

HW1. Given an image $I(i,j)$ and the image $\Gamma(i',j')$. Write the system of linear equations to be used to interpolate the gray level of pixel (i',j') by using the Bi-cubic interpolation.
Due February 03, 2009. The HW has to be on my desk before the beginning of the lecture.

HW2. Prove that the D_4 distance is a metric?
Due February 10, 2009. The HW has to be on my desk before the beginning of the lecture.

HW3. Prove that the transformation defined by $T(k) = \sum_{i=1}^k \frac{n_k}{n}$ is strictly monotonically increasing, single value function, such that $0 \leq T(k) \leq 1$? In the above expression k is a gray level, n_k the number of pixels in the image with a gray level k , and n is the total number of pixels in the image.
Due February 17, 2009. The HW has to be on my desk before the beginning of the lecture.

HW4. Given an image $I_{M \times N}$, and a mask $m \times n$, where $m=2k+1$ and $n=2p+1$. The mask is moving across the image in a pixel-wise fashion and is always in the image. Find the number of arithmetic operations taken by the algorithm of linear filtering using the equation:

$$gl_N = \sum_{i=-k}^k \sum_{j=-p}^p \mu(i, j) f(x+i, y+j).$$

Find also the big O assessment of the algorithm?

This problem will be graded with max 20 relative points.

Due February 24, 2009. The HW has to be on my desk before the beginning of the lecture.

HW5. If you would like to improve your grade on the mid term exam prove that $F(u,v) = F_c(-u,-v)$, where F_c is the conjugate of F .

Due March 31, 2009. The HW has to be on my desk before the beginning of the lecture.

HW6. Prove that the number of summations $a(n)$ and the number of multiplications $m(n)$ taken by the Fast Fourier Transform are in the order of $O(N \log_2 N)$, where $N=2^n$.

Due April 07, 2009. The HW has to be on my desk before the beginning of the lecture. Also, this HW will bring to you 5 ECP.

ECP1. Prove that $\mu_1 = 0$?

Due February 24, 2009. The HW has to be on my desk before the beginning of the lecture.

ECP2. Write the math expression of the mask given below in terms of derivatives and operators.

-1	-1	-1
-1	$A+8$	-1
-1	-1	-1

What component of the filter will decrease if A increases?

Due March 03, 2009. The work has to be on my desk before the beginning of the lecture.