Sessió 8

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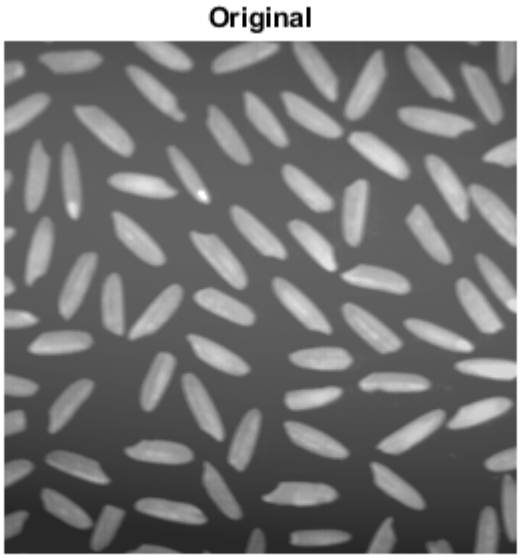
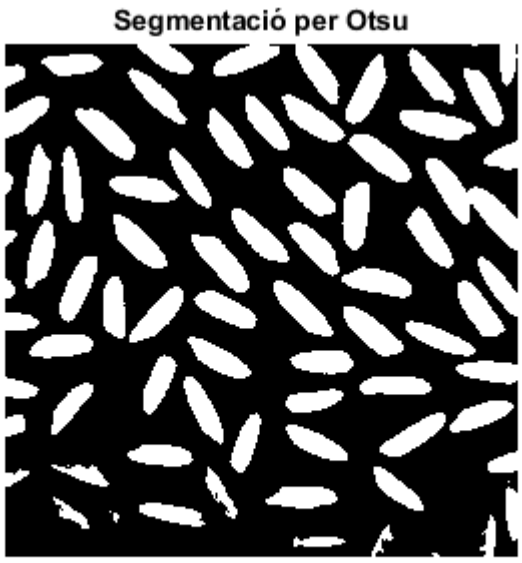
```
im = imread('arros.tif');
imshow(im), title('Original')
```

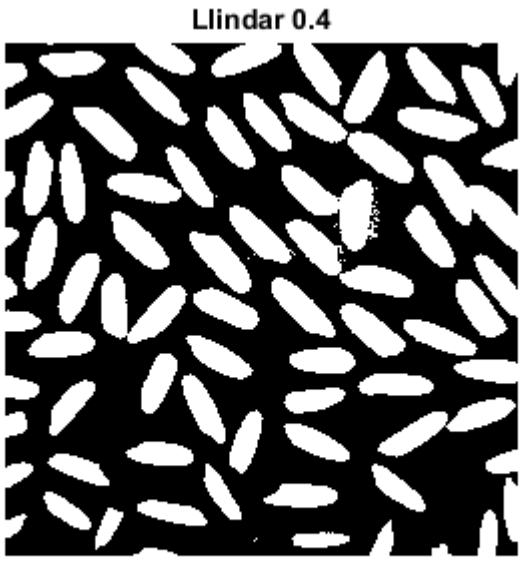


Segmentació de la imatge (Otsu)

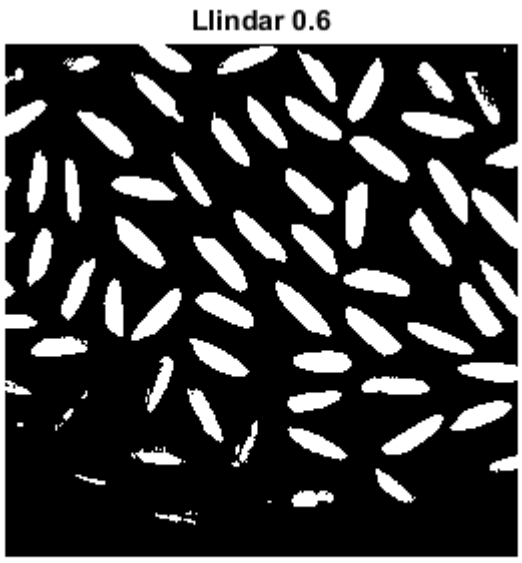
```
th = graythresh(im);
bw = im2bw(im, th);
figure, imshow(bw), title('Segmentació per Otsu')
```



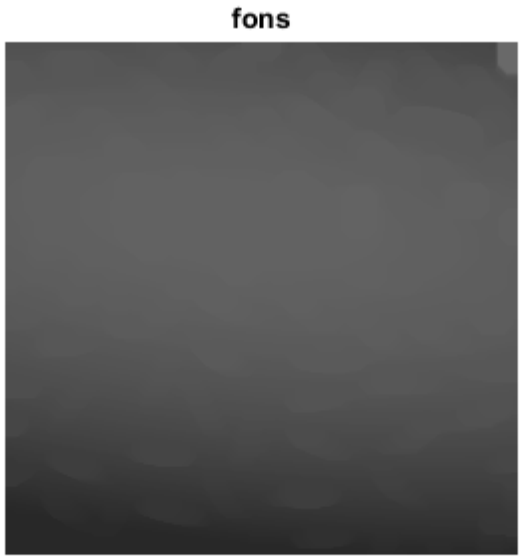

```
% La binarització no és bona
bw = im2bw(im, 0.4);
figure, imshow(bw), title('Llindar 0.4')
```



