

## Sample 3-4

### 平滑化／先鋭化処理

順序統計フィルタ

画像処理特論

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動作確認: MATLAB R2023a

### Image smoothing/sharpening

Order statistic filter

Advanced Topics in Image Processing

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Verified: MATLAB R2023a

### サンプル画像の準備

(Preparation of sample image)

```
close
% Reading original image
I = im2double(imread('cameraman.tif'));
figure(1)
imshow(I)
title('Original')
```



### ゴマ塩ノイズ画像の準備

(Preparation of a contaminated image with salt & pepper noise)

```
% Density
d = 0.05;
% Add noise
```

```
J = imnoise(I,'salt & pepper',d);  
  
% Show the result  
figure(2)  
imshow(J)  
title('Contaminated image')
```



## 中央値フィルタ

(Median filter)

```
% Domain size setting  
hsize = 3
```

```
hsize = 3
```

```
% Median filtering  
K = medfilt2(J,[hsize hsize]);
```

```
% Show the result  
figure(3)  
imshow(K)  
title('Median filter')
```



## 最大値フィルタ

(Maximum filter)

```

% Domain setting
hsize = 3;
domain = ones(hsize);

% Maximum filtering
L = ordfilt2(J,nnz(domain),domain);

% Show the result
figure(4)
imshow(L)
title('Maximum filter')

```



## 最小値フィルタ

(Minimum filter)

```

% Domain setting
hsize = 3;
domain = ones(hsize);

% Minimum filtering
M = ordfilt2(J,1,domain);

% Show the result
figure(5)
imshow(M)
title('Minimum filter')

```

Minimum filter



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