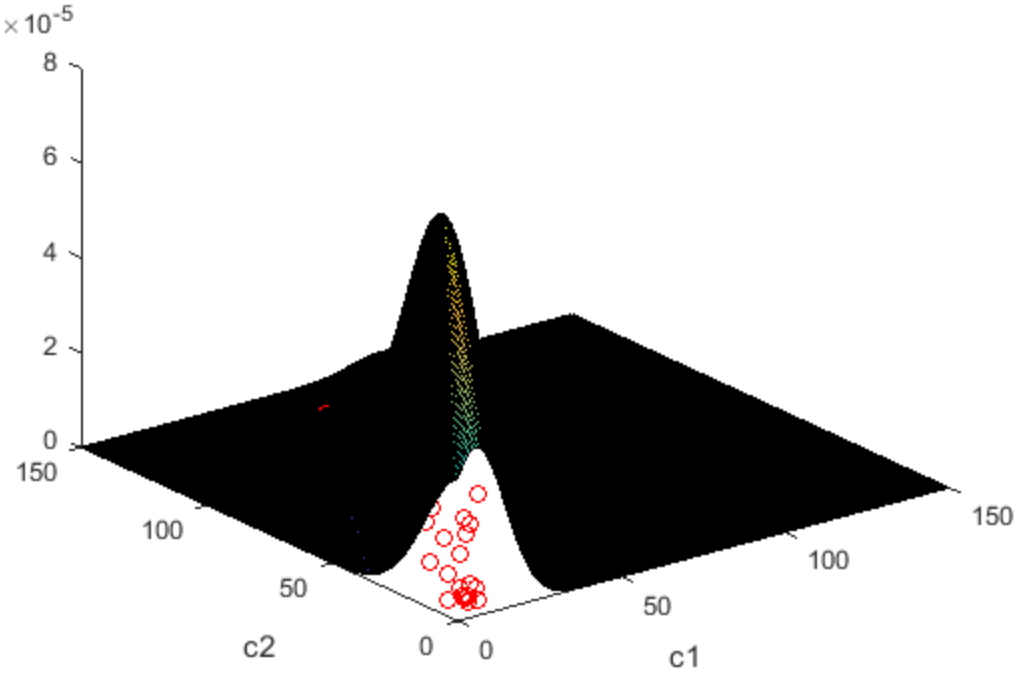


Simple ecart à la moyenne 2D sur données réelles.

```
c1=count(:,1);
c2=count(:,2);
C=cov(c1,c2);
Mu=[mean(c1);mean(c2)];
Sigma = C;
N=@(x) exp(-(x-Mu)'*inv(Sigma)*(x-Mu)/2)/sqrt(det(Sigma*(2*pi)^2));
xMin = 0;
xMax = 150;
step = 1;
X1 = xMin:step:xMax;
X2 = xMin:step:xMax;
[X1aff,X2aff]=meshgrid(xMin:step:xMax,xMin:step:xMax);
L = zeros(length(X2),length(X1));
for i = 1:length(X1)
    for j = 1:length(X2)
        x = [X1(i) X2(j)]';
        L(j,i) = N(x);
    end
end
figure;hold on;
contour(X1,X2,L);
```

```
scatter(c1,c2,'ro')
xlabel('c1');
ylabel('c2')
figure;
hold on;
surf(X1aff,X2aff,L)
scatter(c1,c2,'ro')
xlabel('c1');
ylabel('c2');
view(3);
```

