Université de Genève

Imagerie Numérique

13X004

TP 6: Spatial Filters

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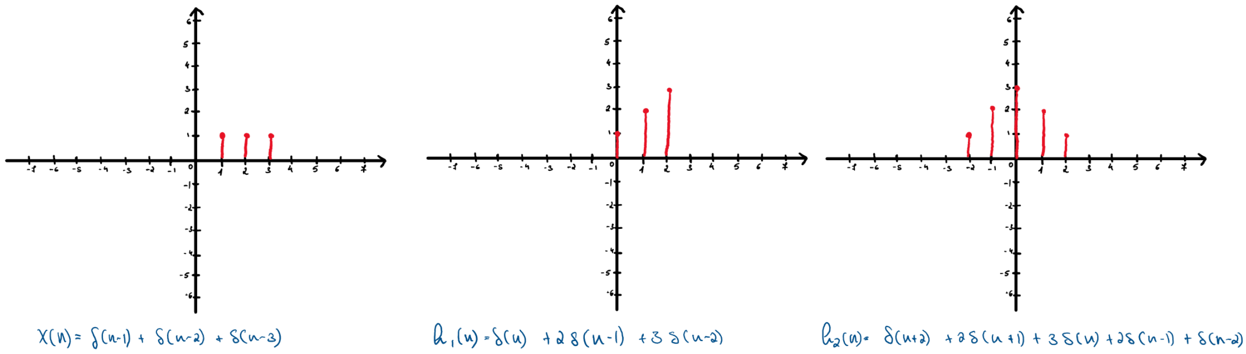
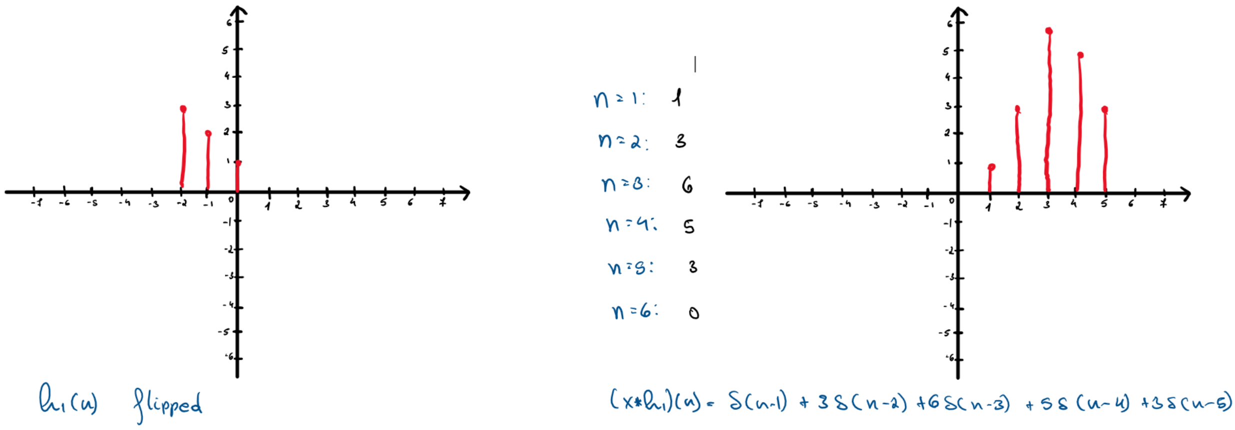
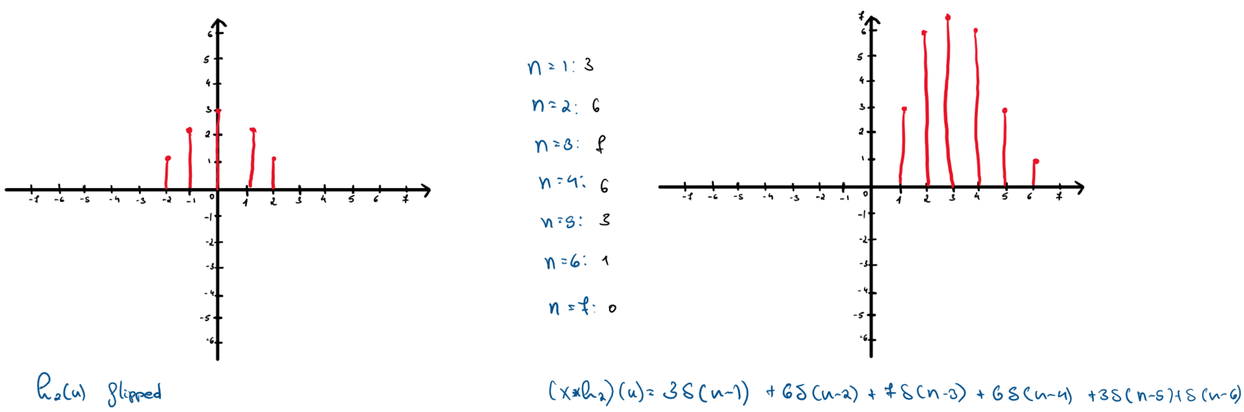
Exercise 1



