

Sliding DCT

Mathematical Models and Methods for Image Processing

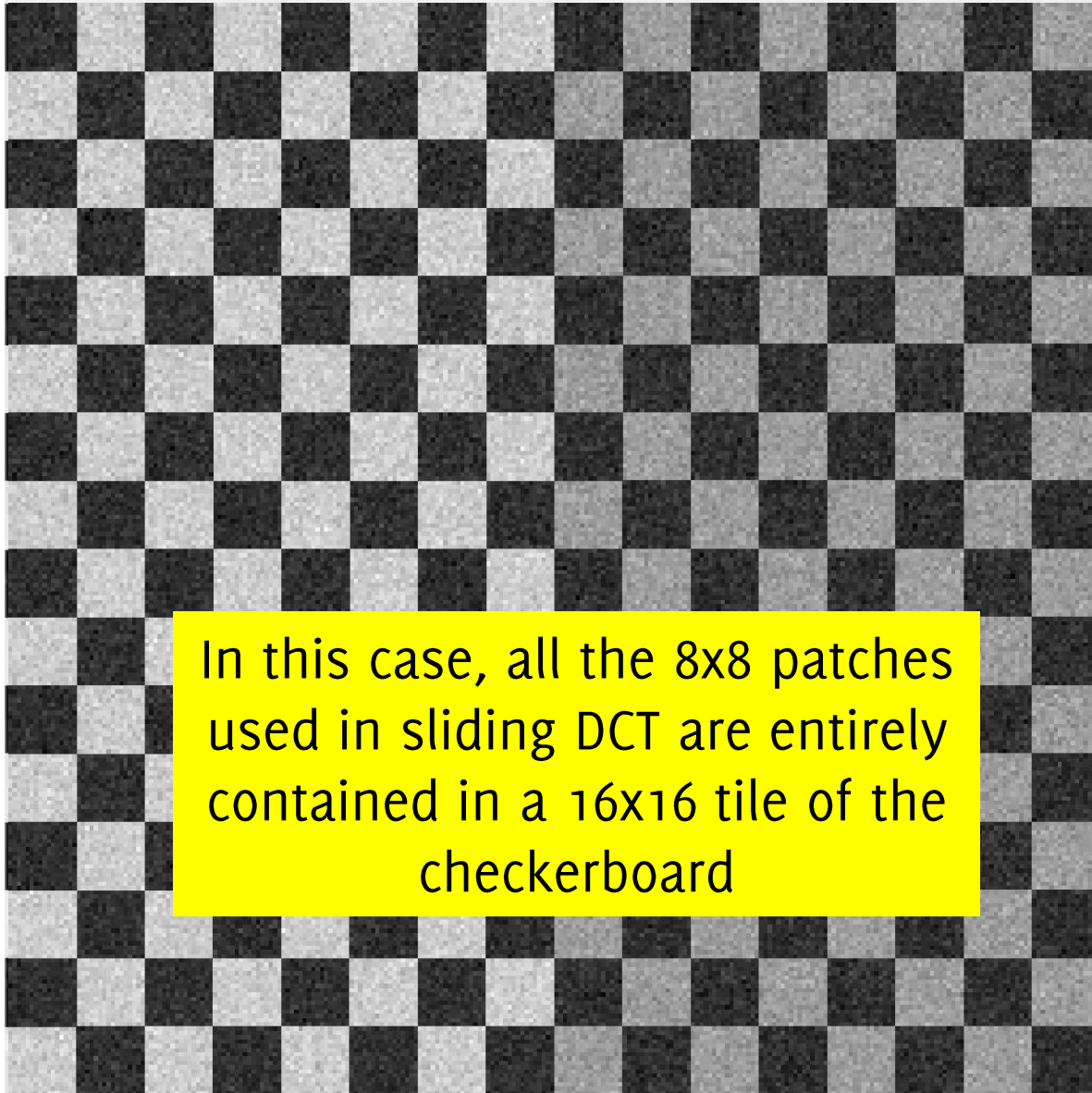