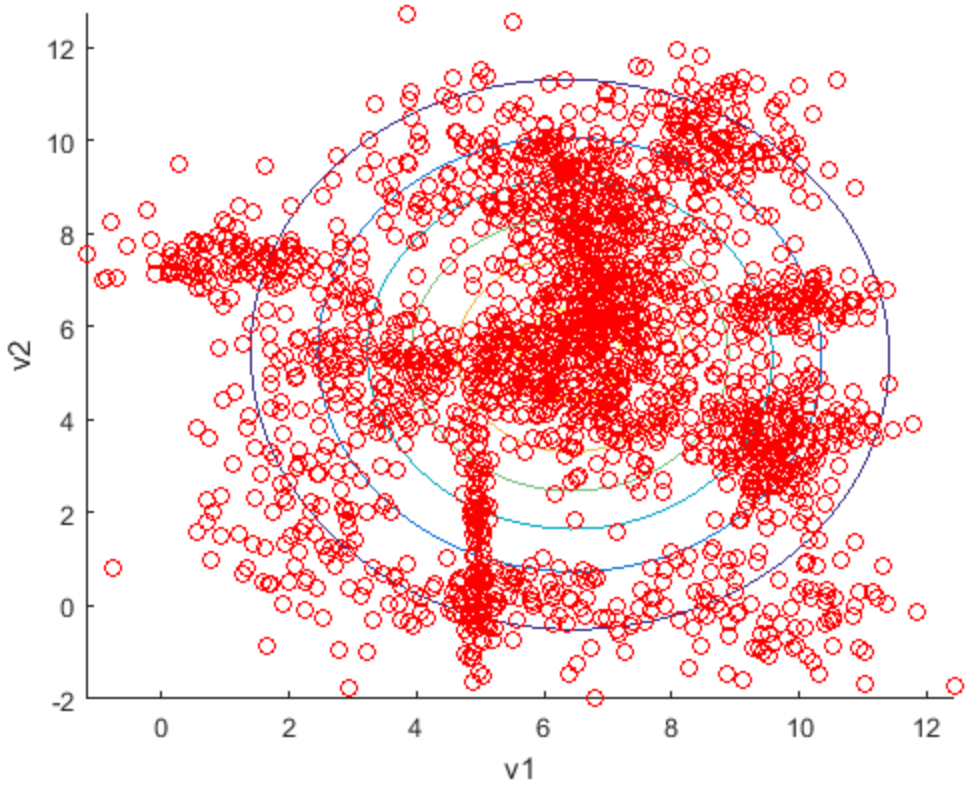


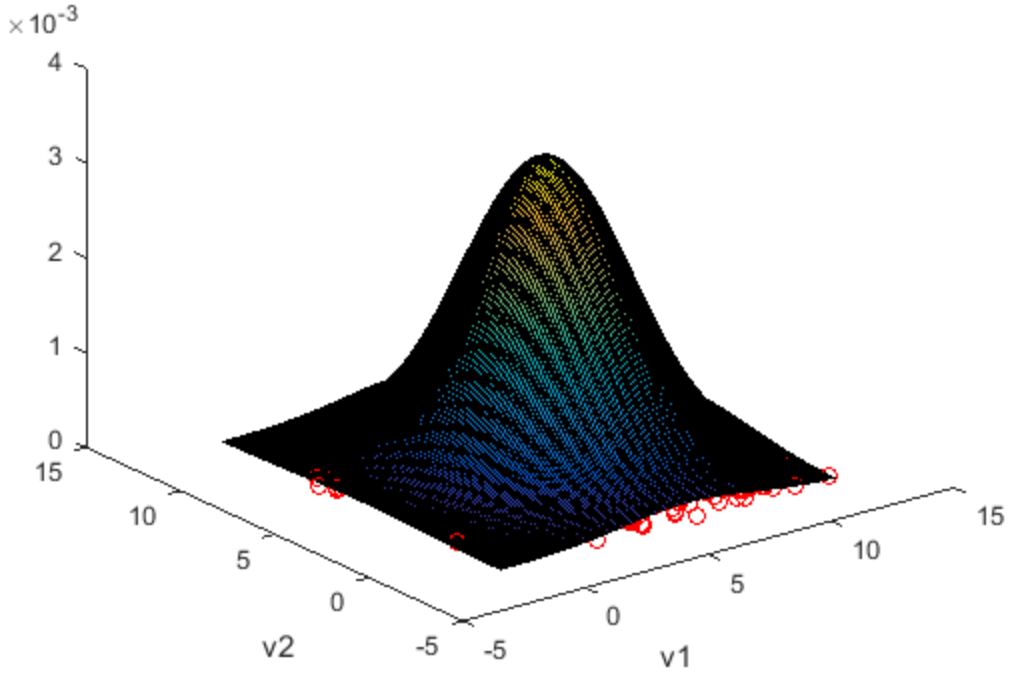


Simple ecart à la moyenne 2D sur données synthétiques.

```
v1=PointAnomalySynthetic_data(1:2010,40);%count(:,1);
v2=PointAnomalySynthetic_data(1:2010,30);%count(:,2);
C=cov(v1,v2);
Mu=[mean(v1);mean(v2)];
Sigma = C;
N=@(x) exp(-(x-Mu)'*inv(Sigma)*(x-Mu)/2)/sqrt(det(Sigma*(2*pi)^2));
xMin1 = min(v1);
xMax1 = max(v1);
xMin2 = min(v2);
xMax2 = max(v2);
step = 0.1;
X1 = xMin1:step:xMax1;
[X1aff,X2aff]=meshgrid(xMin1:step:xMax1,xMin2:step:xMax2);
X2 = xMin2:step:xMax2;
L = zeros(length(X2),length(X1));
for i = 1:length(X1)
    for j = 1:length(X2)
        x = [X1(i) X2(j)]';
        L(j,i) = N(x);
    end
end
```

```
figure;hold on;
contour(X1,X2,L);
scatter(v1,v2,'ro')
xlabel('v1');
ylabel('v2');
figure;
hold on;
surf(X1aff,X2aff,L)
scatter(v1,v2,'ro')
xlabel('v1');
ylabel('v2');
view(3);

%%%%
% A=PointAnomalySynthetic_data(1:100,1:3);
% figure;scatter3(A(:,1),A(:,2),A(:,3));
% hold on;
```

