Monday

Class 37:

The Microscope Approximation and Level Curves

The definition of a *linear* function of two variables is a natural extension of the definition of a linear function of one variable. It surface graph is a plane. A nonlinear function of two variables is *locally linear* at a point if the surface graph at that point appears more and more like a plane as you zoom in. This plane is called the *tangent plane* at that point, and is analogous to the tangent line for a function of one variable. The approximation to the surface graph given by the tangent plane leads to the *Microscope Approximation* for functions of two variables.

One application of the Microscope Approximation for a function of two variables is to find *level curves* for the function. These are the sorts of curves you see on a topographic map, and correspond to *horizontal slices* through the surface graph of the function. A collection of level curves for a function is called a *contour plot* for the function.

Preparing for Class 38

Reading: Read *CiC* pp.474-480, pp.483-488.

Homework Preparing for Class 37 Due.

Recommended: *CiC* pp.492-499: #6, 8, 34, 45, 46, 58.

Wednesday

Class 38:

Optimizing Functions of Two Variables

A critical point for a function of two variables is a point where both of its first partial derivatives have the value zero. Critical points are *candidates* for local minima or maxima. However, not every critical point is a local maximum or minimum. A contour plot centered at a critical point can help you classify the point as a *local maximum*, a *local minimum*, or a *saddle point*. Contour plots can also help you solve optimization problems involving *constraints*.

Take-Home Quiz on Partial Derivatives Handed Out.

Preparing for Class 39

Reading: Read *CiC* pp.501-506, pp.510-514.

Recommended: Problems to be handed out.

Friday

Class 39:

Reviewing for the Final Exam

Take-Home Quiz Due at the Start of Class.