Giacomo Boracchi

<https://boracchi.faculty.polimi.it/teaching/MMMIP.htm>

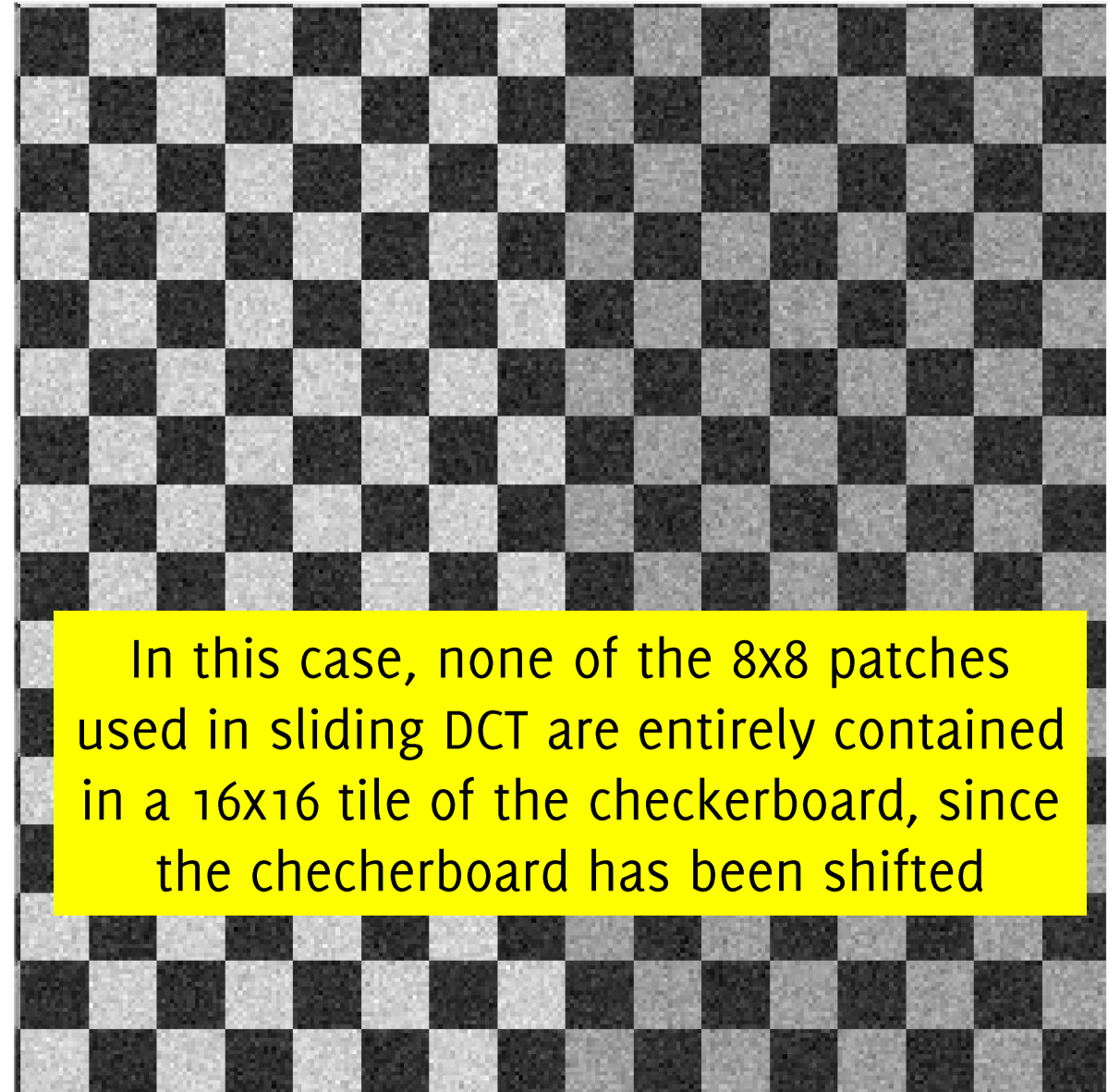
February 25th 2025

Sliding DCT

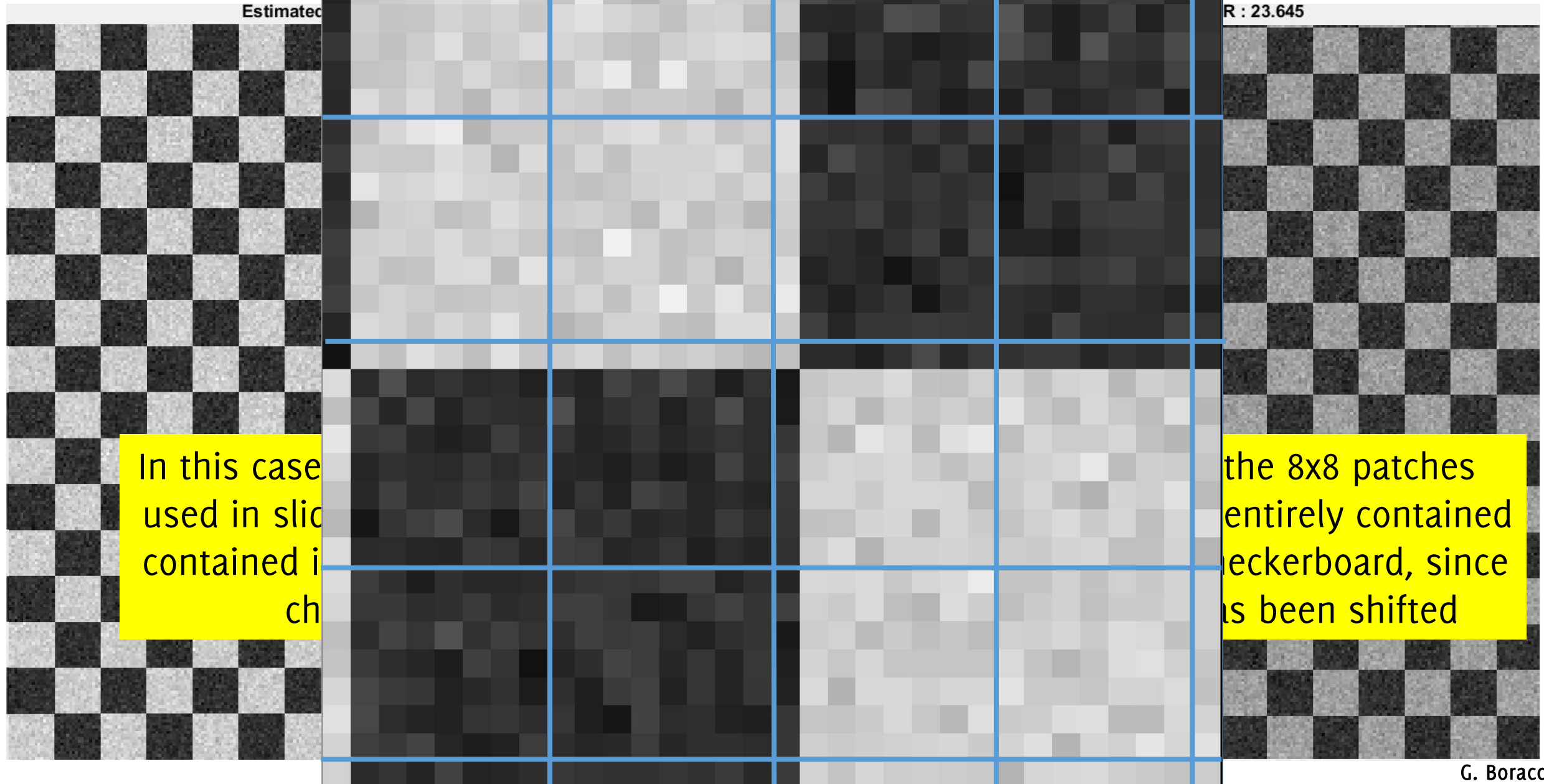
