Self-Similarity Prior

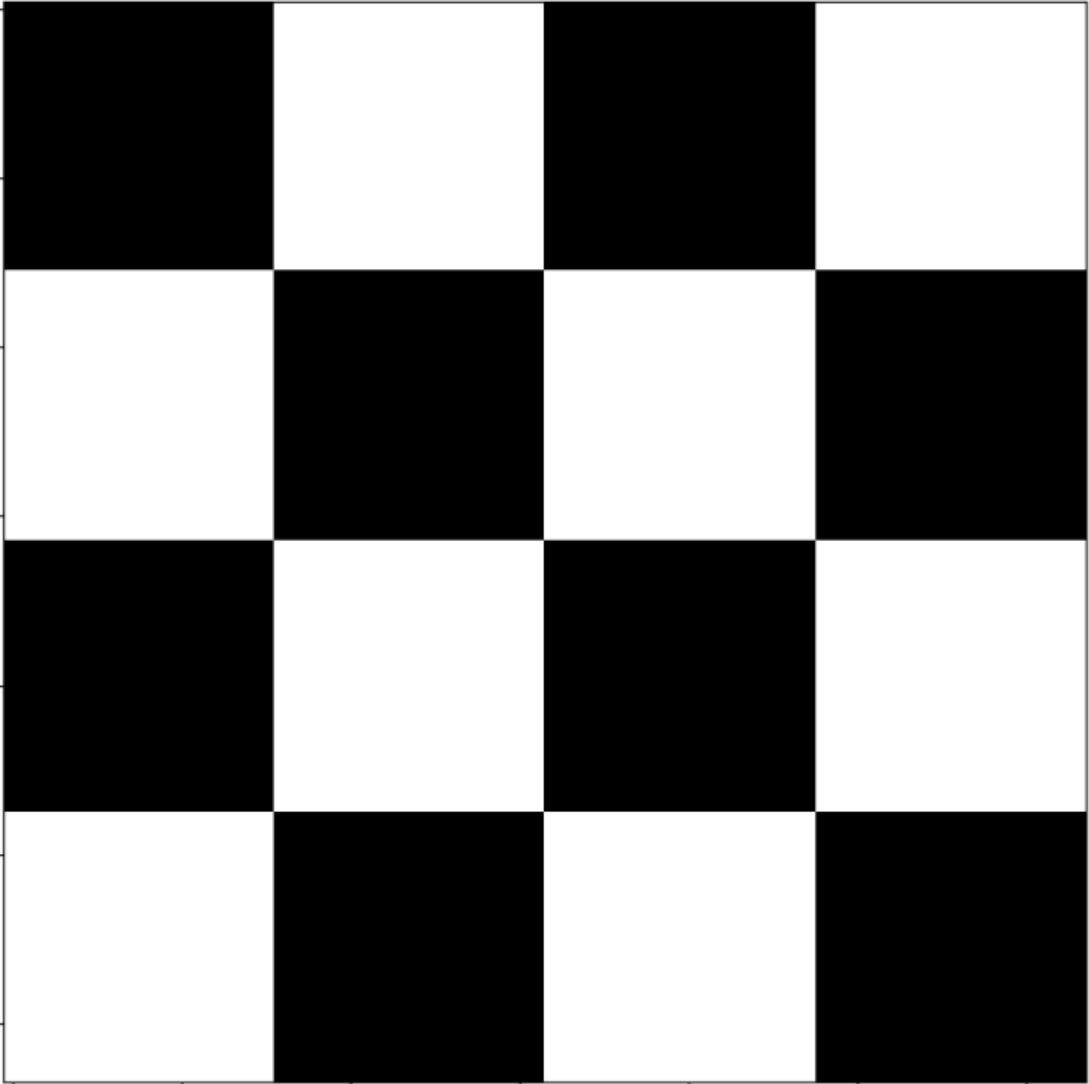## Mathematical