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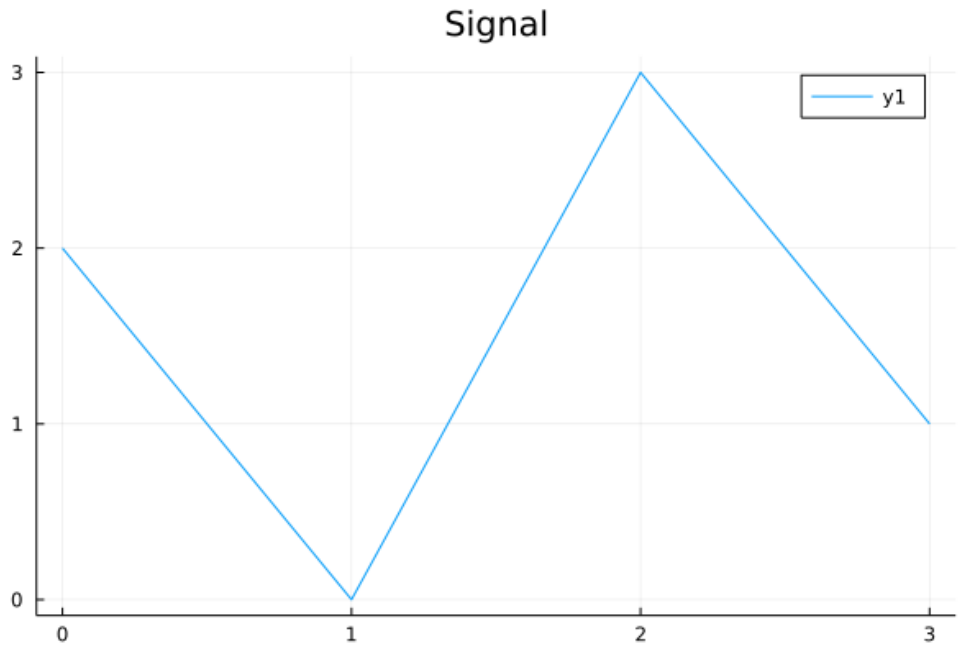
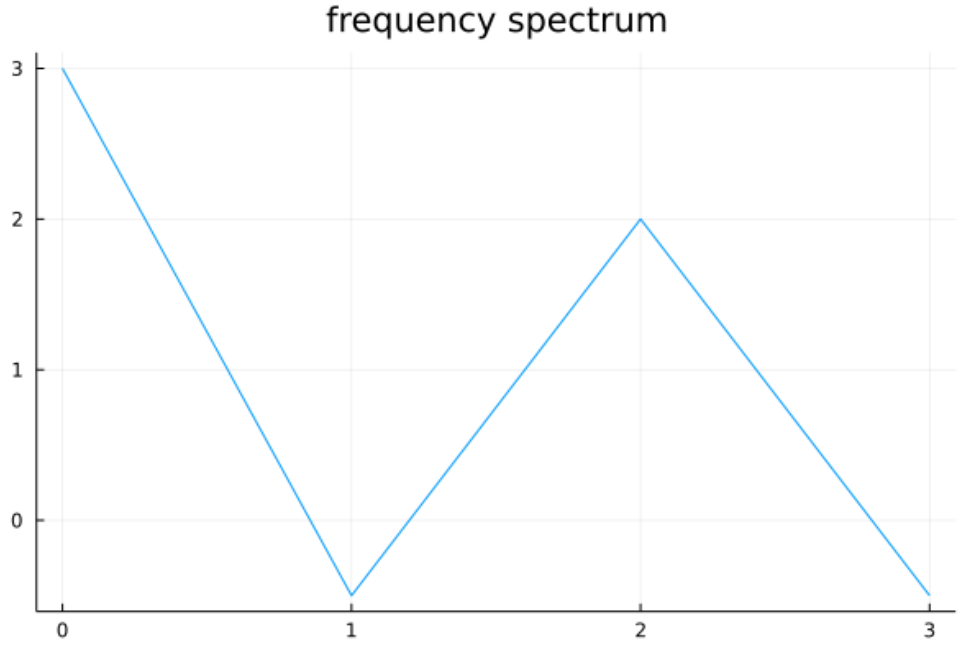
Exercise 1

The plot for the original given points is given by the following image.



If we apply the fourier transform and take the real part of the imaginary fourier coefficients and plot those points, we get the frequency spectrum.



If we apply the fourier transform and inverse it, the points will still be imaginary ones. As you can see in the following image, the imaginary parts are so small one can say they are 0. This is due to the approximations.