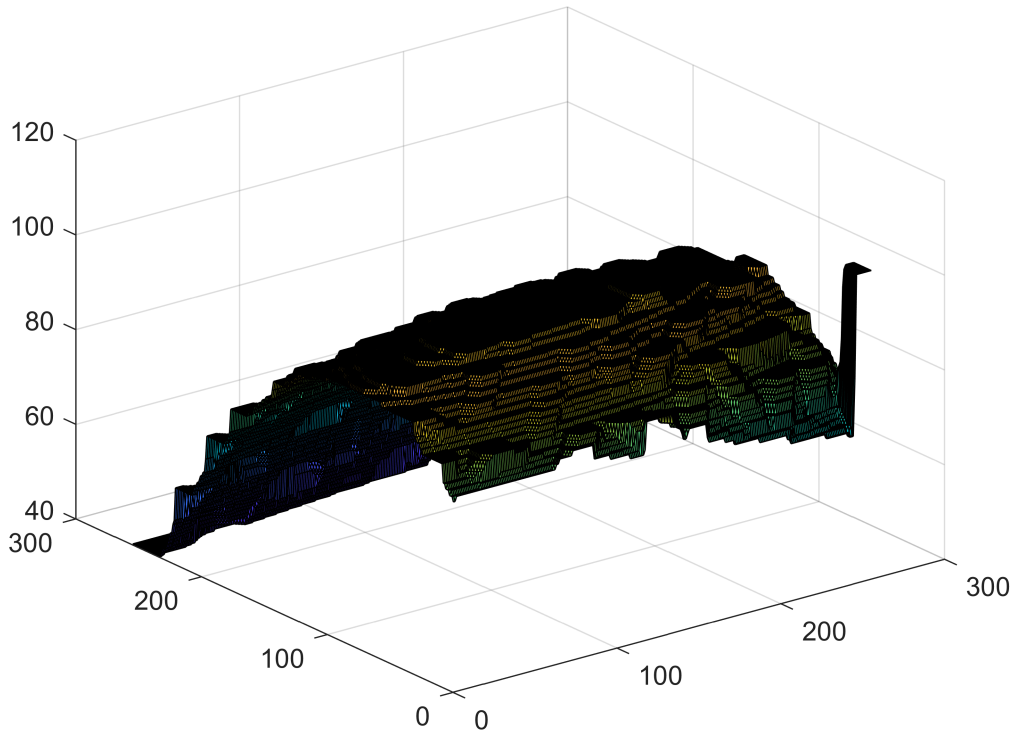

```
bw = im2bw(im, 0.6);
figure, imshow(bw), title('Llindar 0.6')
```



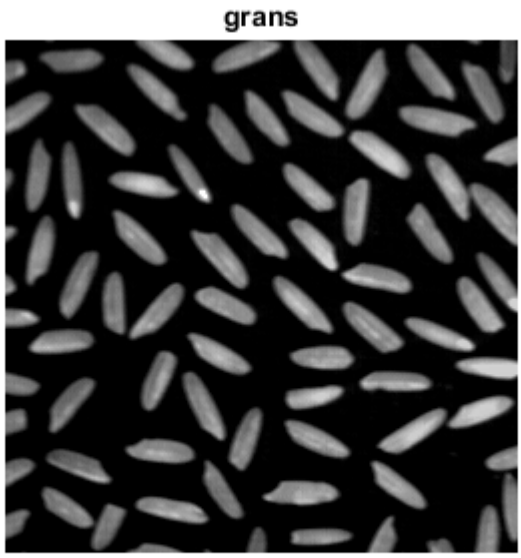

```
ee = strel('disk', 10);
op = imopen(im, ee);
figure, imshow(op), title('fons')
```




```
figure, surf(op)
```

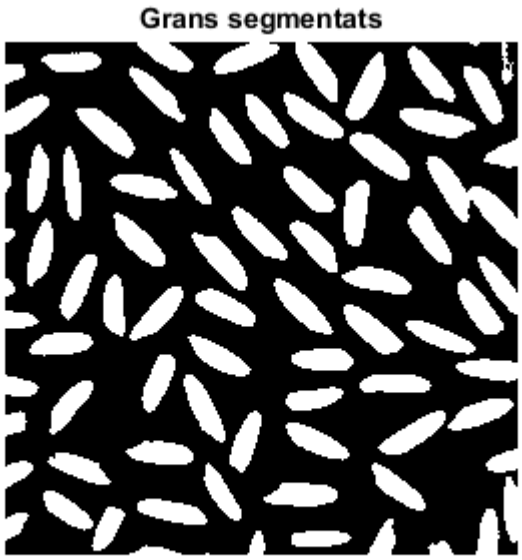



```
grans = imsubtract(im, op);
figure, imshow(grans, []), title('grans')
```




```
th = graythresh(grans);
bw = im2bw(grans, th);
```

```
figure, imshow(bw), title('Grans segmentats')
```

