

# DIP Assignment - 3

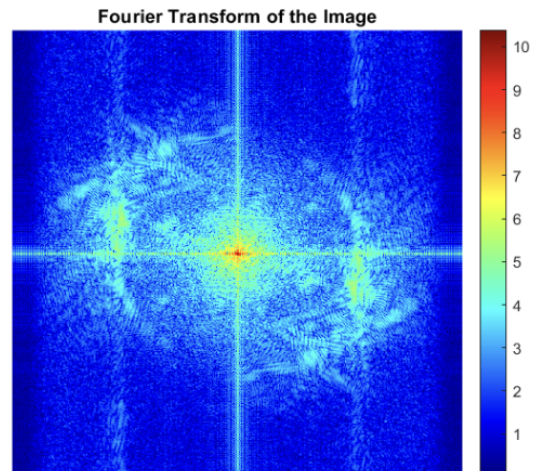
## Question 2 Solution

1. Created predictions on frequencies of 40, 60 and 80 in the results. While running the code parameter of cutoff\_frequency needs to be given.
2. Padding has been done accordingly as required and made image larger
3. Log absolute Fourier transform for all filtered and original image are displayed as required
4. Comparison of results and observations are marked at the end

**Original Image**

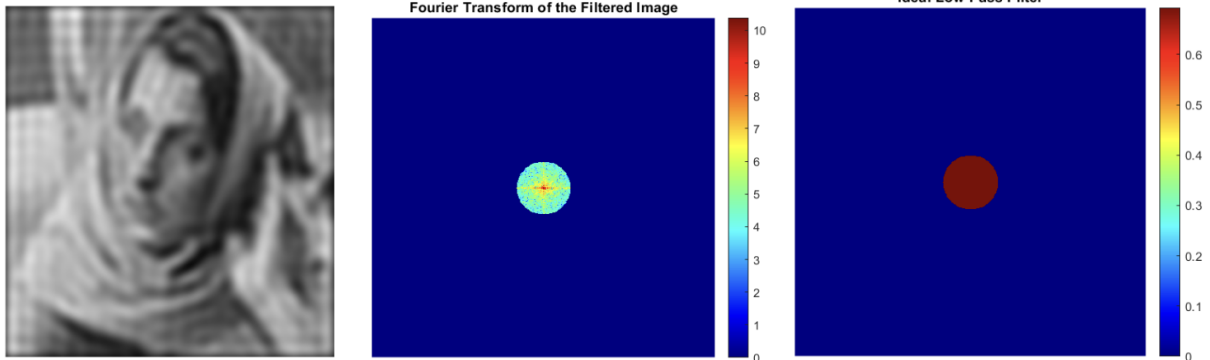


**Image Fourier Transform**

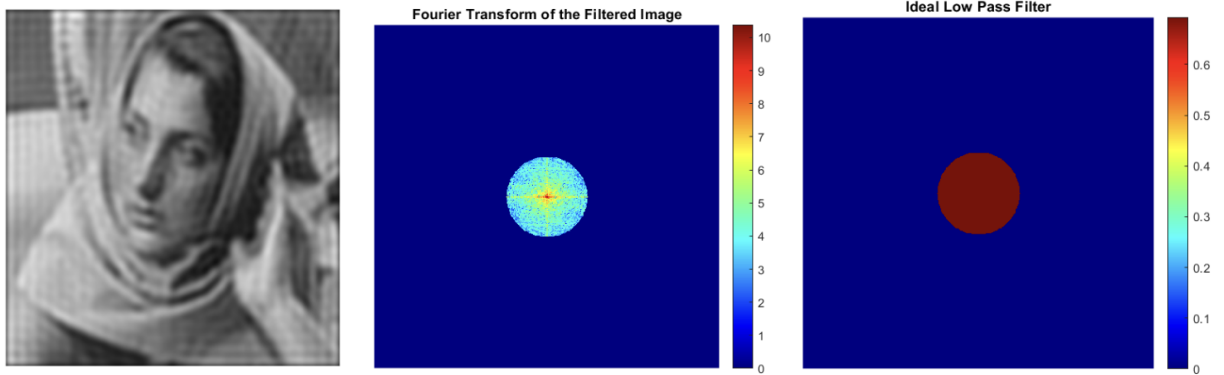


## A) Ideal Low pass filter with cutoff frequency

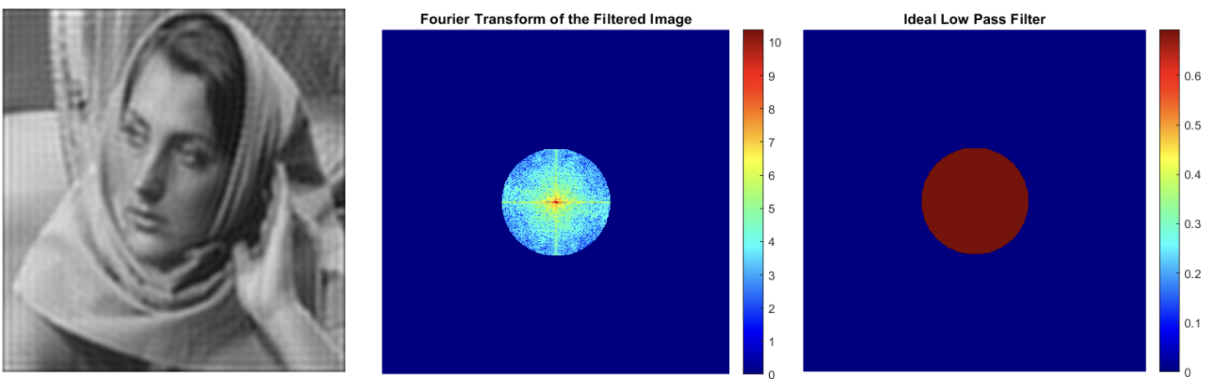
### 1. Frequency = 40



### 2. Frequency = 60

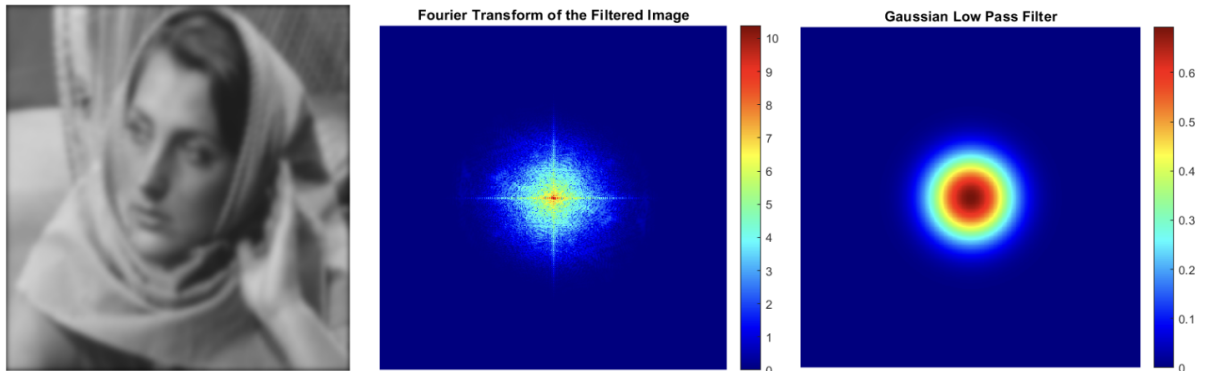


