

Math 495R Homework 9

- (1) It has often been said that a picture is worth 1,000 words. Using Python make a mesh plot to help you visualize the following functions:

(a) $f(x, y) = \frac{x^2 - y^2}{x^2 + y^2}$

(b) $f(x, y) = xy^2 - x^3$ (monkey saddle)

(c) $f(x, y) = \frac{2x^2 + 3xy + 4y^2}{3x^2 + 5y^2}$

- (2) Repeat exercise 1, but this time make contour plots of the functions.
- (3) Python can also take partial derivatives using sympy. Search the documentation for how to do this and take partial derivatives for x and y for each of the equations in problem 1.
- (4) Consider project Euler problem 262. Using any tools that you have learned so far, return the value f_{\min} . You don't have to figure out the minimum path length.