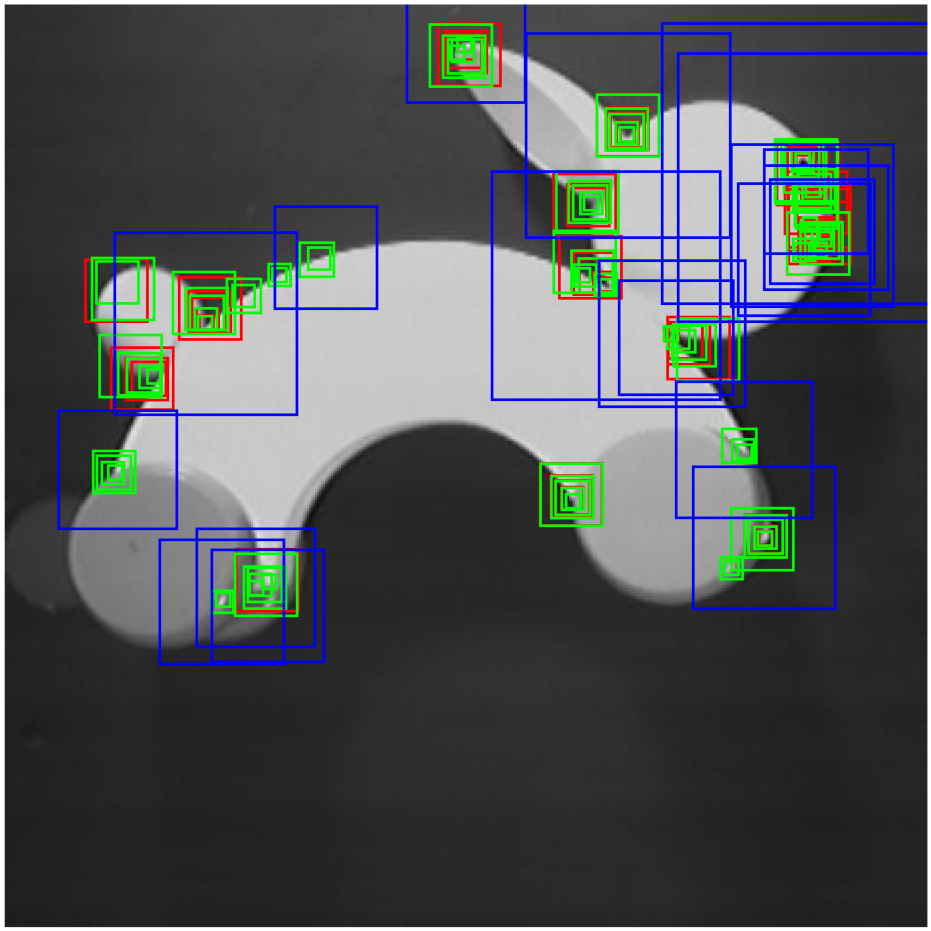
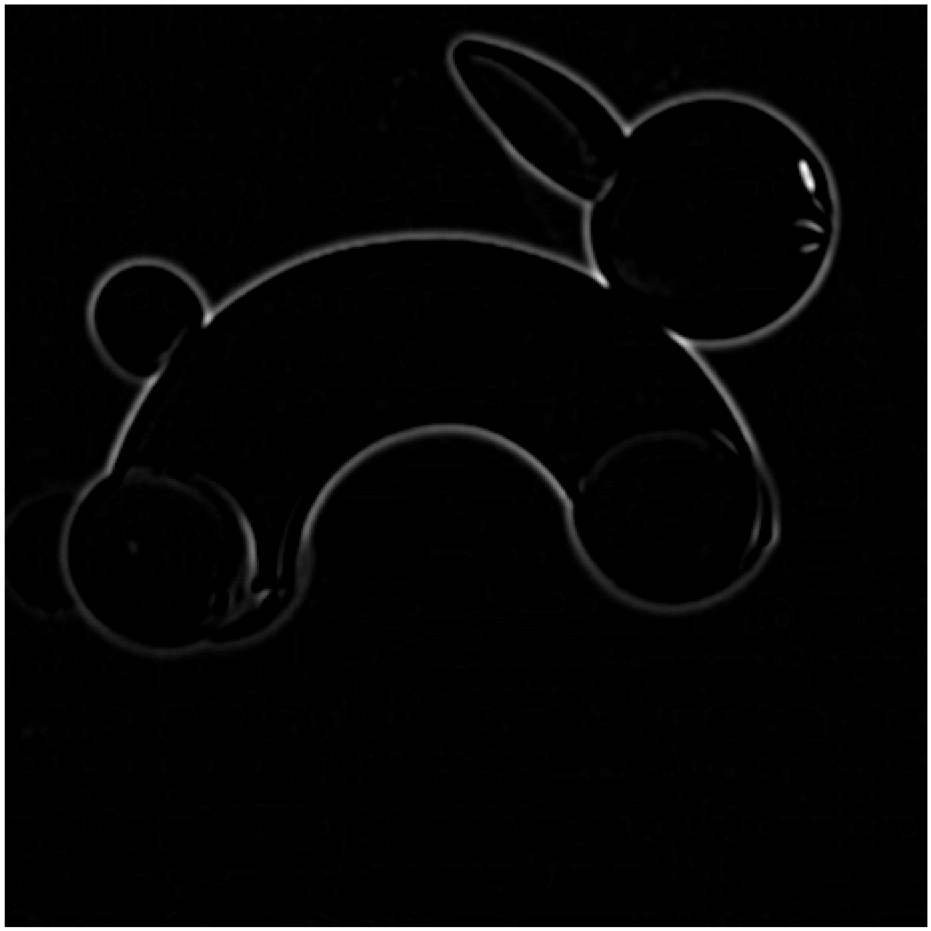
Sesión 11Bis. 12/05

```
im = imread("rabbit.jpg");
imshow(im);
sizes = [7,11,17,21,31];
hold on

for j = 1: size(sizes,2)
    Kp = detectHarrisFeatures(double(im),'FilterSize',sizes(j),'MinQuality',0.1);
    wsize = sizes(j);
    for i=1:size(Kp,1)
        rectangle('Position',[Kp.Location(i,1)-wsize/2,Kp.Location(i,2)-wsize/2,wsize,wsize],'E
    end
end

for j = 1: size(sizes,2)
    Kp = detectMinEigenFeatures(double(im),'FilterSize',sizes(j),'MinQuality',0.12);
    wsize = sizes(j);
    for i=1:size(Kp,1)
        rectangle('Position',[Kp.Location(i,1)-wsize/2,Kp.Location(i,2)-wsize/2,wsize,wsize],'E
    end
end