Models and Methods for Image Processing
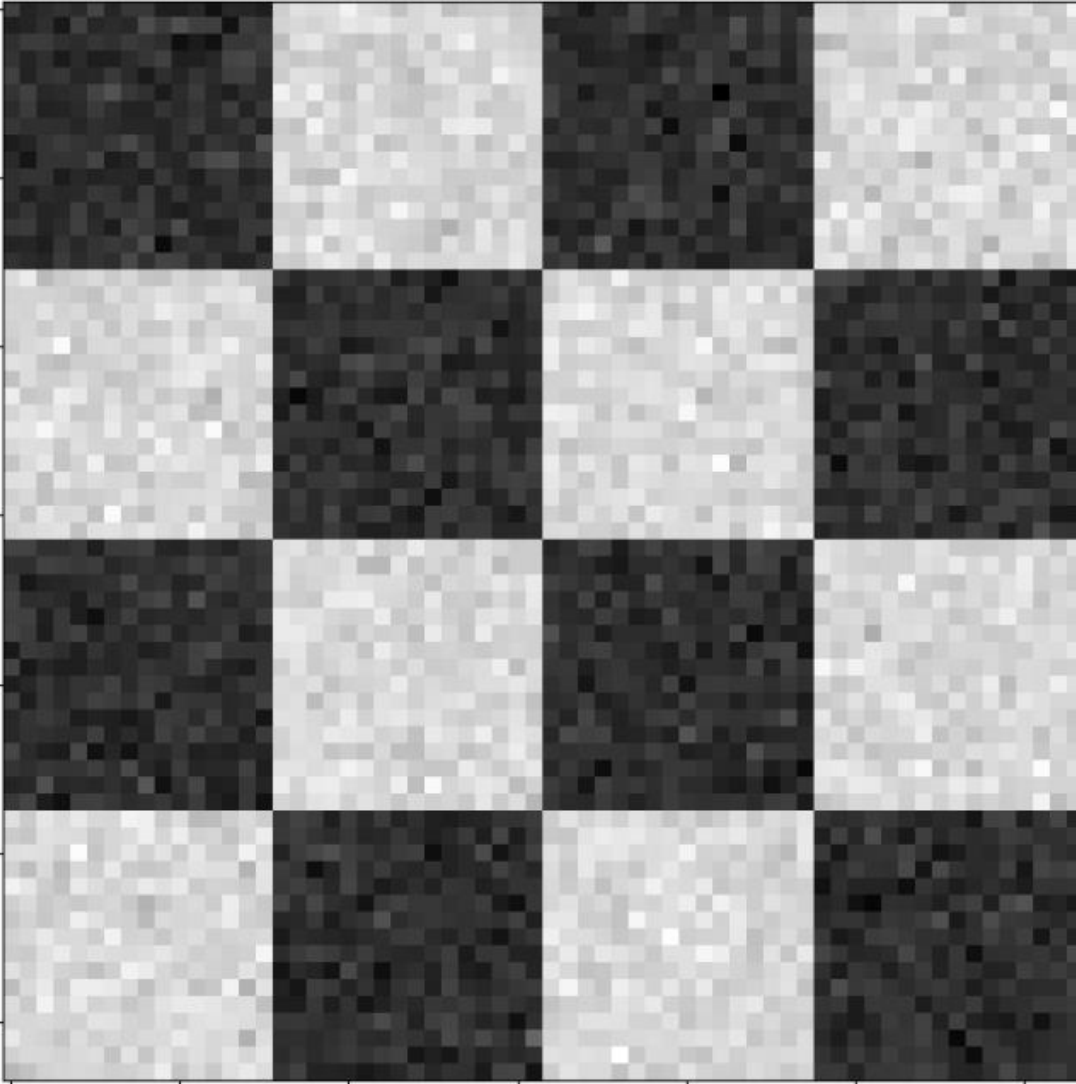