1 Matlab correction

1.1 Binary attribute filtering

If I is a binary image, the different attribute are proposed in the following code (filtering small squares – 25×25, small objects, by elongation or convexity, respectively).

```
S= imreconstruct(imopen(I,strel('square',25)), I));
A= bwareaopen(I, 1000);
E= bwpropfilt(I, 'eccentricity', [0.75 1]);
C= bwpropfilt(I, 'solidity', [0.75 1]);
```

1.2 Grayscale filtering

The grayscale filtering is the previous binary filtering process applied to all level-sets of the original image. The image is first decomposed into the level-sets.

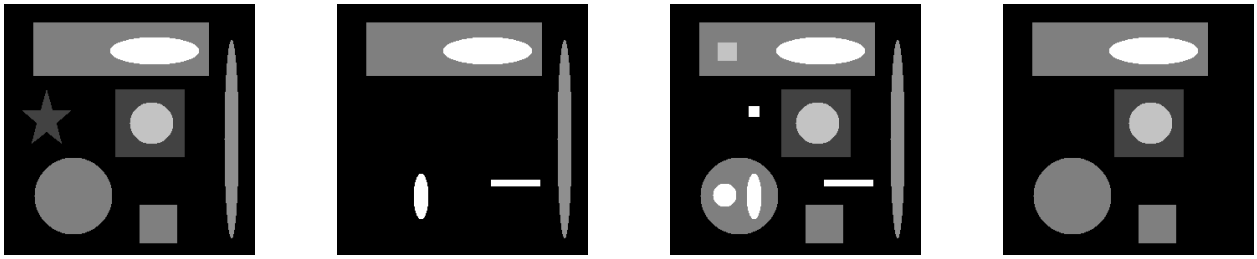
```
A = double(imread('toy.png'));
A = A(:,:,1);

%% IMAGE DECOMPOSITION
[m,n] = size(A);
levelSets_init = false(m,n,256);
for s=0:255
    levelSets_init(:,:,s+1) = A>=s;
end
```

Then, for each level, the binary set is filtered by some attribute, and the resulting image is reconstructed by taking the maximum value on all levels.

```
%% ATTRIBUTE FILTERING
levelSets_res1 = zeros(m,n,256);
levelSets_res2 = zeros(m,n,256);
levelSets_res3 = zeros(m,n,256);
levelSets_res4 = zeros(m,n,256);
for s=0:255
    levelSets_res1(:,:,s+1) = s*(imreconstruct(imopen(levelSets_init(:,:,
        ↪ s+1),strel('square',25)),levelSets_init(:,:,s+1)));
    levelSets_res2(:,:,s+1) = s*bwareaopen(levelSets_init(:,:,s+1),1000);
    levelSets_res3(:,:,s+1) = s*bwpropfilt(levelSets_init(:,:,s+1),'
        ↪ eccentricity',[0.75 1]);
    levelSets_res4(:,:,s+1) = s*bwpropfilt(levelSets_init(:,:,s+1),'
        ↪ solidity',[0.75 1]);
end
```

```
%% IMAGE RECONSTRUCTION
B1 = max(levelSets_res1,[],3);
B2 = max(levelSets_res2,[],3);
B3 = max(levelSets_res3,[],3);
B4 = max(levelSets_res4,[],3);
```

Results are illustrated in Fig.1.



(a) Filtering by area.

(b) Filtering by elongation.

(c) Filtering by convexity.

(d) Filtering objects larger than a square.

Figure 1: Attribute filtering examples.