Original Checkerboard



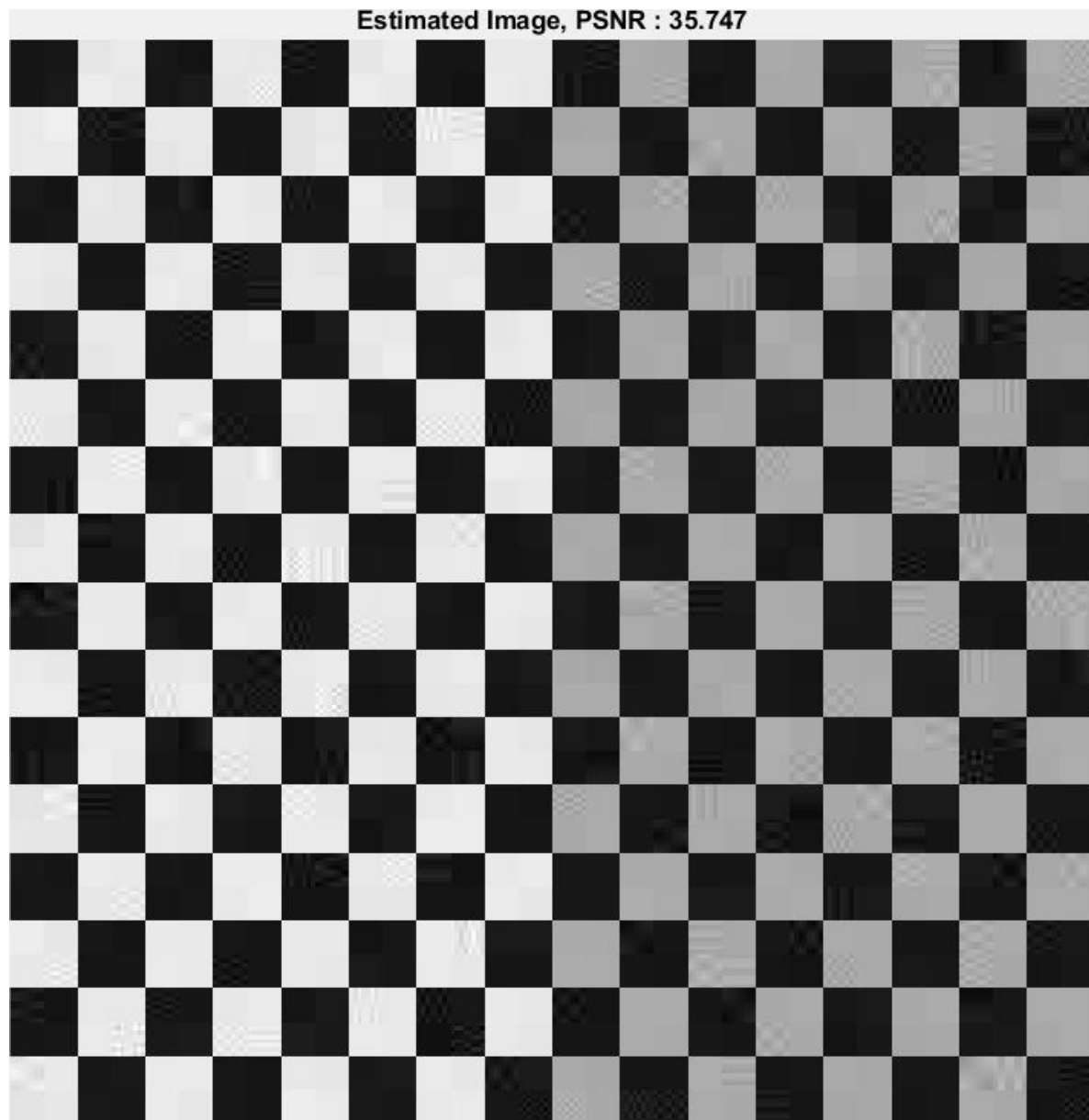
