`Problem1` Report

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NOTE — BEFORE YOU START

All that this package does is to configure the `listings` package for you. If anything is not working the way you want it, refer to the `listings` documentation first and / or take a look at the `mcode.sty` file itself, which is well documented internally.

The `listings` documentation can be accessed either by typing `texdoc listings` into a command prompt on your system, or online:
http://mirrors.ctan.org/macros/latex/contrib/listings/listings.pdf

Installation of the package

As with any other small package, just place the `mcode.sty` file in the same folder as your document, or put it somewhere where LaTeX can find it. Done!

Code & Results

1) Codes

```
1 %Problem 1
2 %by Xue Fanyong
3 %Student ID:515030910443
```

```
%Histogram Equalizatio

%%main part
image1 = imread('/image path/Fig1.jpg');
image2 = imread('/image path/Fig2.jpg');

[histogram1,histogram_e1,transfer_f1,image_e1] = ...
    histogram_equalization(image1);
[histogram2,histogram_e2,transfer_f2,image_e2] = ...
    histogram_equalization(image2);

plot_data(image1,image_e1,histogram1,histogram_e1,transfer_f1);
plot_data(image2,image_e2,histogram2,histogram_e2,transfer_f2);

%%functions part

% get histogram of image
% image: get histogram of it
% histogram: the histogram of image
function histogram = get_histogram(image)
    histogram = zeros(256,1);
    [row,col]=size(image);
    for r = 1:row
        for c = 1:col
            gray = image(r,c);
            histogram(gray+1)=histogram(gray+1)+1;
        end
    end
end

%do the histogram_equalization for image
%image: do the histogram_equalization for it
%histogram: original histogram; histogram_e: histogram after ...
    histogram
%equalizatio; transfer_f: transfer function; image_e: image ...
    after histogram
%equalizatio
function [histogram,histogram_e,transfer_f,image_e] = ...
    histogram_equalization(image)
    [row,col]=size(image);
    transfer_f = zeros(256,1);
    histogram = get_histogram(image);
    transfer_f(1) = 256*histogram(1)/(row*col);

    for i = 2:256
        transfer_f(i) = transfer_f(i-1)+255*histogram(i)/(row*col);
    end
    transfer_f = round(transfer_f);

    image_e = image;
    for r = 1:row
        for c = 1:col
            image_e(r,c)=transfer_f(image(r,c)+1);
        end
    end
    histogram_e = get_histogram(image_e);
end
```

```
56
57 %plot data
58 %image:original image; image_e: image after histogram ...
       equalizatio; histogram: original histogram;
59 %histogram_e: histogram after histogram equalizatio; transfer_f: ...
       transfer function
60 function plot_data(image,image_e,histogram,histogram_e,transfer_f)
61     figure();
62     subplot(2,3,1);
63     imshow(image);
64     title("Original Image");
65     subplot(2,3,2);
66     imshow(image_e);
67     title("Image(Histogram Equalization)");
68     subplot(2,3,3);
69     bar(histogram);
70     title("Histogram");
71     subplot(2,3,4);
72     bar(histogram_e);
73     title("Histogram(Equalization)");
74     subplot(2,3,5);
75     plot(transfer_f);
76     title("Transfer Funciton");
77 end
```

