

ECE 4580 - Digital Image Processing

Homework Assignment #6 - Filtering in the Frequency Domain

Project 4.6 – Lowpass filtering in the frequency domain

Lowpass filtering in the frequency domain. Show the image resulting after each of the following:

- (a) Read the image testpattern1024.tif and lowpass filter it using a Gaussian filter so that the large letter "a" is barely readable, and the other letters are not.
- (b)*Read the image testpattern1024.tif. Lowpass filter it using a Butterworth filter of your specification so that, when thresholded, the filtered image contains only part of the large square on the top, right. (Hint: It is more intuitive to work with the negative of the original image.)
- (c) Read the image checkerboard1024-shaded.tif and reproduce the results in Example 3.18 using frequency-domain filtering. (Hint: To obtain images like the ones in the example, scale the shading pattern and the processed image to the full [0,1] intensity range—you can use project function intScaling4e for this.)

[Note that the images, testpattern1024.tif and checkborad1024-shaded.tif, can be downloaded from the Canvas system.]

You need to turn in a written report (in the pdf format), including the following sections: (1) Approach, (2) Experimental Results and (3) Discussion/Conclusion. In addition, you need to turn in your MATLAB implementation codes in a separate file.