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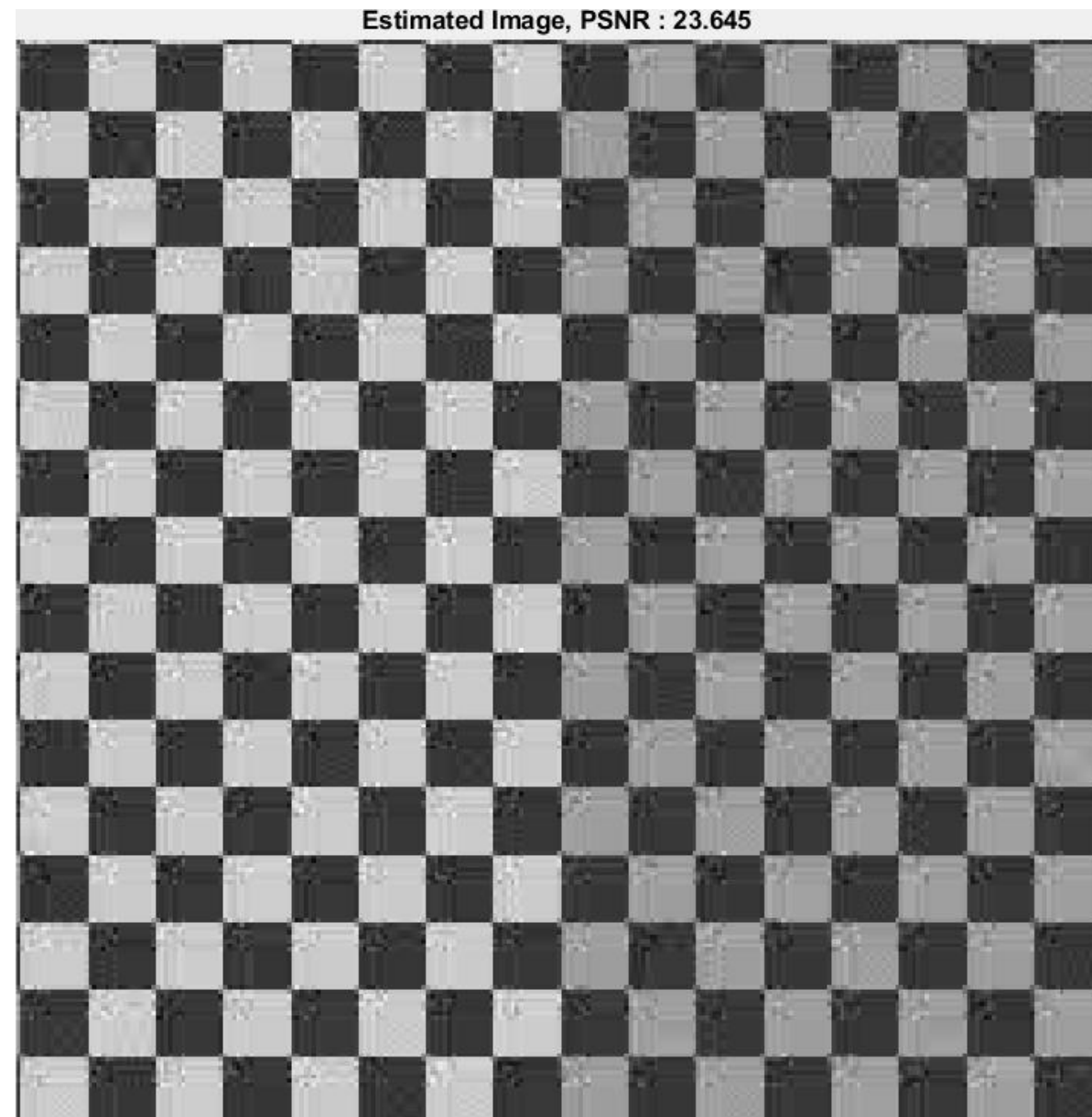
Original Check