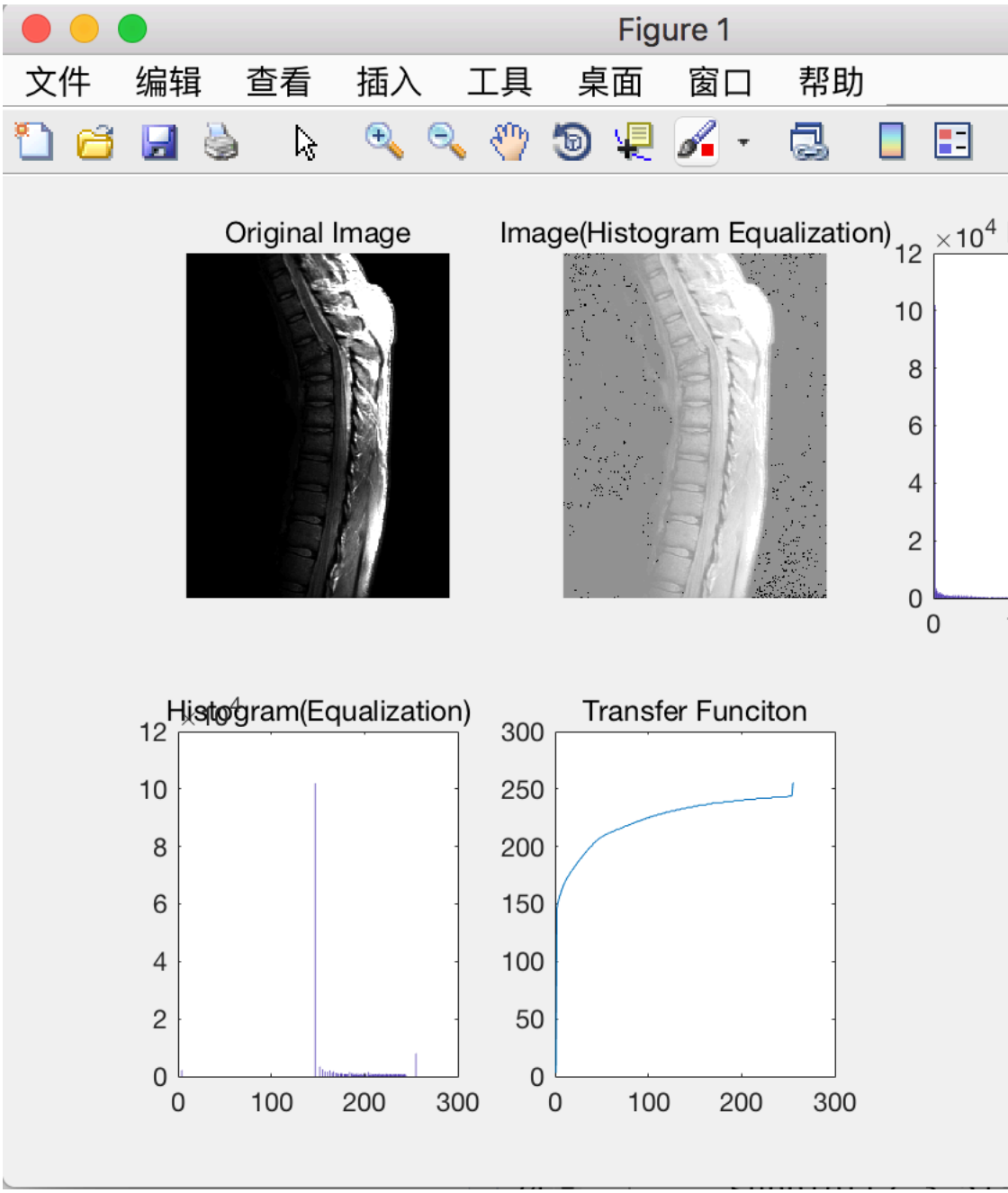
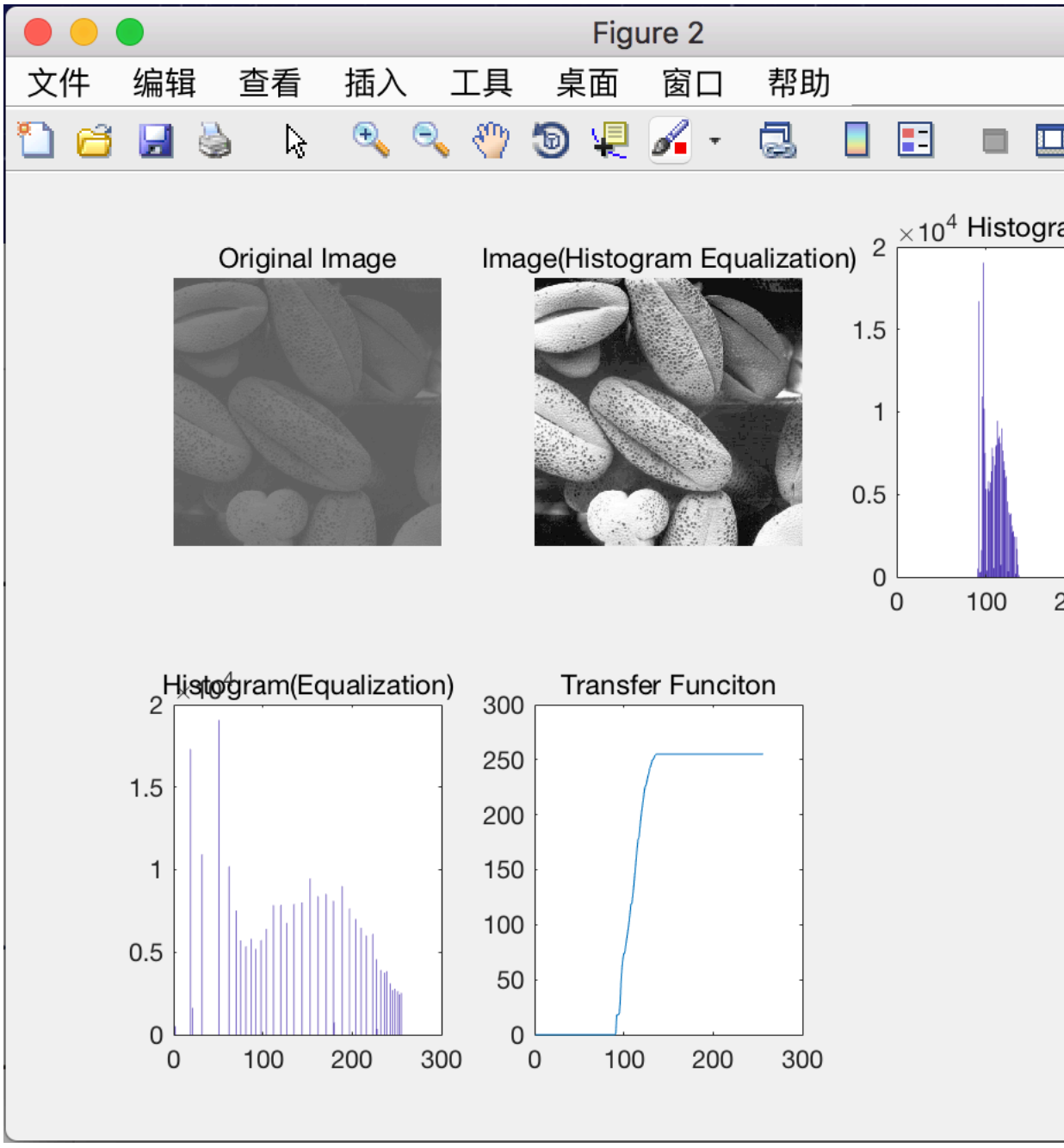