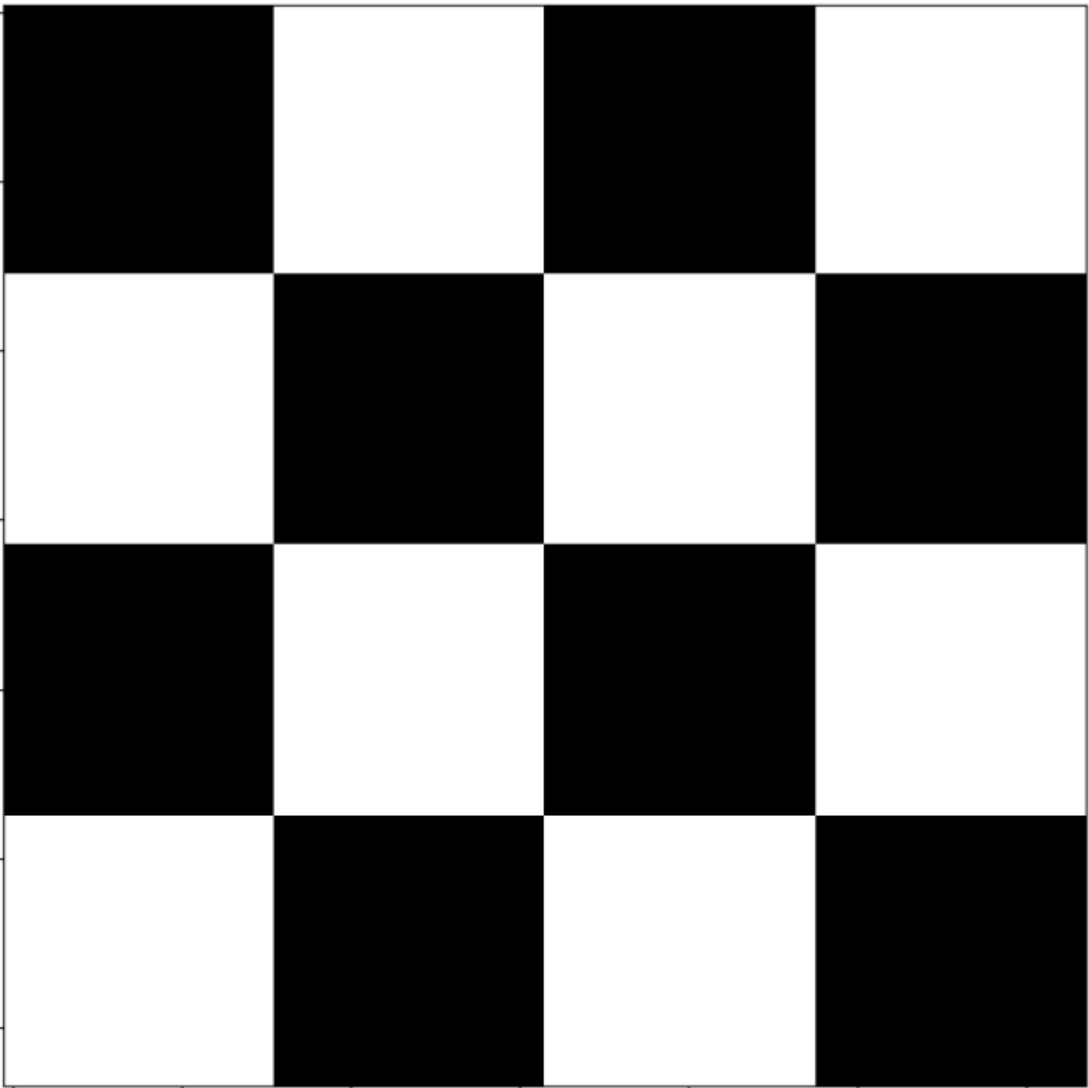
Diego Carrera