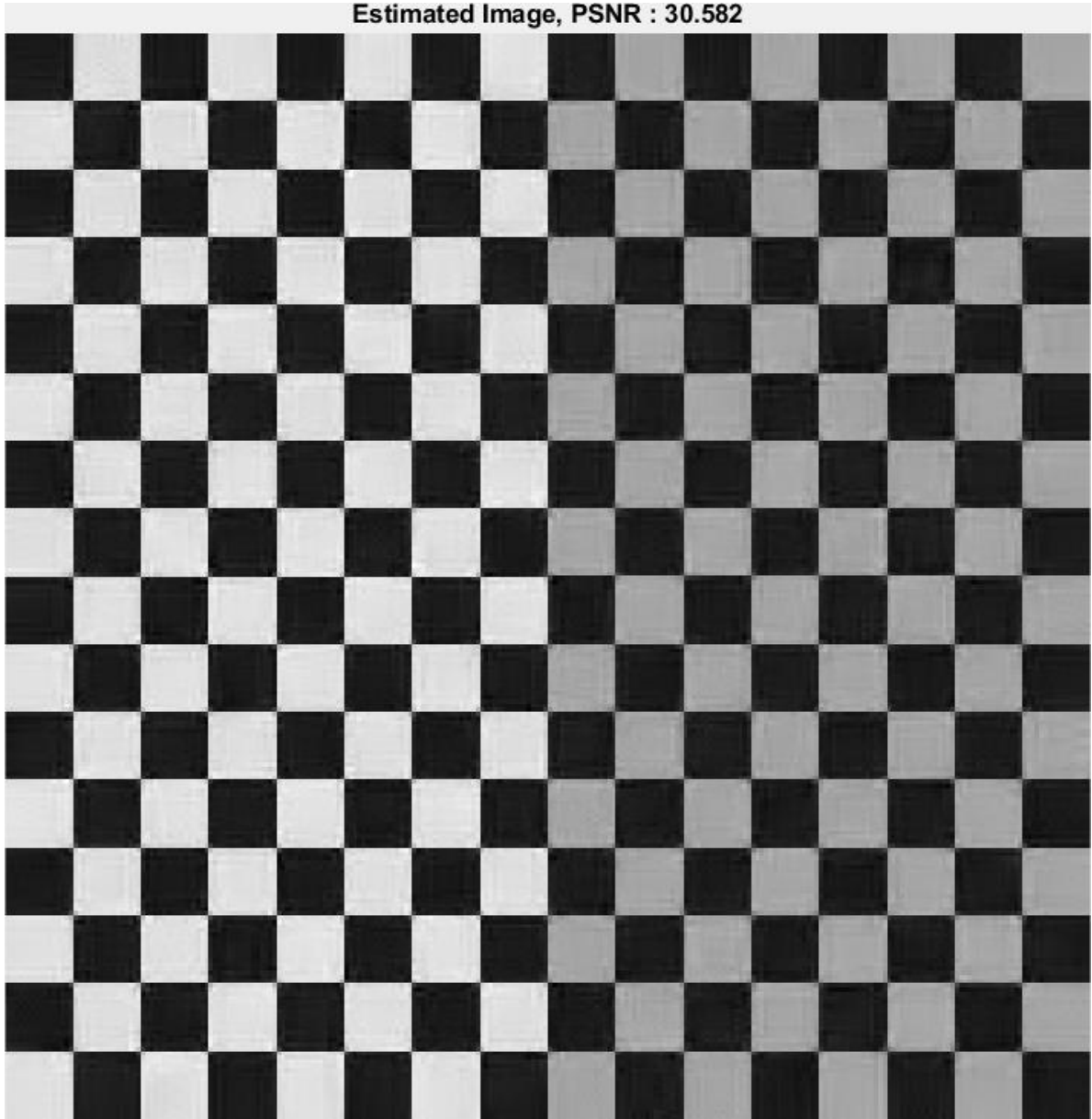
Original Checkerboard



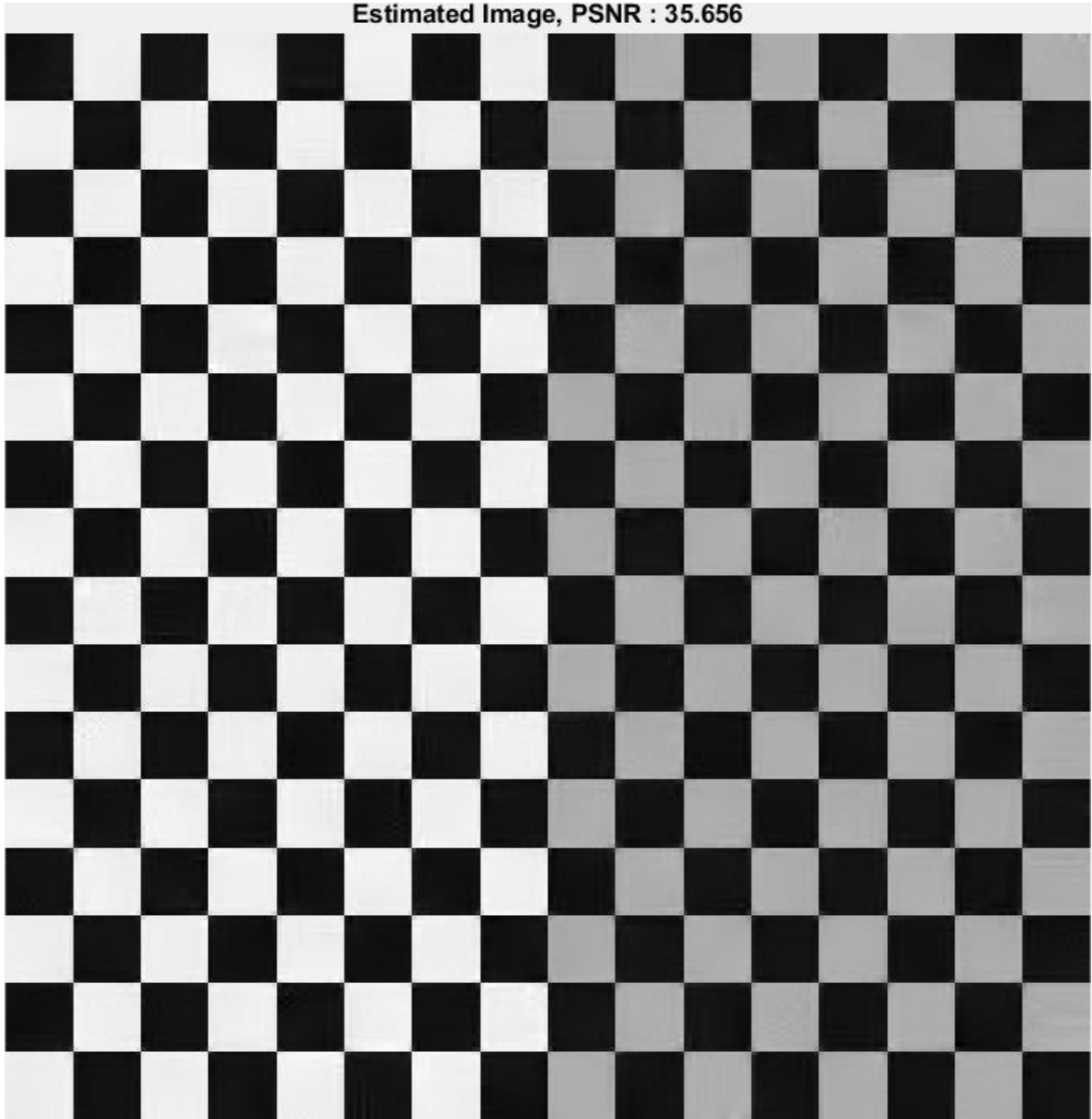
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Uniform Weights



Sparsity-aware



Assignment

1. Implement the sliding-DCT denoising using
 - no aggregation (operate on non-overlapping tiles)
 - aggregation using uniform weights
 - aggregation using weights inversely proportional to patch sparsity in DCT domain.
2. Test the three algorithms on both chekerboard and cameraman image
3. Test how much the choice of the threshold τ influences the denoising performance. Observe the resulting image when:
 - $\tau \ll 3\sigma$
 - $\tau \gg 3\sigma$

This is very important to understand how important is the choice of the threshold

Original image



Noisy image, PSNR = 22.09



HT Estimate, PSNR = 29.15



Wiener Estimate, PSNR = 29.41

