

# ASSIGNMENT 11

AIM 1:- Write a matlab program to implement low pass filters.

Code:-

```
clc;
clear;
close all;

f=imread('t1.tif');
%f=imresize(f,[1000 1000]);
subplot(2,2,1);
imshow(f);
title('Original Image');

[m,n]=size(f);

F=fft2(f);
F_shift=fftshift(F);

p=m/2;
q=n/2;
n1=10;
n1=2*n1;
d0=50;
sigma=5;
H = zeros(m, n);
for i=1:m
    for j=1:n
        distance=sqrt((i-p)^2+(j-q)^2);
%        Gausssin low pass filter
%        H(i,j)=1-exp((-distance^2)/(2*(d0^2)));
        if distance <= d0
            H(i,j) =1;
        else
            H(i,j) =0;
        end
%BLPF
%H(i,j) = 1-(1/(1 + (distance/d0)^n1));
%        x1= distance./d0;
%        p1=2* n1;
%        H(i,j) =(1./(1+(x1.^p)));

    end
end
```

```

g1 =F_shift .* H;
g =ifftshift(g1);
f_new=abs(ifft2(g));

subplot(222);
imshow(f_new, [])
title('Ideal Lowpass filtered image');
subplot(223);surf(H);
subplot(224);imshow(H);

figure,
subplot(2,2,1);
imshow(f);
title('Original Image');

[m,n]=size(f);

F=fft2(f);
F_shift=fftshift(F);

p=m/2;
q=n/2;
n1=10;
n1=2*n1;
d0=50;
sigma=5;
H = zeros(m, n);
for i=1:m
    for j=1:n
        distance=sqrt((i-p)^2+(j-q)^2);
%         Gausssin low pass filter
        H(i,j)=exp((-distance^2)/(2*(d0^2)));
%         if distance <= d0
%             H(i,j) =0;
%         else
%             H(i,j) = 1;
%         end
%BLPF
%H(i,j) = 1-(1/(1 + (distance/d0)^n1));
%         x1= distance./d0;
%         p1=2* n1;
%         H(i,j) =(1./(1+(x1.^p)));

    end
end

