Assignment #3

Due November 3, 2023

Write a program to enhance the “flower1.jpg” and “fruit.jpg” images in frequency domain using the following filters:

1. Notch filters
    a. Low-pass filter with radius, r equals to 10, 50, and 100, respectively.

$$H(u,v) = \begin{cases} 1 & if\ (u,v) is\ closer\ to\ the\ center\ than\ r \\ 0 & if\ (u,v) is\ further\ from\ the\ center\ than\ r \end{cases}$$

    b. High-pass filter with radius, r equals to 10, 50, and 100, respectively.

$$H(u,v) = \begin{cases} 0 & if\ (u,v) is\ closer\ to\ the\ center\ than\ r \\ 1 & if\ (u,v) is\ further\ from\ the\ center\ than\ r \end{cases}$$

2. Gaussian filters
    a. Low-pass filter with cutoff, D_0 equals to 10, 50, and 100, respectively.

$$H(u,v) = e^{-D^2(u,v)/2{D_0}^2}$$

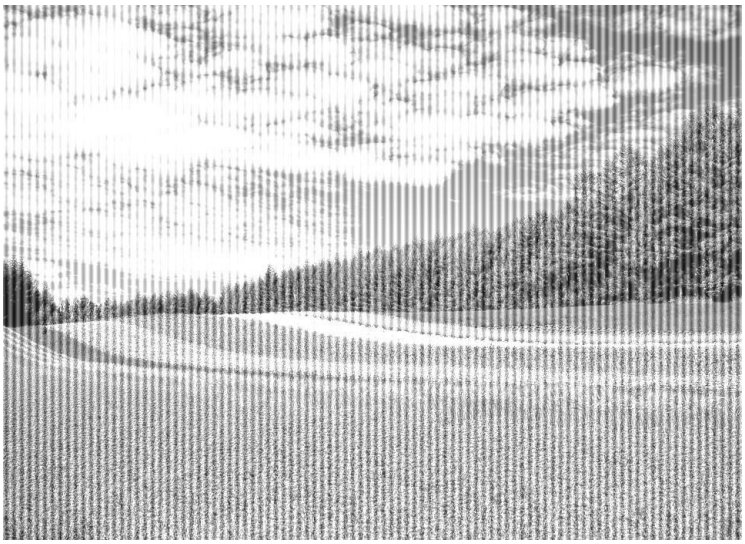
    b. High-pass filter with cutoff, D_0 equals to 10, 50, and 100, respectively.

$$H(u,v) = 1 - e^{-D^2(u,v)/2{D_0}^2}$$

3. Remove periodic noise from the given images using any of the filters that you think are the most suitable ones to be used.

flower1.jpg

noisy_flower1_horizontal.jpg



noisy_flower1_vertical.jpg