Homework 12

The only thing you need to turn in for this assignment (by 5 PM Thursday, Dec 12) is an email with a paragraph describing the topic of your paper for next semester. Try to give some specific details: among other things, you should tell me at least one source you intend to follow and why you've choosen your particular topic.

The remaining problems are just to give some more practice with Lagrange multipliers.

Problem 1. Hubbard and Hubbard: 3.7.4, 3.7.5.

Problem 2. Find the minimum and maximum values of $x + yz$ on $\overline{B_1(0,0,0)} \subset \mathbf{R}^3$.

Problem 3. Recall the figure 8 curve $C := \{(x,y) \in \mathbf{R}^2 : (x^2+y^2)^2 = (x^2-y^2)\}$ and let $a \geq 0$ be given. Use the method of Lagrange multipliers to find the points in C nearest and furthest from $(0,a)$. Redo the problem using the parametrization for C given in Jones prob 2-6. Do your answers agree? Do they make sense graphically (i.e. when you compare them with Mathematica pictures of C)?

Problem 4. Redo problem 2-4 in Jones using Lagrange multipliers. Note that we now have two definitions of tangent vector to a curve–one using defining functions and the other using parametrizations. You may assume that the definitions are equivalent.