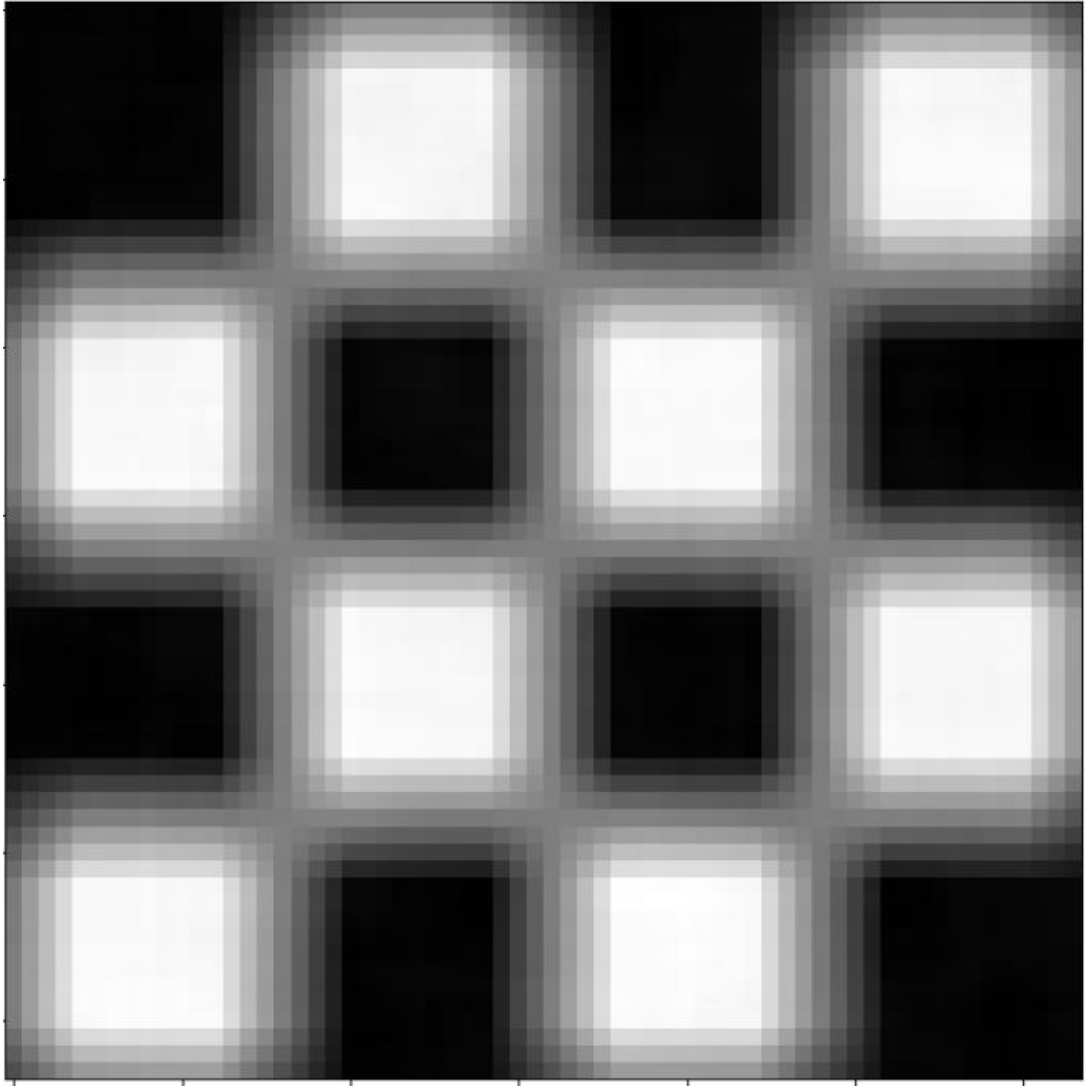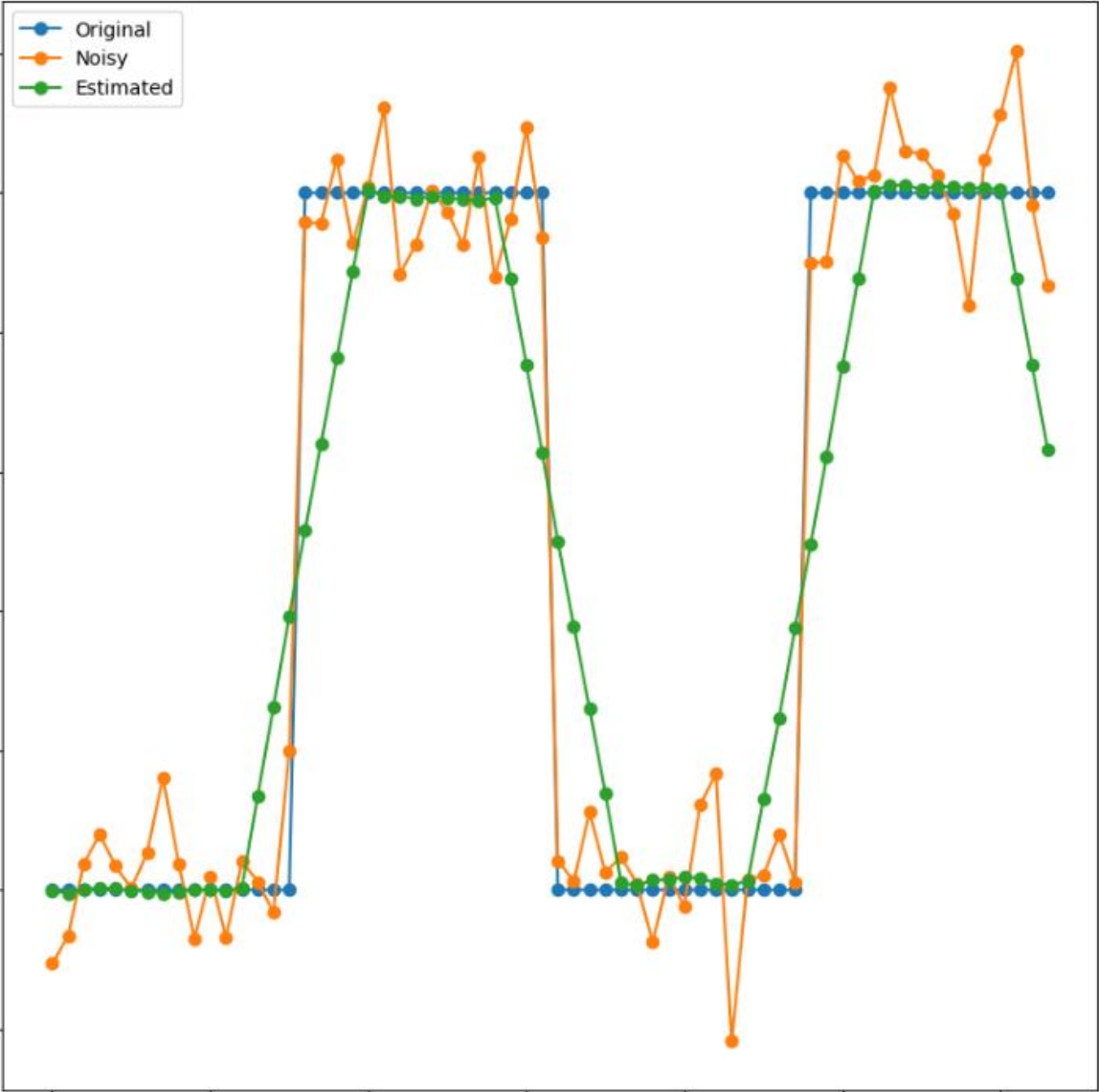
May 7th 2024