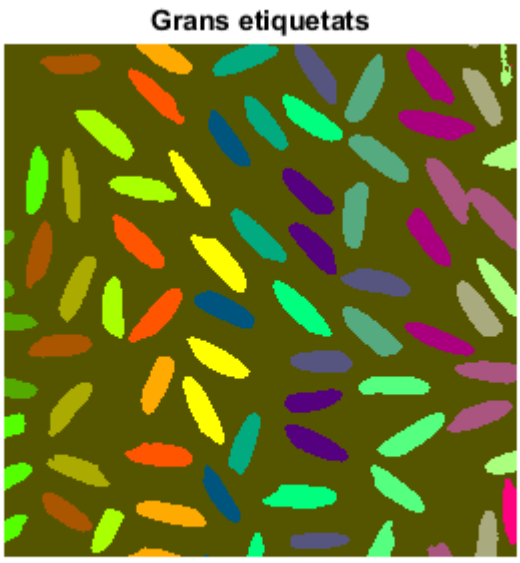


Etiquetatge

```
eti = bwlabel(bw, 4);
max(eti(:))
```

```
ans = 81
```

```
figure, imshow(uint8(eti)), title('Grans etiquetats'), colormap('colorcube')
```



Extreure dades (Característiques)

```
dades = regionprops(eti, 'all');
arees = [dades.Area];
dades(50).Area
```

```
ans = 305
```

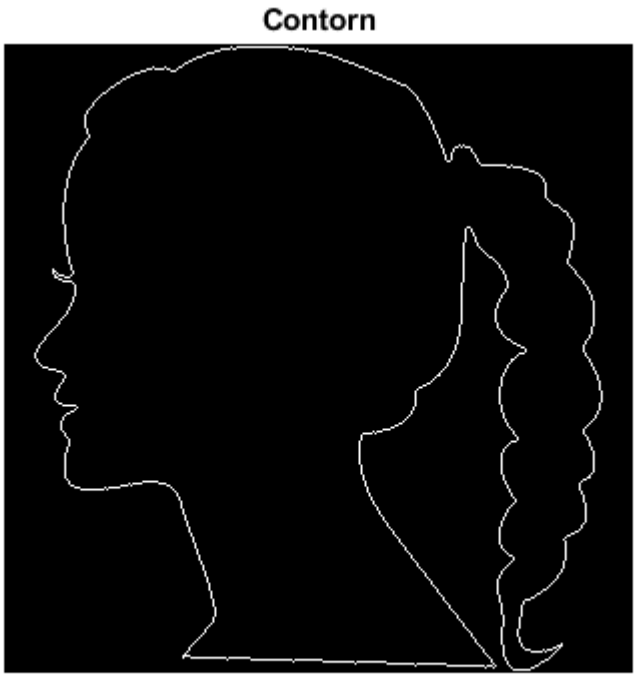
```
figure, plot(arees)
clear all
close all
```

```
im = imread('head.png');
im = imresize(im, 1/2);
imshow(im)
```

```
area = sum(im(:))
```

```
area = 58501
```

```
ero = imerode(im, strel('disk', 1));
cont = imsubtract(im, ero);
figure, imshow(cont), title('Contorn')
```




```
perm = sum(cont(:))
```

```
perm = 1526
```

```
C = perm * perm/area
```

```
C = 39.8057
```

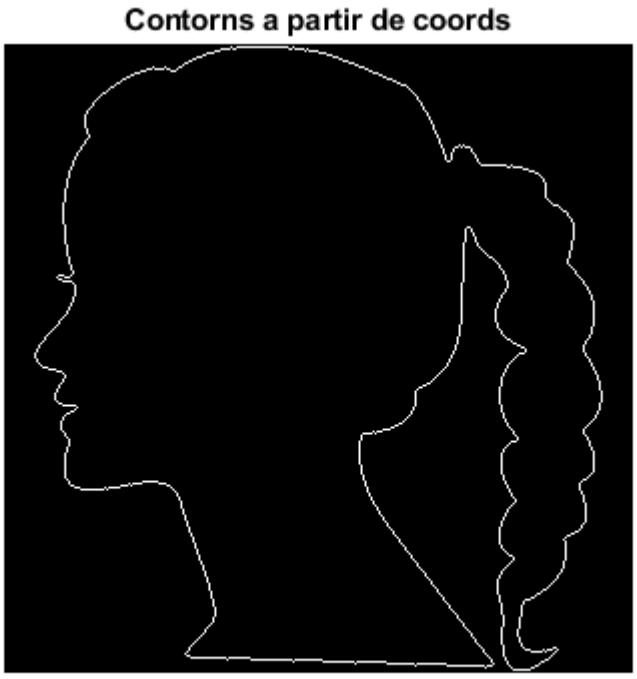
```
C/(4 * pi)
```

```
ans = 3.1676
```

```
[fila col] = find(cont, 1)
```

```
fila = 155
col = 16
```

```
B = bwtraceboundary(cont, [fila, col], 'E');
aux = zeros(size(im));
aux(sub2ind(size(aux), B(:, 1), B(:, 2))) = 1;
figure, imshow(aux), title('Contorns a partir de coords')
```