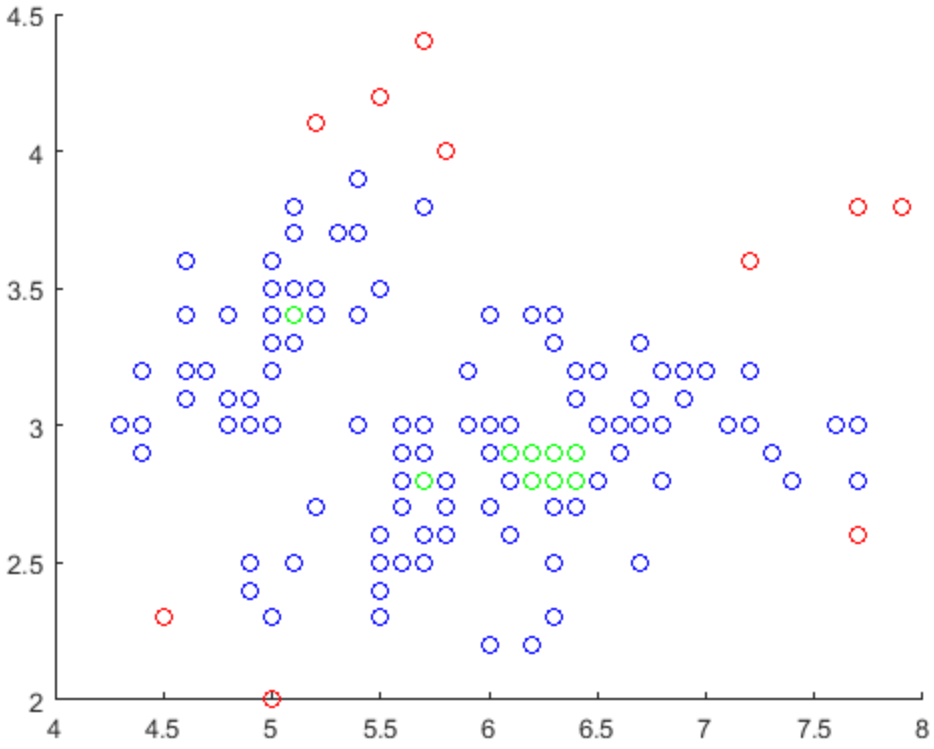


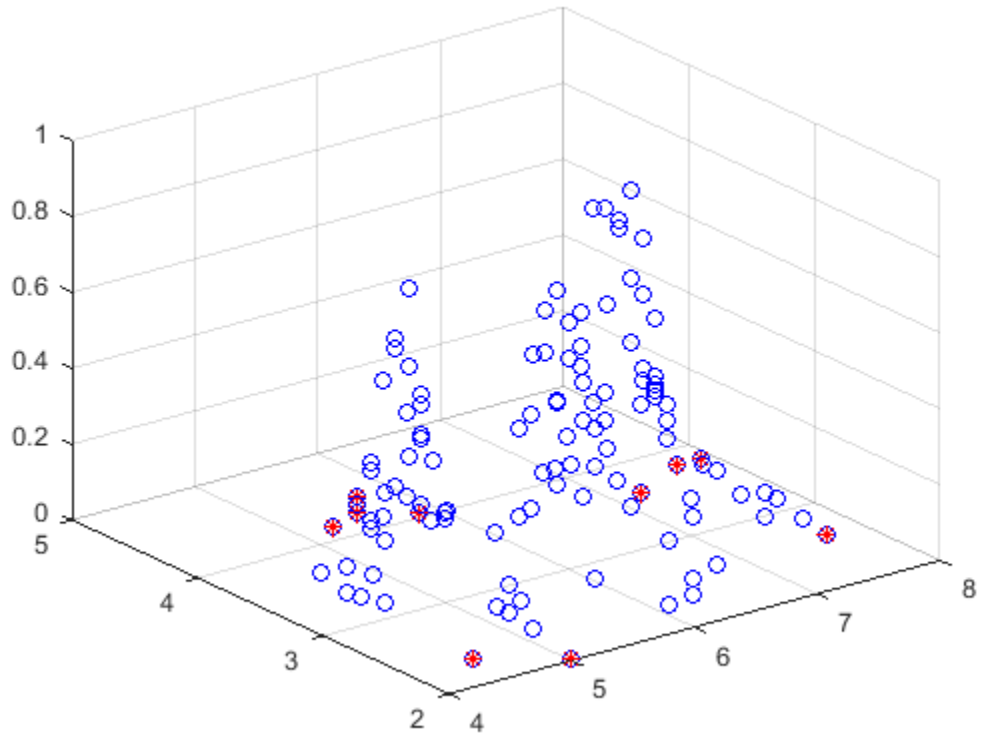


ABOD

```
% % Angle Based Outlier Detection
% % Authors: Hans-Peter, Kriegel Matthias, Schubert Arthur Zimek
% % Original paper :
% % Angle-Based Outlier Detection in High-dimensional Data In KDD2008
% % Website : http://www.dbs.ifi.lmu.de/
% % e-mail : {kriegel,schubert,zimek}@dbs.ifi.lmu.de


load('iris.mat', '-mat');
% penser à mettre dans le path
A=iris(:,[1;2]);
%A=iris(:,[1;2;5]);
B=A;
[A, ia, ic] = unique(A,'rows');
instance_number = size(ia, 1);
origin_instance_number = size(ic, 1);
var_array = zeros(instance_number, 1);

for i=1:instance_number
    M=[];
    for j=1:instance_number
        if j==i
            continue
```

```
        end
        for k=j+1:instance_number
            if k==i
                continue
            end
            vector1 = A(j,:) - A(i,:);
            vector2 = A(k,:) - A(i,:);
            norm_vector1Xnorm_vector2 = (norm(vector1) *
 norm(vector2))^2;
            vector1Xvector2T = vector1 * vector2';
            M=[M,vector1Xvector2T/norm_vector1Xnorm_vector2];
        end
