PCA based denoising

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Global PCA Denoising’

Noisy_barbara

Global PCA based Denoising

Error (RMSE): 0.0052

Localised PCA denoising

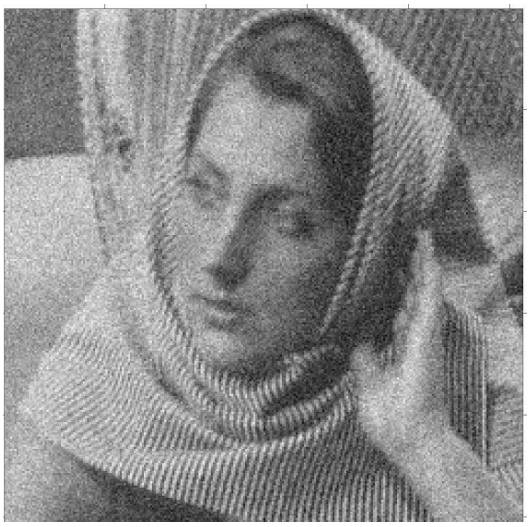
Noisy_barbara

Local_PCA_denoising

RMSE = 0.0105

Bilateral_Filter denoising:

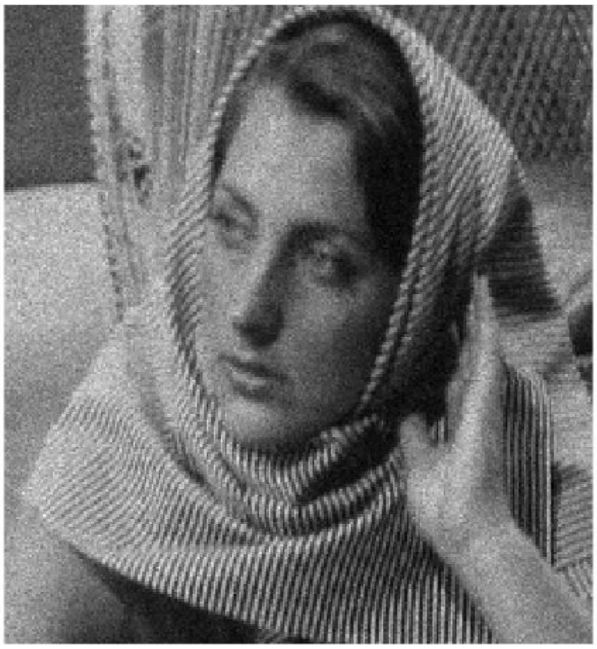
Barbara_noisy



Bilateral_filter

Bilateral filter is based on non-linear spatial averaging whereas PCA is based on feature extraction. For a average non zero noise in the neighbourhood, bilateral filter will provide a blurry output. In PCA, feature extraction takes place via eigenvectors. We observe a loss of sharpness in PCA technique due to the selection of certain number of eigen vector which do not span the complete space.

Poisson noise model:



Noisy_barbara_poisson_1

Local PCA filtering

Noisy-barbara_poisson_2

Local PCA filtering

On division by 20, we observe a high noise generated similar to limited light in the accusation process. And we see the corresponding PCA filtering