(a)



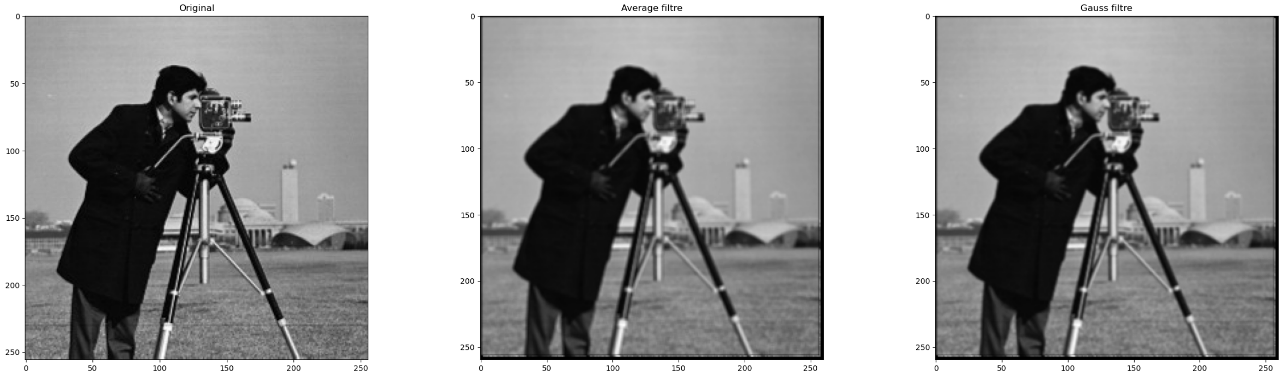


(b) For the x*h1 we get the the same results but in a different order because we don't flip h1, however, since h2 = h2 flipped, for the computation x*h2, the result is the same.

Exercise 2

(a) In file.

(b)