Exercici: Codi de Freeman

```
[fila cols] = size(B);
V = B(2:fila, :)-B(1:(fila - 1), :);
V
```

```
V = 1506×2
     1     0
     1     0
     1     1
     1     0
     1     1
     1     1
     1     1
     0     1
     0     1
     1     1
     ⋮
```

```
sol = zeros(size(V, 1), 1);
sol = mod((atan2d(V(:, 2), V(:, 1)) + 360)/45, 8) + 1;
sol
```

```
sol = 1506×1
     1
     1
     2
     1
```

```
     2
     2
     2
     3
     3
     2
     ⋮
```

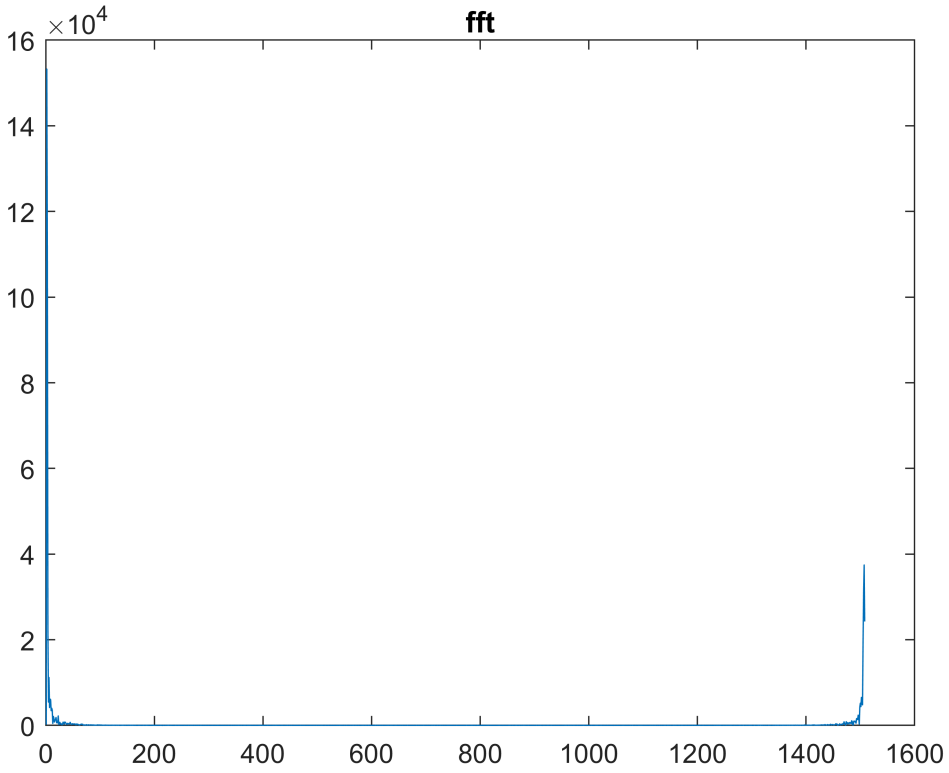
```
%%%%%%%  DIRECCIONS   %%%%%%%
%           7
%       6       8
%
%   5               1
%
%       4       2
%           3
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Fourier

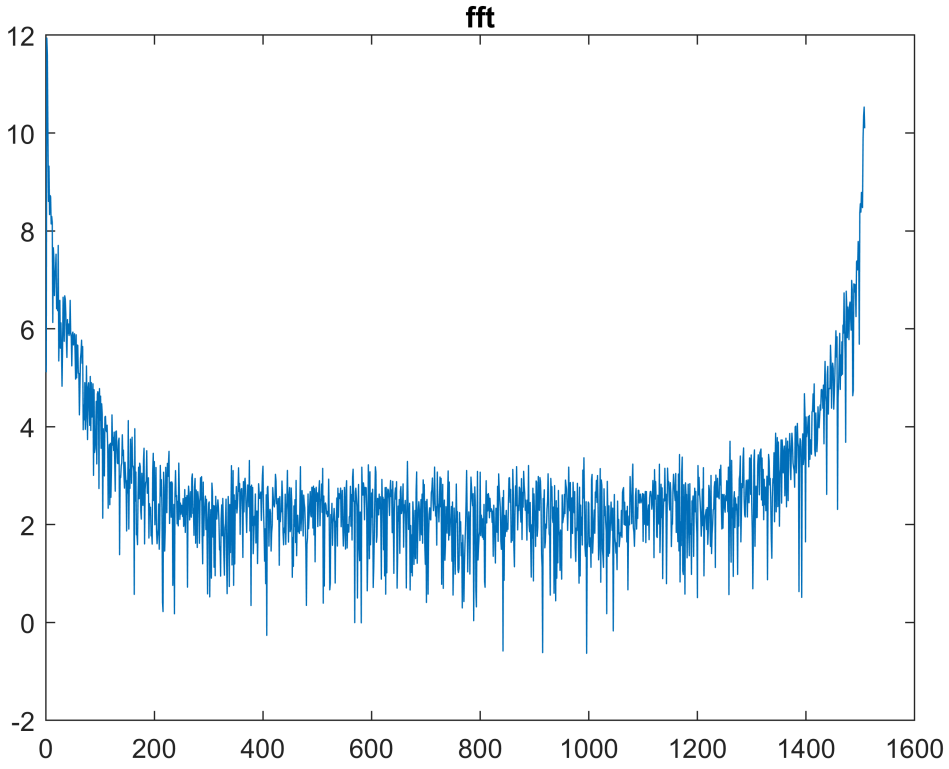
```
cdm = mean(B)
```

