

Intro. to Image Processing HW4

110550093 蔡師睿

Method

test1.tif

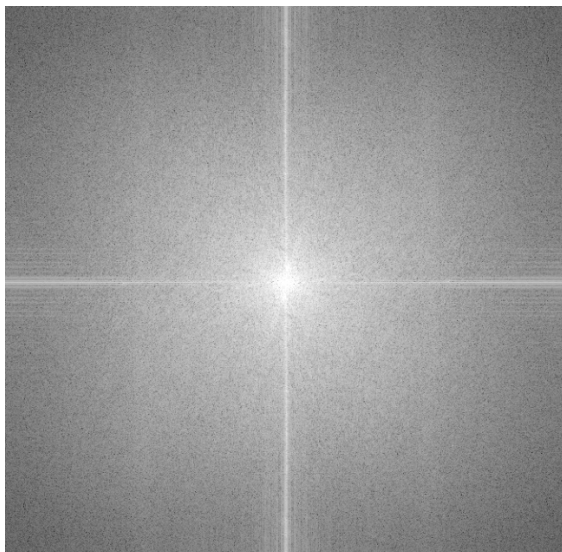
1. Read the image, and then use `np.fft.fft2()` and `np.fft.fftshift()` to transform to the frequency domain. Then I use `20*np.log(np.abs())` to make the spectrum enable to show.
2. Due to the noise of the test1.tif, I need to use the vertical notch reject filter in frequency domain. Thus, I apply the ideal filter to make the vertical line to be zero except the center.
3. Use `np.fft.ifftshift()`, `np.fft.ifft2()`, and `np.abs()` to get the final filtered image.

test2.tif

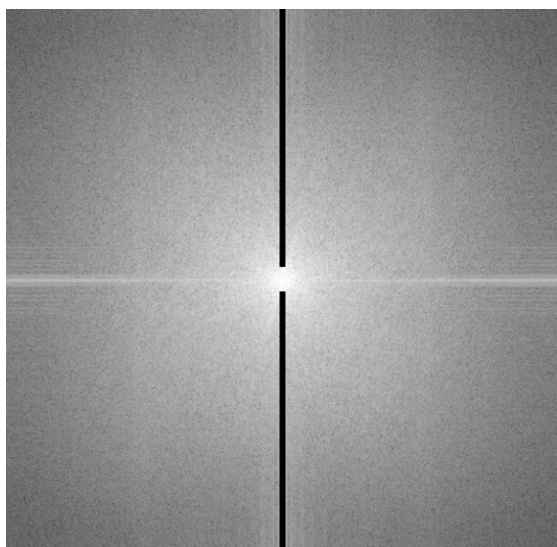
1. Read the image, and then use `np.fft.fft2()` and `np.fft.fftshift()` to transform to the frequency domain. Then I use `20*np.log(np.abs())` to make the spectrum enable to show.
2. Due to the noise of the test2.tif, I use the notch reject filter in frequency domain and use Microsoft paint to plot the center of the eight bright points. I've applied butterworth and ideal filter, and I thought that the ideal filter is better. Thus, I still use ideal filter in this part.
3. Use `np.fft.ifftshift()`, `np.fft.ifft2()`, and `np.abs()` to get the final filtered image.

Result

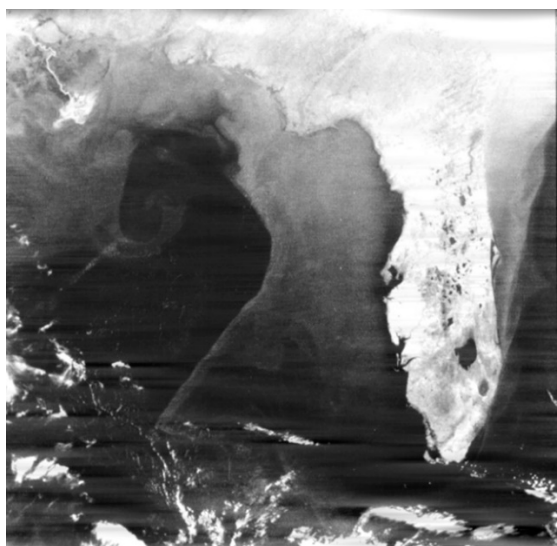
test1.tif Spectrum



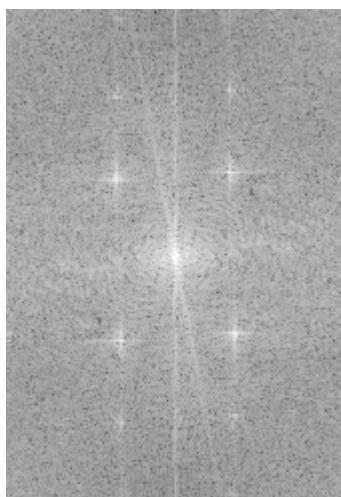
test1.tif Filtered Spectrum



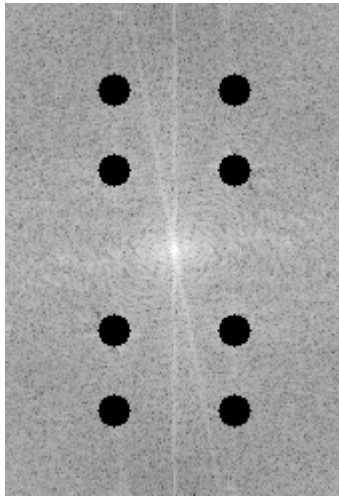
test1.tif Final Image



test2.tif Spectrum



test2.tif Filtered Spectrum



test2.tif Final Image



Feedback

It's amazing that filters applied in frequency domain can obtain better results in some cases.