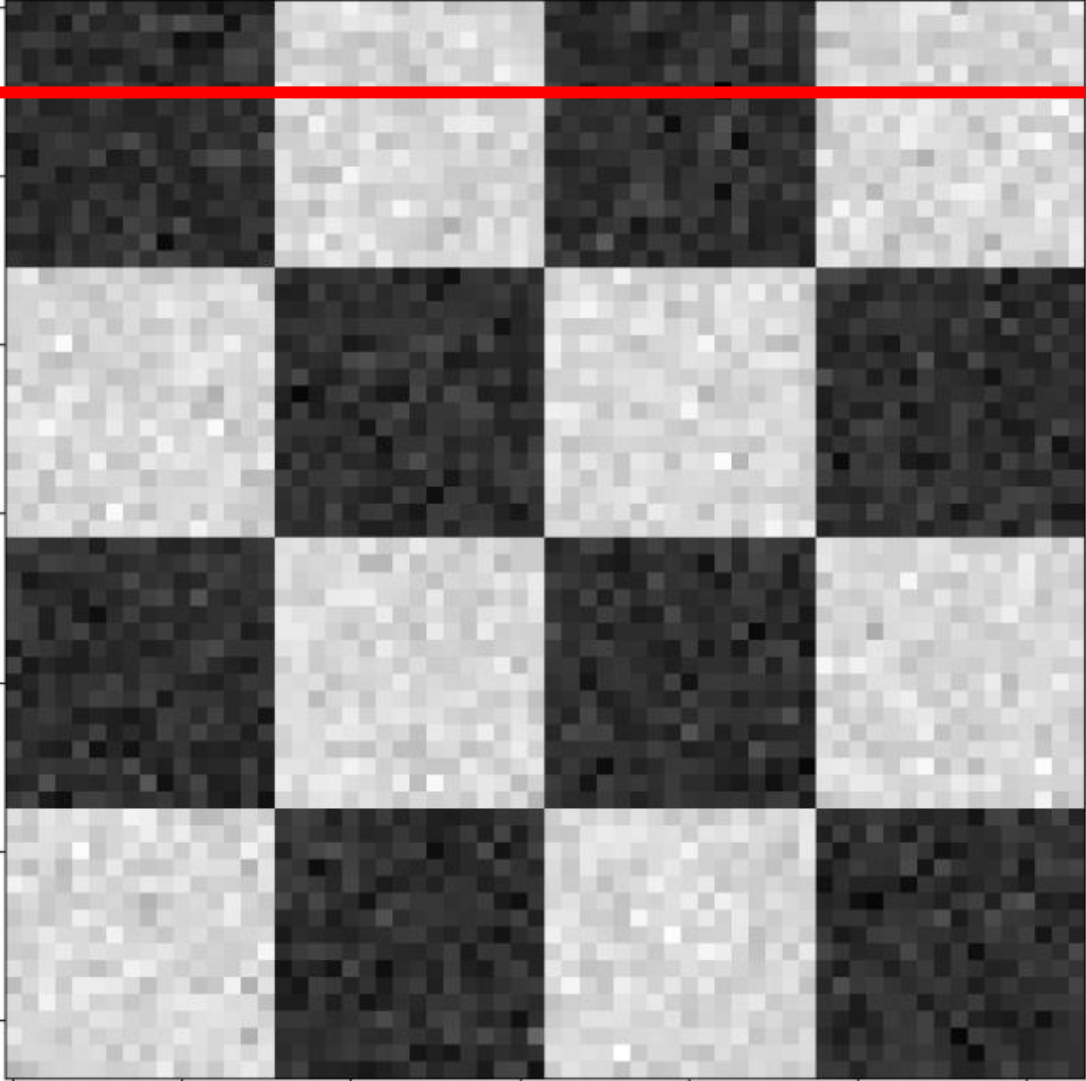# Denoising by convolution

Original

Noisy

Denoising by convolution

Original