```
cdm = 1×2
  176.7956  180.6357
```

```
Bc(:, 1) = B(:, 1) - cdm(1);
Bc(:, 2) = B(:, 2) - cdm(2);
s = Bc(:, 1) + i * Bc(:, 2);
s(end+1) = s(end);
z = fft(s);
figure, plot(abs(z)), title('fft')
```

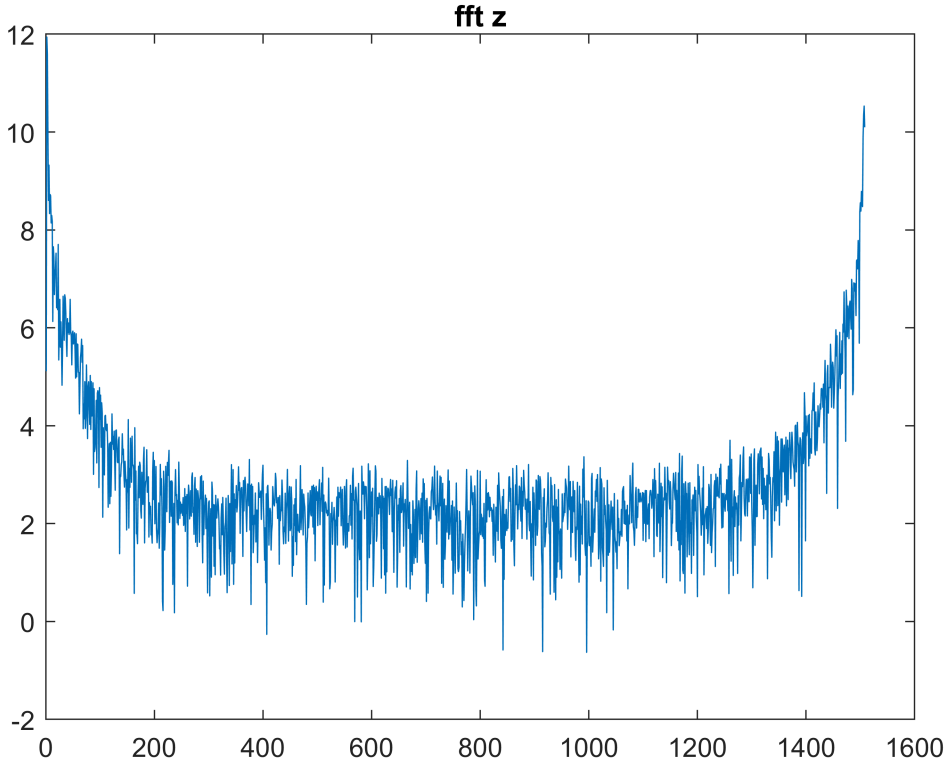



