

ASSIGNMENT 3 QUESTION 1 EXPLANATION

For σ_s

- As it increases, a larger and larger neighborhood of values around $\mathbf{p}=(x,y)$ will contribute to the averaging (more noise reduction but possible contribution from dissimilar regions)
- As it shrinks towards 0, fewer and fewer neighbors of the central pixel \mathbf{p} will contribute to the averaging

For σ_r

- For moderate values, only intensities close to $I(\mathbf{p})$ will affect the averaging
- For larger values, the bilateral filter will begin to resemble a Gaussian filter
- Features or edges with intensity difference less than σ_r will be blurred, others will be preserved

Thus, for σ_s very large, like 15, the edges are not very well preserved and in the case of σ_s smaller like 0.1 or 2, the edges are preserved better. For higher value of σ_r , more averaging occurs like in the case of $\sigma_r = 2$ or 3 compared to 0.1

As σ_n increases, that is the noise added increases and higher mean shift filtering is required to smoothen the image (like in the case of $ss=3$, $sr=15$)