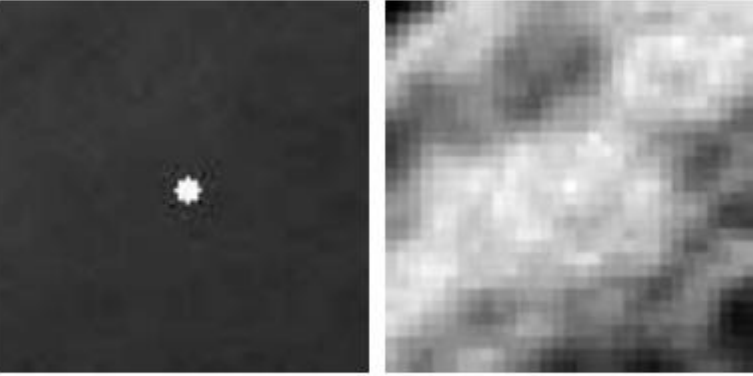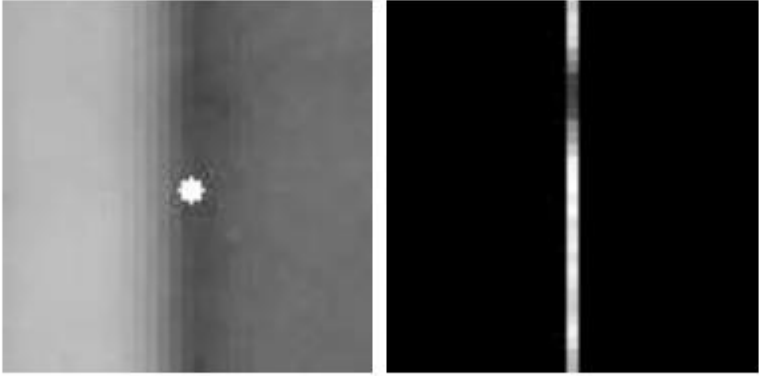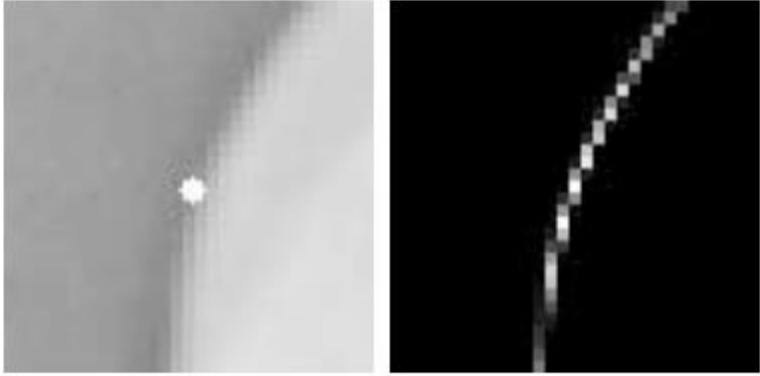
Estimated

