Sessió 3

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Soroll i filtres

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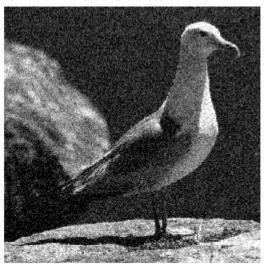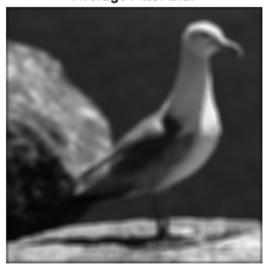

Soroll Gaussià

```
imgauss = imnoise(im, 'gaussian');
figure, imshow(imgauss), title('Gaussian Noise')
```

Gaussian Noise


```
w = ones(7);
w = w/49;
resavg = imfilter(im, w, 'conv');
figure, imshow(resavg), title('Average Filter Blur')
```

Average Filter Blur


```
wgauss = fspecial('gaussian', 7, 2);
resgauss = imfilter(imgauss, wgauss, 'conv');
figure, imshow(resgauss), title('Gaussian Noise + Gaussian Blur')
```

Gaussian Noise + Gaussian Blur

Soroll Salt & Pepper

```
imsp = imnoise(im, 'salt & pepper', 0.2);
figure, imshow(imsp), title('Salt & Pepper Noise')
```

Salt & Pepper Noise


```
resgaus2 = imfilter(imsp, wgauss, 'conv');
figure, imshow(resgaus2), title('Salt & Pepper Noise + Gaussian Blur')
```

Salt & Pepper Noise + Gaussian Blur
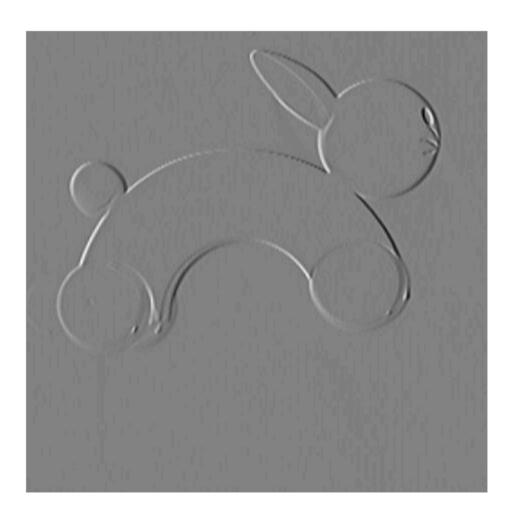
Filtre no lineal

```
resmed = medfilt2(imsp, [5 5]);
figure, imshow(resmed), title('Filtre mediana')
```


Filtre mediana

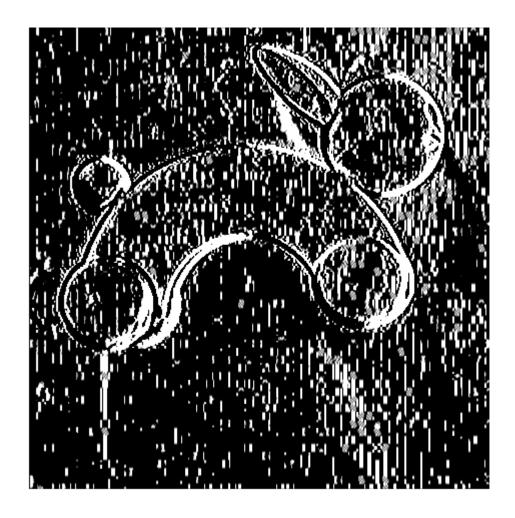## Resaltat de contorns

```
im = imread('rabbit.jpg');
```

```matlab
novaim = zeros(size(im));
w = [-1 0 1;
     -1 0 1;
     -1 0 1];

for fila = 2:460
    for columna = 2:460
        mat3 = double(im((fila - 1):(fila + 1), (columna - 1):(columna + 1)));
        res = w .* mat3;
        novaim(fila, columna) = sum(res,'all');
    end
end
figure, imshow(novaim, [])
```


