## MATH 426 - Assignment 7

## June 18, 2008

## 1 mesh - surf, contour

Plot the function  $f(x, y) = x^2 - y^2$  over the domain  $[-2, 2] \times [-2, 2]$  using surf and mesh; also make a contour plot of f(x, y). Organize your results in one figure using subplot (three rows with one column).

Submit the code producing the plots and a print-out of your results.

## 2 Parametric Surfaces

In this problem we will see how to plot a parametric surface (x, y, z) = (x(u, v), y(u, v), z(u, v)), in Matlab. The following example illustrates the idea. Let  $(x, y, z) = (\cos(u), \sin(u), v)$  where  $0 \le u \le 2\pi, -2 \le b \le 2$ . To plot the resulting surface (a cylinder - Figure 1) we can use the following code.

```
u = 0 : 2*pi/64 : 2*pi;
v = -2 : 4/64 : 2;
[U, V] = meshgrid(u, v);
surf(cos(U), sin(U), V);
```



Figure 1: Plotting Parameterized Surfaces

Using the above example as a guide plot the surface parameterized by

$$(x(u, v), y(u, v), z(u, v)) = (\cos(u)\cos(v), \sin(u)\sin(v), \sin(v)),$$

where,  $0 \le u, v \le 2\pi$ .

In addition, experiment with shading and colormap; also try the commands camlight and observe its effect (try also rotating the plot to see the surface from different angles).

Submit the code producing the plot and a print-out of the plot.