Kp = detectFASTFeatures(im,'MinQuality',0.1);
for i=1:size(Kp,1)
    wsize = Kp.Metric(i);
    rectangle('Position',[Kp.Location(i,1)-wsize/2,Kp.Location(i,2)-wsize/2,wsize,wsize],'EdgeC
end
```



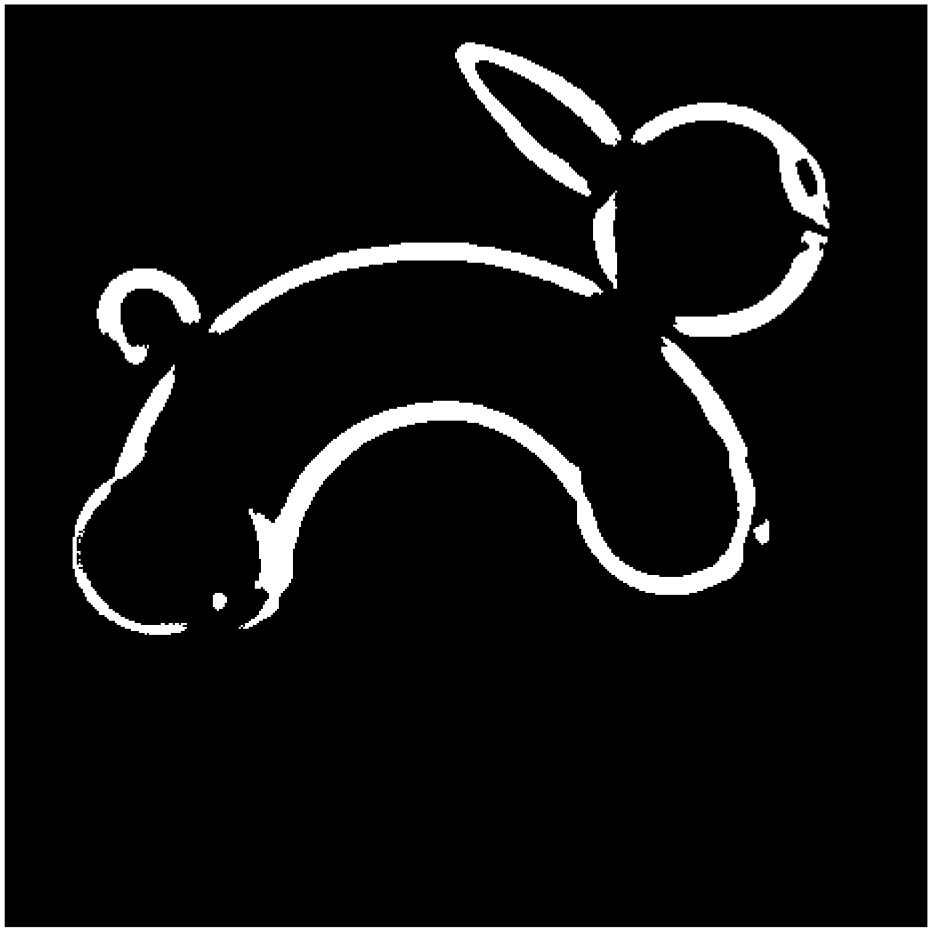
DoG

```
close all
im = imread("rabbit.jpg");
h = fspecial("gaussian",7,7/4);
G1 = imfilter(im,h,'replicate');
h = fspecial("gaussian",15,15/4);
G2 = imfilter(im,h,'replicate');
h = fspecial("gaussian",30,30/4);
G3 = imfilter(im,h,'replicate');
imshow(G2-G1,[]);
```

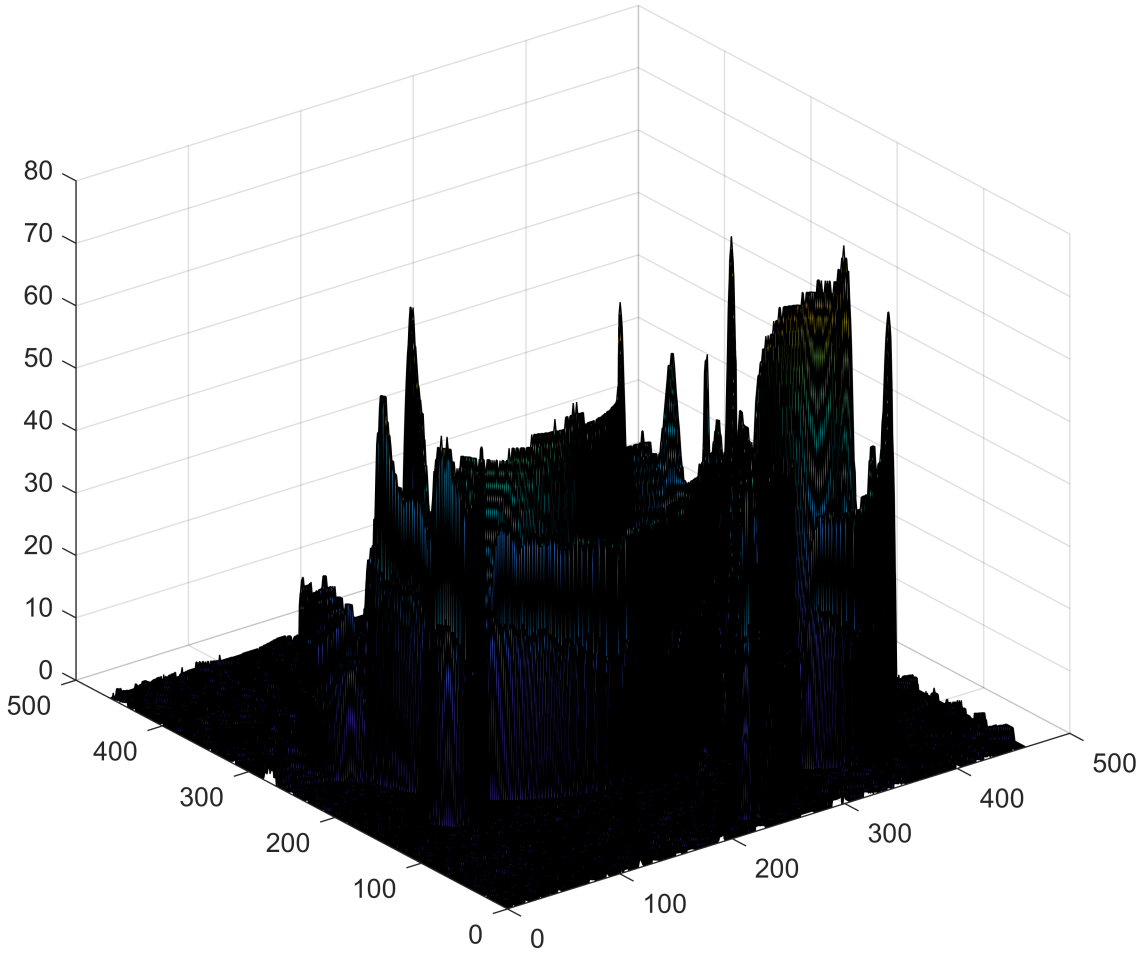


```
imshow(G3-G1,[]);
```

```
h = fspecial("gaussian",7,7/4);
G(:,:,1) = imfilter(im,h,'replicate');
h = fspecial("gaussian",15,15/4);
G(:,:,2) = imfilter(im,h,'replicate');