```
figure, plot(log(abs(z))), title('fft')
```

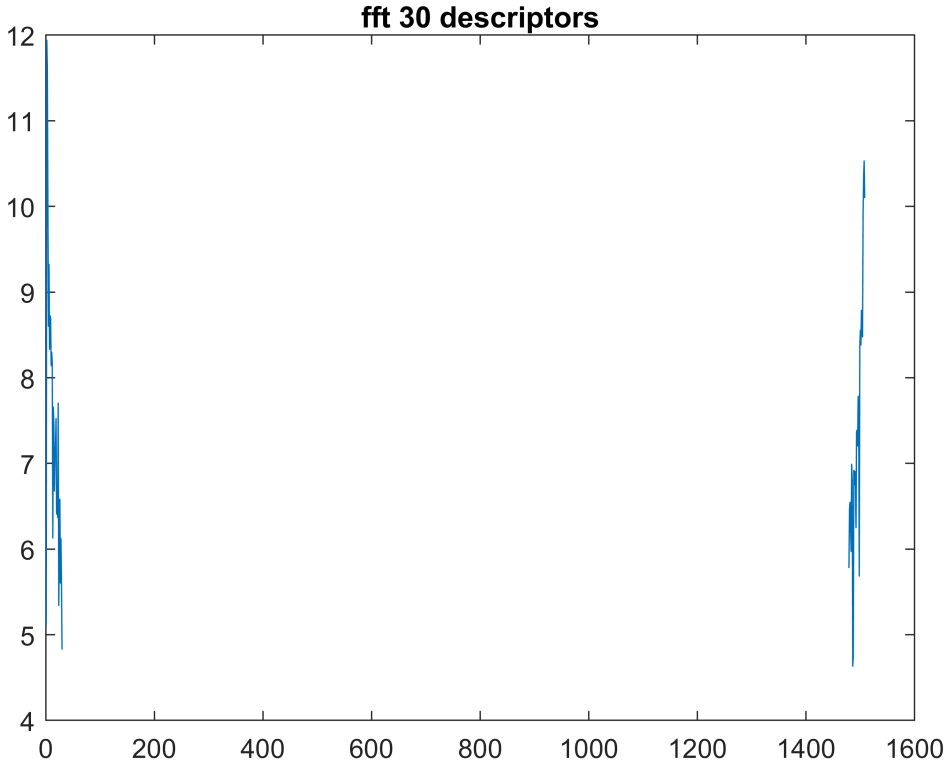


```
s2 = ifft(z);
files = round(real(s2) + cdm(1));
cols = round(imag(s2) + cdm(2));
aux = zeros(size(im));
aux(sub2ind(size(aux), files, cols)) = 1;
figure, imshow(aux)
```

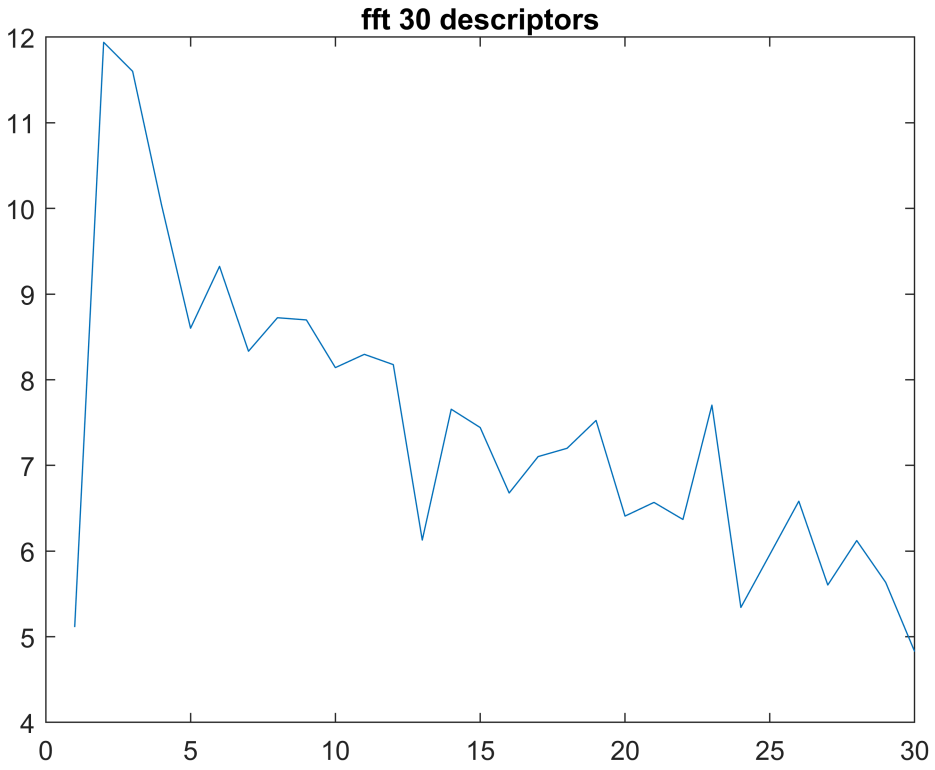
```
N = 30;
tmp = z;
tmp(N+1:end-N) = 0;
figure, plot(log(abs(z))), title('fft z')
```



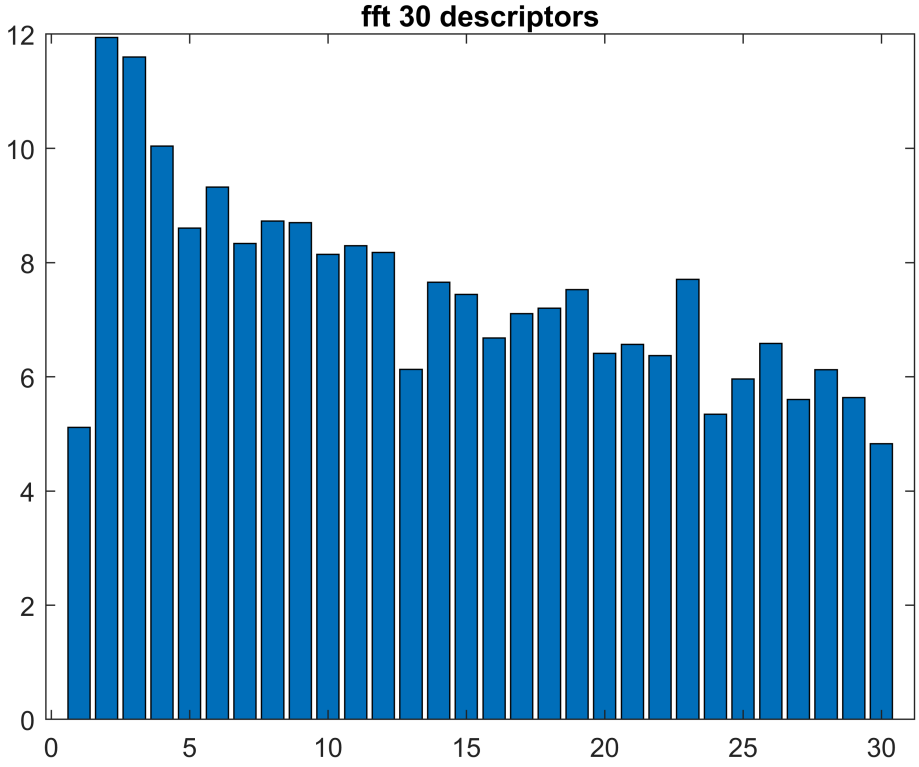