Figure 1
文件 编辑 查看 插入 工具 桌面 窗口 帮助
Original Image
Image(Histogram Equalization)
×10^4
12
10
8
6
4
2
0
0
Histogram(Equalization)
×10^4
12
10
8
6
4
2
0
0 100 200 300
Transfer Funciton
300
250
200
150
100
50
0
0 100 200 300

2)Results



Note: Here, the package was loaded with the `framed`, `numbered`, `autolinebreaks` and `useliterate` options. **Please see the top of mcode.sty for a detailed**

explanation of these options.

3) Finally, you can also directly include an external m-file from somewhere on your hard drive (the very code you use in MATLAB, if you want) using the `\lstinputlisting{/SOME/PATH/FILENAME.M}` command. If you only want to include certain lines from that file (for instance to skip a header), you can use `\lstinputlisting[firstline=6, lastline=15]{/SOME/PATH/FILENAME.M}`.

FAQ

Why does `delta` get replaced by Δ, `~=` by ≠, etc.? Well, that's precisely what the `useliterate` option does. If you don't want that, don't use it.

Can I get contiguous line numbers from one code block to another? Yes, but you have to read the `listings` documentation for that (Section 4.8 in particular).

`mcode.sty` doesn't work in my document! Well, try your (Matlab) code fragment in this demo document here to see whether there's something in it that might be causing a problem (not so likely, but possible), or if there's some conflict between the `listings` package and some other package you have loaded.

Is feature XYZ possible? Well, the `listings` package might already be able to do that. Please consult its documentation (see red box at the top)!