```

```

g1 =F_shift .* H;
g =ifftshift(g1);
f_new=abs(ifft2(g));

subplot(222);
imshow(f_new, [])
title('Gaussian Lowpass filtered image');
subplot(223);surf(H);
subplot(224);imshow(H);

figure,
subplot(2,2,1);
imshow(f);
title('Original Image');

[m,n]=size(f);

F=fft2(f);
F_shift=fftshift(F);

p=m/2;
q=n/2;
n1=10;
n1=2*n1;
d0=50;
sigma=5;
H = zeros(m, n);
for i=1:m
    for j=1:n
        distance=sqrt((i-p)^2+(j-q)^2);
        % Gausssin low pass filter
        %H(i,j)=1-exp((-distance^2)/(2*(d0^2)));
        % if distance <= d0
        %     H(i,j) =0;
        % else
        %     H(i,j) = 1;
        % end
        %BLPF
        H(i,j) = (1/(1 + (distance/d0)^n1));

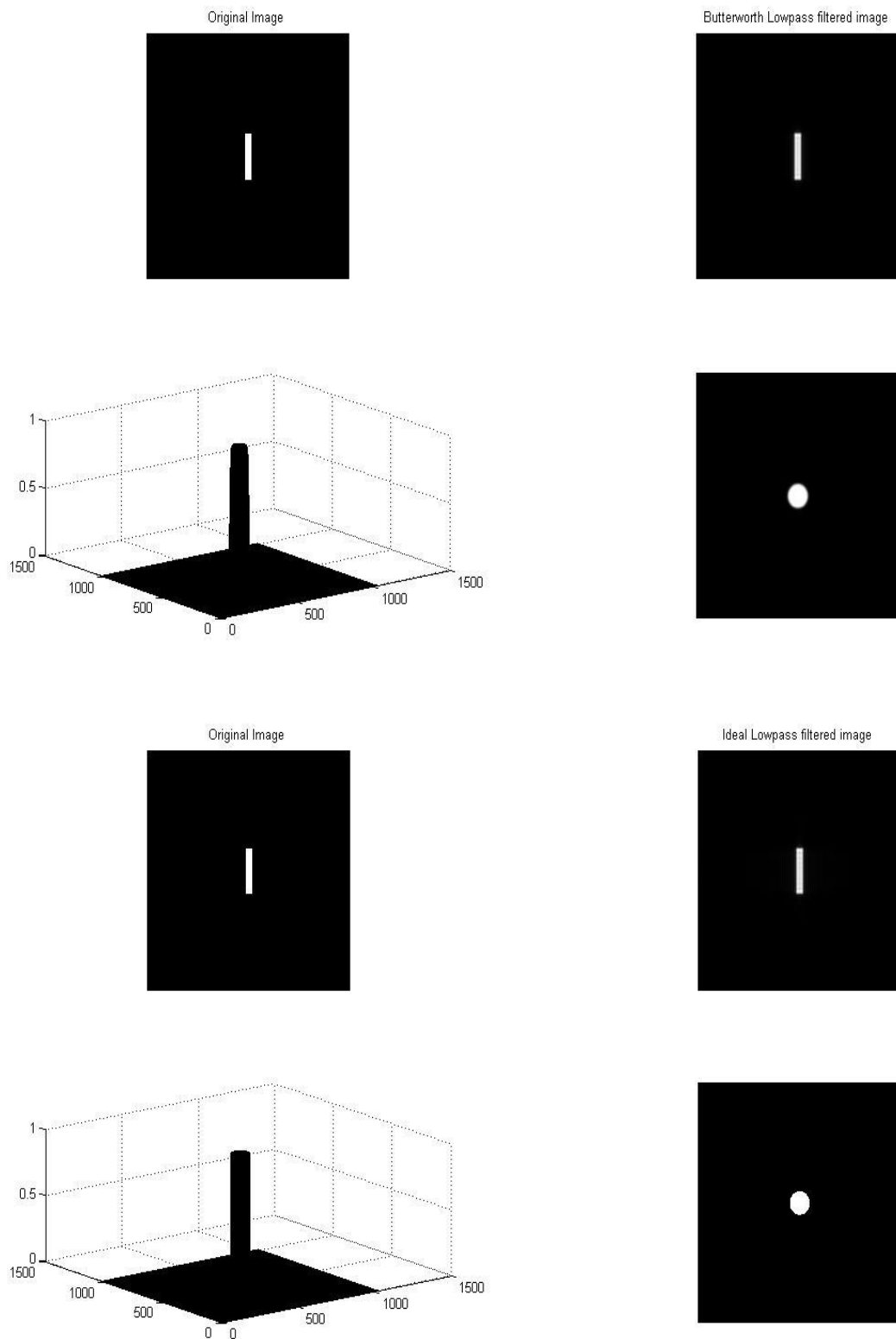
    end
end

g1 =F_shift .* H;
g =ifftshift(g1);

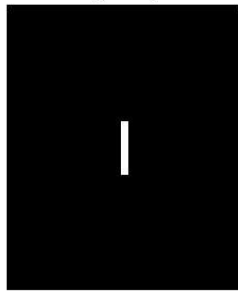
```

```
f_new=abs(iff2(g));  
  
subplot(222);  
imshow(f_new, [])  
title('Butterworth Lowpass filtered image');  
subplot(223);surf(H);  
subplot(224);imshow(H);
```