### 3. Frequency = 80

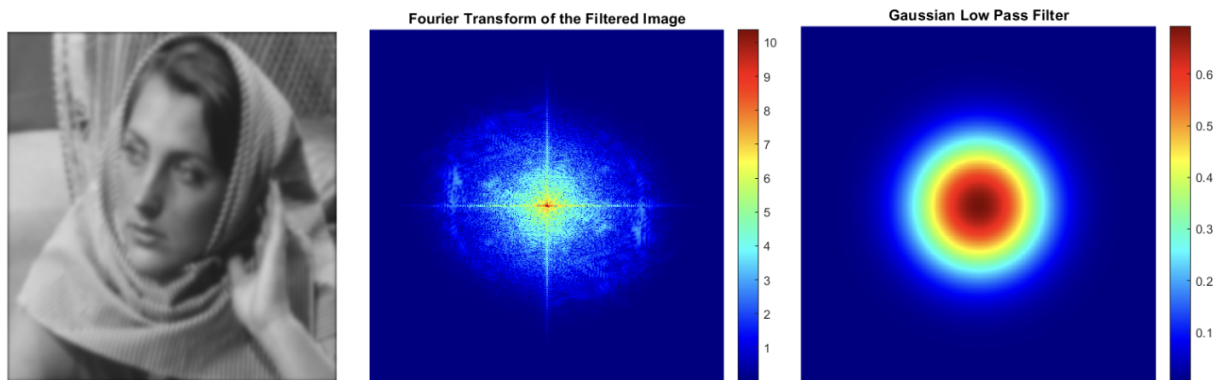


## B) Gaussian Low pass filter with cutoff frequency

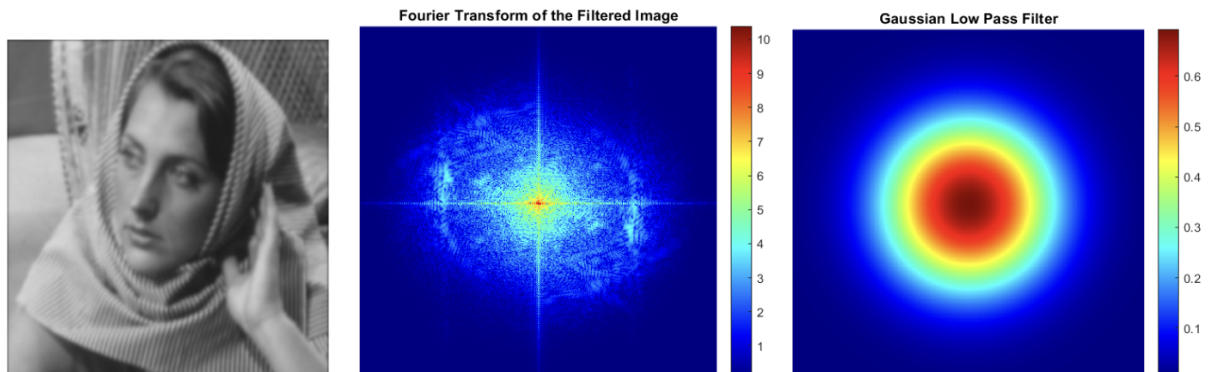
### 1. Frequency = 40



### 2. Frequency = 60



### 3. Frequency = 80



## Observations

Increasing cut-off frequency (ideal low pass filter) or sigma (Gaussian low pass filter) makes higher frequency components visible.

### **Ideal Low Pass Filter:**

1. Presence of ringing artifacts near sharp transitions in images.
2. Result of complete elimination of high frequencies beyond cut-off frequency due to ringing artifacts.

### **Gaussian Low Pass Filter:**

1. Absence of ringing artifacts.
2. Weakens higher frequencies instead of complete elimination.