Matlab 3– due Friday, April 29, 2005

Math 241H

You are encouraged to work on these problems in groups of two or three. Each group should turn in only one copy of the assignment, but put all your names on the assignment you turn in. Your assignment should include a printout of your Matlab session (i.e., the Matlab commands you gave and the Matlab's responses) as well as your graphic output.

Now is a good time to review our optimization techniques, in preparation for the final exam. We will do this by using Matlab to do some optimization problems.

Problem 1. [5 points] Use Matlab to find and classify all critical points of the function

$$f(x, y) = x^4 - y^3 + 2x^2y + y.$$

Your final answer should be a list of all critical points (x, y) for which x and y are real numbers classified as relative maximum, relative minimum, or saddlepoint, or none of the above. If you can't get the table to print out, at least make sure you have Matlab compute the critical points, and the quantities D and f_{xx} for each critical point. You can summarize the rest by hand.

Problem 2. [5 points] Use Matlab to find the maximum and minimum of $(x - 1)^2 + y^2 + y(z + 1)^2$ subject to the constraint $xy + z^2 = 1$. Your final answer should give the absolute maximum and minimum values and the points at which they occur. Again, if you can't get the table to print out right, don't worry about it as long as you have Matlab display the relevant data to get the solution (see handout), and then summarize the rest by hand.