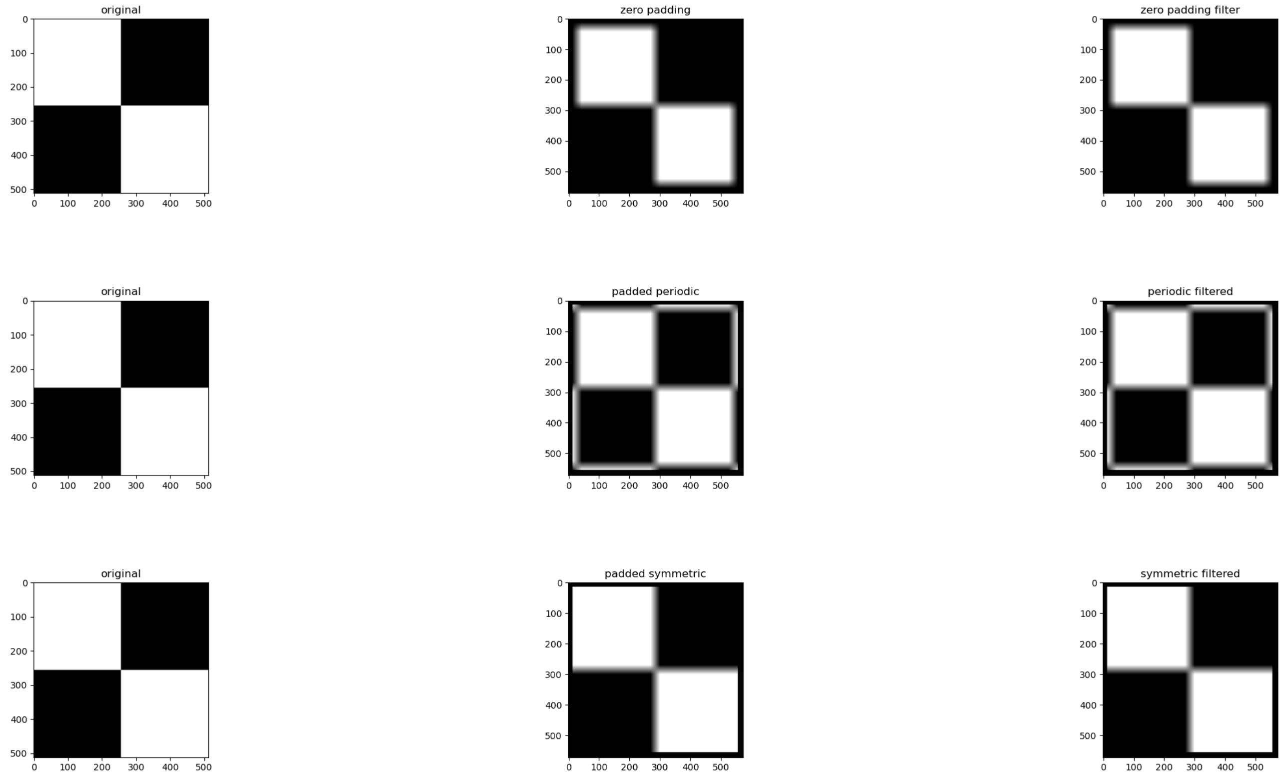


(c)

Exercise 3

(a) In file.

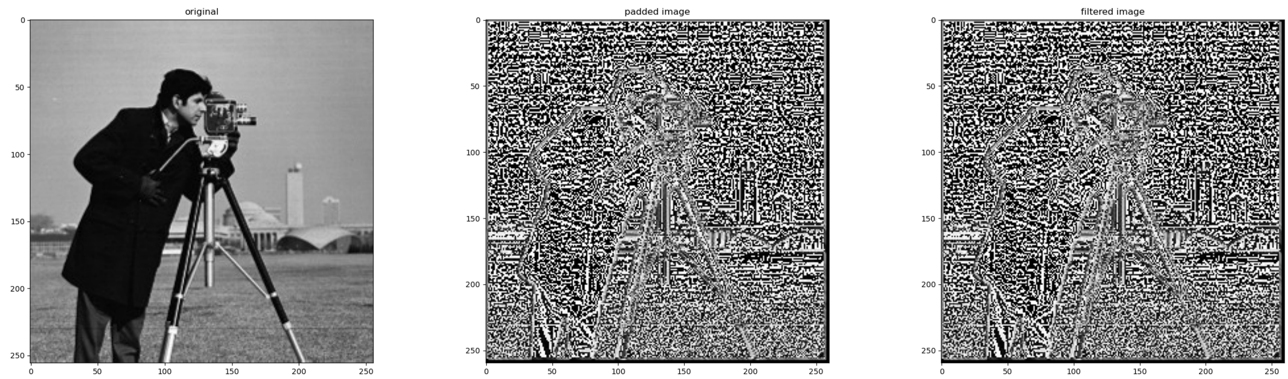
(b)



(c) The periodic filter wasn't as good as I expected, however the results from the symmetric filter are very good, the borders are very sharp, and the frontiers between the two colors are definitely less blurry withe the symmetric filter.

Exercise 4

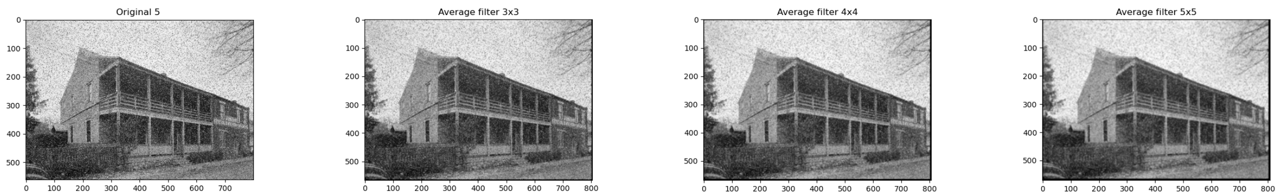
(a) Laplacian filtering is used to highlight edges of the objects in images.