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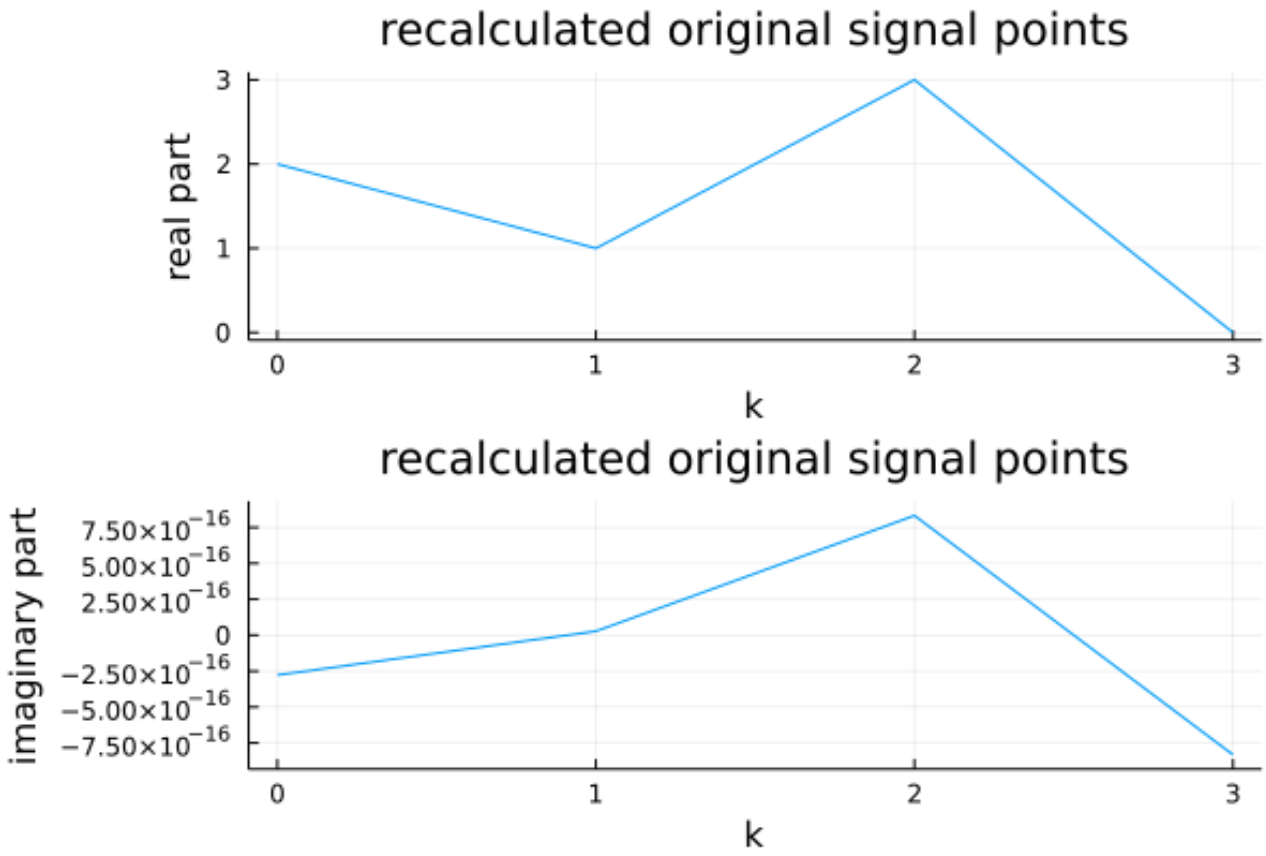

Exercise 2

The gaussian filter for the first image is given by the following.

The filter which will be applied to the fourier transformed picture is the following.