    end
    var_array(i) = var(M);
end

min_var_array = min(var_array);
abof = (var_array - min_var_array) / (max(var_array) - min_var_array);
origin_abof = zeros(origin_instance_number, 1);
for i=1:origin_instance_number
    origin_abof(i, 1) = abof(ic(i, 1), 1);
end
abof = origin_abof;
[yepee, suspicious_index] = sort(abof);
A=B;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

S=size(A);
if S(2)==2
    figure; hold on;
    scatter(A(:,1),A(:,2),'ob')

 scatter(A(suspicious_index(1:10),1),A(suspicious_index(1:10),2),'or')

 scatter(A(suspicious_index(end-10:end),1),A(suspicious_index(end-10:end),2),'og')
    figure;
    hold on;
    grid;
    scatter3(A(:,1),A(:,2),abof,'ob')

 scatter3(A(suspicious_index(1:10),1),A(suspicious_index(1:10),2),yepee(1:10),'*r'
    view(3);
elseif S(2)==3
    figure;
    hold on;grid;
    scatter3(A(:,1),A(:,2),A(:,3),'ob')

 scatter3(A(suspicious_index(1:10),1),A(suspicious_index(1:10),2),A(suspicious_ind
    view(3);
end
```


4.5
4
3.5
3
2.5
2
4
4.5
5
5.5
6
6.5
7
7.5
8


1
0.8
0.6
0.4
0.2
0
5
4
3
2
4
5
6
7
8

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