高级图像处理习题三练习

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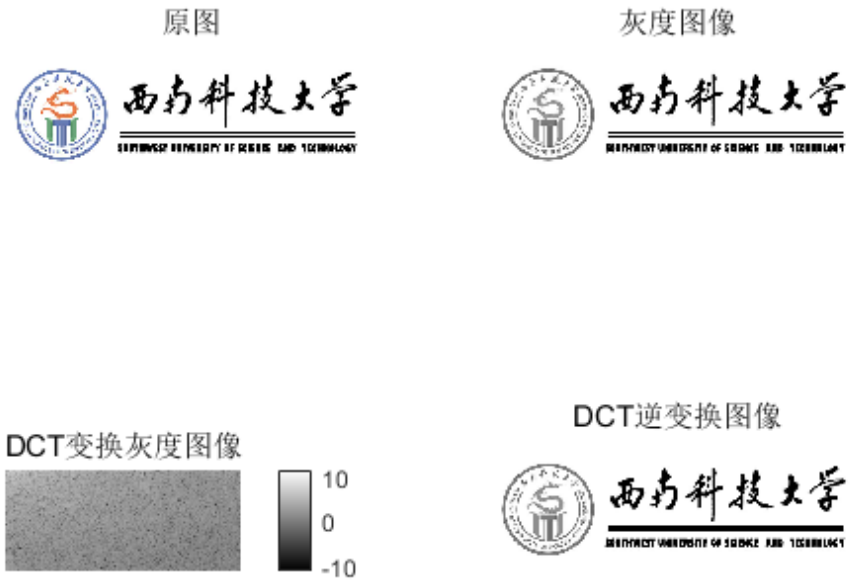
Code（Matlab R2016b）：

1.DCT.m

```
close;
clear all;
clc;
[fn,pn,fi]=uigetfile('*.png','choose Image');
imag=imread([pn fn]);
I1=rgb2gray(imag);
dctI1=dct2(I1);
dctgrayImage(abs(dctI1)<0.1)=0;
I2=idct2(dctI1)/255;
figure();
subplot(2,2,1),imshow(imag);
title('原图');
subplot(2,2,2),imshow(I1);
title('灰度图像');
subplot(2,2,3),imshow(log(abs(dctI1)),[]);
title('DCT变换灰度图像');
colormap(gray(4)), colorbar;
subplot(2,2,4),imshow(I2);
title('DCT 逆变换图像');
```

测试图片：

DCT 变换结果：



参考链接：

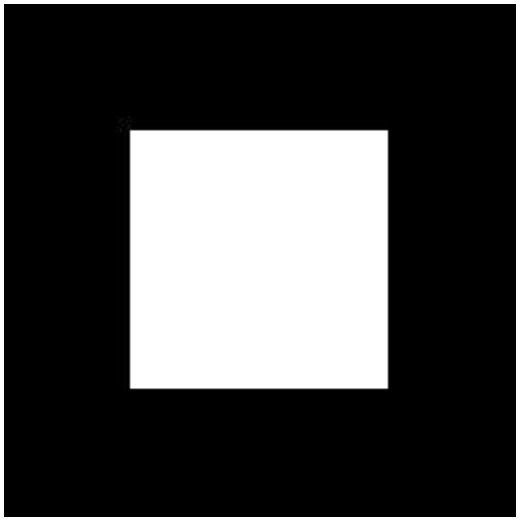
- 离散余弦变换
- 关于离散余弦变换
- 图像的离散余弦变换
- DCT 变换、DCT 反变换、分块 DCT 变换

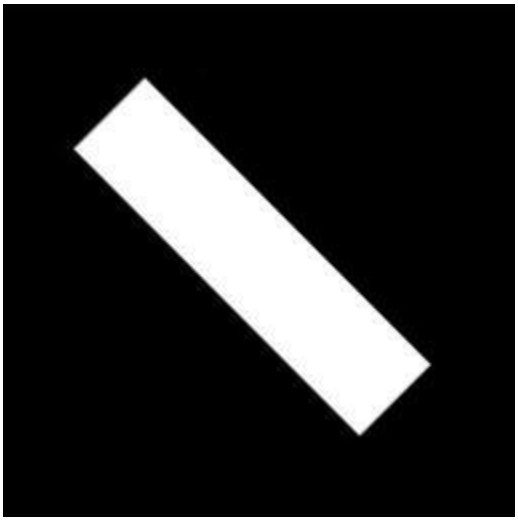
2.fft.m

```
close all

f_1 = imread('图片1.jpg');

figure();

subplot(2,3,1),imshow(f_1),title('原图一');

f = im2double(f_1)
%f1 = rgb2gray(
fft_f1 = fft2(f);
fft_s = abs(fft_f1);
subplot(2,3,2),imshow(im2uint8(mat2gray(log(1+fft_s)))),
```

