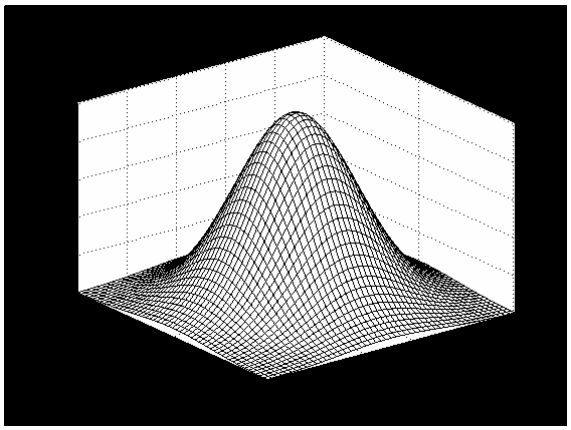
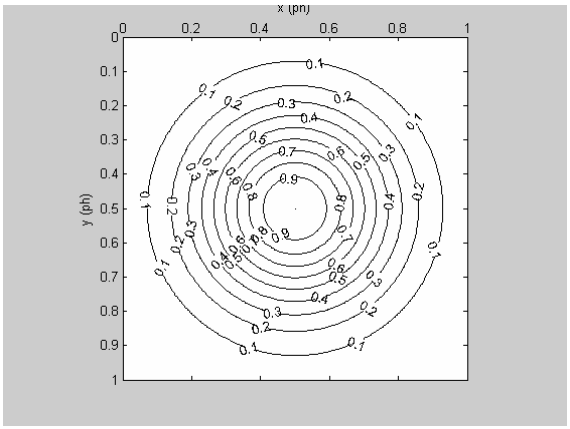
Plotting 2D Functions

Two-dimensional Gaussian function, centred at (0.5,0.5) and with r = 0.2

$$f(x,y) = \exp[-((x-0.5)^2 + (y-0.5)^2)/2(0.2)^2]$$

Plot perspective and contour plots of $f(x,y)$ for $0 \le x,y \le 1$





Perspective Plot

```
x=0:.02:1; y=x;       %x and y values between 0 and +1 spaced by 0.02
                      %(51 values)

r = 0.2;              %set the r parameter

[X,Y]=meshgrid(x,y);  % generate a 2D grid of xy values (51 by 51
                      %arrays) X(i,j) = x(j) and Y(i,j) = y(i)

Z=exp(-((X-0.5).^2+(Y-0.5).^2)/(2*r^2));   % generate the Gaussian
                      %function on the grid

mesh(X,Y,Z)           % generate the perspective plot

colormap([0 0 0]);    % use black only
xlabel('x (ph)'), ylabel('y (ph)');
set(gca,'ydir','reverse');
```

Contour plot

```
x=0:.005:1; y=x;      %x and y values between 0 and +1 spaced by 0.005

r = 0.2;

[X,Y]=meshgrid(x,y);  %generate a 2D grid of xy values

Z=exp(-((X-0.5).^2+(Y-0.5).^2)/(2*r^2));   % generate the Gaussian
                      %function on the grid

v=0:.1:1.;            % contours will be from 0 to 1 in steps of 0.1
[C,h]=contour(X,Y,Z,v); % generate the contour plot, including values
                      %to label contours
axis square           %make the plot square
clabel(C,h)           %label the contours
xlabel('x (ph)'), ylabel('y (ph)');
set(gca,'ydir','reverse');
set(gca,'XAxisLocation','top');      %Xaxis labels on top
colormap([0 0 0]);     % use black only
```

Your task:

Plot contour and perspective plots of the following function:

$$f(x, y = \exp[-((x-.35)^2+(y+.35)^2)/2r_1^{\,2}] + \exp[-((x+.2)^2+(y-.2)^2)/2r_1^{\,2}] - \exp[-((x-.35)^2+(y+.35)^2)/2r_2^{\,2}] - \exp[-((x+.2)^2+(y-.2)^2)/2r_2^{\,2}]$$

for -1 ≤ x ≤ 1 and -1 ≤ y ≤ 1 with a spacing of 0.04, and with $r_1 = 0.25$ and $r_2 = 0.1$
View the perspective plot from different points of view.