Cross Section

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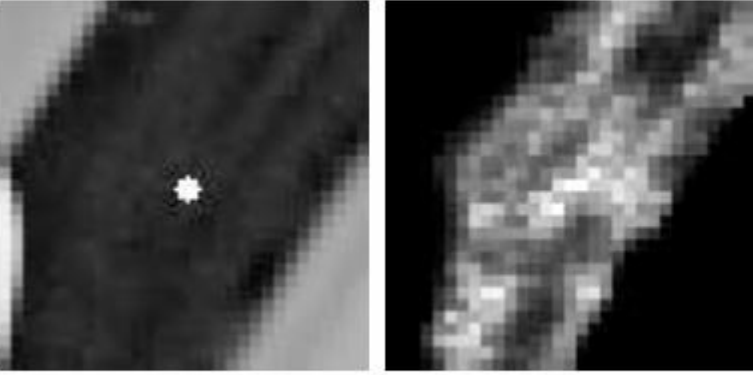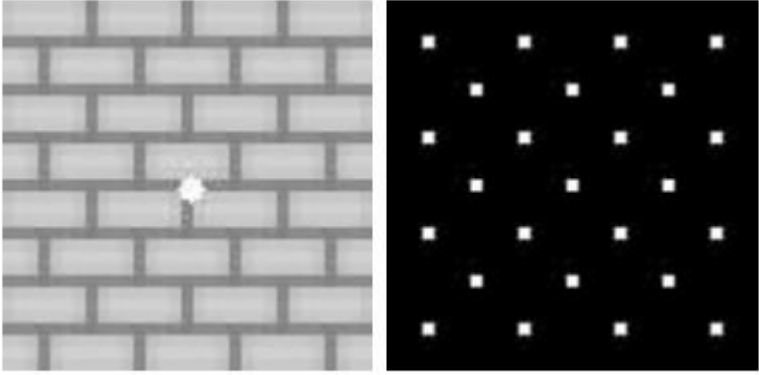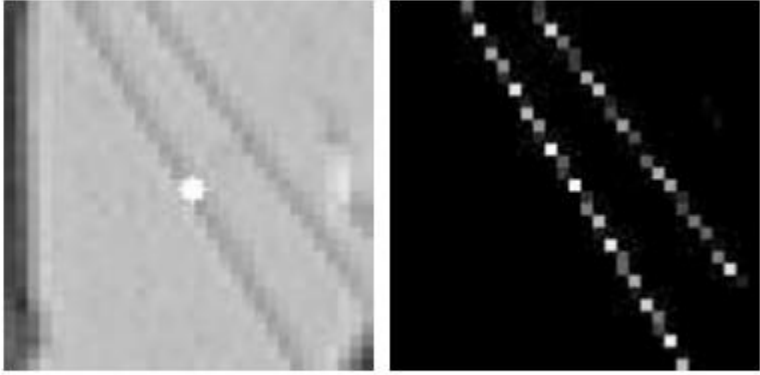# Weights in Nonlocal Means

(a) (b) (c)

(d) (e) (f)

Buades, Antoni, Bartomeu Coll, and J-M. Morel. "A non-local algorithm for image denoising." *2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'05)*. Vol. 2. IEEE, 2005.

D. Carrera

Assignment: implement the Nonlocal means algorithm

- The estimate is point-wise: you cannot use the step to speed up computation

- Try using:

  - $\sigma = 20$

  - H = 15

  - M = 49 (7x7 patches)

- To develop and debug, start by cropping a portion of image

Estimated Image,
PSNR = 28.67

Antoni Buades, Bartomeu Coll, and Jean-Michel Morel, Non-Local Means Denoising, Image Processing On Line, 1 (2011), pp. 208–212. https://doi.org/10.5201/ipol.2011.bcm_nlm