Operador Sobel

```matlab
wx = [-1 0 1;
      -2 0 2;
      -1 0 1];
```

```
Gx = imfilter(im , wx, 'conv');
figure, imshow(Gx)
```



```
max(Gx(:))
```

```
ans = uint8

 255
```

```
wx = wx/4
```

```
wx = 3×3
   -0.2500        0    0.2500
   -0.5000        0    0.5000
   -0.2500        0    0.2500
```
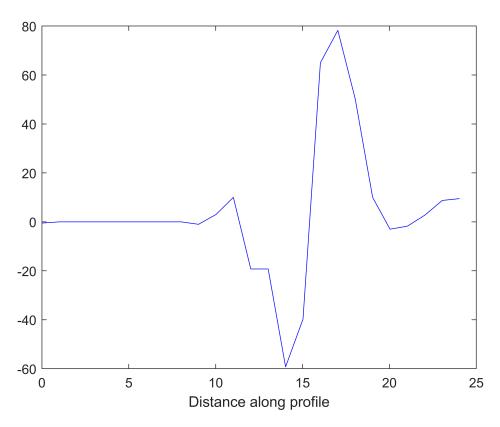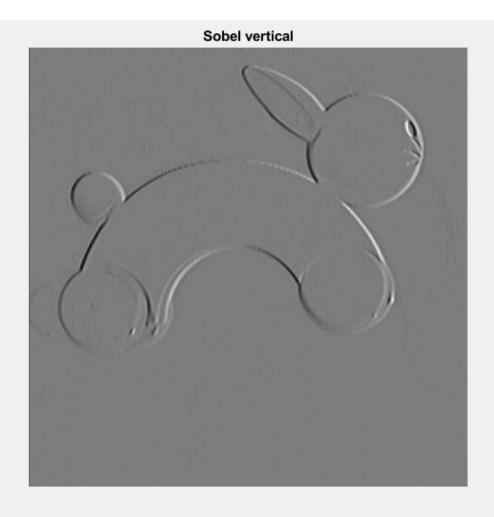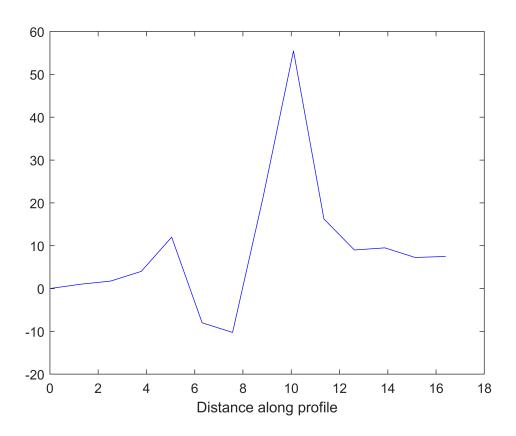
```
Gx = imfilter(double(im), wx, 'conv');
figure, imshow(Gx);
```

```
figure, imshow(Gx, []), title('Sobel vertical')
improfile
```

Distance along profile

```
wy = wx';
Gy = imfilter(double(im), wy, 'conv');
figure, imshow(Gy, []), title('Sobel horitzontal')
improfile
```

Sobel horitzontal
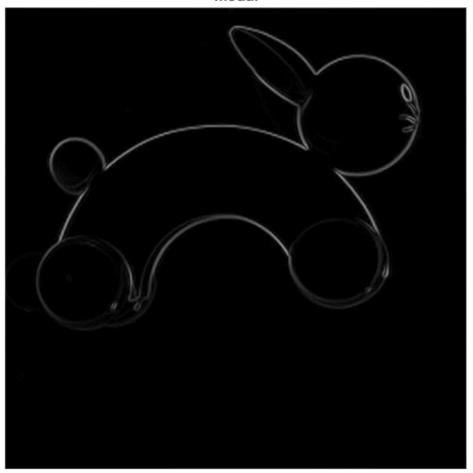
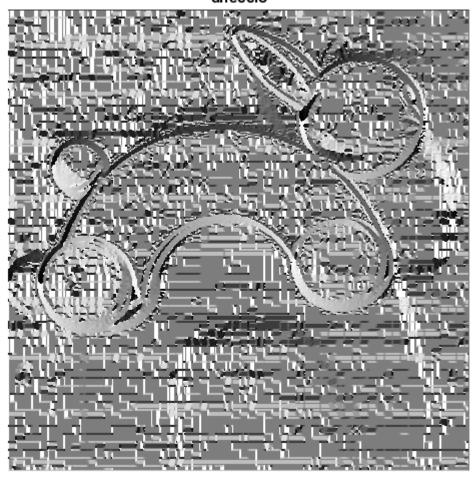**Sobel vertical**

Mòdul i Direcció

```
mod = sqrt(Gx.^2 + Gy.^2);
mod = uint8(mod);
figure, imshow(mod), title('modul')
```

modul


```
alfa = atan2(Gy, Gx);
alfa2 = uint8((alfa + pi)/2/pi * 255);
figure, imshow(alfa2), title('direccio')
```
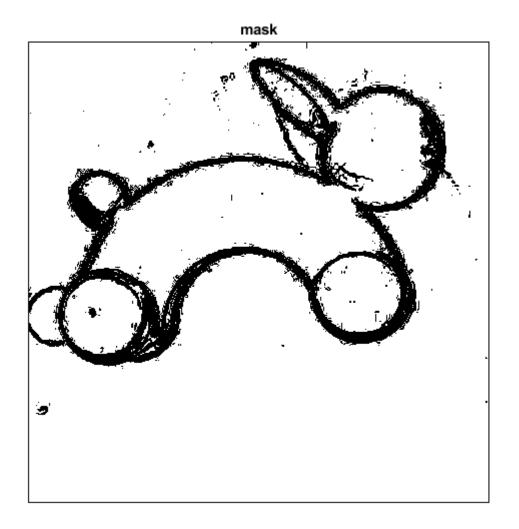
direccio


```
mask = mod < 4;
aux = alfa2;
aux(mask) = 0;
figure, imshow(aux), title('direccio')
```

direccio

```
figure, imshow(mask), title('mask')
```

mask

```
figure, imshow(mod > 90)
```