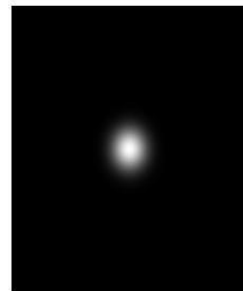
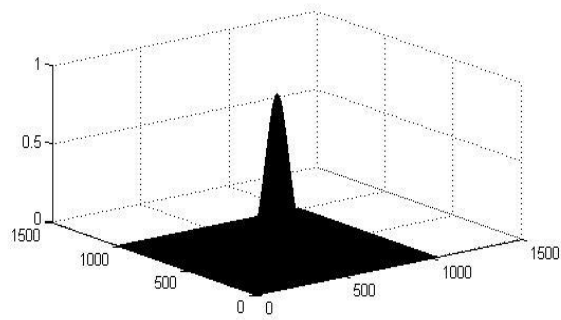
Output:-



Original Image



Gaussian Lowpass filtered image



AIM 2:- Write a matlab program to implement ideal high pass filter.

Code:-

```

clc;
clear;
close all;

f=imread('t1.tif');
%f=imresize(f,[1000 1000]);
subplot(2,2,1);
imshow(f);
title('Original Image');

[m,n]=size(f);

F=fft2(f);
F_shift=fftshift(F);

p=m/2;
q=n/2;
n1=10;
n1=2*n1;
d0=30;
sigma=5;
H = zeros(m, n);
for i=1:m
    for j=1:n
        distance=sqrt((i-p)^2+(j-q)^2);
%        Gausssin low pass filter
%        H(i,j)=1-exp((-distance^2)/(2*(d0^2)));
        if distance <= d0
            H(i,j) =0;
        else
            H(i,j) = 1;
        end
%BLPF
%H(i,j) = 1-(1/(1 + (distance/d0)^n1));
%        x1= distance./d0;
%        p1=2* n1;
%        H(i,j) =(1./(1+(x1.^p)));

    end
end

g1 =F_shift .* H;
g =ifftshift(g1);
f_new=abs(ifft2(g));

```

```

subplot(222);
imshow(f_new, [])
title('Ideal Highpass filtered image');
subplot(223);surf(H);
subplot(224);imshow(H);

figure,
subplot(2,2,1);
imshow(f);
title('Original Image');

[m,n]=size(f);

F=fft2(f);
F_shift=fftshift(F);

p=m/2;
q=n/2;
n1=10;
n1=2*n1;
d0=30;
sigma=5;
H = zeros(m, n);
for i=1:m
    for j=1:n
        distance=sqrt((i-p)^2+(j-q)^2);
%         Gausssin low pass filter
        H(i,j)=1-exp((-distance^2)/(2*(d0^2)));
%         if distance <= d0
%             H(i,j) =0;
%         else
%             H(i,j) = 1;
%         end
%BLPF
%H(i,j) = 1-(1/(1 + (distance/d0)^n1));
%         x1= distance./d0;
%         p1=2* n1;
%         H(i,j) =(1./(1+(x1.^p)));

    end
end

g1 =F_shift .* H;
g =ifftshift(g1);
f_new=abs(ifft2(g));

```



```

subplot(222);
imshow(f_new, [])
title('Gaussian Highpass filtered image');
subplot(223);surf(H);
subplot(224);imshow(H);

figure,
subplot(2,2,1);
imshow(f);
title('Original Image');

[m,n]=size(f);

F=fft2(f);
F_shift=fftshift(F);

p=m/2;
q=n/2;
n1=10;
n1=2*n1;
d0=30;
sigma=5;
H = zeros(m, n);
for i=1:m
    for j=1:n
        distance=sqrt((i-p)^2+(j-q)^2);
%         Gausssin low pass filter
%         %H(i,j)=1-exp((-distance^2)/(2*(d0^2)));
%         if distance <= d0
%             H(i,j) =0;
%         else
%             H(i,j) = 1;
%         end
%BLPF
H(i,j) = 1-(1/(1 + (distance/d0)^n1));

    end
end

g1 =F_shift .* H;
g =ifftshift(g1);
f_new=abs(ifft2(g));

subplot(222);
imshow(f_new, [])

```

```
title('Butterworth Highpass filtered image');  
subplot(223);surf(H);  
subplot(224);imshow(H);
```

Output:-