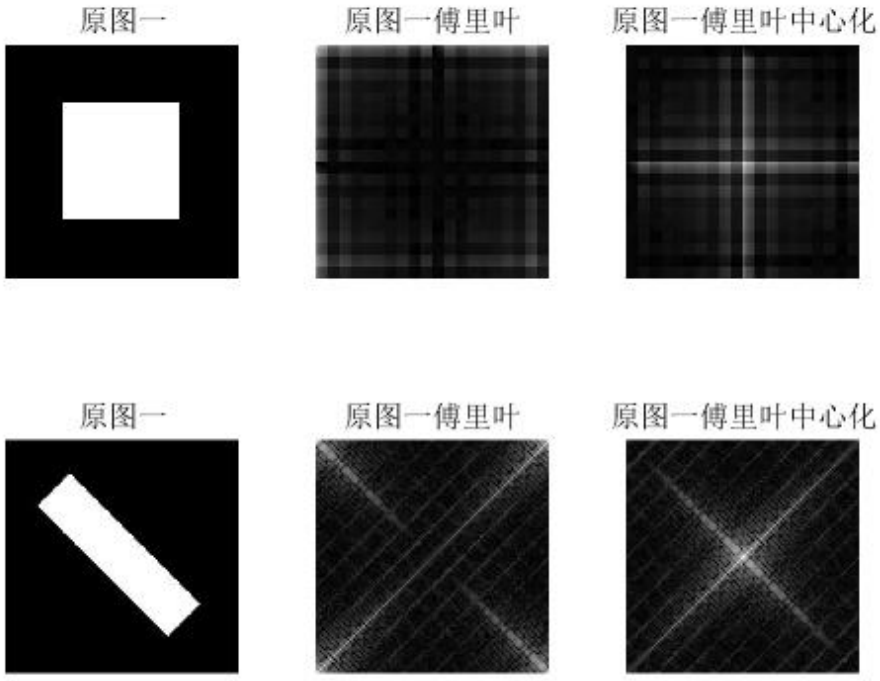
```
title('原图一傅里叶');

fc = fftshift(fft_f1);
fc_s = abs(fc);
subplot(2,3,3),imshow(im2uint8(mat2gray(log(1+fc_s)))),t
itle('原图一傅里叶中心化');


f_2 = imread('图片2.jpg');

subplot(2,3,4),imshow(f_2),title('原图一');

f2 = im2double(f_2)
%f1 = rgb2gray(
fft_f2 = fft2(f2);
fft_s2 = abs(fft_f2);
subplot(2,3,5),imshow(im2uint8(mat2gray(log(1+fft_s2))))
,title('原图一傅里叶');

fc2 = fftshift(fft_f2);
fc_s2 = abs(fc2);
subplot(2,3,6),imshow(im2uint8(mat2gray(log(1+fc_s2)))),
title('原图一傅里叶中心化');
```

测试图片：





测试结果：



3.Walsh_Hardmard.m

```
A = [1,3,3,1;
    1,3,3,1;
    1,3,3,1;
    1,3,3,1
    ];
%H=hadamard(4);
H = [1,1,1,1;
     1,1,-1,-1;
     1,-1,1,-1;
     1,-1,-1,1
    ];
Walsh=H*A*H
Walsh2=Walsh/4;

H1 = [1,1,1,1;
```

```
     1,-1,1,-1;
     1,1,-1,-1;
     1,-1,-1,1
    ];
haImg=H1*A*H1
haImg2=haImg/4;


结果:
>> Walsh_Hardmard

Walsh =

    32     0     0   -16
     0     0     0     0
     0     0     0     0
     0     0     0     0


haImg =

    32     0     0   -16
     0     0     0     0
     0     0     0     0
     0     0     0     0
```