h = fspecial("gaussian",30,30/4);
G(:,:,3) = imfilter(im,h,'replicate');

DoG(:,:,1) = abs(G(:,:,1)-G(:,:,2));
DoG(:,:,2) = abs(G(:,:,2)-G(:,:,3));

[V,S] = max(DoG,[],3);

I = V > 10;
imshow(I,[]);
```



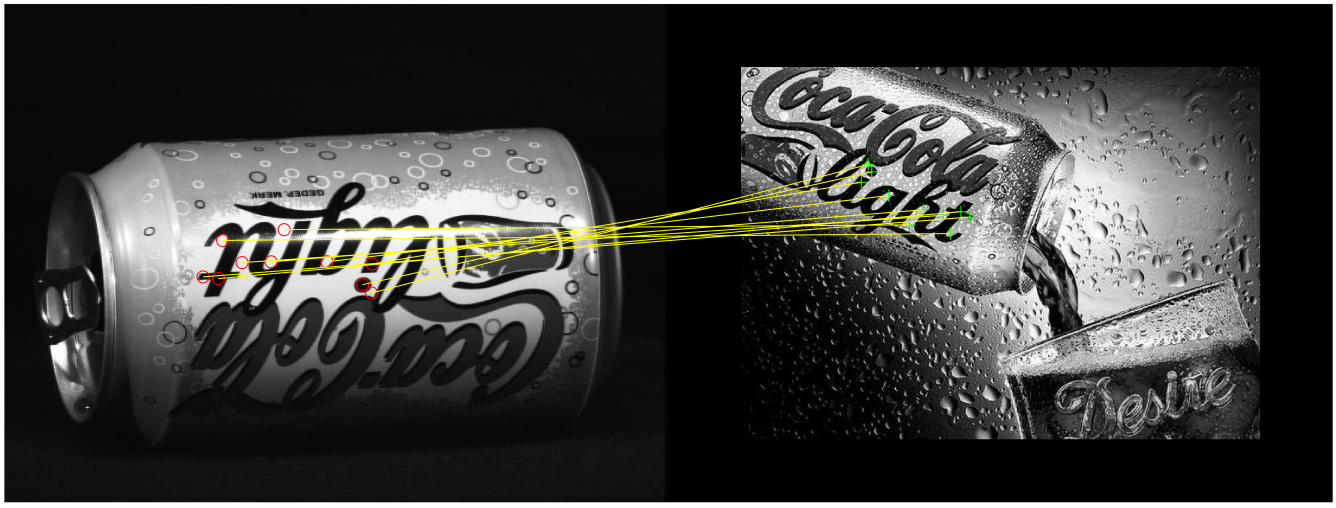
```
surf(double(V).*double(S));
```



SIFT & matching

```
close all
im_obj = rgb2gray(imread('coke.jpg'));
im_esc = rgb2gray(imread('anunci.jpg'));
%montage({im_obj,im_esc});

kp_obj = detectSIFTFeatures(im_obj);
kp_obj = selectStrongest(kp_obj,50);

% imshow(im_obj);
% hold on
% plot(kp_obj);

kp_esc = detectSIFTFeatures(im_esc);
kp_esc = selectStrongest(kp_esc,200);
```

```
% imshow(im_esc);
% hold on
% plot(kp_esc);

[feat_obj,kp_obj] = extractFeatures(im_obj,kp_obj,'Method','SIFT');
[feat_esc,kp_esc] = extractFeatures(im_esc,kp_esc,'Method','SIFT');

pairs = matchFeatures(feat_obj,feat_esc,"MatchThreshold",100);

m_kp_obj = kp_obj(pairs(:,1),:);
m_kp_esc = kp_esc(pairs(:,2),:);

figure
showMatchedFeatures(im_obj,im_esc,m_kp_obj,m_kp_esc,"montage");
```



```
T = estimateGeometricTransform2D(m_kp_obj,m_kp_esc,"affine");

[f,c] = size(im_obj);
figure
imshow(im_obj);
box = [1,100;1,f;c,f;c,1;100,1];
hold on
line(box(:,1),box(:,2));
```

```
nbox = transformPointsForward(T,box);

figure
imshow(im_esc);
hold on
line(nbox(:,1),nbox(:,2));
```


```
%anava a fer la prova amb un jugador de futbol com a escena i obj l'escut
%de l'equip. però no he tingut prou temps
```