```
figure, plot(log(abs(tmp))), title('fft 30 descriptors')
```



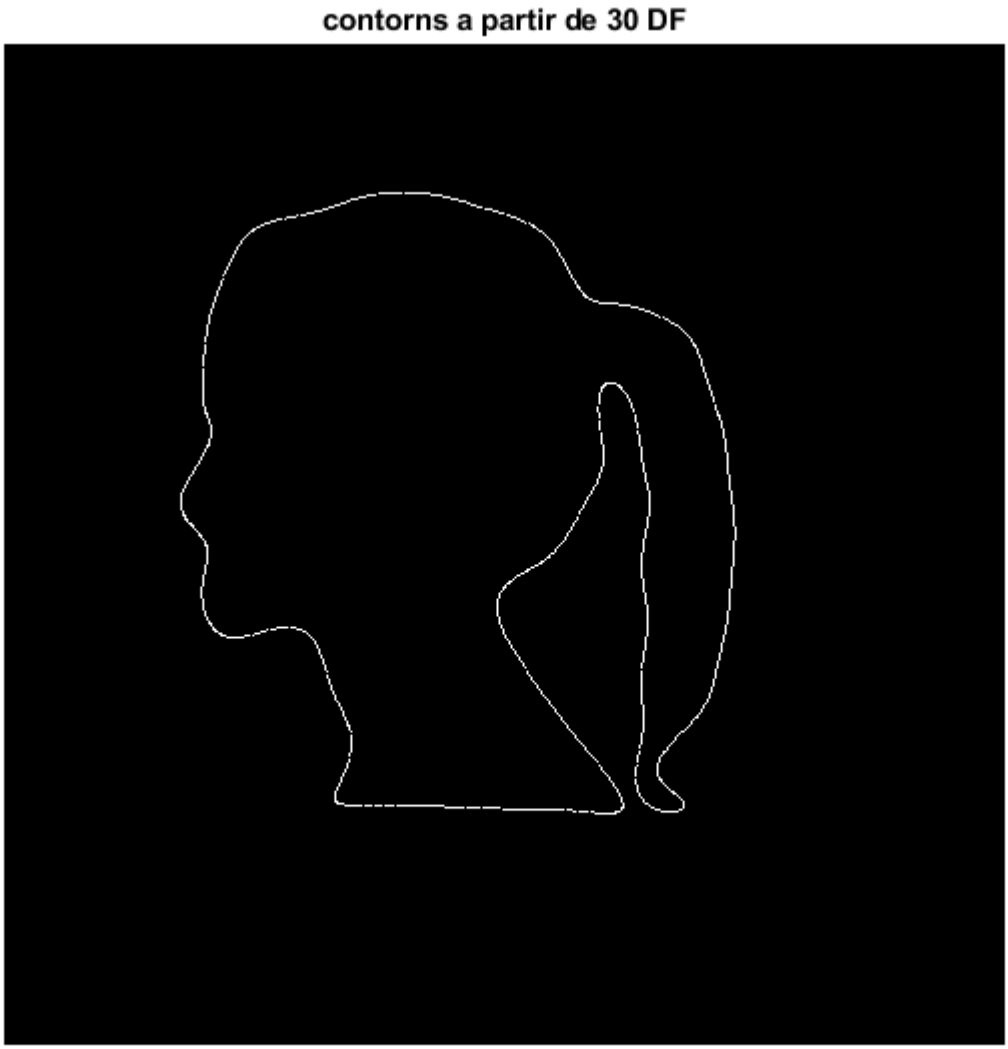
```
figure, plot(log(abs(tmp(1:30)))), title('fft 30 descriptors')
```