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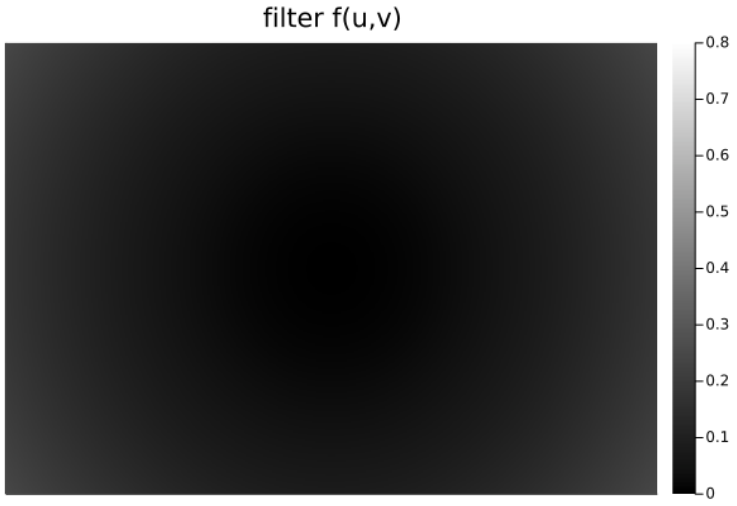
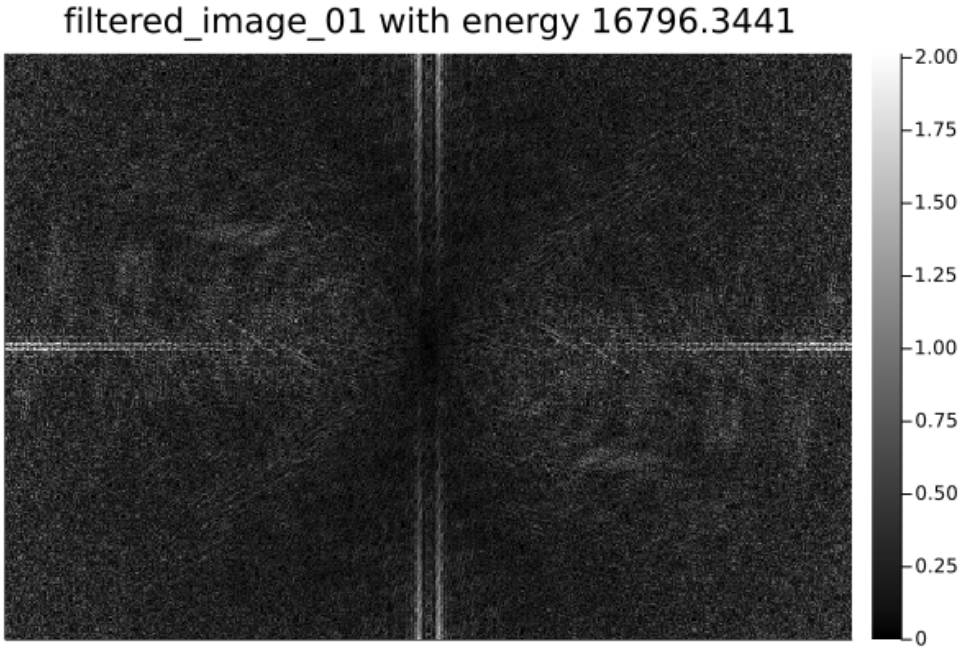
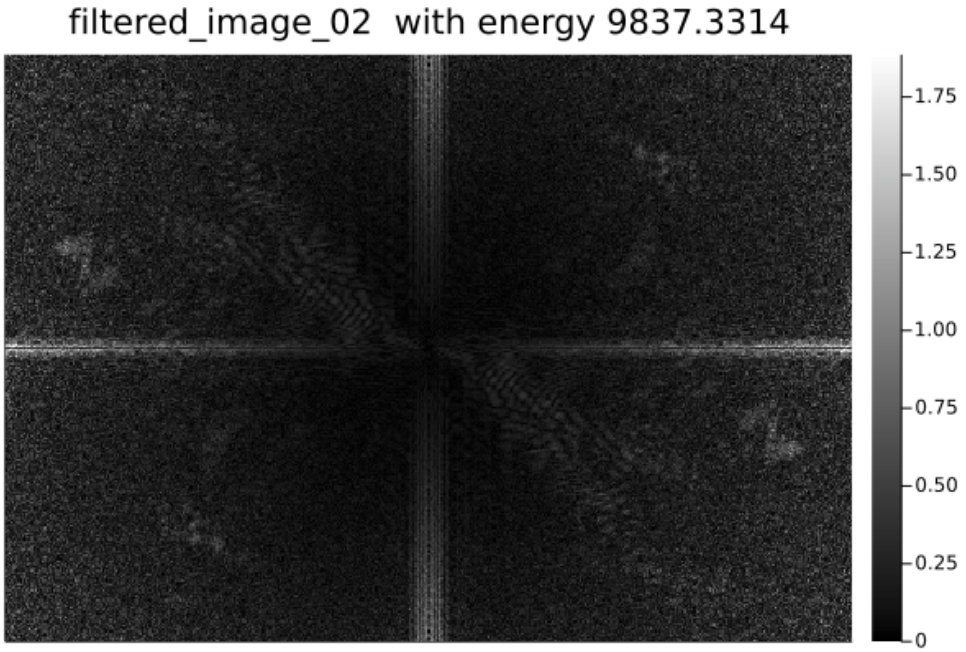


If you apply the fft-algorithm on the image 01 and apply the filter f(u,v) you get the follwoing result.



If you apply the fft-agorithm on the image 02 and apply the filter f(u,v) you get the following result.



You can indeed see, that the energy level of the first picture is higher than the second one. Due to scaling the filter the energy level can be scaled down or up.