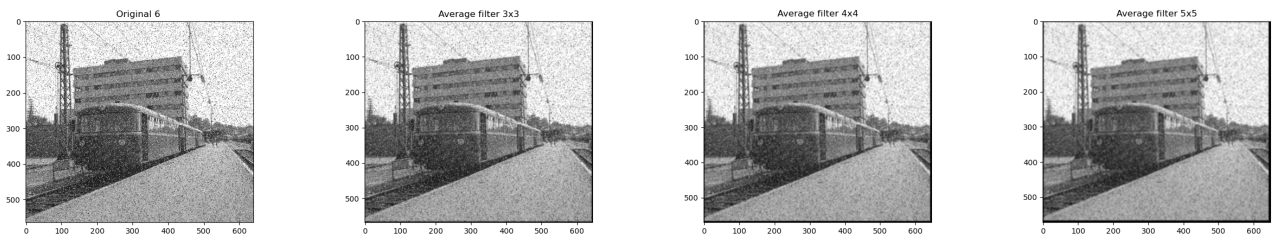


Exercise 5

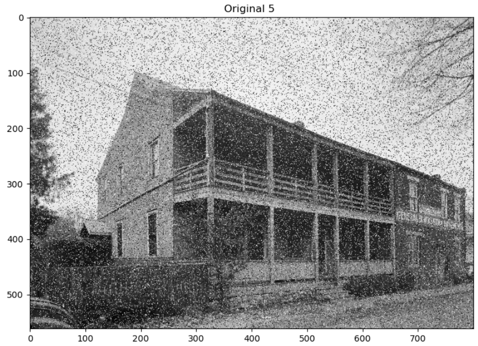
Exercise 6

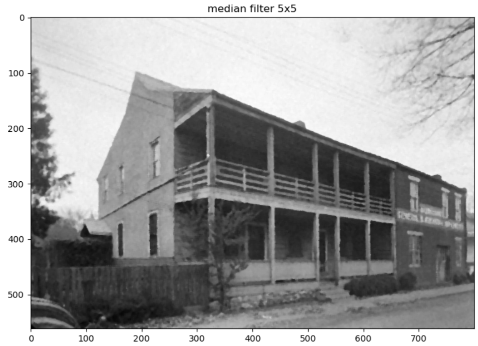
(a) filtre_avearaging = 1 / 9 * lib.np.array([[1, 1, 1], [1, 1, 1], [1, 1, 1]]), I scaled the filter up for 4x4 and 5x5, the bigger window got the better results, but going even bigger would lose quality. In the 5x5 image we definitely less completely black pixels in the image, which was expected due to a bigger window to average down these pixels. however a noisier image would take more advantage of a smaller window, as a big window would have too many black/noisy pixels.

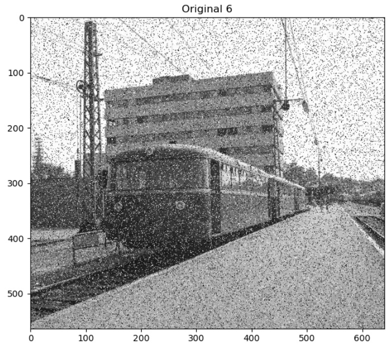


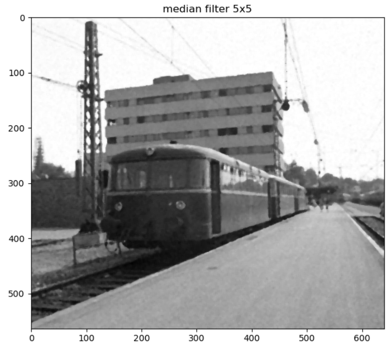


(b) The size for the window was 5, as bigger was too blurry like before, and smaller didn't returned a good image either. The image is very high quality. As I had troubles computing this, I used cv2 function, the image quality is actually pretty much perfect.


Original 5


median filter 5x5


Original 6


median filter 5x5