```
figure, bar(log(abs(tmp(1:30)))), title('fft 30 descriptors')
```



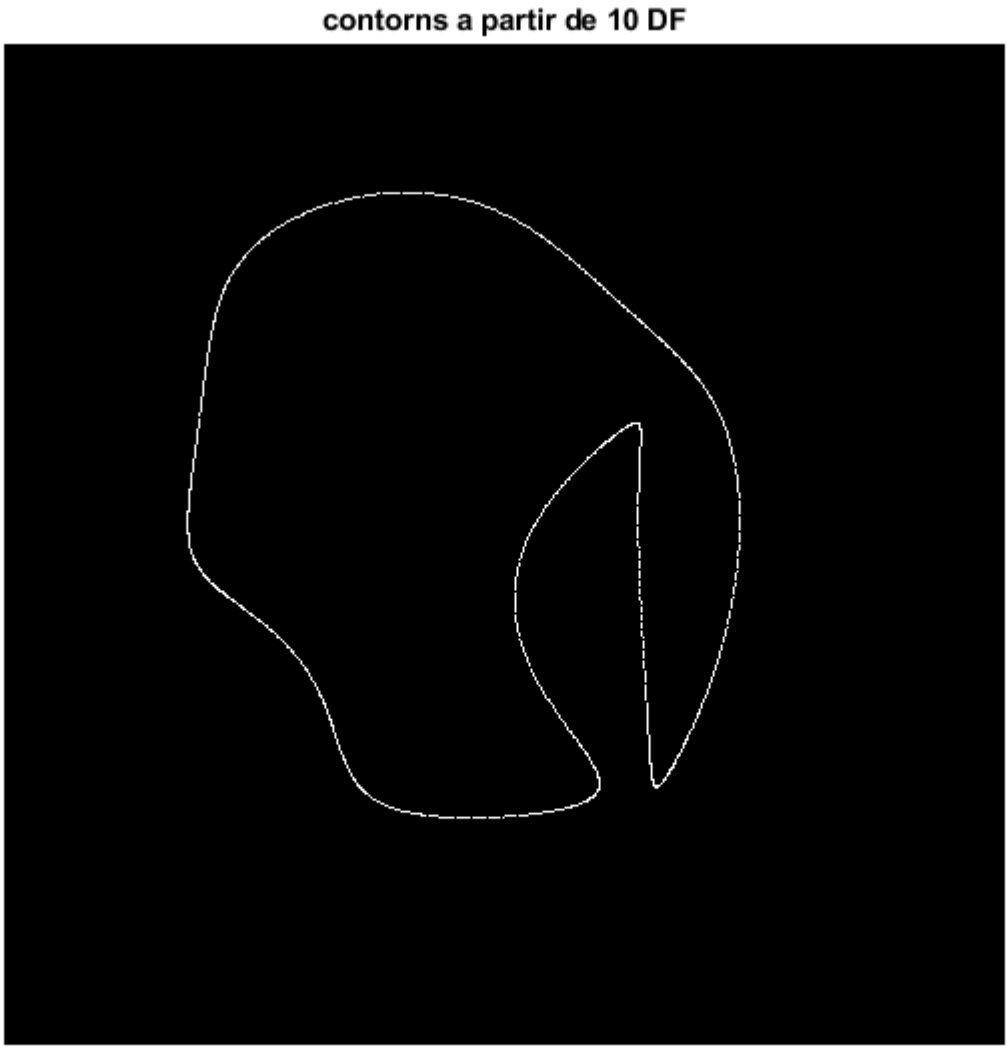

```
s2 = ifft(tmp);
aux = zeros(500);
files = round(real(s2)+250);
cols = round(imag(s2)+250);
aux(sub2ind(size(aux), files, cols)) = 1;
figure, imshow(aux), title('contorns a partir de 30 DF')
```



Exercici

Menys components

```
N = 8;
tmp = z;
tmp(N+1:end-N) = 0;
s2 = ifft(tmp);
aux = zeros(500);
files = round(real(s2)+250);
cols = round(imag(s2)+250);
aux(sub2ind(size(aux), files, cols)) = 1;
figure, imshow(aux), title('contorns a partir de 10 DF')
```



Més components

```
N = 150;
tmp = z;
tmp(N+1:end-N) = 0;
s2 = ifft(tmp);
aux = zeros(500);
files = round(real(s2)+250);
cols = round(imag(s2)+250);
aux(sub2ind(size(aux), files, cols)) = 1;
figure, imshow(aux), title('contorns a partir de 50 DF')
```

contorns a partir de 50 DF